

Welcome letter from the Organizing and Scientific Committee

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Dear colleagues and participants,

Welcome to this special supplement dedicated to compiling the abstracts of the communications and lectures of the FINUT 2020 Conference. The supplement accounts for 339 abstracts for oral and poster communications from 18 countries. It also comprises the abstracts of more than 80 selected guest speakers participating in the scientific symposia and special lectures.

The main objective of the FINUT Conference, which will be held every two years, is to create a space for exchange and discussion of ideas regarding the main challenges of Food and Nutrition in Iberoamerica, to provide solutions aimed at improving the health of the populations of the region, where all the stakeholders, both public and private, are present and can share their thoughts. In addition, the Conference seeks to open a place for contrasted science shared by the Iberoamerican region, a necessary space to open opportunities and to display the research work done in Food and Nutrition, especially that from Latin American countries.

The scientific program of the Conference includes 32 parallel symposia, 4 meetings with the experts and 10 special lectures. In this first edition the Conference focused on 4 topics:

- Challenges of nutrition and public health in Iberoamerica.
- Nutrition in the prevention and treatment of chronic diseases.
- Safe, healthy, and sustainable foods.
- Challenges for an effective and efficient public-private partnership in food and nutrition.

The Conference is organized by the Iberoamerican Nutrition Foundation (FINUT), a nonprofit organization founded in 2011 by the International Union of Nutritional Sciences (IUNS), the Latin American Society of Nutrition (SLAN), and the Spanish Nutrition Society (SEÑ) to promote knowledge, research, development and innovation of Nutrition and Food in Iberoamerica. The FINUT programs are aimed at training professionals and researchers interested in these areas and building partnerships with governments, universities, research centers and other organizations.

Although we are living moments full of uncertainty, the FINUT 2020 virtual Conference organizers would like to thank all our speakers, attendees, and collaborators for their effort to share the scientific advances in the fields of nutrition and food sciences. The organization acknowledges and congratulates all the FINUT 2020 participants and members of the committees for their ability to adapt to new communication needs and hope that in the next edition of the Conference we can give you all the very personal thanks for moving forward

and for continuing the valuable work of providing the world with true and scientifically verified research, so essential in these times.

¡We are looking forward to seeing you at the FINUT 2022 Conference!

Very truly yours,

Prof. Luis Moreno

President of the Organizing Committee

Prof. Benjamín Caballero

President of the Scientific Committee

Prof. Angel Gil

President of the Ibero-American Nutrition Foundation (FINUT)

Dr. María José Soto-Méndez

Executive Secretariat of the Conference

Organizer



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CT3

NON-IgE-MEDIATED COW'S MILK PROTEIN ALLERGY. CONSENSUS DOCUMENT OF THE SPANISH PEDIATRIC SOCIETY

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Cow's milk protein allergy (CMPA) is an adverse reaction to food, in which an immune mechanism is demonstrated or suspected. It is the most frequent food allergy in childhood (2-3% children under 3 years old). It is characterized by an abnormal clinical response after ingestion, inhalation or contact with cow's milk proteins (CMP). It can be mediated by IgE, not mediated by IgE or mixed.

For its diagnosis, a detailed medical history, physical examination and exclusion-provocation test are required, the latter mandatory for the diagnosis of certainty. Symptomatology of late onset is predominantly digestive, including proctocolitis, enteropathy and CMP-induced enteropathy (FPIES).

Sometimes it can simulate frequent gastrointestinal disorders such as gastroesophageal reflux (GERD), infant colic and constipation. If CMPA is suspected, the CMP will be removed from the diet until clinical normalization, and should not be prolonged for more than 6 weeks without diagnostic confirmation by provocation. It would only be avoided if the risk of reproducing it was high. Its interpretation in doubtful cases requires observation for at least 4 weeks.

The treatment consists in the exclusion of CMP from the diet at least 6 months after its diagnosis. In children with exclusive breastfeeding, exclusion will be made in the maternal diet. In infants with an adapted formula, the treatment of choice is the widely hydrolyzed formulas (HF). If there is an affectation of the nutritional status, it will be assessed to use HF enriched in medium chain triglycerides. In children who reject it, do not tolerate it or in vegetarian families, formulas based on hydrolyzed rice are effective and safe. Soy formulas are not recommended in children under 6 months. In the case of severe enteropathy, FPIES or as an alternative to the lack of response to treatment with HF, elementary formulas are the first therapeutic option. The assessment of the persistence of the CMPA requires the tolerance acquisition test, which implies controlled reintroduction under medical supervision of CMP.

Exclusive breastfeeding during the first 6 months is the best food.

¹Espín B, Díaz JJ, Blesa LC, Claver A, Hernández A, García JJ et al. Alergia a las proteínas de la leche de vaca no mediada por IgE: Documento de Consenso de la Sociedad Española de Gastroenterología, Hepatología y Nutrición Pediátrica (SEGHN), la Asociación Española de Pediatría

Extrahospitalaria y Atención Primaria (SEPEAP) y la Sociedad Española de Inmunología Clínica, Alergología y Asma Pediátrica (SEICAP). *An Pediatr (Barc)* 2019; 90(3):193.e1-193.e11. doi: <https://doi.org/10.1016/j.anpedi.2018.11.007>

Conflict of interest: Has participated in teaching activities, symposiums and as advisory board laboratories dedicated to infant feeding.

Keywords: Cow's milk protein allergy; Non-IgE-mediated cow's milk allergy, Food allergy, Food protein induced enterocolitis syndrome,

CT4

DIET EARLY IN LIFE AND OBESITY DURING CHILDHOOD

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Obesity develops early in life and it is considered one of the most critical public health issues worldwide. Adding to genetic predisposition, the presence of lifestyle risk factors determines its development during childhood and adolescence. Early dietary intake is considered one of the most important lifestyles related with obesity. During early periods of life, starting at conception and until the end of the second year, there are a large number of factors that could influence the development of obesity later in life. Before or during pregnancy: pre-pregnancy maternal body mass index (BMI), gestational weight gain, gestational diabetes, maternal malnutrition, maternal smoking, alcohol consumption, free sugars intake, low polyunsaturated fat (omega 3) intake, low physical activity levels, antibiotics consumption. At birth or at early infancy: high or low body weight at birth, lack of breast feeding, consumption of high protein content infant formulas, rapid infant weight gain, high protein, fat or free sugars intake during infancy, early introduction of complementary feeding and short sleep duration. Interventions consisting on promoting a healthy dietary pattern during pregnancy alone and associated with physical activity are effective to reduce body weight gain. High protein intake during the first months of life is also related to obesity development. Free sugars intake could also be related with obesity in children. Interventions trying to prevent obesity should start as early as possible as the possibility to positively influence the early programming of the condition is high during this period.

Conflict of Interest: None in relation with this abstract.

Keywords: Nutritional programming / diet / breastfeeding / protein intake / complementary feeding

CT5 HEALTHY AND SUSTAINABLE DIET

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Our Food System feeds 7.7 billion people and has contributed to the reduction of extreme poverty, hunger and malnutrition in the world. However, the increased intake of unhealthy diets has created a pandemic of obesity and chronic diseases, and is contributing to the degradation of the planet, becoming one of the main threats to human health and the environment in the 21st century. Agriculture uses almost 40% of the global land area, is responsible for 29% of greenhouse gas emissions, and uses 70% of the planet's clean water. The use of land for agriculture is leading to the mass extinction of species, and the excessive use of nitrogen and phosphorus causes eutrophication and dead zones in lakes and coasts.

The diet proposed by the EAT-Lancet Commission is a healthy and sustainable diet composed mainly of plant-based foods and small amounts of animal-based foods. Animal-based food, mainly red meat, is the food group with the highest emission of greenhouse gases, the highest use of land and energy, and with the greatest potential for acidification and eutrophication compared to other food groups. Globally, the transformation to a sustainable diet involves doubling the intake of healthy foods of plant origin and a reduction of more than 50% in the intake of red meat and added sugars. However, recommendations must be adapted to the context of each region. Mexico requires a substantial increase in the intake of vegetables, fruits, legumes, whole grains, nuts and seeds; a substantial reduction in the intake of added sugars, refined cereals, processed meat and red meat (except for the indigenous population); and a higher intake of dairy products in indigenous regions and lower intake in urban areas.

Strategies for achieving a sustainable food system able to feed close to 10 billion people by 2050 should include the adoption of a healthy and sustainable diet, reducing food loss and waste (currently about a third of all food produced is lost or wasted at all stages along the food supply-chain), and the development of innovative technology for sustainable food production.

Conflict of Interest: None.

Keywords: food system/ sustainability/ healthy and sustainable diet

CT8 CHILDHOOD OBESITY PREVENTION, AN OPPORTUNITY IN THE POST COVID-19 STAGE

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The SARS-CoV-2 pandemic has caused a crisis in health systems around the world, and has exposed the physical and mental vulnerability of populations. It has been observed that

people with a BMI >25 kg/m² increase the risk of mortality for COVID-19 by more than three times, and nutritional deficiencies in early life are known to be associated with higher prevalence of chronic diseases in adulthood. The aim was to develop a proposal for the prevention of childhood obesity and malnutrition in all its forms for the post COVID-19 stage.

The ecosocial model might be more appropriate and relevant to the approach of childhood obesity prevention in the post-COVID-19 stage (1), since substantial changes are required in the policies that govern the economic, health and educational systems in their various fields (2), in addition to being accompanied by new legal frameworks, resulting in the allocation of resources to impact the community and social, beyond the clinical-biological approach to nutrition. Interventions should be based on a multi-component approach, integrating not only food strategies, education for nutritional health and physical activity, but also considering the environment as a whole, such as sustainable urban and educational development (3). In the post-COVID-19 stage, constant innovations in health will be required, for example, in the development of relevant educational models that are culturally respectful of children's development (4); which in general favour health self-care behaviours and attitudes, considering awareness actions that directly involve the carers in order to impact on their children's nutritional status (5, 6). For all of the above, it is necessary a true scheme of legislation and evaluation free of conflicts of interest (7).

In the post COVID-19 stage, a restructuring of policies and schemes of approach is required, as well as a new understanding of strategies to combat child overweight and obesity, considering environmental, developmental, and parental and social care factors in childhood.

Conflict of Interest: I declare no conflicts of interest.

Keywords: childhood obesity/ prevention/ malnutrition/ COVID-19

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CT 9 MATERNAL OBESITY AND EFFECT ON PLACENTAL NUTRIENT TRANSFER

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Maternal lifestyle during pregnancy and early nutrition and environment of their offspring's are considered relevant factors for childhood obesity preventative efforts. Maternal pre-pregnancy BMI and gestational weight gain are both positively and independently associated with neonatal and infant adiposity. Early and mid-pregnancy gestational weight

gain, which primarily represents increased maternal fat rather than the weight of the fetus, may be causally linked to offspring adiposity through the increased availability of maternal fuels. Normal and overweight women may be more physiologically sensitive to the effects of high gestational weight gain than those with obesity. Recent studies reported that pre-pregnancy BMI was inversely associated with polyunsaturated fatty acids, docosahexaenoic acid (22:6 omega 3, DHA) and omega-6 fatty acids in venous cord blood. Maternal obesity increases placental size but not placental efficiency. Some studies highlight the convenience of DHA supplementation in pregnancies with obesity or diabetes to avoid DHA depletion in the fetus. Similarly, gestational diabetes has been associated with lower proportion of arachidonic acid (20:4 omega-6) and DHA in umbilical vein plasma but not in maternal plasma. Disturbances on placental fatty acid transport using stable isotope labelled FA in these pregnancies and altered FA transport protein expression in placental tissue of obese and GDM women have been confirmed, which could explain these effects. The role of the maternal insulin on the transfer of nutrients from the mother to the fetus may affect also to the nutrient placental transport not only of glucose but also of lipids and aminoacids. Better knowledge on placental nutrient transport in maternal obesity is highlighted to design proper maternal supplementation.

protein, unsaturated fatty acids, fiber, vitamins (vitamins E and B6, folic acid, and niacin), minerals (magnesium, potassium, and copper), phytosterols (stigmasterol, campesterol, and sitosterol), and polyphenols (catechins, resveratrol, etc.). Evidence from a growing database of clinical studies indicates that part of the cardioprotective effect of nuts is their favorable effects on plasma lipids and lipoproteins due to their fatty acid composition when they replace dietary saturated fatty acids/or carbohydrate. Hence, the incorporation of edible nuts, around 30 to 50 g/d, in the typical diet would be advisable to ensure various health benefits without the risk of body weight gain. Thus, the investigations about the effect of nuts on cardiometabolic risk, energy metabolism, inflammation, oxidative stress, genetic markers, chronobiological aspects, and intestinal permeability, appears promising and little explored.

Conflict of Interest: None declared

Keywords: cardiovascular diseases / nuts / lipid profile / oxidative stress / unsaturated fat / functional properties / body weight

CT10

CONSUMPTION OF NUTS AND THEIR CARDIOPROTECTIVE EFFECTS

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Healthy eating habits remain one of the pillars of the prevention of cardiovascular diseases. For many years, diets targeting plasma lipids were the main forms of nutritional intervention. However, the consumption of some specific foods and nutrients, as well as, dietary patterns are also associated with cardioprotective effect. In recent decades, several epidemiological studies have shown that nuts consumption is associated with several health benefits, such as antioxidant, hypocholesterolemic, cardioprotective, anticancer, anti-inflammatory, and antidiabetic benefits, among other functional properties. Also, nuts can modulate lipid profile, glycemic control, blood pressure, appetite, which are essential markers for coronary heart disease risk. Some nutrients from nuts as phytosterols, fiber, monounsaturated fatty acids, and polyunsaturated fatty acids contribute to their healthy effect. Various types of nuts such as almonds, Brazil nuts, hazelnuts, macadamia nuts, peanuts, pecans, pine nuts, pistachios, walnuts, and cashews are commonly consumed by human beings, although individual intake varies remarkably. Several well-controlled clinical studies and studies conducted with free-living subjects consuming self-selected diets have also demonstrated beneficial effects of nut consumption on plasma lipids and lipoproteins. For this reason, the American Heart Association has recommended nut consumption since 2000. In general, nuts are energy dense and provide 23.4 to 26.8 kJ/g of food with a high-fat content (45–75% of weight), but mostly unsaturated fat. Nuts are also rich sources of

Symposium Sessions Presentations

S04.2

NUTRITIONAL GENOMIC IN THE NON-COMMUNICABLE CHRONIC DISEASE: BASIC SCIENCE FOR PERSONALIZED NUTRITION

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Nutrition in the prevention and treatment of chronic diseases

Non-communicable diseases (NCDs) are considered a global emergency responsible for over 70% of deaths worldwide. NCDs are also the basis for complex and multifactorial diseases such as hypertension, cardiovascular diseases, mellitus diabetes, cáncer, neurodegenerative disorders and obesity. In the last years, the Omic sciences (genomic, transcriptomics, proteomics, metabolomics) are promoting to understand the molecular basis of NCDs. Likewise, recent developments in genetic sequencing techniques have allowed precision medicine to become a model for disease prevention, diagnosis, and treatment based on the patient's genotype in many human genetic diseases. The integration of the human genome project with nutritional, genetic research, and health outcomes studies has led to the emergence of nutritional genomic; this has different areas: Nutrigenetics, Nutrigenomics, Nutriepigenetics. Therefore, subjects are different in their requirements for and responses to nutrients and bioactive molecules in the diet. Many factors contribute to metabolic heterogeneity (genetic variations, epigenetics, microbiome, lifestyle, diet intake, and environmental exposure). The hope is that we will be able to subcategorize people into ever-smaller groups that can be targeted in terms of recommendations, but we will never achieve this at the individual level, thus, the choice of precision nutrition rather than personalized nutrition to designate this new field.

In conclusión, the knowledge from diet-gene interactions will enable more effective and specific interventions for NCDs prevention based on precision nutrition.

Conflict of Interest: No conflicts of interest

Keywords: Non-communicable chronic diseases/ Nutrigenetics /Nutrigenomics / Nutriepigenetics / Precision nutrition

S04.3

TRANSLATION OF BASIC KNOWLEDGE IN NUTRITION OF NONCOMMUNICABLE DISEASES TO CLINICAL RESEARCH: OPPORTUNITY FOR PRECISION NUTRITION

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Nutrition in the prevention and treatment of chronic diseases

The increase in basic knowledge in the area of nutrition through omic sciences and areas of neurosciences, molecular biology, biochemistry, sociology, anthropology, education, etc., are revolutionizing the nourishment treatments for people with noncommunicable diseases (NCDs).

Until a few years ago the set up of nutritional treatment in humans were based on caloric restriction. Today the what, how and when to eat is considered, and therefore is driven to change eating behaviors that sustained over time can impact on human nutrition. However, we are indebted to society because despite the advances in science, the population continues to suffer the consequences of malnutrition.

These are times of transdisciplinary collaboration, because we have to look beyond our area of expertise, and translational work that guarantees the transfer of knowledge, because food and human nutrition are in crisis.

On the one hand we are living a historical moment where there is high scientific evidence that adherence to various food patterns (vegetarian and non-vegetarian) can improve metabolic indicators of patients with NCDs. However, some aspects of such patterns are contrasting and it is confusing to determine which one is best for treating NCDs. In addition, the consequences of environmental changes that affect the quality of food (reducing its content in vitamins, minerals and antioxidants) and at the same time the production of food, products and supplements that increase ecological damage, become more chaotic the answers to the questions about what to eat and what foods or products or supplements restore or maintain health.

The generation and application of science in team is a way to generate, implement and improve nutritional strategies with greater precision and in a more holistic way that allows the use of resources (human, environmental, financial, etc.) in a more efficient towards precision nutrition.

Conflict of Interest: No conflict of interest.

Keywords: translational nutrition, noncommunicable diseases, precision nutrition

S04.4 ENTREPRENEURSHIP AND FOOD GUIDES BASED ON PERSONALIZED EVIDENCE FOR NCDS: THE GREAT CHALLENGE

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Nutrition in the prevention and treatment of chronic diseases

Innovation and entrepreneurship are key in the advancement of concepts and in the generation of opportunities to solve problems, especially if they start from the needs of the users themselves. That is why, in translational nutrition, it is also necessary to listen to people who, day by day, live with chronic degenerative diseases and who, throughout their day, must deal with the need to eat healthy, to improve their nutritional status and their health.

The user-innovator is a person who, due to the need he has, and with a new perspective on the issue that afflicts him, proposes an innovation or a paradigm shift, for example, in the care or follow-up of a disease.

Food guides are general proposals for the population; however, they are not prepared, explicitly, to be a starting point for those with an NCD.

Hence, it will be necessary to generate a collaborative work between patients and health personnel, as well as people with other profiles, to find new proposals for personalized food recommendations, new foods, preparations, which help to clearly facilitate the well-being of patients.

However, the information we have is still insufficient to define in a concise and direct way what the best practices are. Certainly, global and personal contexts, production systems, family and social reality, personal background, are elements that have a role in people's activities and decision making, for food selection.

We will analyze these aspects and propose lines of work to continue advancing along the path of personalized food guides for NCDs, based on innovation and entrepreneurship.

Conflict of Interest: None.

Keywords: innovation, translational nutrition, no transmissible diseases, personalized nutrition, entrepreneurship.

S05.4 HEALTHY FOOD IN THE ELDERLY ADULT?

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Safe, healthful and sustainable food

Chilean older adults (AM) have serious problems of malnutrition due to the poor quality of their diet. The Chilean AM population has a high risk of malnutrition due to: (i) deficit (insufficient intake of micronutrients, which implies production of ulcers, falls, anemias, cognitive deficits and recurrent infections) and (ii) excess (due to ingesting more calories than actually necessary, which induce hyperglycemia, hyperlipidemia, hyperinsulinemia, diabetes and obesity). In this presentation we will show results of interventions in the elderly population of different municipalities in the metropolitan region, Santiago, Chile. Most of them attached to the Supplementary Feeding Program for the Elderly (PACAM). The nutritional status of the study population showed 37.7% of overweight and obesity, 47.6% of normal and 14.7% with malnutrition. We will show what they consume as food? We will answer the question if the consumption of food delivered by PACAM affects the status of micronutrients and vitamins and finally we will show the percentage of deficits of micronutrients and vitamins in this population.

Conflict of Interest: No conflict of interest.

Keywords: Senior Adult / Food / Health

S07.2 IMPACT OF LATIN AMERICAN NUTRITION RESEARCH ON PUBLIC POLICY

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Challenges of nutrition and public health in Ibero-America

Introduction and objective: Malnutrition has historically been researched and addressed from two distinct perspectives: undernutrition, food insecurity, and micronutrient deficiencies on one hand and overweight, obesity, and dietary excess on the other.

Methods: Nevertheless, because of rapid global nutrition transition, an increasing proportion of individuals are exposed to different forms of malnutrition during the life cycle and are directly affected by the double burden of malnutrition (DBM).

Results: Long-lasting effects of malnutrition in early life can be attributed to interconnected biological pathways that involve imbalances of the gut microbiome, inflammation, metabolic dysregulation, and impaired insulin signaling. Recent studies show that 5.9% of children <5 years are overweight globally while at the same time, 21.9% are stunted and only 41.2% of infants < 6 months of age receive exclusive breastfeeding. At the same time, 32.8% of mothers of reproductive age are anemic, while 9% of men and 7.9% of women are diabetic and 15% of women and 11% of men, respectively, are obese.

Conclusions: Mitigation of the DBM will require major societal shifts regarding nutrition and public health, in order that comprehensive change can be implemented over decades to include the entire global food system. But it is also necessary to strengthen local capacities in the design of localized strategies and programs, including populations in decision making regarding program implementation. In this

context, the identification of partners and technical assistance can contribute to the implementation of effective and sustainable intervention strategies. There are a variety of experiences of this kind, which have in different countries achieved positive results; these represent the basis for other successful programs that can ensure sustainable food production as well as availability and access to healthy foods.

Keywords: Policies, strategies, programs, double burden, food consumption

S07.4 THE SYNDOMIC OF MALNUTRITION AND GLOBAL CHANGE

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Challenges of nutrition and public health in Ibero-America

Syndemic is the occurrence of two or more epidemics that act synergistically, enhancing their effects and sharing common factors. This term, used by Swinburn B et al. in a Lancet publication that describes three major pandemics that are wreaking the health of the population and the sustainability of our planet: undernutrition, obesity, and global warming. Our global Food System is supporting 7.8 billion inhabitants of our planet, but it has not been able to prevent undernutrition and hunger, is contributing to an epidemic of obesity and deteriorating our planet. Malnutrition is caused, in part, by the profound inequity in the distribution of food in the world population. The epidemic of obesity and chronic diseases is due in part to the transition towards an unhealthy diet, rich in ultra-processed food, with high energy density and high amounts of added sugar, fats, and refined carbohydrates and low in fiber, as well as an excessive intake of animal source food, particularly meat and dairy products in a growing proportion of the population and by the high consumption of refined cereals and the low consumption of whole grain cereals and other products of plant origin such as vegetables, fruits, legumes and nuts. Finally, agriculture causes almost 30% of global greenhouse gas emissions, contributing to global warming. To the three pandemics identified by Swinburn B et al, the deterioration of other aspects of planetary health, in addition to climate, should be added: excessive use of water, eutrophication of lakes and seas due to abuse of nitrogen and phosphorus and reduction of biodiversity as a result of agricultural expansion. In addition, the covid19 pandemic must be included as part of the global syndemic. On the one hand, it has been estimated that covid19 will increase child malnutrition and hunger, on the other hand, obesity and chronic diseases increase the risk of severity and death by covid19. We must move towards a healthy, sustainable food system that generate equity.

Conflict of Interest: There are no conflicts of interest.

Keywords: Malnutrition / obesity / climate change

S08.1 SUPPLEMENTATION DURING PREGNANCY, A PARTNERSHIP AMONG ACADEMIA, INDUSTRY, AND THE GOVERNMENT

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Challenges of nutrition and public health in Ibero-America

Introduction: Iron deficiency anemia is a global public health problem. In Colombia interventions have been undertaken to diminish it, however, the desired effects have not been achieved. In 1999 it was identified that one of the causes of low program impact was that women were not adhering to iron supplement intake recommendations (ferrous sulfate) due to undesired side effects of the supplements.

Objective: Develop a well-tolerated product for women to take daily to achieve desired essential nutrient intake levels for the prevention of iron deficiency anemia.

Methods: As a result of the studies carried out by the research group, and considering WHO recommendations, the following formulation was proposed: 60mg ferrous fumarate, 400mcg folic acid, and 70mg vitamin C – the vitamin C for the increased absorption of the iron. A partnership was established with Laproff Laboratories for production of the supplement and meetings were attended by governmental entities to enable the purchase of the supplement at reduced prices, free distribution to pregnant women, and the education of health personnel regarding adequate dietary and supplementation practices.

Results: the supplement was tested for tolerance and women took it with increased frequency over previous iron supplements. It was found to be effective in preserving iron deposits and in the prevention and treatment of iron deficiency anemia. Various institutions in Colombia have acquired the supplement at a low price and are distributing the supplement for free to pregnant women.

Conclusions: the partnership among academia, industry and governmental organizations resulted in an effective treatment for iron deficiency anemia in pregnant women. However, it is necessary to keep in mind that the partnership must follow all ethical procedures and that all nutrition interventions must be accompanied by practical and easy to understand education for recipients and health personnel. For sustainability, the programs must have in permanent procedures in place and the participation of health personnel working in prenatal care. It can be difficult to achieve trust among the three entities in the partnership, but it is possible if the focus is on correcting problems and not on specific interests of each member.

Conflict of interest: The author has worked with Laproff Laboratories and the government, and has been compensated monetarily by both for her work.

Keywords: anemia, iron deficiency, pregnancy, academia, industry, government

S08.2

INTERVENTIONS FOR PREGNANT ADOLESCENTS BASED ON SCIENTIFIC EVIDENCE; FROM CONCEPT TO ACTION IN NUTRITION AND DIET

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Challenges of nutrition and public health in Ibero-America

Introduction: A study in pregnant adolescents in the public network of Medellín, Colombia, found that in the third trimester of pregnancy, 50% of participants were at risk of stunting or growth delay, and 33% had low BMI, all of which are associated with babies born small for gestational age.

Objective: Develop contextualized strategies for nutritional care and education that contribute to the empowerment of adolescent pregnant girls facing motherhood.

Methods: Based on qualitative research, an educational program was developed consisting of four sessions and seven materials on food and nutrition, which were designed and validated with the adolescent participants of the program. For the development of the intervention, the concept of Maternal Constellation was introduced; understood as a mother's priority of being close to her newborn at birth.

Results: The educational process contributed to empowering the pregnant girls to care for their newborns and consider maternal constellation. The educational materials based on the needs of pregnant adolescents and adapted and evaluated with the girls themselves ensured that the program was established in the health institution in which the intervention was carried out, and that it served as model for other institutions. The validation of the materials helped identify elements that did not fit the daily life of the pregnant girls and allowed adapting the teaching materials, to achieve the structuring of optimal materials coupled to the needs and characteristics of the pregnant participants.

Conclusions: working from the perspective of maternal constellation allowed the adolescents to reflect in turn on the diet and nutrition of their newborns. Achieving changes in diet and nutrition requires that the planning and evaluation processes include the participation of the beneficiaries, in this case the pregnant adolescents.

Conflict of Interest: the author declares no conflict of interest.

Keywords: health education, health counseling, teenage pregnancy, pregnancy

S08.3

SIGNIFICANT EXPERIENCES TO PROMOTE, PROTECT, AND SUPPORT THE CULTURE OF BREASTFEEDING

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Challenges of nutrition and public health in Ibero-America

Introduction: Health education during pregnancy has to date been directed at women with little inclusion of their families, and with a medical focus centered on disease. Additionally, currently employed methodologies limit significant findings. In Colombia, the rate of exclusive breastfeeding has been decreasing since 2005 through the current National Nutrition Survey of 2015 (46.9% to 36.1%). An interdisciplinary team from the University of Antioquia designed a comprehensive educational project within the framework of the development of solutions in science, technology and innovation for Telehealth, aimed at pregnant families in the state of Antioquia (Colombia).

Objective: Support communities to help strengthen their capacity, and contribute to building healthy families of pregnant women.

Methods: Using participative and interdisciplinary methods, the contents of the Pregnant Family strategy were defined, and then organized using interactive multimedia (<http://www.atulado.co/>). Themes are recreated with videos, games, readings, and other activities that allow for interaction, critical thinking, decision-making, and self-care. A story is told about a couple experiencing an unintended pregnancy, including an e-book for families and caregivers, as well as a booklet outlining what to expect at pre-natal visits.

Results: This educational strategy focusing on families was implemented in 24 municipalities throughout the state, working with educators, health professionals, and pregnant families.

Conclusions: The social support of pregnant families through comprehensive educational programs must recognize and adapt to the context in which these families live. The educational focus that recognizes women's rights and fosters the development of their abilities allows the appropriation of knowledge and useful experiences to achieve significant learning. The management of educational digital platforms requires appropriate technological developments in communities and increased digital literacy.

Conflict of Interest: the authors declare no conflicts of interest.

Keywords: health education/ telemedicine/ pregnancy/ breastfeeding

S08.4 MY FIRST FOODS WORKSHOP: COMPLEMENTARY FEEDING INSTRUCTION FOR PARENTS AND HEALTH PERSONNEL

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Challenges of nutrition and public health in Ibero-America

Background: The complementary feeding period, from six to 12 months of age, is considered a critical period of growth, during which inadequate diet and nutrition can contribute to malnutrition, obesity and other illnesses in the short, medium, and long terms. According to WHO data, few children receive adequate and nutritionally sound complementary foods; less than 25% of children 6-23 months meet the criteria for dietary diversity and frequency of appropriate foods for their age.

This process generates doubt and anxiety in the nuclear family, and as such health personnel are called to orient and provide tools to families for successful transitional feeding during this period. Health personnel can help families comply with international complementary feeding guidelines in practical ways such that it is less difficult for parents and caretakers to provide appropriate foods using successful feeding practices. WHO studies reveal that caretakers need specialized support to adequately feed children who are breastfed.

Objective: Orient parents, caretakers, and health personnel to the correct forms of feeding children 6-23 months of age. Provide practical tools on how to properly prepare complementary foods and to learn feeding tips and cues such that children 6-23 months of age receive adequate foods and feeding.

Methods: Interactive, in-person or virtual workshop that uses videos and/or in-person interactions and synchronous learning; interactive games using the Moodle platform; development of infographics and educational materials; and hands-on practice in the preparation of recipes appropriate for the various complementary feeding age groups.

Results: The workshop has been undertaken in three versions – the first was held in-person and the second and third were held virtually using the Moodle platform. All were aimed at health personnel, nutritionists and dietitians, and parents. In the three versions, participants gave excellent post-workshop evaluations and it was well accepted by all participants.

Funding: University of Antioquia – School of Nutrition and Dietetics

Conflict of Interest: The authors declare no conflicts of interest

Keywords: complementary feeding, workshop, interactive activities, nutrition

S09.1 EARLY LIFE PROGRAMMING OF CHILDREN OBESITY

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Childhood obesity is a major public health problem. Several early-life risk factors have been identified in the literature, including maternal pre-pregnancy overweight/obesity, smoking during pregnancy, excess gestational weight gain, prematurity, high and low birth weight, not being breastfed and rapid early infant weight gain. Our research group has explored early-life risk factors of overweight/obesity at school age and their cumulative and longitudinal effects. We have also study particular vulnerability of those newborns with early poor nutritional outcome: premature infants, intrauterine growth retardation or feeding problems due to ineffective suction or swallowing as newborns with cleft lip and palate. Early undernutrition may predispose to excess/rapid weight gain and, due to this rapid growth catch up, later programming of trajectories to excess body weight. We have also investigated longitudinal associations between social vulnerabilities on overweight/obese later in life.

Our results: Among early life factors, rapid infant weight gain in term newborns and smoking during pregnancy are significant global predictors of overweight/obesity during childhood after adjusting for confounders. A higher number of early-life risk factors is associated with higher odds of being overweight/obese. Children with several social vulnerabilities are more likely to be overweight/ obese compared with children with no vulnerabilities. Small for gestational age newborns have less fat free mass but higher abdominal adiposity compared with their counterparts later in life. However, those newborns with cleft lip and palate or other postnatal nutritional risk that achieve appropriate postnatal catch up growth do not have a higher risk of later overweight.

Conclusions and final comments: Rapid infant weight gain is an important determinant of childhood obesity. However, in those infants with postnatal undernutrition, a good and optimal catch up growth, to recover normal weight following standard growth paths, is associated with good clinical outcome without increased risk of later overweight. Those with a higher number of early risk factors had elevated odds for obesity later in life suggesting cumulative effects. Early interventions should be developed targeting those children who accumulate more risk of being overweight/obese later in life.

Conflict of interest: no conflict of interest

Keywords: Overweight, early life factors, sociocultural, feeding, growth

S09.2

SEARCHING FOR SATIETY IN CHILDREN: ROLE OF MACRONUTRIENT COMPOSITION, EXERCISE AND ENVIRONMENT

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Nutrition in the prevention and treatment of chronic diseases

Overweight and obesity has become a substantial health concern in developed countries over the last several decades. The increasing prevalence of childhood obesity is particularly concerning, as obese children are at very high risk of becoming obese adults, and subsequently developing many obesity-related chronic diseases. Although environmental factors have been the overwhelming focus of research on the causative factors of obesity, physiological mechanisms of intake control in children are poorly understood. It remains unclear whether obesity develops in susceptible individuals because physiological mechanisms of food intake control are compromised first or if these are overridden by the environment and become compromised. To answer this question requires an identification of the primary determinants of excess energy intake. Are these determinants primarily physiological or environmental and to what extent do they interact? Research is needed that moves beyond cross-sectional, correlational studies to the use of experimental designs. There is an urgency to understand the key behavioral and physiological control mechanisms of food intake in children to ensure normal growth and development and to reverse the epidemic of childhood overweight/obesity.

This presentation will summarize our research examining the role of macronutrient composition, exercise intensity and duration, and screen-exposure at mealtime on food intake control in school-aged children. It is imperative that we elucidate the effects of macronutrients, screen-time environments, and physical activity that may foster or inhibit normal growth and development. Ultimately, this work has the potential to provide a physiological rationale to inform dietary, physical activity, and screen time guidelines for children and adolescents that may ultimately improve health and establish healthy habits during this important period of growth and development.

Keywords: food intake regulation, satiety, children, macronutrients, screen exposure, exercise

S09.3

USEFUL BIOMARKERS FOR THE EARLY DETECTION OF CARDIOMETABOLIC RISK IN CHILDREN WITH OBESITY

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Together with genetics, diet, physical activity, socioeconomic status, etc., excess weight remains as the main predictor of cardiometabolic risk, due, in part, to its association with inflammation, insulin resistance, oxidative stress and endothelial damage. It is known that the molecular alterations linking these processes are initiated early in life in children with obesity, leading to a higher risk of cardiovascular disease (CVD) later in life

Objectives: To review current knowledge on novel biomarkers useful in the early detection of cardiometabolic risk in children.

Methods: Journal articles and reviews were searched for in the public databases of PUBMED and SCOPUS, using the sentence: child* AND (biomarker OR Biomarker OR marker) AND (cardiometabolic OR cardiovascular OR "metabolic disease") AND (diagnose OR diagnostic OR prevention OR early OR detection) AND (obesity OR "excess weight" OR overweight).

Results: In addition to the glucose and lipid profile, blood pressure (BP) and anthropometry, concentrations of inflammatory and oxidative stress biomarkers (i.e. interleukin 6, myeloperoxidase, C-Reactive protein, monocyte chemoattractant protein 1, tumor necrosis factor α) and adipokines (i.e. leptin, adiponectin, visfatin, retinol-binding protein 4) in serum or plasma of children have been found useful in terms of their association with later CVD risk. Particularly, plasma myeloperoxidase appears as a promising potential biomarker of cardiometabolic risk in children independently of adiposity. Also, other molecules such as miRNAs have shown promising results in the prediction of cardiometabolic alterations.

Conclusions: Research on candidate biomarkers in longitudinal and intervention studies warrants promising results regarding the early detection of cardiometabolic risk in children with and without obesity.

Conflict of Interest: None.

Keywords: biomarker / cardiometabolic risk / childhood / obesity

S10.2

GENOMICS OF OBESITY

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Obesity is a leading cause of disease burden and disability, as well as a major public health concern worldwide. It is the fifth leading cause of death worldwide and affects more than 600 million people. Obesity is a highly prevalent condition and major risk factor for chronic medical disorders such as type 2 diabetes, cardiovascular disease and hypertension.

The first insights into the genetics of obesity came from candidate gene and linkage studies approaches, which were extremely successful in the identification of causal genes for the monogenic forms of obesity. But these approaches have not been fruitful for common polygenic obesity. Although, those candidate genes identified for monogenic obesity, have shed some light into the biological pathways of the disease.

Several genetic approaches have been used to investigate the genomic basis of common polygenic obesity, from linkage and candidate gene association studies to genome wide association studies (GWAS).

Candidate gene studies have achieved limited success. These studies have investigated genes involved in energy balance regulation, such as those encoding factors that regulate food intake and energy homeostasis, and genes involved in peripheral regulation of energy expenditure. *FTO* was the first gene to be robustly associated with common obesity, being involved in controlling food intake, energy homeostasis and energy expenditure.

Genome-wide linkage studies (GWLSs) have identified many genetic loci associated with obesity but most of them were not replicated. Only one region reported by linkage studies was strongly linked to obesity to date.

GWAS interrogates a large number of genetic markers (SNPs) spanning the entire genome in a non-hypothesis-driven approach for their associations with the phenotype of interest. This has been a suitable and very successful approach for examining the genomic basis of common conditions such as obesity. To date, the latest meta-analysis of GWAS of BMI, conducted in 700,000 individuals of European ancestry, has identified 941 genetic signals, 751 of which were novel.

The use of high-throughput Next-Generation Sequencing (NGS) technologies, such as exome genotyping arrays and deep sequencing of candidate loci identified from GWAS to study rare variants, have emerged as new methods to dissect the genetic architecture of common obesity.

Conflict of Interest: None.

Keywords: genomics / obesity / GWAS / NGS

S10.3

MICROBIAL POPULATION CHANGES AND THEIR RELATIONSHIP WITH OBESITY

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The obesity prevalence is increasing worldwide and currently represents a major health problem in both adults and children. The obesity etiology has been associated with diverse factors, such as dietary, environmental, educational, and genetic factors. However, these elements do not completely describe the global incremental rise in obesity, and microbiota have recently been shown to play a causative role in obesity, demonstrating the potential of the microbiota as a therapeutic target in obesity. An elevated abundance of *Firmicutes* and a decreased abundance of *Bacteroidetes* have been shown to correlate with overweight and obesity. Interestingly, *Bacteroidetes* are a better predictor of body mass index than *Firmicutes*. It has been recently defined that microbiota markers in adolescent and adult obese patients show different age-dependent traits. In particular, *Faecalibacterium prausnitzii* and *Actinomyces* have been assigned to the microbiota of obese adolescents, whereas *Bacteroides caccae*, *Barnesiellaceae*, *Parabacteroides*, *Rikenellaceae*, and *Oscillospira* have been assigned to the microbiota of adolescents with normal weights. *F. prausnitzii* participates in the fermentation of non-absorbed carbohydrates, and its abundance in the guts of obese adolescents may contribute to increased energy recovery, leading to a higher dietary energy intake that may, in turn, contribute to the lower success of weight-loss diets reported for individuals with a higher abundance of *F. prausnitzii*. The levels of short chain fatty acids have been shown to be higher in obese children, suggesting that gut dysbiosis and augmented intestinal fermentation must be considered to be among the factors involved in the etiology of infant obesity. Of the 287 active clinical trials annotated to date in ClinicalTrials.gov that consider the gut microbiota as a therapeutic target in obesity, 226 (78.7%) employ dietary supplements or modifications in the diets of individuals in their interventions, 77 (26.8%) propose the use of probiotics, prebiotics, 36 (12.5%) analyze the microbiota after bariatric surgery, 13 (4.5%) perform fecal transplantation interventions, and 46 (16%) are strictly observational analyses. Finally, personalized nutrition, the prebiotics and probiotics administration, fecal microbiota transplantation, dietary education, and physical activity constitute the primary approaches aimed at using the gut microbiota as a therapeutic target for obesity in children.

Conflict of Interest: The author declare no conflict of interest.

Keywords: microbiota / obesity / metagenomics / obesity-related diseases

S10.4

METABOLOMICS IN THE STUDY OF OBESITY: STATE OF THE ART AND PERSPECTIVES

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Nutrition in the prevention and treatment of chronic diseases

Obesity is a disorder characterized by a disproportionate increase in body weight in relation to height, mainly due to the accumulation of fat, and is considered a pandemic of the present century by many international health institutions. It is associated with several non-communicable chronic diseases, namely, metabolic syndrome, type 2 diabetes mellitus (T2DM), cardiovascular diseases (CVD), and cancer. The rise of new, highly sensitive technologies sounds useful in the new era of precision medicine. Metabolomics, a technology capable of detecting thousands of features on a single specimen, has shown to be a useful tool to investigate the metabolic status of organisms. Unlike the genome, which remains static, the metabolome is a reflection of genetic and environmental factors, including medications, contaminants, intestinal microbiota activity, and, notably, the diet. This is the reason why metabolomic profiles offer a level of description of biological systems that transcend genetic information and more accurately reflect the phenotype. For instance, metabolomics has proven reliable in evaluating the changes in metabolites due to being overweight or obese at the body fluid and cellular levels. In addition, it is possible to ascertain metabolic changes in metabolically unhealthy overweight and obese individuals when compared to metabolically healthy individuals. Recently, a systematic review revealed that metabolomics studies might provide a sound insight related to the metabolic signature of obesity, its progression and its complications. Continuity in this type of work is essential to progress not only in clinical outcomes but also in the development of databases, workflows, and the improvement in the identification of nutritionally relevant compounds, endogenous and exogenous.

Conflict of Interest: The author has none conflict of interest.

Keywords: Metabolomics/ Obesity

S11.2 THE SENSE OF TASTE: HOW TO EDUCATE AND MAINTAIN IT?

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Nutrition in the prevention and treatment of chronic diseases

There is no doubt that among the factors that influence what a person eats, the most important is "what they like". And that is because food, and therefore gastronomy, must be satisfactory, because people will eat healthy, supportive and sustainable whenever they enjoy it. And we must always bear in mind that sensory issues are not only based on knowledge, but also on experience. In short, learning to eat, globally through the senses, and at any age. A challenge, a necessity. In recent years, many health professionals (including dietitians) have focused on wellness and nutrition, often neglecting

pleasure and good taste. However, appealing to the senses plays an important role in ensuring that food is enjoyed and that the required nutrients are ingested in a balanced way.

The process of transforming food from the *field to the table* includes important aspects related to the sensory properties, acceptance and choice of the foods that form part of our diet. There is an interest in knowing how production methods affect the taste or texture of foods or ingredients, how these are modified by different cooking techniques, what is the brain's interpretation of the sensory signals that tell us about the palatability of a food or how we can manipulate and improve, through new culinary processing techniques. Finally, the process that leads to the acceptance of a food depends on its orosensory properties, but it is also determined by the context, in which previous experience with a certain food, the cultural profile/background, expectations in relation to food and its physiological state all play a role. The power of the senses, and the sensory capacities, manifest themselves as a valid and effective tool to achieve a healthy and satisfactory diet. Finally, the flavours of the different countries constitute a gastronomic and cultural heritage, which must be preserved and promoted, with the necessary adaptations for the 21st century.

Conflict of Interest: The author declares no conflict of interest.

Keywords: /Taste/Food choice/ Education/Gastronomy /Palatability

S11.3 FOOD, HEARING AND EYE HEALTH

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Nutrition in the prevention and treatment of chronic diseases

The connection between individual variation in sensory perception, food choice and intake, and eventually diet related diseases, provides a context for applied sensory research. Several studies have invested into understanding the physiological mechanisms that influence food choice [1, 2]. And, in this regard, our senses play a key role in the sensory effects on choice preferences. Obviously, a food will not be consumed if it does not have an appeal to the senses. How many times have we heard "*you eat with your eyes first*"?. Indeed, appearance and color (vision) are the most valued attributes when choosing a food. However, the sound (hearing) that a food produces when we ingest it, is a less valued attribute in sensorial analysis [3]. Several studies that aimed at answering this question indicate that it is more important than we think. What is more, food characteristic ratings (crispy) may be improved by increasing certain sounds produced during consumption [4] and visual cues may alter not only the acceptability of food, but then also modify the way taste, flavor and odor are perceived [5]. Losses in sensory perception might seriously affect overall health, nutritional status, activities of daily living and quality of life. Specifically, impairments of the essential senses of vision and hearing are

the second-leading cause of years of lived with disability [6]. However, paradoxically, nutrition may prevent or slow down these losses [7, 8]. Therefore, there is a need to deepen into the knowledge of the relationship between nutrients and sensory-related disease, and hence the implementation of hearing and visual loss preventive nutrients protocols seems crucial to prevent these diseases that occur more frequently in aging and that impact the sensory system.

Conflict of Interest: The author declares no conflict of interest.

Keywords: Food choice/ Sensory perception / Auditory / Visual /

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S13.1

HISTORY AND IMPORTANCE OF BREAKFAST IN LATIN AMERICA

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Challenges of nutrition and public health in Ibero-America

Introduction: Latin America is a large region with 642 million inhabitants, generally understood as the reunion of countries in South America and Central America. Understanding food patterns in this region may support actions to improve population health.

Objectives: To provide an overview of breakfast history and composition in Latin America.

Methods: We conducted a narrative review of the literature on breakfast intake in eight Latin American countries: Argentina, Brazil, Chile, Colombia, Costa Rica, Ecuador, Peru, and Venezuela.

Results: Food patterns in this region, including breakfast food habits, have modified over the centuries as a result of extensive mixture of culinary traditions from Indigenous, Spanish or Portuguese colonization as well as other European explorers, and African slaves. The feeding and meal habits of the LA breakfast have also been influenced by the climate, humidity, presence of natural fruits and vegetables, affordability and socio economical variation in the region. Coffee and milk, with cakes, bread and butter is the common Portuguese influence in Brazil and some neighbor countries. Arepas and manioc flour products, corn and wheat derivate are a tradition in the region, with different ways of preparation. African influence and slave food brought plates with preparations with second-class meat cuts (offal), rice, beans and corn products. In general, breakfast is accompanied by beverages, such as coffee and milk and fruit juices, with added sugar. There is low intake of whole grains. Because of the geographical diversity of many LA territories, there are differences among the regions within each country, such as mountain, coast, plateau or jungle region, as well as urban vs. rural areas, which translates into different food availability and consequently food preparations. Nevertheless, LA dietary patterns have passed through rapid changes due to several reasons, such as industrialization, urbanization, economic development and market globalization, as occurred to other developing countries/regions.

Conclusions: Consuming a high quality breakfast has been shown as an opportunity for the consumption of foods rich in nutrients and to be associated with benefits to health and to nutrient related outcomes. Therefore future research is needed to better understand the current breakfast habits in LA.

Conflict of Interest: The International Breakfast Research Initiative and this workshop was funded by Cereal Partner Worldwide (Latinamerican and European Studies) and General Mills, INC. (Canadian and United States studies). All the authors have no conflicts of interest to declare. MF have received fees and consultancy payments from biotechnology, pharmaceutical, food and beverage companies, government sources and non-profit entities. None of the entities mentioned had or have any role in the design or preparation of this workshop.

Keywords: Breakfast / Latin America / Food intake

S13.2

BREAKFAST HABITS AND FOOD GROUP COMPOSITION IN LATIN AMERICA

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Challenges of nutrition and public health in Ibero-America

Introduction: Regular breakfast consumption has been associated with benefits to health and to positive nutrient related outcomes, however, it is a frequently skipped meal.

Objectives: To provide updated data on the regularity of breakfast consumption and its food composition in Latin America, and to explore factors associated with breakfast consumption.

Methods: A total of 9,218 subjects from 15 to 65 years old were evaluated in the ELANS study, a multicenter cross-sectional survey conducted in eight Latin American countries (Argentina, Brazil, Chile, Colombia, Costa Rica, Ecuador, Peru, and Venezuela). Dietary data were obtained by two 24-hour dietary recalls. Breakfast was defined by self-report and included consumption of any food or beverage of at least 50 kcal at a meal occasion named by the respondent as breakfast. Regularity of breakfast consumption was defined as: Regular breakfast consumers, who consume breakfast on both dietary assessment days; Occasional breakfast consumers, who consumed breakfast only one day; and Breakfast skippers, who did not consume breakfast on both days. Differences were tested through Pearson's Chi-square test and adjusted multiple logistic regression models.

Results: Breakfast consumers were 78.6% of the population, occasional were 15.9% and skippers were 5.5%. The countries with more breakfast skippers were Argentina (10.7%) and Brazil (10.1%), whereas Peru had the lowest proportion (1.3%) ($p < 0.001$). Adolescents were the age group with the highest proportions of occasional consumers (19.2%) and skippers (6.8%). In adjusted models, breakfast consumers were more likely to be older adults than adolescents ($OR = 1.49$, $95\%CI: 1.06-2.10$) and physically active than insufficient active ($OR = 1.29$, $95\%CI: 1.07-1.55$), and less likely to be underweight than normal weight ($OR = 0.63$, $95\%CI: 0.41-0.98$). No significant difference in breakfast consumption was observed for gender and socioeconomic level. Different foods were consumed for breakfast, varying across the countries, according to its food habits and culture.

Conclusions: Although the prevalence of breakfast consumption in Latin America was high, there were differences across the countries and specific groups. The main targets for encouraging breakfast intake is Brazil and Argentina, as well as the adolescents, those who are underweight and insufficient physically active in Latin America.

Conflict of Interest: The International Breakfast Research Initiative and this workshop was funded by Cereal Partner Worldwide (Latinamerican and European Studies) and General Mills, INC. (Canadian and United States studies). All the authors have no conflicts of interest to declare. None of the entities mentioned had or have any role in the design or preparation of this workshop.

Keywords: Breakfast / Dietary intake / Food intake / Latin America

S13.4

POSSIBLE RECOMMENDATIONS FOR BREAKFAST IN LATIN AMERICA

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Challenges of nutrition and public health in Ibero-America

Introduction: Several studies have reported a wide variation in the contribution of breakfast to nutrients intake and diet quality in various parts of the world, however data on the Latin American composition of breakfast are scarce.

Objectives: To provide updated data on the breakfast nutritional composition and its contribution to daily intakes among the Latin American population in order to derive nutrient recommendations based on the observed nutritional profile.

Methods: 9,218 subjects from 15-65 years old were evaluated in the ELANS study, a multicenter cross-sectional survey conducted in eight Latin American countries (Argentina, Brazil, Chile, Colombia, Costa Rica, Ecuador, Peru, and Venezuela). Dietary data were obtained by two 24-hour dietary recalls. The total intakes and proportion of daily energy and nutrients from breakfast were calculated. Breakfast consumers were stratified by tertiles of the Nutrient Rich Food (NRF) index, used as a measure of diet quality, and dietary intakes were compared using ANCOVA and Bonferroni tests, adjusted for daily energy intake.

Results: On average, ELANS sample consumed 444kcal at breakfast, which accounted for 23% of the total daily EI (ranging 16–27%). The contribution of breakfast to mean daily intakes ranged from >30% of total added sugar, riboflavin and calcium; 20-30% of total protein, carbohydrates, fat, saturated fat, fiber, sodium, vitamins A, D, thiamin, niacin, vitamin B12, iron, potassium, magnesium and zinc; and <20% of total vitamins B6 and C. In most countries, breakfast was carbohydrate-, added sugar- and saturated fat-rich eating occasion relative to the entire day, and the energy contribution of protein and fats were lower at breakfast. All countries had similar percentage of energy from protein (14-16% breakfast; 10-14% daily), fat (19-22% breakfast and daily) and saturated fat (9-12% breakfast and daily). Those with higher daily diet quality (higher NRF tertile) presented in breakfast higher intakes of energy, protein, carbohydrates, polyunsaturated fatty acids, fiber, vitamins A, C, and from complex B, calcium, iron, potassium, and magnesium, and lower added sugar and sodium.

Conclusions: The observed nutritional profile of breakfast in Latin American countries will allow deriving locally relevant recommendations based on specific dietary habits of the region.

Conflict of Interest: The International Breakfast Research Initiative and this workshop was funded by Cereal Partner Worldwide (Latinamerican and European Studies) and General Mills, INC. (Canadian and United States studies). All

the authors have no conflicts of interest to declare. None of the entities mentioned had or have any role in the design or preparation of this workshop.

Keywords: Breakfast / Dietary intake / Latin America

S14.3

DIET QUALITY AND NUTRITIONAL ADEQUACY: PRACTICAL METHODOLOGIES

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Challenges of nutrition and public health in Ibero-America

Introduction: food consumption surveys allow evaluating and planning interventions, monitoring the dietary intake and nutritional status of individuals, groups or nations, and providing important data related to the quality of food and thereby contributing to implementing strategies for the development, prevention and treatment of diseases.

Objectives: determine the nutritional intake and adequacy of the Lenca ethnic population of Honduras.

Methods: this study is part of a nutritional assessment and body composition of the Honduran Lenca population (2018). It is a descriptive cross-sectional study. The sample consisted of 63 men and 63 women aged 19 to 65. Sample selection was not intentional probabilistic. A 24-hour dietary recall was applied twice, non-consecutively, including a weekend, to 63 households in Lenca communities. Data were analyzed with Student's t, frequency analysis. Homemade food models and kitchen utensils were used at the interview site. The food consumption information was taken to grams and subsequently, the caloric composition of macronutrients and the content of micronutrients (iron, sodium, vitamin C and calcium) were determined through Food Processor SQL 10.10 programme. An average of the values obtained from the two recalls was used to calculate the energy and nutrient averages.

Results: the corn tortilla and the coffee with sugar were the foods consumed by 100% of the population. They are followed by beans, bread and rice, consumed by more than 80% of the population. Their diet presented excess carbohydrates, sugar and sodium, an iron deficit was estimated in 67% of women and 42% of men. A vitamin C deficit was estimated in 85% of women and 79% of men, which decreases iron absorption which comes from beans mainly.

Conclusions: the Lenca population has a reduced variety in their diet that causes imbalance in their intake of nutrients, mainly composed of carbohydrates and added sugars and excess sodium with high deficiencies of protein, fat, iron, calcium and vitamin C, and antioxidants. This study demonstrated the importance of the food/nutrient intake surveys. These are important to promote dietary diversity, assess contribution by biofortified products, and consider food fortification when there are foods processed by centralized and developed food industries.

Conflict of Interest: No conflict to declare.

Keywords: nutritional deficiencies / nutrient intake / sugar

S14.4

NUTRITIONAL MONITORING BIOMARKERS IN MEXICAN CHILDREN, THROUGH THE NATIONAL HEALTH AND NUTRITION SURVEYS

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Challenges of nutrition and public health in Ibero-America

The National Health Survey System in Mexico is part of the monitoring nutritional system; includes a series of multi-thematic surveys on health and nutrition; the surveys are probabilistic and representative at the national level and include diverse geographic areas and population sub-groups.

As of 2006, the General Health (ENSA) and Nutrition (ENN) surveys were joined to form the National Health and Nutrition Survey (ENSANUT), which has been conducted four times: in 2006, 2012, the 2016 Mid-Stage; the 2018-2019 ENSANUT, and a special edition of ENSANUT 100K. Previously, in 1988 and 1999 two National Nutrition Surveys (ENN) were carried out.

The data gathered through the National Nutrition Surveys (2006, 2012, 2016 and 2018) was used to compare the trends for nutritional deficiencies in preschool children. Anemia was considered if [Hb]<11 g/dL, ZD if [Zn]<65 µg/dL and ID if [ferritin]<12µg/L

Anemia is still a serious public health problem in children <5 years old in Mexico. Currently 23% of the children suffer anemia (20.4% in 2006); the prevalence of zinc deficiency in 2006 was 27.5% and fall to 18.6% in 2018 and the prevalence of iron deficiency was reduced from 26% in 2006 to 7% in 2018.

These results provide relevant information to reinforce some of the ongoing nutrition policies and to redesign others, particularly those regarding zinc and anemia. For several decades, the ENSANUTs in Mexico have generated consistent and relevant information for public health policy-making, and have fostered actions linked to priority themes in the public agenda.

Conflict of Interest: I declare no conflict of interest

Keywords: monitoring nutritional System, National Health and Nutrition Surveys; public policies, Mexico

S16.1

NUTRIPIGENETIC AND PHYSICAL ACTIVITY

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Challenges of nutrition and public health in Ibero-America

Obesity is one of the most important health problems worldwide. Several factors related to lifestyle have been described as increasing the risk, physical inactivity, and diets rich in saturated fats, salt, and sugars. However, other risk factors related to genetics, metabolism, microbiota, and epigenetics also contribute to increase or decrease the susceptibility to develop obesity and other chronic diseases. In this sense, the regular physical activity can contribute to improving health and there is consistent evidence that these adaptations may be the result of epigenetic modifications. The main epigenetic mechanisms include DNA methylation, covalent histone modification, and non-coding RNAs (miRNAs).

Physiological and metabolic adaptation to exercise occurs in skeletal muscle, which is associated with the remodeling of the DNA methylation profile of several genes involved in glucose and lipid metabolism. One of the epigenetic mechanisms that might explain these adaptations is the methylation of the *PRKAA2* (*AMPK α 2*) gene. It has been found that acute exercise test increases the levels of miR-1 and miR-133a in skeletal muscle biopsy of healthy individuals and after training period, subjects improved their VO_2 max and insulin sensitivity.

In type 2 diabetes patients (T2D), the DNA methylation and miRNA expression were altered by metabolic plasticity in muscle after 16 weeks of endurance training. These adaptations seem to occur by hypomethylation in the gene bodies of 6-phosphofructo-2-kinase (*PFKFB3*), histone deacetylase (*HDAC4*), and the gene encoding the multifunctional Ser/Thr protein kinase (*GSK3A*) that may regulate glycolytic flux relevant to diabetes rehabilitation.

Changes have been also studied in adipose tissue of sedentary healthy subjects, who performed an endurance exercise increases in DNA methylation in 16,470 CpG sites and decreases in 1,505 CpG sites. Of the genes that showed significant changes were found to be located in 18 candidate genes for obesity, and in 21 candidate genes for T2D. It should be emphasized that 10 of these sites were mapped to the *KCNQ1* gene and six sites to the *TCF7L2* gene.

In conclusion, the regular physical exercise can improve the negative consequences of physical inactivity through epigenetic modifications in different tissues, such as adipose, skeletal muscle, and blood cells.

Conflict of Interest: No conflicts of interest

Keywords: Physical activity / Non-communicable chronic diseases / Epigenetic

S16.2 & S16.5

NUTRIGENETICS IN OBESITY AND METABOLIC DISORDERS: A ROLE FOR TASTE

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Obesity is a global challenge in human nutrition that is interrelated to several metabolic comorbidities including glucose intolerance, insulin resistance, dyslipidemia, and inflammation. Traditional environmental determinants of the obesity epidemic include a sedentary behavior and the long-term consumption of unbalanced diets. However, about 100 SNPs across the human genome have been identified by GWAS and candidate gene studies also associated with energy metabolism, which is enabling the better understanding of obesity physiopathogenesis and the prescription of low-calorie diets with different carbohydrate, lipid and protein distributions to induce weight loss. These comprise SNPs mapped to genes related to important physical processes encompassing oral taste perception, appetite, energy expenditure, adipogenesis, glucose uptake, and lipid metabolism. Nutrigenetic studies have investigated the association of these SNPs with obesity predisposition and therapy responsiveness through interactions with diet. Regarding genetics of taste, the SNP Ile191Val in the sweet taste receptor (*TAS1R2*) gene has been associated with the habitual consumption of sugars in Canadian overweight and obese individuals as well as with carbohydrate-induced hypertriglyceridemia among the population of west Mexico. Also, the AVI/AVI non-taster haplotype emerged from three functional SNPs (A49P, V262A, and I296V) in the bitter taste receptor (*TAS2R38*) gene have been associated with individual preferences for cruciferous/brassica vegetable intake, selected nutrient/energy dense foods, and increased risk of obesity in some populations, but not in others. Moreover, genetic variations in the human fatty acid transporter (*CD36*) gene, a lipid receptor, modulate oral fat sensing and associate with fat intake and adiposity markers in adults and children. Meanwhile, the number of studies investigating the role genetics in umami, salty, and sour taste qualities and its influence on body composition and metabolic status is limited. Given the ethnic and cultural/social heterogeneity between populations, further research is essential to confirm these results. Nevertheless, this knowledge is promoting advancement in nutrition science, research and development related to taste sensitivity and food preferences/choices that potentially allow the identification of high-risk groups as well as the prescription of tailored personalized dietary strategies with public health perspectives and capacity building approaches for nutritionists to address obesity and other chronic nutritionally related epidemics.

Keywords:

Obesity/taste/genetics/lifestyle/diet/nutrigenetics/precision nutrition.

Conflicts of interest: None declared

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S17.1 HISTORICAL EVOLUTION OF RESEARCH ON EVOO AND HEALTH. EVOO AND MEDITERRANEAN DIET

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Nutrition in the prevention and treatment of chronic diseases

Since 1962, in which the International Olive Council began a campaign to increase the consumption of extra virgin olive oil (EVOO) in the world, knowledge of the nutritional value of this dietary fat and its relationship with health has progressed significantly. Studies on EVOO and health began in Spain in the 80s from the international symposium held in Crete in 1980. The first studies focused on the role of monounsaturated fatty acids (C10: 1 n9, oleic) against saturated and polyunsaturated and lipid metabolism, especially on serum cholesterol. For this, EVOO oil was not used but a variety of safflower oil rich in oleic acid. In Spain and specifically at the School and Institute of Nutrition of the University of Granada, a line of research began on the relationship between the consumption of EVOO and health. The term virgin was included in the research since this type of oil, in addition to being rich in MUFAS, contains numerous minor components of antioxidant and anti-inflammatory importance. Subsequently, numerous groups around the world and especially in the Mediterranean countries (Greece, Italy, Spain, etc.) study the role of EVOO in relation to different chronic diseases of high prevalence (cardiovascular, cancer, diabetes, etc.). These studies were carried out not only with EVOO but with this fat in the context of a Mediterranean pattern diet in which this oil constitutes the backbone as added fat and cooking fat. We must mention in this area the important contribution of the PREDIMED study and currently the PREDIMED plus in the knowledge of the role of the Mediterranean diet and EVOO in health and disease prevention

Conflict of Interest: No conflicts of Interest.

Keywords: Extra virgin olive oil (EVOO), Oleic acid, Antioxidants, Mediterranean diet.

S17.2 BIOACTIVE COMPOUNDS IN VIRGIN OLIVE OIL

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Nutrition in the prevention and treatment of chronic
diseases

Extra virgin olive oil (EVOO) is the healthiest fat. It is one of the pillars of the Mediterranean diet and is considered a functional food. EVOO is a natural juice, which clearly differentiates it from the other oils, which are obtained by refining processes.

The high content of oleic acid determines that EVOO is the most oxidation-resistant fat source and an increase in fluidity and it influences the function of cell membranes.

The unsaponifiable fraction of EVOO (2% of the total content) contains numerous bioactive compounds responsible for the organoleptic properties, stability and part of the beneficial effects of EVOO. More than 200 different chemical components found in the olive tree, including sterols, carotenoids, terpenes, flavonoids, tocopherols and polyphenols, have been identified and characterized.

Polyphenols represent the most characteristic and genuine molecules of virgin olive oil. Polyphenols include hydroxytyrosol, tyrosol and their derivatives linked to the aldehyde and dialdehyde forms of elenolic acid, described as secoiridoids (which include derivatives of oleuropein aglycone, dimethyloleuropein and ligstroside). Small amounts of lignans, flavonoids (luteolin and apigenin) and phenolic acids are also found.

The most abundant phenolic compounds are hydroxytyrosol, tyrosol, oleocanthal, oleacein and oleuropein. Of note, oleocanthal has shown an interesting biological activity and it represents 10% of all EVOO polyphenols (100–300 mg/kg EVOO). All of them are potent antioxidants, especially hydroxytyrosol, tyrosol and oleuropein, but their anticancer properties are also relevant. Oleocanthal shows anti-inflammatory effects and its consumption is associated with the lower incidence of cardiovascular disease found in the Mediterranean countries.

These compounds exert their effects when they are part of the olive oil and they are not as effective when taken as supplements, demonstrating that the food matrix of the oil exerts a modulating effect on its properties, which reaffirms olive oil as a functional food.

Conflict of Interest: No conflict of Interest

Keywords: Virgin olive oil, Mediterranean diet, polyphenols, Hydroxytyrosol, oleocanthal, oleuropein.

S17.3 CLINICAL TRIALS WITH VIRGIN OLIVE OIL ENRICHED IN BIOACTIVE COMPOUNDS

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Nutrition in the prevention and treatment of chronic
diseases

The PREDIMED study demonstrated the beneficial effects of the Mediterranean diet supplemented with extra virgin olive oil (EVOO) for health and for the prevention of chronic diseases such as cardiovascular, diabetes and metabolic syndrome. Currently, the PREDIMED-plus continues studying the effect of an intensive multifaceted lifestyle intervention including energy-restricted Mediterranean diet, supplemented with EVOO and nuts, increased physical activity and behavioral support, that is hypothesized to be more effective for reducing the cardiovascular risk associated with overweight and obesity than the non-energy-restricted traditional Mediterranean diet, also supplemented with EVOO

and nuts, in overweight and obese adults with metabolic syndrome.

Our research group is involved in the study of the cardioprotective effect of EVOO enriched in bioactive compounds obtained from the olive tree. The CARDIOLIVE project has evaluated the anti-hypertensive effect of an EVOO enriched with different olive fruit extracts (750 mg/kg of phenolic compounds) in spontaneously hypertensive rats (SHR) compared with a control EVOO (17.6 mg/kg of phenolic compounds). We observed a reduction of hypertension after four weeks of treatment, that was progressively augmented until eight weeks of treatment with the enriched EVOO. In addition, after eight week of treatment plasma levels of Angiotensin II and total cholesterol, and the urinary levels of endothelin-1 were also reduced, while the oxidative status was improved.

In humans, the NUTRAOLEUM study (Clinical Trials number NCT02520739) has demonstrated that daily intake during three weeks of EVOO with at least 124 ppm of phenolic compounds, regardless of the triterpenes content, improved the endothelin-1 levels *in vivo* and *ex vivo*, as well as oxidative stress biomarkers in healthy adults, while and optimized EVOO (490 ppm of phenolic compounds and 86 ppm of triterpenes) and a functional EVOO high in phenolic compounds (487 ppm) and enriched with triterpenes (389 ppm) had additional beneficial effect on oxidative and inflammatory status. However, it is needed to confirm all this results in longer studies and in subjects with metabolic syndrome and impaired endothelial function.

Conflict of Interest: No conflict of Interest

Keywords: extra virgin olive oil, cardiovascular disease / PREDIMED study / CARDIOLIVE study / NUTRAOLEUM study

S19.1 NUTREH AND PESOEH MODEL TO PREVENTION OF MALNUTRITION IN PRESCHOOL AND SCHOOL AGE CHILDREN

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Nutrition in the prevention and treatment of chronic diseases

In Mexico, stunting is a relevant nutrition problem in preschool children (10%), and in school children the problem of greater magnitude is overweight or obesity (OB) (33.2%). The objective was to evaluate the effectiveness of the Child Nutrition Attention Strategy in Priority Municipalities of the State of Hidalgo (NUTREH) in the attention to stunting, and of the OS Prevention Program in Schoolchildren of Hidalgo (PESOEH) in preschoolers and Schoolchildren from indigenous and urban areas of Hidalgo, Mexico.

The NUTREH model was a community trial without a control group in 20,000 preschoolers and schoolchildren from CONAFE and indigenous schools during two school cycles. The population was assigned to some type of food support program: cold breakfast package (DEF), DEF and Vitanut-Pro

(DEF + Vitanut) and freshly prepared breakfast (DEC). For the PESOEH model, a community trial was carried out with a control group in 500 schoolchildren during three school cycles. Schools were intervened with nutrition education within the curriculum (EDUSANUT), training for parents in healthy eating (As) and physical activity (AF), and training for school store managers (ECSAL).

In NUTREH model, preschool beneficiaries of DEC, DEF + Vitanut and DEF, decreased from 33%, 27% and 19% of stunting, respectively; and no significant changes were observed in schoolchildren. In PESOEH, a greater proportion of schoolchildren achieved learning in AS and AF (80%) compared to control (72%) ($p < 0.05$), and in non-intervened schools the overweight and obesity was increased up to five times.

The targeting and supervision to consumption food support in the NUTREH model, favored the decrease in the prevalence of stunting in preschool children and not in school children. The PESOEH model was effective in stopping the increase in OB in school children. It is necessary to apply and evaluate differentiated interventions of attention to malnutrition appropriate to the context of the regions of Mexico.

Keywords: stunting, obesity intervention, school children, preschool children, nutrition education, physical activity.

Conflict of Interest: We declare no conflicts of interest.

S19.2 THE MATERNAL AND NEWBORN NUTRITIONAL STATUS IN MEXICO

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Nutrition in the prevention and treatment of chronic diseases

Low birth weight continues to be a public health problem worldwide, affecting mainly low-income countries. It is estimated that 15-20% of newborns (NB) have a low birth weight (<2500 g). Therefore, one of the global goals of nutrition (3rd) for 2025 is to reduce 30% the cases of low birth weight. Low birthweight includes preterm infants (<37 weeks gestation) and born to small terms for gestational age and those with both conditions.

Maternal conditions such as age, marital status, access to health services and schooling are related to the birth weight of their children. In Mexico, there is enough information about mothers, so it is necessary to carry out studies on this subject, which will be the basis for designing effective interventions. It is necessary to start with an evaluation of the prevalence of low birth weight (LBW) since in Mexico there are limited reports on this subject.

This symposium will present data from a study conducted from the databases of the Birth Information Subsystem (SINAC), all newborns in Mexico were evaluated (2008 to 2017). During these 9 years, the percentage of NB with LBW increased 18.5% and that of premature babies by 9.1% (from 5.4% to 6.4% and from 6.6% to 7.2%, respectively), thus more

than half of cases of children with LBW cannot be explained by preterm birth, besides to the constant increase instead of the annual reduction, which makes it difficult to meet the third goal of WHO for 2025.

Conflict of Interest: I declare no conflicts of interest.

Keywords: Low birthweight / Mexico / maternal conditions

S19.3

NUTRIMETRY AND SURVEILLANCE OF LINEAR DEVELOPMENT IN CHILDHOOD

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Nutrition in the prevention and treatment of chronic diseases

Declaration of Rome¹ to reduce all forms of malnutrition, practice governance, achieve zero hunger, demands an effective form of linear development surveillance in childhood.

Present Nutrimetry² as a methodology that helps achieve the goals set in food safety programs, according to the cross of two variables.

Data from 328 children measured during 2010-2017 at a clinic in Tenabo, Campeche were analyzed. The cross-analysis of height and BMI z-scores with Nutrimetry (described in other publications) was done. Prevalence by year, nutrition codes and z-scores means were compared with Kruskal-Wallis.

From 29 to 52 children (55.8% boys and 44.2% girls) were observed per year, with ages between 24 and 32.98 months (\bar{x} =28.95, s.d.=2.73). Although no statistically significant differences were observed between years of measurement in any variable, it seems to be a tendency to increase \bar{x} in z-height/age (from -1.14 in 2010 to -0.73 in 2017, χ^2 (7)=10.74, p=.150), and in z-BMI/age (from 0.40 in 2010 to 0.55 in 2017, χ^2 (7)=2.93, p=.89) as years progress.

With Nutrimetry no children of z-height/age $\geq +2$ were found with thinness, normal weight or overweight in any year, although one with obesity. When moving the cut-off point to z-height/age $\geq +1$ there were no children with thinness or overweight, but with normal weight (from 1.92% in 2012 to 5% in 2015) and obesity (2.94% in 2019 and 5% in 2016).

Individual indicators only showed absence of statistically significant changes among years. Nutrimetry showed that from eight years of observation only one child reached a high height at 1000 days and he was obese, additionally showed that the tallest in the sample tended to normal weight and obesity, in the first case, it was expected because of total number of children located in that nutrition code (207/328), but not in obesity (24/328), which calls attention to avoid increasing overweight and obesity by wanting to increase height. It shows how Nutrimetry could allow monitoring compliance of goals to reduce chronic malnutrition with short stature and give direction to the control of overweight/obesity and prevention of chronic degenerative diseases.

Conflict of Interest: None

Keywords: Nutrimetry

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S19.5

NUTRIMETRY AS EPIDEMIOLOGIC TOOL FOR CHILDREN SURVEILLANCE

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Nutrition in the prevention and treatment of chronic diseases

Introduction: To combat malnutrition, assessment that allows joint interpretation of nutritional indicators is required, unfortunately at epidemiological level it doesn't occur. Many measures have been incorporated to develop new indicators, e.g. BMI crosses height and weight, resulting in corpulence index, indirect indicator of body fat and unhealthy weight, but its interpretation is still recommended with other indicators. Nutrimetry allows cross indicators for joint interpretation at epidemiological level, generation of unique codes enable new variables or nutritional status nuances be covered.

Objectives: Present options of the use of Nutrimetry in epidemiological analysis.

Methods: 2,460 data from ENSANUT_2018-100K of Mexican children between 0 and 4 years were analyzed, by sex, region (North, Center, Cd/Edo-Mex and South) and area (Urban / Rural), crossing z-BMI and z-height with Nutrimetry, according to WHO cut points.

Results: Individual indicators shows 9.1% thin children, 58.1% with normal weight, 19.7% overweight and 13.12% obesity; 6.07%, 66.62% and 27.32% with short, normal and high height. Nutrimetry showed that most of thin (5.8%) and normal weight (45.8%) children have normal height, likewise overweight children (11.0%) who nevertheless also tend to be tall (7%), in obesity high-height is prevalent (8.6%). No significant differences were found in gender distribution among codes and regions, but in z-BMI (χ^2 =-2.51, p<0.05) and z-size (χ^2 =2.39, p<0.05) in code 5 (Thin/High-height) and z-BMI in code-15 (Obesity/Medium-height) (χ^2 =2.91, p<0.05) were, indicating higher height and BMI for urban areas, as well as high-height prevalences. Finally, prevalence of low BMI in center and south Mexico suggests more urgent attention than other regions, since they are higher in nutricode-1 (Thin/Short-height).

Conclusions: Nutrimetry is a flexible tool that opens possibilities for cross analysis of anthropometric variables, from simple prevalence analysis, to comparison between and

among groups and nutricodes. Prompting group research of nutritional indicators crossings helps to better understand the problem at epidemiological level, and public policies could direct their intervention approaches, bridging the gap between decisions made from analysis of aisolated data and what is observed in clinic attention.

Conflict of Interest: None

Keywords: Nutrimetry/ epidemiologic analysis/ ENSANUT-2018-100K

S20.1 PREGNANCY AND FETAL PROGRAMMING OF OBESITY

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Nutrition in the prevention and treatment of chronic diseases

Nutrition during both pregnancy and the first two years of life of children (the first 1000 days) are crucial for health and development at that time, but also in later stages of life. Thus, the World Health Organization (WHO), in its Implementation Plan on maternal, infant and young child nutrition, prioritizes actions to improve the development and health of children in the world before 2025. Maternal lifestyle during pregnancy is considered an important relevant factor for preventive efforts of childhood obesity, since individuals begin to be programmed metabolically from conception and not from birth. There are several models for predicting overweight and childhood obesity, but most of them have not been externally validated and the factors considered differ greatly between studies, since the results are predicted at different ages. Women should avoid starting pregnancy with obesity and during pregnancy, women should achieve adequate gestational weight gain and avoid malnutrition, smoking and free sugar intake exceeding 10% energy. The actions to consider are promoting healthy nutrition and a normal weight status at the reproductive age and during pregnancy, carefully monitoring child growth to detect excessive weight gain. Early life experiences may induce permanent changes in structures and functions of certain organs and tissues, through a process of biological programming of the fetus, which can contribute to increase both child and adult obesity rates in the different countries.

S20.3 POSTNATAL FACTORS ASSOCIATED WITH CHILDHOOD OBESITY DEVELOPMENT

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Nutrition in the prevention and treatment of chronic diseases

Childhood obesity is the most prevalent nutritional disorder during childhood. It develops in individuals with a genetic predisposition substrate and the presence of factors related with nutrition, sedentary behaviours and others as short sleep duration. During early periods of life, starting at conception and until the end of the second year (The first 1000 days), there is a large number of factors that may influence the development of obesity later in life. In the early postnatal period some factor may be considered, such as lack of breast feeding, consumption of high protein content infant formulas, rapid infant weight gain, high protein intake, fat or free sugars intake during infancy, early introduction of complementary feeding and short sleep duration. From all these candidate risk factors, the one most strongly associated with obesity development during the early postnatal period is rapid weight gain during infancy. Breast feeding has been also suggested as a protective factor for obesity development; however there is still scientific controversy on the independent effect of breastfeeding. In any case, despite the inconclusive effect of breastfeeding on reducing obesity risk later in life, breastfeeding should be promoted owing to its many beneficial effects. There is also more and more evidence about the role of high protein content formulas on the early excess fat deposition. Perinatal factors also influence the expression of some genes related with obesity development. For instance, breastfeeding also modulate the effect of the PPAR-gamma 2 gene polymorphism on the excess of adiposity in adolescents. Interventions trying to prevent obesity should start as early as possible as the possibility to positively influence the early programming of the condition is optimal in this period.

Conflict of Interest: None in relation with this abstract.

Keywords: Nutritional programming / weight gain / breastfeeding / protein intake

S21.1 KETOGENIC DIET AND REFRACTORY EPILEPSY: EVIDENCE AND TYPES OF KETOGENIC DIET

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The ketogenic diet (KD) is associated with metabolic changes related to the large ketone production caused by increased fat intake, with a ratio between fats and proteins plus carbohydrates (CHO) of 4:1. The drastic decrease in CHO consumption reduces the use of glucose as a source of energy and the liver synthesizes the ketone bodies: beta-hydroxybutyrate and acetoacetate acids, which provide the energy required by the cell instead of glucose. Prospective multicenter studies have shown that approximately 75% of patients with refractory epilepsy in KD decrease the number of seizures by more than 50%. KD has diversified its use and is a first line therapy in inherited metabolic diseases such as deficiency of cerebral glucose transporter type 1 and dehydrogenase pyruvate deficiency. These are the basic 4 types of KD:

Classic ketogenic diet: provides 90% of calories as fat and the remaining 10% as protein and CHO, establishing a ratio between lipids, proteins+CHO of 4: 1 or 3: 1.

KD with medium chain triglycerides (MCT): MCT oil produces more ketones per gram of fat, due to their metabolism. This diet provides 30% of MCT and 40% of long-chain fats, 10% of proteins and 20% of CHO.

Modified Atkins Diet (MAD): It was formulated to treat obesity and is based on the significant reduction of CHO, which decreases insulin levels and induce lipolysis. It provides 65% fat, with a 5% of CHO (10 to 20 g/day) and 30% of protein intake.

KD with low glycemic index (DBIG): it was proposed to increase the adhesion to KD and provide 10% of CHO - between 20 and 40 grams of CHO of glycemic index <50-with a fat contribution not exceeding 60% of the caloric molecule and free intake of proteins

Based on the large amount of existing scientific evidence that demonstrates the positive effect on crisis control, it is concluded that KD is an excellent alternative for the treatment of refractory epilepsy.

Keywords: ketogenic diet/ MCT oil/ Modified Atkins Diet/

S21.2 USES OF KETOGENIC DIET THERAPIES IN CHRONIC NONCOMMUNICABLE DISEASES (CND)

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Introduction: With the significant health, social and economic burdens associated with obesity and T2DM, effective interventions for treatment and prevention of these diseases are urgently needed. A fundamental approach for this is weight management.

Ketogenic diets to treat obesity were described as far as 1863, until the mid 20th century, and were used until half of the century and then marginalized as “fad diet”.

Over the last 15 years several groups have reexamined low-carb diets and now several studies for the use of these diets to treat obesity and T2DM are available, including 7 RCTs and 6 meta-analyses.

In the face of the current resurgence and how these treatments are fashionable again this presentation will seek to provide evidence that justifies its use.

Objective: Clarify the concepts of very-low-carbohydrate ketogenic diet (VLCKD) or low-carbohydrate ketogenic diet (LCKD), keto-adaptation and nutritional ketosis, and explain the rationale of carbohydrate restriction in the treatment of obesity and show the scientific evidence to support its use in the treatment of the CND.

Conclusions: Evidence suggests that there are many options for treating obesity or the individual components of Metabolic Syndrome but carbohydrate restriction has the ability to target the range of markers with a single intervention.

The most surprising findings indicate that the low carbohydrate diet not only is effective to lose weight but also improves the cardiometabolic risk factors by lowering serum triglyceride and raising HDL-cholesterol.

Keywords: very low carbohydrate ketogenic diet/ low carb diets/ metabolic syndrome/ obesity.

S21.3 KETOGENIC DIET (KD) FOR CANCER AND NEURODEGENERATIVE DISEASES (ND)

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During the last decade, the mechanisms in which KD affects metabolic pathways has been extensively studied at a molecular level. The comprehension of its diverse and synergistic actions derived from the change in energy substrate, namely, the use of fatty acids to generate ketone bodies as the primary energy fuel replacing glucose, has led investigators to expand its use to other pathologic conditions.

Surgery, ionizing radiation, and chemotherapeutic drugs are recognized as the main pillars of cancer treatment. Considering that in cancer cells most energy comes from glucose due to the shift from oxidative phosphorylation to glycolysis (known as the Warburg effect), with concurrent mitochondrial dysfunction, KD has been proposed as an adjuvant therapy for cancer. The current clinical evidence has demonstrated safety and feasibility for the use of KD in high grade tumors and late stage cancers. Even though there has been several case reports and prospective analysis that show improvement in overall survival in certain types of cancer, due to heterogenous methodology, different KD protocols and lack of reproducibility, there has been mixed results regarding its efficacy. Although the evidence of beneficial effects of KD as

an adjuvant cancer therapy is accumulating, more high-quality studies are needed to assess the overall strength of evidence.

Alzheimer's disease (AD) is the principal contributor to dementia in the elderly. This is a multifactorial disorder which promotes cognitive impairment, progressive memory loss and personality changes that profoundly affect quality of life. It involves deposition of neurotoxic amyloid β -peptide (A β) and progressive neuronal loss. Primarily, this occurs as a consequence of mitochondrial dysfunction and alterations in the respiratory chain function (oxidative phosphorylation). There is evidence that early disturbance in brain glucose metabolism can be detected before any measurable cognitive decline, with downregulation of glucose transporter GLUT 1 in AD. Mitochondrial dysfunction and oxidative stress also play a significant role in the pathogenesis. Research on the neuroprotective action of KD in ND favors numerous molecular changes such as: increase in antioxidant enzymes, reduction of reactive oxygen species that promote oxidative stress, and enhanced mitochondrial biogenesis.

Several human trials have demonstrated improvement in diverse neurocognitive testing after different type of KD, including MCT oil supplementation has been used. These results are promising, but high-powered RCT are required to weight the long-term clinical impact on ND outcome.

Keywords: cancer/ alzheimer's disease/ neurodegenerative diseases/ ketones/ ketogenic diet

S21.4

WORKSHOP: LOW AND LOWER CARBOHYDRATES DIET

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Nutrition in the prevention and treatment of chronic diseases

The Ketogenic Diet (KD) is a non-pharmacologic treatment for children with drug resistant epilepsy and for some Inherited Metabolic Disorders. Additionally, with less evidence; it has been used in patients with multiple neurological disorders.

There are variations of the KD, all of them aim to produce ketosis. These variations include: Classic KD, Medium-Chain Triglyceride Oil Diet (MCT), Low Glycemic Index Treatment (LGIT), and Modified Atkins Diet (MAD). The Classic KD: is the most restrictive, strictly and specific; it offers higher ketogenic potential and are prescribed as a ratio of grams of fat to combined grams of carbohydrate and protein, generally as 4:1 (4 g from fat: 1 g from carbohydrate + protein) or 3:1, but also as low as 2:1 (modified KD), while MCT, LGIT, and MAD are typically ratios of 1:1.

The KD, with the objective to be more effective, suggests the use of specific natural food; it has low carbohydrates content, with Low Glycemic Index and sometimes energy-dense food. The Glycemic Index (GI) is a relative ranking of carbohydrate in foods according to how they affect blood glucose levels. Low GI values its <55. Listed below are some examples of common foods used in KD:

Fats: *oils*: avocado, olive, soy, hemp, sesame, vinaigrette, dairy fats: heavy cream, butter, ghee, sour cream, cream cheese. Natural MCT: oil coconut, oil palm, and coconut.

Nuts and seeds: almonds, peanuts, macadamia nuts, pecans, pistachios, chia, flax, pumpkin.

Low Carb fruits, vegetables and others: asparagus, arugula, avocado, berries, celery, garlic, green tea, radishes, spinach, and sprouts.

Apart from that, there are some resources that make easier the diet: medical commercial formulas and products with different ratios: 4:1, 3:1, 2:1, or MCT oil.

In addition to this, upon being a strict diet, it has been necessary to create educational material for parents and caregivers, with the propose of making an easier transition to KD and in this way have a better effectiveness; that is why associations as The Charlie Foundation in USA and Mathew's Friends in England, strengthen, and help the families offering diverse online resources and education.

Conflict of Interest: none.

Keywords: ketogenic diet/ KD/ fat/ epilepsy

S22.1

BIOACTIVE COMPOUNDS: PRESENT AND FUTURE

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Safe, healthful and sustainable food

More and more bioactive compounds in foods are characterized, showing potential use for human supplementation. Several groups at the Institute of Nutrition and Food Technology (INRYA) of the University of Granada researching on the prevention and treatment of noncommunicable metabolic diseases, sports, aging and cancer focus their studies on bioactive compounds derived from extra virgin olive oil (EVOO). Among these compounds, sterols, triterpenes and polyphenols are highlighted due to their broad spectrum of beneficial actions for health: antioxidants, anti-inflammatory, anti-cancer, antihypertensives, cholesterol-lowering effect, etc.

The group led by Dr. MD Mesa, has shown in a clinical trial a first level of evidence on the *in vivo* health benefits of olive oil triterpenes (oleanolic and maslinic acids) in healthy humans, occurring by decreasing DNA oxidation.

Dr. A. Segura and his group have shown that the anti-tumor properties of EVOO against breast cancer are linked to its content of lignans and secoiridoids, and that the stereochemistry of EVOO-derived lignans and secoiridoids might provide an excellent and safe platform for the design of new HER2-targeted anti-breast cancer drugs.

Oleocanthal and hydroxytyrosol are probably the most characteristic polyphenols of EVOO. Oleocanthal stands out because of its strong anti-inflammatory activity, whereas hydroxytyrosol is a powerful antioxidant. Our research group has verified the absence of acute/subacute and sub-chronic oral toxicity of hydroxytyrosol and the presence of an ergogenic effect in trained rats at high doses (300 mg/kg day). However, intermediate doses of hydroxytyrosol (25 times the

mean daily intake of the Spanish population) seem to interfere with the expression of GLUT transporters in rats undergoing specific training to increase insulin resistance.

Undoubtedly, these studies open a promising horizon, but they also raise serious questions: Are these active compounds as active outside the food matrix as they show *in vitro*?

Conflict of Interest: No conflict of Interest

Keywords: Virgin olive oil, bioactive compounds, polyphenols, Hydroxytyrosol, oleocanthal, oleuropein.

S22.2

ADVANCED TECHNOLOGIES FOR THE IMPROVEMENT OF NUTRITIONAL AND ORGANOLEPTIC QUALITY OF FOOD PRODUCTS

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Safe, healthful and sustainable food

Introduction: There is an increasing global demand for fresh and natural food products. Additionally, consumers demand that those food products must have optimal nutritional and organoleptic properties without compromising their hygienic safety.

Objectives: To combine non-thermal disinfection, preservation and stabilization methods with bioactive compounds obtained from fruits and vegetables coproducts and by-products to improve the nutritional and hygienic quality of food products.

Methods: Within the SHEALTHY project, non-thermal technologies such as electrolysed water, ultrasounds, plasma, active packaging, bioactive coating, among others, are used as alternative to thermal and chlorination method in order to obtain healthy fruit and vegetable products. Moreover, natural bioactive compounds from fruits and vegetables coproducts and by-products obtained by ultrasound-assisted extraction combined with different technologies such as membrane filtration and pulsed electric field (PEF), will be used as functional ingredients for smoothies and bioactive packaging production.

Results: Ultrasound-assisted extraction has demonstrated the extraction of higher amounts of bioactive compounds than conventional extraction while the recovery of bioactive compounds was improved when PEF was employed. Additionally, membrane filtration has proven to be a good technique to separate and purify bioactive compounds.

To date, bioactive compounds from cherimoya, mango and its by-products or guava leaves have been extracted and characterized. The major group of bioactive compounds was made up of phenolic compounds (mainly phenolic acids and derivatives and flavonoids). Those compounds have good antioxidant and antimicrobial activities, thus, making them good candidates to be employed to design active packaging and bioactive coatings for food preservation and to be added to smoothies as healthy ingredient.

Conclusions: The combination of those emerging technologies will be interesting for the Food Industry due to their capability for the extraction and purification of bioactive compounds which can be employed for food preservation or be incorporated into food products obtaining functional food products that help to promote the consumer's health.

Acknowledgement: SHEALTHY project has received funding from European Union's Horizon 2020 research and innovation programme under grant agreement No 817936

Conflict of Interest: The authors declare no conflicts of interest.

Keywords: bioactive compounds/ non-thermal technologies/ food quality/ hygienic quality/ functional foods

S22.3

FOOD BIOTECHNOLOGY AND FOOD SAFETY: GLOBALIZATION AND IMPACT ON BIOECONOMY

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Safe, healthful and sustainable food

Introduction: Currently, processed food is a real fact in our globalized dishes, however consumers' growing awareness request higher quality food indicators. The population is not only interested in safety aspects on the food supply chain, but also on the individual selection of food according to personal dietary needs. Besides good taste, biotech food needs to comply with safety standards and compositional assessments through complementary toxicological and pharmacological approaches, mainly when this food is designed for treating dietary personalized disorders.

Objectives: To identify and highlight the need of common efforts towards High-quality food in the biotechnology era, specifically regarding processed food and food biotech.

Methods: Searching evidence on EFSA and FDA scientific opinions regarding the risk assessment carried out for identifying key derivative microbial substances considered a potential hazard when consuming processed and biotech food.

Results: Biotechnology supports modern food technologists, by offering advanced production methods and biotech substances that meets the growing dietary wishes of the 21st century society. A list of processed food containing potential low level of microbial derivatives substances in the final food product will be analysed. Bioeconomy key aspects of food additives, processing aids, and enzymes from genetically modified microorganisms, used during the production of food biotech will be shown. It will be also widely discussed norms and key aspects of their risk assessment procedures.

Conclusions: Exposure to potential hazardous substances become unavoidable in food biotech, but they should be under the limits established by specific Regulations. Knowledge exchanges within academia, stakeholders, industry, food biotech sector, regulatory agencies, risk assessors, and risk

managers is mandatory to achieve globalized food safety and bioeconomy synergic success.

Conflict of Interest: No declared.

Keywords: Food Biotech, Food Safety, Biotechnology, Globalisation and Bioeconomy

S27.3

FUNCTIONAL GASTROINTESTINAL DISORDERS IN CHILDREN: ABDOMINAL PAIN DISORDERS AND GUT-BRAIN AXIS

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Nutrition in the prevention and treatment of chronic diseases

The role of the intestinal microbiota in health and disease has been the focus of intensive research during the past decades. Different evidence supports a role of the gut microbiome in behavioral responses associated with pain, food intake and emotion and social interactions. Infantile colic, constipation, functional abdominal pain (FAP), and IBS are the most common functional gastrointestinal disorders (FGID). The etiology of FGID is considered multifactorial, but alterations in bidirectional brain-gut microbiota axis are believed to be involved in the pathogenesis of gut disorders such as irritable bowel syndrome (IBS) and related FGID. There are considerable gaps in our understanding of the magnitude as well as the sites, pathways, and molecular mechanisms within the gut-brain axis that are responsible for these alterations. There is limited evidence regarding alterations in microbial ecology or production of microbial-derived metabolic products in human patients with brain or brain-gut disorders. The association between dysbiosis and functional gastrointestinal disorders in children and infants has raised great interest in modulating the gut microbiota composition and activity as a promising therapeutic and preventive option. Although there are studies of different strains of probiotics in this field, *Limosilactobacillus reuteri* DSM 17938 has been the most widely studied probiotic in FGID. Its effect, specifically in abdominal pain related FGID (FAP or IBS) has been investigated in 5 randomized clinical studies in children and showing some efficacy relieving abdominal pain. More studies in this field are needed in order to confirm this effect.

Conflict of Interest: I have been speaker for Abbott Laboratories, BioGía, Carnot, Mayoly Spindler, Nestlé, Nestlé Nutrition Institute and Sanofi.

Keywords: functional gastrointestinal disorders / gut-brain axis / functional abdominal pain / probiotic

S29.2

ASSESSMENT OF DIETARY INTAKE IN SOUTHAMERICAN CHILDREN AND ADOLESCENTS

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Challenges of nutrition and public health in Ibero-America

Introduction: As other regions of the world, South America, has enough food to feed its entire population. However, with the urbanization processes and the establishment of new food consumption patterns, the food system should be more efficient, sustainable and sensitive to nutrition, especially in children and adolescents who are completing their growth and forming their food habits. The high consumption of industrialized products, with a big amount of sugar, fat and salt, is one of the most important risk factors for developing overweight, obesity and noncommunicable diseases. Several investigations have linked the consumption of sugar and fat with weight gain, an increased risk of cardiovascular disease and metabolic syndrome.

Objective: to analyse the dietary intake of South American children and adolescents.

Methods: A systematic review of studies conducted with South American children and adolescents in which food intake was analysed was performed.

Results: Studies show that, although children and adolescents' consumption of industrialized foods in the Region, and their association with overweight and obesity, is being widely investigated, it is poorly documented in the available literature. The studies showed that food habits are not adequate, highlighting the low consumption of breakfast, a below-recommended intake of fruits and vegetables and dairy products, and an excessive consumption of highly industrialized foods.

Conclusions: The inadequate food habits of children and adolescents in South America and the sedentary lifestyle and lack of physical activity, are risk factors for overweight and obesity, as well as for noncommunicable diseases.

Conflict of interest: The author has nothing to disclose.

S29.4

CARDIOMETABOLIC RISKS AT AN EARLY AGE: ARTERIAL HYPERTENSION AND SCREENING METHODS

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Challenges of nutrition and public health in Ibero-America

South America deals with multiple malnutrition burdens. Although malnutrition has declined in recent years, it is still present especially in the most vulnerable sectors. On the other hand, overweight and obesity in this region are among the highest in the world. The prevalence has increased mainly due to a high consumption of energy dense diets, rich in fats and sugars and low physical activity, consequence of the rapid urbanization and economic development that these countries are undergoing. The increasing prevalence of overweight and obesity in children and adolescents, has led to an increase in the prevalence of hypertension (HT). Early HT is one of the main predictive factors of HT in adults, a major risk factor for cardiovascular events. Despite the clinical relevance of this condition, HT in childhood is under-diagnosed. This is mainly because the diagnostic procedure in children is quite complex, involving the use of percentile reference tables according to age, gender and height for both systolic and diastolic blood pressure. Several authors have developed equations to simplify the detection of high blood pressure in children and adolescents; they include height in their formulation and have been validated in several populations. We tested four of these formulas to determine which was the best one screening high blood pressure in children and adolescents from South America: the Blood Pressure to Height Ratio (BPHR), the Modified BPHR, the New Modified BPHR and the Height Based Equation (HBE). The HBE equation showed the maximum sensitivity (100%) in children, both for boys and girls, and showed the best performance results, with a very high Negative Predictive Value (>99%) and high Positive Predictive Value (>60%) except for female children (53.8%). In adolescents, the highest sensitivity (100%) was achieved with the New Modified BPHR for both genders. Kappa coefficients indicated that HBE had the highest agreement with the gold standard diagnostic method (between 0.70 and 0.75), except for female children (0.57). Simplified methods are friendlier than the percentile gold standard tables. The HBE equation showed better performance than the other formulas in this South American population.

Conflict of Interest: I declare I have no conflict of interest

S30.1

BIOELECTRIC IMPEDANCE ANALYSIS IN MODERN TIMES: ANALYZERS, THEIR FUNCTIONS AND POSSIBILITIES

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Challenges of nutrition and public health in Ibero-America

Bioelectrical impedance analysis arose with cumbersome large (TOBEC) machines, evolving to portable, valise-sized instruments, and most recently numerous innovations have been incorporated into increasingly compact and user-friendly modules with novel features, representing a new generation.

To illustrate applications in the laboratory and field settings that have been explored recently in Guatemala in CeSSIAM or in collaborations with an assortment of innovative

instrumentation and to project to limitless potential applications.

At CeSSIAM, we have five new generation instruments among four models seeking validation, calibration and exploratory application. These include: two mBCA 525 (ethnicity specific) (SECA, Hamburg, Germany) and 1 each of QUANTUM V (segmental), REAL TIME QV (continuous, interval-recording) and LEGACY ("pocket-sized") (RJL Systems, Clinton Township, MI, USA). Demonstrations and studies involving from 5-111 subjects have been conducted. Additional anthropometric measures variously including standing height, weight, waist-circumference and wrist-circumference (frame-size) and physical activity estimations are variously required. Variables output comes from manufacturers' software with 23 discrete, routine variables from the SECA series and 35 variables from RJL Systems basic tetrapolar configuration and 119 with octapolar, segmental configuration. They cover primary resistance, reactance and phase-angle as well as subjects' fat-mass and fat-free-mass and various compartments of water. Descriptive statistics are generally calculated for the data as well as coefficients-of-variation, and Pearson and Lin coefficients.

In terms of calibrations, there are less than 5% differences in quantitative estimates of body composition variables in the same subject measured by both SECA and RJL instruments. CVs with mBCA were generally tight for the SECA variables at intervals of 4-h, 24-h and 7-d, with water/hydration being most variable. Acute ingestion of water is reflected in BIA registration. Percent body fat can be combined with BMI for more precise body-composition classification. Isolating on the lean soft tissue variable in extremities with segmental analyses promises an estimation of sarcopenic muscle loss.

Measurements of variables from both instruments are remarkably consistent and reproducible over the selected time intervals. Although the size of the samples in each series is apparently small, it proved to be adequate for the test-retest demonstrations in every single group of participants.

Conflict of Interest: No conflict of interest.

Keywords: body composition / bioelectric impedance analysis / BMI / Guatemala.

S30.2 & S30.3

BIOELECTRICAL IMPEDANCE ANALYSIS (BIA) AND BODY COMPOSITION IN TERMS OF FAT AND LEAN TISSUES

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Challenges of nutrition and public health in Ibero-America

BIA has been used to assess fat and lean mass to estimate body composition for clinical, wellness and investigative purposes. Emerging applications, as exemplified here, include the use of this technology to explore the interactions between adipose tissue, inflammation and iron metabolism, by accurately quantifying fat tissue.

This summary's objective is to present evidence of the advantages of using BIA as a diagnostics tool to classify

research subjects into precise body composition categories, based on a combined %Body Fat (%BF) and body mass index (BMI) criterion.

Height, weight and BMI were determined in 111 women aged 19-68y from Sololá, Guatemala. Participants were allocated into 3 groups: "normal", "overweight" and "obese", according to WHO BMI categories. Their %BF was measured on a SECA mBCA 525 BIA instrument and estimated by two methods: BIA and predictive equations.

Participants (median: 35y, 60.45Kg and 148cm) were equally divided (n=37 per group) and classified in three combined BMI and %BF categories (medians): "normal" (23 kg/m², 32%), "overweight" (27 kg/m², 39%) and "obese" (31 kg/m², 46%). Pearson correlation for BMI vs %BF was r²=0.64 (p<0.001). Average BIA-measured %BF was 3.2 percentage-points higher than the theoretical association from the Gallagher (2000) and Deurenberg (1991) predictive equations derived from BMI alone. In a practical application, we employed internationally-recognized criteria for maximum %BF in normal-weight and minimum %BF in obesity, from our BIA outputs, to impose a dual criterion (BMI plus appropriate body fat) in selecting 11-subject comparison groups for a study on iron status, inflammation and body adiposity.

In this population, women of normal weight are not necessarily "lean"; however, almost all women classified as obese by BMI had elevated adiposity by both universal and conditional body fatness criteria. A combined criterion of BMI and %BF allows higher specificity in the assessment of body composition. The latter is fundamental in a biological context, especially when it comes to metabolic studies that require precise discrimination and definition of body adiposity.

Conflict of Interest: No conflict of interest.

Keywords: Bioelectrical Impedance Analysis / BMI / %BF / percent body fat / fat composition / Guatemala

S30.4 & S30.5

BIA, BODY WATER AND HYDRATION STATUS

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Challenges of nutrition and public health in Ibero-America

The hydration status can be affected by water intake, temperature and physiological status, among other factors. Electric Bioimpedance Analysis (BIA) is a reliable approach to measure Total Body Water (TBW) and Extracellular Water (ECW) thus to obtain hydration% (Hydration%=ECW/(TBW-ECW)*100). The objective was to describe the principles and experiences of using BIA to measure hydration status and to identify the most important findings derived from BIA studies conducted by CeSSIAM in Guatemala.

Four hydration status studies, using BIA Seca® 525 were reviewed: 1) Comparison of lactating women (LW) and non-lactating women (NLW); 2) Evaluation of a Pre-Post hydration intervention with 2L of water, 3) Comparison of LW from different climates: Caribbean and Western Highlands, including Urinary Osmolality (Uosm) biomarker 4) Comparison of BIA and other urinary biomarkers such as Uosm, Urinary Density (Usg) and Colorimetry (Ucol) in LW

from the Caribbean. Uosm was measured using the Vogel Löser model 8158 osmometer, Usg measured by Fisherbrand handheld analog clinical refractometer model 12-561-341, and Ucol using 'Hydration for Health' 8-point chart developed by Lawrence E. Armstrong.

The hydration status medians from BIA were 75.9% and 75.8% for LW and NLW respectively, with no significant differences (p=0.931). The opposite was shown when evaluating the Pre-Post water consumption, finding medians of BTW of 27.9L(Pre) and 29.3L(Post) (p=0.000). In the case of hydration status from LW from different climates assessed by BIA and Uosm results shown: 77.74% (Caribbean) vs. 76.30% (Western Highlands) (p=0.209), and 697.5mOsm/Kg (Caribbean) vs. 573mOsm/Kg (Western Highlands) (p=0.089) respectively. Regarding the comparison between BIA and additional urine biomarkers in LW, relationship was positive for Usg(0.007) and no relationships were found for Uosm(p=0.051) and Ucol(p=0.076).

For the population assessed, BIA results shown only a difference in hydration status after water consumption. BIA have shown to be useful, easy-to-use and a non-invasive approach for measuring hydration status in different populations and contexts.

Conflict of interest: There is no conflict of interest to report.

Keywords: Hydration / BIA / total body water

S30.6

USE OF SEGMENTAL BIA FOR SARCOPENIA (SENESCENT MUSCLE LOSS) ASSESSMENT

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Challenges of nutrition and public health in Ibero-America

During aging the human being undergoes senescent changes of organs and body systems. At the skeletal muscle tissue level there is a progressive loss of mass and strength known as Sarcopenia. Studies conducted using Segmental Bioelectrical Impedance Analysis (BIA) have detected muscle loss in elderly adults.

This summary's objective is to describe the results and experiences in the application of segmental BIA for the detection of senescent muscle loss.

Evaluation of body composition through segmental BIA Quantum V (Segmental) RJL Systems® and anthropometry were conducted with 47 elderly men (≥60 years) from the municipality of Nahualá, Sololá, Guatemala. Percentage of segmental lean soft tissue (LST), considered to represent skeletal muscle in the limbs, fat mass (FM) and muscle density in lower extremities were calculated. Muscle density is a variable created by dividing, LST in Kg and leg length, derived from a sagittal photograph applied to the measured standing height, expressed in cm. In addition, field experiences in the use of segmental BIA were described.

The distribution of LST % was: 58% in torso {representing vital organs}, 31% in lower limbs and 11% in arms. For FM, 64.5% in the torso and 35.5% among the 4 extremities. The median estimated lower extremity muscle density was 0.59

kg/cm, without a difference between legs. Using Pearson's regression, we found a significant and negative association between advancing age and LST for both legs (right $r = -0.457$, $p = .001$, left $r = -0.478$, $p = 0.001$). A good control of the participants is important as the Segmental BIA RJL Systems® only handles codes, not subject names. Physical activity levels were self-reported and adapted to the context, with most elders self-claiming "heavy exertion."

In the population assessed, muscle mass in lower limbs has been preserved and muscle density is inversely related to age increasing. For future studies it is suggested to include other variables (e.g. grip strength and physical activity) that may provide more information about Sarcopenia.

Conflict of interest: No conflict of interest.

Keywords: Sarcopenia / Segmental BIA / Lean Soft Tissue / muscle loss/ aging/Guatemala

S31.1 OBESITY AND MICROBIOTA

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Nutrition in the prevention and treatment of chronic diseases

Obesity is a serious public health concern that is alarmingly growing in the population around the world. It is widely accepted that high levels of body mass index (BMI), comprising a high range between overweight and obesity, can promote a risk of developing non-communicable diseases, such as metabolic syndrome, cardiovascular and musculoskeletal disorders, type 2 diabetes, non-alcoholic fatty liver disease, and certain type of cancers, leading to high rates of mortality. Indeed, obesity and its comorbidities are characterized by a low-grade chronic inflammation status. On the other hand, according to the research in the last decade, there must be an interaction between nutrients and the gut microbiota; therefore, gut microbes might play a crucial role in the regulation of host metabolism. Thus, in the context of obesity and related metabolic diseases, the gut microbiota could be proposed as an interesting therapeutic target to avoid inflammation disorders. In addition, microbiota may contribute to significantly facilitate food digestion through enriching genes in metabolizing carbohydrates, vitamins, short-chain fatty acids and amino acids, leading to homeostasis, as well as to a balanced energy metabolism and immunological status. The colon is well-known to contain the highest density of microbes, so that easily sampled using faeces is the most widely studied gut site to evaluate microbiota composition and the risk of obesity. High fat/carbohydrate ratio diets are capable to programme gut microbiotas predominating Firmicutes (Clostridium), Prevotella and Methanobrevibacter, although deficient in beneficial genera/species such as Bacteroides, Bifidobacterium, Lactobacillus and Akkermansia. Reduced amounts of beneficial microorganisms also inhibit fasting induced adipocyte factor expression leading to dyslipidemia. Moreover, altered gut microbiota is associated with decreased

expression of short-chain fatty acids that maintain intestinal epithelial barrier integrity, reduce bacterial translocation and inflammation, and an increased expression of hunger-suppressing hormones. In this sense, the synergy of high-fat diets and dysbiosis could be responsible of a recipe that epigenetically programmes the host for an increased adiposity as well as serious inflammation processes.

Conflict of Interest: The authors declare no conflict of interests.

Keywords: inflammation/gut microbiota/obesity

S31.2 DOWN SYNDROME AND OBESITY

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Nutrition in the prevention and treatment of chronic diseases

Down Syndrome (DS) is a human genetic disorder due to the triplication of chromosome 21 that is associated with several chronic pathologies, such as cardiovascular diseases, obesity, diabetes mellitus or Alzheimer, together with a variety of dysmorphic physical characteristics, and immunodeficiency. On the other hand, inflammation has been related to obesity. In fact, adipose tissue excess is capable to lead to elevated inflammatory biomarkers, although there is still a lack of knowledge on children and adolescents, particularly in a very special group such as subjects with DS. Recently our group has observed in a total of 502 children and adolescents (101 with DS) aged 10–20 years-old, that adolescents with DS showed higher levels of BMI, waist-to-height-ratio (WHTR), waist circumference, and body fat percentage (BF%) than the control group, and Galactin-3 and adiponectin levels were lower in DS than in controls. BMI was positively correlated with insulin and negatively with adiponectin in both groups and WHTR was positively associated with C3 and C4 as well as with leptin levels. In the total sample, 64.5% adolescents showed visfatin levels below the detection limits. However, DS participants within visfatin detectable group showed higher visfatin levels than controls. It is interesting to highlight that BMI positively correlated with TNF- α and cortisol in the control group and negatively with visfatin in the DS group. Nevertheless, no direct association was found between BF% and leptin levels in DS group, different outcome from that found in the control group. Our results we could suggest that this chromosomal alteration may exert metabolic modulator effect on variables such as leptin. Thus, it seems that adolescents with DS may show a peculiar inflammatory and metabolic behaviour, different from control subjects at the same age.

Conflict of Interest: The authors declare no conflict of interests.

Keywords: inflammatory biomarkers/ children and adolescents/ Down syndrome/fatness

S32.3

EFFECTS OF NO-CALORIE AND LOW-CALORIE SWEETENERS ON INTESTINAL MICROBIOTA

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Safe, healthful and sustainable food

The consumption of sugars, mainly as sucrose and glucose-fructose syrups, has dramatically increased worldwide and growing concerns about their adverse effects on health and metabolic diseases, such as metabolic syndrome, cardiovascular diseases, and type 2 diabetes (T2D), have motivated people to reduce the consumption of free sugars. Sweeteners are sugar substitutes that mimic the sweet taste of sugar but have a negligible impact on energy intake. Non-nutritive sweeteners (NNS) include both synthetic sweeteners (acesulfame K, aspartame, cyclamate, saccharin, neotame, advantame, and sucralose) and natural sweeteners (thaumatin, steviol glycosides, monellin, neohesperidin dihydrochalcone, and glycyrrhizin) and nutritive sweeteners (NS) include a number of polyols or sugar alcohols. The recent scientific evidence indicates that within NNS only saccharin, sucralose and steviol glycosides change significantly the composition of the gut microbiota although those changes have not been related to specific health derangements in humans. Low-calorie sweeteners such as isomaltose, maltitol, lactitol, and xylitol, can reach the large bowel and increase the numbers of bifidobacteria in humans. Although we usually refer to the different low and no calorie sweetener (LNCS)) as if they were a single molecule, it is well known that they do not share their absorption, distribution, metabolism and excretion profiles. Therefore, extrapolation of the effect of a particular LNCS on the intestinal microbiota to all LNCS is inappropriate. Hence, further research on the effects of each sweetener on the composition of the human gut microbiome is necessary.

Conflict of Interest: Angel Gil is President of the Iberomeric Nutrition Foundation

Keywords: nutritive sweeteners, non-nutritive sweeteners, sweetening agents, table top sweeteners, microbiota

S33.1

WHAT DO EAT A CHILD WHO DOES NOT EAT...

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Nutrition in the prevention and treatment of chronic diseases

Feeding Difficulty (FD) is generally defined as any problem that negatively affects the child's feeding process by parents

or caregivers. Describes many behaviors such poor appetite, selective intake and phobia, and misinterpreted observation by parents or health professionals. Picky eaters and sensorial issues determine poor nutritional intake and parents fear of children being malnourished or diseased. Regardless of the source of the complaint, caregivers seek to resolve the situation using strategies that often involve coercive methods and compromise interaction with their children, further aggravating food difficulties.

The main origin of the FD can have a decisive influence on the weight-height impairment that accompanies the food complaint. An organic cause obviously leads to important changes in growth and appetite. Environmental and behavioral causes, in turn, impact on food refusal with less influence on growth patterns. The insufficient consumption of some nutrients by children with FD has also been demonstrated. Selectivity does not always lead to consumption below the recommendations for the entire set of nutrients; this aspect depends on the type and degree of selectivity. Often, when evaluating specific nutrients or groups, one can find low, normal or even excessive intake. Based on data of our FD clinic, children with FD have adequate consumption of macro and micronutrients at the expense of compensatory consumption of milk in exaggerated volumes with excessive protein consumption, a factor that reassures caregivers, but which - on the other hand - may end up perpetuating the food complaint, in a compensatory way. The number of preparations (not food) that are accepted by children with FD is higher than those initially referred by parents. It is very important to observe the daily registered intake and not only the complaint that the child does not eat at all.

Conflict of Interest: speaker for Abbott, CPW, Danone, Nestlé and Novo-Nordisk

Keywords: feeding difficulties, micronutrients, protein, nutritional status

S33.2

PROMOTING THE CONSUMPTION OF FRUITS AND VEGETABLES: THE PROFRUVE PROGRAM

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Nutrition in the prevention and treatment of chronic diseases

The main objective of the PROFRUVE study was to evaluate the effectiveness of a TPB-based intervention program at increasing fruit and vegetable (FV) consumption in schoolchildren aged 7–10. Eight eligible classrooms of one school were randomly assigned to the intervention (classrooms n=4; children n=90) or control group (classrooms n=4; children n=95). The intervention group received 14 sessions of 1 h during an academic year (from October to June) but the control group did not. Sessions were based on the Theory of Planned Behavior (TPB) and focused on modifying FV intake. FV consumption and the evolution of FV choice determinants were evaluated before, shortly after and 1 year after intervention ended using validated 7-day food

records and questionnaires. FV intake increased significantly only in the intervention group (+ 0.45 servings/day; 95% CI 0.17–0.74; $p = 0.001$) shortly after intervention. The effect was maintained 1 year after intervention (+ 0.52 servings/day from baseline; 95% CI 0.22–0.78; $p = 0.003$). The intervention program produced stronger changes in Attitude and Perceived Control toward FV intake in the intervention group (+ 0.38 points; $p = 0.000$ and + 0.41 point; $p = 0.000$ respectively) while slightly attenuated Subjective Norms in the control group (- 0.15 points, $p = 0.063$). TPB model SEM analysis showed that changes in FV intake Intention of the intervention group were well predicted by changes in Subjective Norms and Perceived Control after intervention and 1 year after (R^2 0.562 and .429 respectively).

PROFRUVE program had a moderate effectiveness in increasing FV intake and successful in maintaining the effect one year after. Changes in FV intake TPB determinants seem involved in changes produced by the program.

Conflict of Interest: Author declare no conflicts of interest

Keywords: Fruit and vegetables intake / children / eating behavior / intervention program

S35.2 CHILDHOOD OBESITY, A GLOBAL PROBLEM FROM WHICH MEXICO DOES NOT ESCAPE

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Challenges of nutrition and public health in Ibero-America

The prevalence of individuals with overweight/obesity is at an all-time high and is increasing across the globe. Children Obesity is one of the most current problems that impacts over the health. Childhood obesity is particularly concerning as it is a strong predictor of obesity during adulthood, and to develop noncommunicable diseases like diabetes and cardiovascular diseases at a younger age.

One of the factors that is needed to address is the country's food environment that has been transformed as a result of economic growth and free trade agreements.

According to the OCDE, Mexico is one of the most concerning cases. More than 70% of the Mexican population is overweight (compared to one-fifth of the population in 1996).

Data from the National Health and Nutrition Surveys in Mexico shows that overweight and obesity increased in children, the prevalence doubled from 8.9% in 1999 to 17.515% in 2018-19. Currently one out of three children have overweight or obesity (35.6%), this condition is affecting Mexico's economic performance. Overweight and obesity, as well as their related diseases, are largely preventable. Prevention of childhood obesity therefore needs higher priority. Primary maternal and childcare interventions and improvements in water access and sanitation, are priority base of the prevention of overweight and obesity. Mexico's government has taken substantial steps to address this enormous challenge. It has introduced taxes on sweetened drinks and high calorie non-essential foods and recently a

front-of-pack labelling system for food and beverages aimed to help the consumers in making healthier food choices.

Conflict of Interest: I declare no conflict of interest

Keywords: Children obesity, food intake, policies, Mexico

S35.3 FEEDING BEHAVIOUR AND THEIR RELATION TO BODY WEIGHT

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Challenges of nutrition and public health in Ibero-America

Background and objective: Feeding behavior is characterized as the set of actions that an organism performs to feed itself, emphasizing the act of eating and drinking. In this sense, eating behavior is decisive in health and disease conditions. In other words, the how, when and with which organisms feed is reflected in their state of health. A diet based on fatty, sweet and hypercaloric foods has been shown to result in increased body weight; on the contrary, a balanced diet is reflected in an adequate body weight; finally, a caloric and nutritionally deficient diet results in loss of body weight. This becomes relevant when identifying that an unhealthy body weight leads to the development of chronic degenerative diseases that are not transmissible (p. eg. obesity, diabetes mellitus 2, among others. Although current dietary perspectives aim to promote healthy eating behaviors by promoting various diets, the majority of the population continues to eat unhealthy. Therefore, the objective of this research is to analyze eating behaviors and their relationship with body weight in a group of infants from various regions of Mexico.

Methods: The methodology to develop the reference values will be through Cole & Green's LMS method and Box-Cox transformations with the Statgraphics program.

Results: Create a scientific instrument that allows measuring and understanding one of the current consequences of eating behavior on body weight.

Conclusions: Body weight is an indicator of health, so both a low weight and a higher weight than expected according to sex and age, is a predictor of other pathologies. Understanding eating behavior and factors that reinforce unhealthy habits allows generating more effective strategies for body weight control and thereby reduce the probability of developing chronic degenerative diseases.

Keywords: Food behavior, eating behavior, body weight, health.

S36.1

MODELO ECOSOCIAL PARA EL ABORDAJE DEL ESTUDIO DE LOS AMBIENTES ESCOLARES

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Challenges of nutrition and public health in Ibero-America

Efforts by health systems have been insufficient to contain the obesity epidemic in the world. Among the reasons identified as the cause of the low effectiveness of intervention actions in the field of nutritional health promotion, the following stand out: that the actions do not have a theoretical basis, are detached from the reality of the target population, and that these actions have as final objective the individual. In this framework, both the situational diagnosis of the context in which obesity develops, and the design of interventions, requires a theoretical basis and a conceptual framework that allows understanding the processes underlying this phenomenon. In this sense, the Ecosocial Theory is one of the alternatives to visualize the phenomenon of obesity as a biological result of social processes. The problem of the quality of school environments, as a subject of study, is very complex due to the large number of actors involved in its definition and the diversity of levels of organization in which they are immersed. This theory is ideal for the study of school environments given the need to know the ecological dimensions of social-environmental influences. Moreover, this theory gives us elements to generate interventions with high feasibility for its development and with a high probability of having an impact on the variables and processes that define school environments.

Conflict of Interest: I declare no conflict of interest.

Keywords: Eco-social theory / School environments / Obesity / School-Children

S36.2

THE IMPROVEMENT OF SCHOOL ENVIRONMENTS, FROM CONTROLLED TESTS TO PUBLIC POLICIES

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Challenges of nutrition and public health in Ibero-America

The World Health Organization (WHO), in response to the increase in childhood obesity and the consequences that it brings to the health of children and adolescents, has proposed measures and recommendations to counteract obesogenic environments, with the school being one of the environments more important to generate healthier lifestyles.

The interventions that have been carried out in educational establishments have consisted of incorporating nutritional food education into the classroom, increasing the

availability of fruits and vegetables; generate policies that establish limits for the critical nutrients of food, provide economic incentives in the choice of food within schools and perform quality recreational sports activities.

Despite the apparent advantages of addressing obesity in schools, the lack of evidence on the effectiveness of the interventions carried out could question the desirability of allocating resources to these programs, so new studies that contribute more clearly are needed. Information on these aspects.

In Chile, the effectiveness of a comprehensive intervention in food and physical activity was evaluated, aimed at controlling the increase in obesity in children from 6 to 10 years of age, of low and low middle socioeconomic status, who attended public schools in Chile, concluding that interventions that integrate nutritional food education, healthy kiosk and quality physical activity, are more effective in reducing the ZIMC. improve physical fitness and control the increase in childhood obesity than those that address these variables in isolation.

The results of this study will guide other researchers on issues related to interventions in schools to control childhood obesity, and will serve as evidence for the generation of public policies in this area.

S36.3

FOOD EDUCATION FOR NUTRITIONAL HEALTH. SCHOOL ENVIRONMENT, MEDIA, AND MEDIATIONS

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Challenges of nutrition and public health in Ibero-America

The school age, being the one with the highest brain uptake for learning, is the privileged one for formal education and life education, such as the formation of habits, attitudes, and knowledge, which, over time, once incorporated, constitute a lifestyle, that largely determines the quality of life, which involves the conditions and health status of individuals at later stages.

Along with home or family, school is considered the most important environment for the formation of a schoolchild, and in it, not only the thematic knowledge transmitted from the academic programs by areas of knowledge similar to geography, social or mathematics is important, but how they are treated in and out of the classroom, that is, the means with which they are intentionally addressed in class, and how they are presented by each teacher, such as those that in a natural way flow as messages from the social environment, through interaction with other people, with advertising, with social dynamics, with spaces or events, that facilitate the student relating to previous experiences and knowledge to reach conclusions and make decisions for their own life and immediate environment.

The educator for nutritional health must be fully aware of the scope of his actions and must guide them wisely. The difference between information, communication and

education is based on the scope, intentionality, objectives, and strategies used; therefore, to discern about the school environment and its influences, to use the available or required means in a relevant and appropriate manner, as well as the role of significant adults as mediators and other individuals, is their challenge.

Conflict of interest: none

Keywords: Nutrition Education / school environment / educational media / pedagogical mediations.

S36.4

PERSPECTIVES AND DIAGNOSIS OF AN OBSERVATORY FOR NUTRITIONAL HEALTH IN SCHOOLS FROM LATIN AMERICA

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Challenges of nutrition and public health in Ibero-America

The school environment is relevant in childhood health and development. The school's food environment has been identified in the causal link of childhood obesity and it has been recognized some practices and actors are involved in this environment negatively influence the environment and could contradict of tendering set rules aimed to for achieve healthy eating environments. Therefore, it is necessary to study and address the causes that generate the high availability of unhealthy foods and the low-level supervision of food environments. Faced with these challenges, virtual and real-time surveillance systems, such as observatories, can be useful tools that contribute to the description and detection of problems and needs of school environments, as well as the monitoring and progress of the quality of environments food and, in turn, build research and information exchange space between specialists and decision makers in the area of nutritional health. The construction of a virtual observatory for nutritional health in schools aims to integrate surveillance of school food environments through an international collaborative work platform that collects and integrates information on the status of the quality of school food environments and contributes to compliance with regulations. In addition, to provide conceptual and methodological consensus to broadcast intervention models and propose public policies for the improving the school environment from Latin American countries.

Conflict of Interest: without any conflict of interest.

Keywords: food environment, school health, nutritional health, observatory.

S37.1

SARCOPENIA: DEVELOPMENT AND NUTRITIONAL TREATMENT

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Nutrition in the prevention and treatment of chronic diseases

Sarcopenia is a multifactorial disorder that appears in geriatric age. Characterized by a progressive and widespread loss of skeletal muscle mass and strength with the risk of producing negative effects such as physical disability, deterioration quality of life, loss of autonomy and greater morbidity and mortality. At 75 years old, 50-55% of men and 45% of women present it. Although the epidemiological variability is mainly due to the method and cut-off points used for diagnosis, it affects women more than men.

Suboptimal protein consumption is common in the elderly, the recommendation of 0.8 g / kg is insufficient, it has been observed that ingestion of 1.2 g / kg weight / day decreases muscle mass loss by 40%. The protein source is important, protein animals have a higher content of Leucine and have a rapid absorption kinetics, being more effective in stimulating muscle deposition. A recent meta-analysis confirmed that leucine can increase muscle protein synthesis in the elderly and that its consumption is directly related to muscle mass retention. One of its metabolites, β -hydroxy β -methylbutyrate (HMB), has been proven effective in improving muscle mass and strength in older adults, even immobilized. There is a decrease in their age-related concentrations, so supplementation with HMB in older sarcopenic individuals is justified.

Vitamin D supplementation in subjects with sarcopenia can have positive effects on muscle performance and strength, improve the composition and morphology of muscle fiber.

Probiotics and prebiotics have been proposed as a treatment for sarcopenia but the evidence is based primarily on animal experimentation studies.

Conflict of Interest: The author declare no conflict of interest.

Keywords: Sarcopenia / nutrition/ older people.

S37.2

DIFFICULTIES IN DIAGNOSTIC AND ESTIMATION OF THE SARCOPENIA PREVALENCE: USEFUL METHODS

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Nutrition in the prevention and treatment of chronic diseases

Although it is know that a large proportion of elderly people are sarcopenic, there are large differences in the estimated prevalence in different studies. Regardless the different diagnostic techniques, the cut-off points and the criteria have changed in recent years. When muscle strength is considered as an indicator of sarcopenia, handgrip strength is used for its determination. However, different techniques and indexes have been used to assess muscle mass, so it is difficult to compare different studies. The problem is compounded by differences in the cut-off points applied in the studies for both strength and muscle mass. Keep in mind that

cut-off points depend on the measurement technique and the availability of reference population data.

The estimated sarcopenia prevalence may significantly vary depending on differences in the criteria and algorithms used in the diagnosis, different techniques, and different cut-off points used. It is important to note that large variations in the estimation of the sarcopenia prevalence may have significant implications in clinical research. This is a key point for developing preventive strategies in order to improve the quality of life of the elderly.

Conflict of Interest: No declared.

Keywords: Sarcopenia, Elderly, Diagnosis

S37.3 APPLICATION OF IMPEDANCE IN THE DIAGNOSIS OF SARCOPENIA

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Nutrition in the prevention and treatment of chronic diseases

Bioelectrical impedance analysis (BIA) is a simple, fast, cheap, cost-efficient, safe, non-invasive, harmless method that does not require patient collaboration. In addition, it is considered a good alternative to DXA for the body composition analysis, so it is increasingly used in clinical practice.

There are two main BIA modalities: conventional or traditional BIA and bioelectrical impedance vector analysis (BIVA). The first is based on a two-compartment model of body composition, and requires the use of validated predictive equations developed in populations with clinical and biological characteristics similar to the study population (sex, age, race, physiological situation, pathology, etc.). This requirement is especially important in the elderly, given the changes that occur with age. Sometimes the lack of reference standards (and cut-off points) age and sex specific for the geriatric population makes it difficult to interpret the results. This modality has also been used to develop predictive equations for estimating skeletal muscle mass and appendicular skeletal muscle mass, two indicators used in the diagnosis of sarcopenia.

BIVA is a semi-quantitative analysis method which allows to evaluate body cell mass (BCM) and hydration status. Several studies have shown in geriatric population a significant association between the results obtained with BIVA and conventional BIA and other nutritional indicators, such as the Mini-Nutritional Assessment (MNA) and the Subjective Global Assessment (SGA). Recent works propose the application of this technique for the identification and follow-up of sarcopenic individuals

Conflict of Interest: No declared.

Keywords: Sarcopenia, Elderly, Diagnosis, Impedance

S38.1 MICROBIOTA AND CANCER

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Nutrition in the prevention and treatment of chronic diseases

Our gut microbiota is known to exert a plethora of beneficial effects. Among others, the microbes residing in our intestine 1) strengthen the gut barrier; 2) produce short-chain fatty acids, vitamins, neurotransmitters, hormones, fungicide and bactericide molecules; 3) influence organs such as the liver and the brain; and 4) modulate the immune system. The alteration of the healthy microbiota, referred to as dysbiosis, is related to many different diseases, including cancer. The relationship between cancer and microbiota is not surprising considering that the latter may also induce deleterious effects¹. Also, more important as a cancer risk and promoting factor than the microbiota composition is its functionality. Several possible mechanisms have been proposed to understand the microbial influence on cancer. The capacity of the microbiota to induce chronic inflammation and the capacity of specific bacterial species to damage the DNA double helix are mechanisms applicable to cancer in general. The collection of enteric microbial genes whose products are capable of metabolizing estrogens and androgens (the so-called estrobolome and androbolome, respectively) is a mechanism specifically related with hormone-dependent cancers, such as breast and prostate cancers.

To study the relationship between cancer and microbiota we are currently carrying out a case-control clinical trial². To date, we have recruited 100 women affected of early stages of breast cancer (cases) and 44 healthy women (controls). Women are providing samples of urine, feces and mammary tissue. Metagenomics and metabolomics are being performed to ascertain the microbiota composition and its functionality, respectively, in both breast tissue and feces. Environmental contaminants are being analyzed in urine samples. Results obtained so far from a subset of 25 cases and 25 controls will be presented in this lecture.

¹Fernández MF, Reina et al. *Int J Environ Res Public Health* 2018; 15: 1747. doi: 10.3390/ijerph15081747

²Plaza-Díaz J, et al. *BMC Cancer* 2019; 19: 495. doi: <https://doi.org/10.1186/s12885-019-5660-y>

Conflict of Interest: None to report.

Keywords: Androbolome / Cancer / Dysbiosis / Estrobolome / microbiota

S38.2 ENDOCRINE DISRUPTORS AND GUT MICROBIOTA

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Nutrition in the prevention and treatment of chronic diseases

Human are continuously exposed to environmental chemicals that have adverse effects on their hormone homeostasis, the so-called endocrine disruptor chemicals EDCs, which interfere with the synthesis, secretion, transport, binding, action, and/or elimination of natural hormones in the body. Hormones are responsible for the maintenance of homeostasis (normal cell metabolism), reproduction, development, and/or behavior. Some of these effects could be mediated by human microbiota. There is growing scientific evidence indicating that the microbiota plays a critical role in human health, and there is a clear link between intestinal microbiota and many of the most common chronic diseases, from obesity and diabetes to depression and Parkinson disease and different kinds of cancer. Growing evidence also points out that the human gut microbiota interacts with xenobiotics, such as EDCs, which may lead to the disruption of the microbial community structure and the decrease in signaling pathways compromising microbiota's functions¹. However, biological understanding of the interaction between these environmental pollutants on gut and/or breast microbiota is limited, not to mention their combined effects².

The aim of this study is to determine the presence of several non-persistent EDCs (three bisphenols, four parabens and five benzophenones) in urine recruited from women included in a currently ongoing case-control clinical trial², and to ascertain whether the physiological balance of human gut microbiome is affected by the presence and degree of exposure to EDCs. We will also investigate whether EDC exposure can induce systemic and pathological effects on the gut microbiota functionality, assessing, for example, whether pollutant disturbances may promote the establishment of a pro-inflammatory state in the gut. To date, we have recruited 100 women affected of early stages of breast cancer (cases) and 44 healthy women (controls). In addition to urine samples, women are providing feces and mammary tissue. Metagenomics and metabolomics are being performed to ascertain the microbiota composition and its functionality, respectively, in both breast tissue and feces. Results obtained so far from a subset of 25 cases and 25 controls will be presented in this lecture.

¹Cruz et al. Environ Pollut 2020; 260: 113920. <https://doi.org/10.1016/j.envpol.2020.113920>

²Fernández MF et al. Int J Environ Res Public Health 2018; 15: 1747. <https://doi.org/10.3390/ijerph15081747>

³Plaza-Díaz J et al. BMC Cancer 2019; 19: 495. <https://doi.org/10.1186/s12885-019-5660-y>

Conflict of Interest: None to report.

Keywords: Endocrine disruptors / Cancer / BPA-bisphenol A / Estrobolome / microbiota

S38.3 GUT MICROBIOTA AND METABOLIC DISEASES

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Nutrition in the prevention and treatment of chronic diseases

Obesity and its complications represent one of the leading causes of morbidity and mortality worldwide. Among these complications, the metabolic syndrome (MetS) constitutes a cluster of signs and symptoms which is associated with a pro-inflammatory state and an increased cardiovascular risk. The alteration of the gut microbiota, also called dysbiosis, plays an important role in the development of the MetS, and its modification through the use of different strains of probiotics could constitute a therapeutic alternative for these patients. Recently randomized clinical trials in humans have been published to evaluate the effect of different probiotic strains on the components of the MetS. These studies have been providing controversial results. This fact may be partly due to the different populations included, diverse protocols and administration forms used, various intervention times and the type of strain administered. Our group has evaluated the effect of the probiotic strain *Lactobacillus reuteri* (L. reuteri) V3401 on anthropometric and biochemical parameters, hepatic steatosis, inflammatory biomarkers and gut microbiota in patients with MS. For this purpose, a randomized, placebo-controlled, double-blind, two-way cross-over nutritional intervention study was conducted. In this study, no differences were found between the groups in the clinical and biochemical characteristics of the MetS or the degree of hepatic steatosis; however, in the subjects who were taking the probiotic strain, a decrease in inflammatory biomarkers (Interleukin-6 and soluble vascular cell adhesion molecule 1) and an increase in *Akkermansia muciniphila* were found. More well-designed studies in humans are needed to confirm these findings.

Conflict of Interest: None.

Keywords: Metabolic Syndrome / Obesity / Probiotics

S40.1 EXERCISE, A CHALLENGE FOR THE PUBLIC HEALTH CARE SYSTEM

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Challenges of nutrition and public health in Ibero-America

In most industrialized societies, developmental changes have been described in a World Health Organization (WHO) report as motivating the onset of chronic diseases or "diseases related to development." These changes include the

transformation of patterns of eating behavior or physical activity by generating a sedentary lifestyle. Currently, physical inactivity is considered one of the main, if not the greatest, public health problem of the 21st century. All these elements have greater relevance in those populations that due to their special characteristics (lack of resources, illness, disability etc.) are more sensitive to any of these disruptive elements of health, especially inactivity. Physical Exercise is Medicine® (EIM), is a global initiative proposed in 2007 by the American College of Sports Medicine (ACSM) that aims to include physical activity as a fundamental element in the prevention and treatment of the main pathologies of the population through primary care centers. This initiative is present in all continents with a growing expansion that includes more than 40 countries. For a proper implementation, a strategic plan must be designed adapted to the healthcare system of the country. Physicians and nurses must get complementary knowledge as physical activity for health is scarcely included in their syllabus. Lack of time during consultation could be a handicap for including properly physical activity and sedentary behavior in the anamnesis of the patients. Sport scientists are currently not included among health professionals in many countries, and their integration in the multidisciplinary team seems essential for the success of EIM. Patients must be motivated to follow exercise prescription. We understand that the inclusion of this symposium at the FINUT 2020 conference is important to publicize this initiative that is present in Spain and in several Iberoamerican countries, and that it also offers possibilities for interdisciplinary collaboration with other health professionals.

Conflict of Interest: None.

Keywords: Exercise / Chronic diseases / Healthy ageing / Health care costs

S40.4 FACILITATORS AND BARRIERS FOR THE IMPLEMENTATION OF THE EXERCISE IS MEDICINE INITIATIVE

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Challenges of nutrition and public health in Ibero-America

Background: Physical inactivity is related to more than 35 chronic diseases and the fourth mortality-cause generally. Public health strategies are trying to reduce physical inactivity levels, focusing on the Health-Care sector. The self perception barriers and facilitators of Primary Health-Care (PHC) nurses and General Practitioners (GPs) were analyzed in view to design a correct implementation of Exercise is Medicine initiative (EIM) at PHC settings of the Region of Madrid.

Methods: A peer-reviewed content analysis process was developed about 4 verbalized transcribed focus groups sessions in order to design a choice-modeling Google-form questionnaire, validated later by ten experts (V'Aiken coefficient values >0.75). Each questionnaire was sent to all

PHC nurses and GPs to analyze their self-perception about physical activity on prescription (PAP) EIM implementation. The results were analyzed by Chi-squared test (SPSS, 20 version).

Results: Almost all 319 GPs (23.51% males) and 285 nurses (11.57% males) respondents showed awareness on Physical Activity (PA) health-related benefits.

GPs had 98.7% (OR:1.987) more probability to collaborate with other physicians, nurses, psychologists, physiotherapists, nutritionists, sports medicine physicians, sports scientists and school teachers in exercise prescription than nurses. Both groups approved an interdisciplinary PAP approach collaboration with nutritionists (61.58%) and Sports Scientists (60.09%), among others.

Almost all PHC responders (98.0%) showed total agreement to collaborate with some local PAP resources. Significant differences were founded between GPs and nurses in the PAP collaboration with Town Hall services, local Sports centers, Physiotherapy centers, Sport and Younger Government ($p<0.001$), schools and private gyms ($p<0.05$) and no significant differences in the collaboration with wellness centers. There was reluctance to collaborate with this one and Physiotherapist and private gyms centers. Regarding the PAP barriers proposed, significant differences were observed between GPs and nurses in lack of space ($p<0.05$) and lack of consultation time ($p<0.05$). Total agreement was observed in the self-perceived barriers regarding professional and patient PAP awareness, lack of materials and economic resources.

Conclusions: In spite of self-perceived barriers to implement exercise prescription in PHC settings both professionals are willing to collaborate with other health professionals and local resources to establish an efficient interdisciplinary EIM-PAP approach at Madrid PHC System.

Conflict of Interest: None.

Keywords: Exercise / Physical Activity / Exercise Therapy / Preventive medicine / Health Promotion / Public Health.

S41.1 FROM PSEUDOALLERGY TO HISTAMINE INTOLERANCE

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Nutrition in the prevention and treatment of chronic diseases

In the recent years, a significant increase in the incidence of food intolerances (i.e. gluten, histamine, lactose and fructose) has been observed in most developed societies, which are disabling disorders causing a noticeable loss in the quality of life of susceptible population. Histamine intolerance, also referred-to as food histaminosis or sensitivity to food

histamine, is a diet-related disorder that mainly arises from the failure of the diamine oxidase (DAO) enzyme to metabolize histamine in the intestines resulting in an increase of histamine plasmatic levels. Histamine intolerance is characterized by a wide variety of nonspecific gastrointestinal and extraintestinal symptoms (i.e. dermatological, respiratory, neurological and hemodynamic) owing to the distribution of the four histamine receptors along the different tissues and systems of the organism. This disorder, described since not long ago (70% of scientific studies have appeared during the last decade), may help explain some of the uncertainties classically associated with the well-known histamine intoxication, mistakenly called false food allergy. In this sense, interindividual differences in the clinical manifestations of an intoxication outbreak could be partially explained by this enzymatic deficit in sensitive population.

Currently, the most advised strategy to prevent the onset of symptoms is following a low-histamine diet based on the exclusion of those foods that patients relate to the onset of symptoms. This includes those products with high histamine occurrence but also some foods without histamine, the exclusion of which could be due to the presence of other diamines (i.e. putrescine and cadaverine) that being also substrate of DAO enzyme may potentiate histamine adverse health effects by enzymatic competition. Several clinical studies are gathering increasing evidence on the efficacy of low-histamine diets on the improvement or remissions of symptoms. However, the wide and variable occurrence of this amine in foods leads to highly restrictive diets and difficult patient adherence. Orally supplemented DAO enzyme has been proposed as a complementary treatment strategy to enhance intestinal degradation of histamine in intolerant individuals. Food supplements containing porcine kidney protein extract are already on the market and research is currently being performed to obtain new potential sources of DAO enzyme both of plant-origin or in the form of probiotic bacteria with histamine-degrading capacity.

Conflict of Interest: The authors declare no conflict of interest.

Keywords: histamine / histamine intolerance / low-histamine diet / diamine oxidase (DAO)

S41.2 DOES SUCROSE STIMULATE THE IMMUNE SYSTEM?

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Nutrition in the prevention and treatment of chronic diseases

Sucrose or table sugar is a combination of two carbohydrates (CHO), fructose and glucose. The WHO recommends that its consumption should be 10% of the total caloric intake (50 g / day). There is an interrelation between nutrition and the immune system, because many nutrients are considered as modulators of immune function. It has been observed that sucrose modifies the immune system. It is ingested in multiple products, foods and presentations, and

there is not accounting or estimate your daily consumption, since it is accounted as carbohydrate. To assess its effect on the immune system, sucrose was administered to CD1 mice strain, in two forms: Group 1) added to the diet (30% more) and Group 2) added to the water for daily consumption (sucrose diluted in water at 41 mg / kg of weight), for 6 weeks. T (CD3+, CD4+ and CD8+) and B (CD19+ and IgA+) lymphocytes of Blood, peyer patches, lamina propria and spleen were quantified by flow cytometry. In group 1, an increase in percentage of CD3+, CD4+, CD8+, and IgA+ lymphocytes was observed in blood, but reduced the total percentage of CD19+. In the lamina propria of the small intestine, the CD3+, CD4+, CD8+, and IgA+ lymphocytes are elevated, but reduces the total percentage of CD19+. In Peyer's patches, CD3+ and CD19+ lymphocytes decrease, with elevated subpopulations of CD4+, CD8+, IgA+, and CD45+/IgA+ lymphocytes. In group 2, lymphocytes were observed elevated in blood (11.87 ± 0.52) and Peyer's patches (30.62 ± 0.80), with reduction in Spleen (87.5 ± 0.81), compared to their controls (10.5 ± 0.89 , 74.3 ± 3.63 and 94.8 ± 7.48 , respectively). High sucrose intake may affect the immune system. In both studies, regardless of the route of administration of sucrose, its consumption reduces the percentage of CD19+ and IgA+ lymphocytes, with the consequent alteration in antibody production, either systemically or locally in the intestinal mucosa. It is necessary to evaluate your response to antibody production.

Conflict of Interest: There is not conflict of interest

Keywords: Sucrose/ Immune System/ Nutrition

S41.3 THE GUT MICROBIOTA IN RELATION TO FOOD ALLERGIES AND INTOLERANCES

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Nutrition in the prevention and treatment of chronic diseases

Adverse reactions to foods can be broadly divided into those with an immune basis, such as food allergies, and those without an immune basis, known as food intolerances, the latter with a higher prevalence in the population. In particular, food allergies involves deviation from a default state of immune tolerance (IgE-mediated) that is likely driven by antigen exposure, commensal microbiota and their interactions, whereas the etiology of food intolerances is very broad, including pharmacological mechanisms, enzyme deficiencies (e.g. lactose malabsorption), and non-specific gastrointestinal functioning. According to several studies, there is evidence about a possible situation of dysbiosis preceding the development of any type of food allergy. The gut microbiome is an important post-natal immune regulator that promotes the immune maturation of Th1 and Treg lymphocyte functions and suppresses the Th2 response. Dysbiosis, intended as a dysregulation of the microbiome, especially if present in the neonatal period, can be a main cofactor in the genesis of allergic diseases due to its role in the

disruption of immune maturation. Moreover, the fact that the gut microbiota exhibit significant age-associated changes in composition and diversity, as well as in functional features, mainly caused by a situation of low-grade chronic inflammation associated to age, suggests its possible role in the development of food allergies in adulthood. Regarding fructose and lactose intolerance, the gut microbiota seem to be also involved through the fermentation of the excessive loads of these saccharides reaching the colon, which lead to intestinal discomfort due to an increased gas production. Moreover, the high incidence of severe intestinal disorders, such as irritable bowel diseases, have promoted the design of special diets, such as the well-known FODMAP diet, that avoid the intake of fermentable oligosaccharides, disaccharides, monosaccharides and polyols that deeply affect the microbiota of sensitive individuals and may be a key factor resulting in food allergies. However, this hypothesis is still a controversial issue that requires further research.

Conflict of Interest: The authors declare no conflict of interests.

Keywords: food allergy/infant/immunosenescence/inflammaging/food intolerances

S43.2 INDIRECT CALORIMETRY

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Nutrition in the prevention and treatment of chronic diseases

Indirect calorimetry is a clinical method for the quantification of Resting Energy Expenditure (REE). It is based on the non-invasive measurement of oxygen consumption (VO₂) and carbon dioxide production (VCO₂) in the air expired by the patient. Weir equation with substitution of the measured VO₂ and VCO₂ values is Energy Expenditure (kcal/d) = [(VO₂ × 3.941) + (VCO₂ × 1.11) + (uN₂ × 2.17)] × 1440 but an abbreviated form without the urinary nitrogen (uN₂) is commonly used. Respiratory quotient (RQ) is defined as the ratio between VCO₂ and VO₂ (ie, VCO₂/VO₂) and

reflects substrate use. The complete oxidation of glucose in a given system yields an RQ value of 1.0, but the use of different substrates is associated with different VO₂ and VCO₂, and a different RQ is obtained: The oxidation of one mole of lipid consumes 2.029 moles of O₂ and produces 1.430 moles of CVO₂, so the Q is 0.69. The oxidation of one mole of protein consumes 0.966 moles of O₂ and produces 0.782 moles of CO₂, so the RQ is 0.81. From the clinical point of view, indirect calorimeters can measure REE in both mechanically ventilated and spontaneously breathing patients. For spontaneously breathing patients, a facemask or mouthpiece with a nose clip or a canopy may be used, but measurements in mechanically ventilated patients must be more accurate. The standard procedure allows a 5 min acclimation period followed by a 20 min measurement of REE. All these variables allow a less empiric decision-making process regarding the amount of energy provided to patients who need nutritional

support, as well to predict the optimal composition of the nutrition support provided.

Conflict of Interest: None.

Keywords: indirect calorimetry / nutritional requirements /

SP01.3 VITAMIN D: BIOLOGICAL ACTIONS AND GLOBAL NUTRITIONAL STATUS

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Vitamin D (VD) is essential for calcium absorption, metabolism and bone health. Besides the osteomuscular apparatus, the VD receptor (VDR) is expressed in most tissues and cells in the body. Thus, VD has pleiotropic actions related to numerous functions, from cell differentiation and proliferation to energy metabolism, regulation of the immune response and more.

The main source of VD is sun exposure, which induces photoconversion of 7-dehydrocholesterol to pre-VD. After two hydroxylations -one in the liver and another in the kidney-, the result is the steroid hormone 1,25 dihydroxyvitamin D. Extrarenal VD synthesis also occurs in the brain and by immune cells.

The product of the first hydroxylation -25-hydroxyvitamin D (25-OH-D)-, which has an average life of 2-3 weeks, is used to assess VD status. According to the Endocrine Society, a serum level of 25-OH-D <50 nmol/L (<20 ng/mL) indicates VD deficiency, while a level between 50-74 nmol/L is considered as insufficient. Levels >75 nmol/L (>30 ng/mL) are considered as sufficient. Food sources of VD are limited to milk, eggs, oily fish and some mushrooms. Fortified foods (i.e. orange juice, dairy and wheat flour) can also provide important amounts. Consumption of VD supplements varies greatly, and D3 (cholecalciferol) is preferred over D2 (ergocalciferol) due its higher potency. VD status is affected by age, gender, skin color, adiposity, latitude, seasonality and genetic variants (SNPs) of VD metabolism.

Low VD levels seem to be widespread across the globe, and VD deficiency affects most age and gender groups. Individuals more at risk are children, the elderly, overweight/obese individuals, and women. It has been estimated that one billion people could be VD deficient.

VD deficiency affects 40% of individuals in Europe; 10-46% individuals in Latin America; 30% of children and women of childbearing age in Mexico; 40% of adults in the U.S; 96% of neonates and 84% of pregnant women in India; 90% of adolescent girls and young women in China, and 30% of adults in Australia. However, nationally representative surveys are uncommon, making difficult to assess the exact magnitude of the problem. Another issue is the high variability across laboratory assay methods.

Conflict of interest: None

Keywords: Vitamin D / Micronutrients / Nutritional deficiencies / Supplements

SP01.4

AN INNOVATIVE METHOD FOR THE DETERMINATION OF VITAMIN D IN HUMAN MILK USING STABLE ISOTOPES

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Background: Most extant methods for quantifying vitamin D (vit-D) metabolites in human milk (HM) are time-consuming, cause losses during extraction and derivatization, and require large sample volume.

Objective: To develop a simple, low-HM-volume, specific, and high-sensitive assay method for the quantification of vit-D in HM using 6,9,9-deuterated-25-hydroxycholecalciferol (25OH-D3-6,19,19d3) as an internal standard (IS).

Methods: Frozen HM samples were thawed and homogenized at 37°C during 15min. Before extraction, 25OH-D3-6,19,19d3 was added to 4mL of HM (10 ppb). Fat-soluble vitamins were extracted with 8mL of acetonitrile, and then reextracted twice with 12mL of hexane: dichloromethane (4:1). Speed Vac-dried vit D and 25-hydroxylated forms were derivatized by adding 600µL of acetonitrile containing 4-phenyl-1,2,4-triazoline-3,5-dione (PTAD, 1mg/mL). The process was quenched with 400µL of water and filtered. 50µL of the sample were tested in liquid chromatography-tandem mass spectrometry (UHPLC-MS/MS) with a Kinetex (Phenomenex) C18-100X2, 1mm column.

Results: The new method uses only 4mL of HM for vit-D extraction; drying of extracted lipids have been automatized, and derivatization carefully controlled to minimize vit-D losses, that otherwise are controlled by the addition of the IS. Separation and quantitation vit-D metabolites have been optimized using UHPLC followed by quadrupole MS-MS. This method has been validated using 40 Guatemalan HM samples; the median concentrations and (ranges) in IU/L for vit-D2, vit-D3 and 25OH-D3 were, respectively: 12.8 (0-433.0); 15.5 (9.0-221.0), and 10.5 (0-44.0).

Conclusion: This innovative method provides a simple, reliable, high-sensitive methodology for measurement of vitamin D and 25OH-D forms in HM.

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SP01.6

BIOLOGICAL ROLE AND METABOLISM OF POLYUNSATURATED FATTY ACIDS

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Polyunsaturated fatty acids (PUFAs) are linear hydrocarbons of 18 to 22 carbon atoms with various double bonds and a carboxyl function, metabolically derived from the essential fatty acids linoleic (18:2 n-6, LA) and α -linolenic (18:3 n-3, LNA). The principal linoleic acid derivative is arachidonic acid (20:4 n-6, AA). The major derivatives of α -linolenic acid are eicosapentaenoic (20:5 n-3, EPA), docosapentaenoic (22:5 n-3, DPA), and docosahexaenoic (22:6 n-3, DHA) acids. LA and its long chain polyunsaturated derivatives (PUFA-CL) constitute the fatty acids commonly called "Omega-6" and the LNA derivatives as "Omega-3". All of them are formed from essential fatty acids by the action of enzymes called desaturases and elongases that are expressed mainly in the adrenal glands, the brain, the liver and about 20 other tissues, although in smaller proportion.

The main function of PUFA is their incorporation into the complex lipids of the cell membranes, contributing to their functionality. Not only do they influence their physicochemical characteristics, but some of these PUFAs also give rise to the so-called eicosanoids and docosanoids, molecules with a high level of biological activity.

Eicosanoids are intercellular chemical mediators among which are prostaglandins, prostacyclins, thromboxanes, leukotrienes, resolvins and lipoxins. They intervene in the regulation of numerous physiological processes and are therefore involved in many pathological alterations. Series 1 eicosanoids are derived from dihomo-gamma-linolenic acid (20:3 n-6); series 2 eicosanoids are derived from AA; and series 3 eicosanoids are derived from EPA. The relative proportions of the different series of eicosanoids in the body depend on the type of food. The usual diet in the Western world, based on plants and terrestrial animals, leads to the preponderance of the series 2, derived from AA. In contrast, high intake of fish leads to a significant increase in the series 3, derived from EPA. In a general way it can be said that the eicosanoids of series 2 are very active while those of series 3 tend to have less biological activity. Certain derivatives of DPA and DHA that play an important role in the resolution of inflammatory processes and in neuronal protection are called docosanoids. These include D-series resolvins, protectins and maresins.

In addition to the classical functions, PUFA are involved in the modulation of gene expression, leading to changes in metabolism, growth and cell differentiation. The mechanisms by which PUFAs exert gene expression stimulation effects are very varied, but those mediated by transcription factors called "peroxisome proliferator-activated receptors" (PPARs) stand out. These affect many cellular processes. As a whole, the actions of PUFA through the stimulation of alpha and gamma PPARs result in the improvement of the glycemic and lipid

profile, with a clear anti-diabetic and anti-atherosclerotic effect.

SP01.7 MATERNO-FETAL TRANSFER OF FATTY ACIDS ACROSS THE HUMAN PLACENTA

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There is a relatively high placental transfer of lipids in humans, and even the fetus may synthesize some saturated fatty acids and monounsaturated fatty acids from glucose. Nevertheless, the fetus requires maternal supply of essential fatty acids, linoleic and α -linolenic acids, and additionally long chain polyunsaturated fatty acids (LC-PUFA) to match the in utero accretion rate especially during the brain growth spurt. The proportions of polyunsaturated fatty acids in circulating maternal and fetal lipids differ. While proportions of parent essential fatty acids with 18 carbon atoms are lower in lipids of cord than of maternal plasma, LC-PUFA percentages are higher in cord than in maternal plasma lipids. This phenomenon was called "Biomagnification" and raised the hypothesis that LC-PUFA could be preferentially transferred across the human placenta to support the rapid accretion of LC-PUFA in nervous tissue. We demonstrated in pregnant women *in vivo*, using labelled fatty acids with stable isotopes, the preferential placental uptake and transfer of LC-PUFA from the mother to the fetus with respect to other fatty acids, and specially for docosahexaenoic acid DHA (n-3 LC-PUFA).

There is a great prevalence of obesity and gestational diabetes mellitus (GDM) in adolescents in industrialized countries. An impaired materno-fetal LC-PUFA transport occurs in pregnancies that are complicated and characterized by an abnormal placental function, as GDM and maternal obesity. A poor LC-PUFA status in the newborns of diabetic mothers could in part be responsible for the delayed brain maturity in these newborns compared to controls. Indeed, maternal diabetes during pregnancy has been reported to affect behavioral and intellectual development in the offspring. In this context, the efficiency of DHA supplementation during pregnancy could be lower, since DHA can not cross the placenta properly, and infant feeding may be essential to provide LC-PUFA to these babies. In addition, obese mothers have reduced breastfeeding rates respect to normo-weight mothers. This highlight a suitable LC-PUFA composition of infant formulas, since LC-PUFA supplementation in these babies is also a major challenge.

SP01.8 POLYUNSATURATED FATTY ACIDS LONG- TERM EFFECTS ON GROWTH, NEURODEVELOPMENT AND DISEASE PREVENTION DURING CHILDHOOD

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Long-chain polyunsaturated fatty acids (LC-PUFAs) requirements are increased in infancy and must be adequately provided through the infant diet for a healthy growth, brain, immune system and gastrointestinal development. Infants' docosahexaenoic acid (DHA, C22:6n-3) and arachidonic acid (ARA, C20:4n-6) status is provided through breast milk, where the latest is always near 0.5% of total fatty acids, and higher and more stable than DHA. In the last trimester of fetal life, and exponentially during the first 2 years of life, DHA accumulates in brain tissue, particularly in grey matter areas associated with attention, motor control and sensory integration, whereas ARA is responsible for hippocampal plasticity. Adrenic acid (AdA, 22:4n-6), is a significant component in cell membranes (nearly half of n-6 LC-PUFA in the brain and far exceed n-3 LC-PUFA content), associated to better neurodevelopment. Long-term effects of these FAs on the brain structure and functioning have been reported recently. DHA/ARA ratio of 1:1 or 1:2 in infant formulae are associated with better cognitive outcomes and healthy development, whereas ratios of 1.5:1 reduce ARA concentration in red blood cells. During early life, significant amounts of n-3 and n-6 LC-PUFAs accumulate rapidly in body tissue membranes and can modulate infant immune system and gut microbiota establishment. ARA and DHA in human milk are associated with the genus *Bacteroides*, *Enterobacteriaceae*, *Veillonella*, *Streptococcus* and *Clostridium*, bacteria producer of short-chain fatty acids (SCFA), which influence immune system and "gut-brain axis" development. In spite of last EFSA mandatory recommendation of 20-50 mg of DHA/100 Kcal (0.5-1% of total FAs), and optional for ARA, the current evidence suggest the need to add enough and adequate amounts of both, FAs to infant formulae, to guarantee healthy growth and development. This issue will be especially important for the 99% of the Native American people showing FADS haplotype A (ancestral), associated to higher requirements of n-6 FAs in the diet and lower production of DHA and ARA.

Conflict of Interest: The Symposium has been funded by DSM.

Keywords: docosahexaenoic acid (DHA) / arachidonic acid (ARA) / adrenic acid (AdA) / growth / neurodevelopment; immune system / gut microbiota / gut-brain axis / infant formulae

SP01.9**PERSPECTIVES ON THE USE OF SPOT CARDS TO PRESERVE BREASTMILK SAMPLES OF POLYUNSATURATED FATTY ACID CONTENT AMONG WOMEN IN MESOAMERICA**

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Mesoamerica is a cultural region in the Americas extending from central Mexico to the northern side of Costa Rica. Though the region has a diversity of topography, ethnicities and languages, they share a common diet where maize and legumes are major staples, hence the deficiency of substantial dietary sources and intake of essential polyunsaturated fatty acids (PUFA's).

To assess the content of PUFA's in breastmilk samples using spot-cards, among women living in countries along Mesoamerica and exclusively breastfeeding during their infant's first six months of life.

During the last 4-years CeSSIAM has carried out a series of studies involving mothers who are exclusively breastfeeding infants between 40-180 days of age, to evaluate PUFA's intake in the early stages of life. Over 150 mothers have been recruited in Guatemala, Mexico and Honduras, who provided a milk sample obtained by full-breast expression of one mammary gland, extracted with a manual breast pump and mixed. Samples were applied to cover spots of the stabilized PerkinElmer 226 five-spot RUO cards, dried at room temperature and frozen-stored until transported for analysis by Gas Chromatography-Mass Spectrometry system to Lipid Technologies LLC in Austin, Minnesota, USA. Though most of the studies have been exploratory to estimate baselines of PUFA's intake by infants in the region, there is one short-term, intervention trial involving the comparison of higher and lower doses of a supplement formulation containing docosahexaenoic (DHA) and eicosapentaenoic acids (EPA). For all groups descriptive statistics were calculated as well as Pearson, Spearman coefficients and p-values.

Thirty-four fatty acids were evaluated for all groups of women participating in all studies. Values were calculated as weight%, most of the groups evaluated showed the lowest values for several fatty acids of the omega-3 family. The group participating in the supplementation trial with DHA and EPA exhibited substantial improvement in their values for these PUFA's.

PUFA's consumption is essential to the child's growth and cognitive development, majority of the groups of women recruited, showed that their infants have a startling low ingestion of PUFA's during the first six months of life. Nevertheless, supplementation interventions can significantly increase essential PUFA's intake content.

Conflict of Interest: No conflict of interest.

Keywords: polyunsaturated fatty acids / breastfeeding / Mesoamerica

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Oral Abstract Presentations

O01

FOOD AND BEVERAGES MARKETING TECHNIQUES IN BRAND ON SOCIAL NETWORKS IN ARGENTINA

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Challenges of nutrition and public health in Ibero-America

Introduction: The food and beverages (F&B) industry uses different communication channels to spread its brands. In recent years, the Internet has allowed expanding the advertising boundary to all digital media using different marketing techniques (MT).

Objectives: To identify MT of the commercial brands of F&B most consumed in schoolchildren present in the official accounts of the main social networks.

Methods: The consumption of F&B by more than 5% of the schoolchildren of Buenos Aires City was taken according to the Nutritional Food Survey (2011). Up to 20 brands were selected for each F&B category with greater presence in the main retail. From June to July 2019, the MT used in the posts on the main social media, namely Facebook, Twitter and Instagram, were identified on the brands' official accounts.

Results: Of a total of 198 identified brands, 58% (114) have Facebook, 45% (89) Instagram and 33% (65) Twitter accounts. At the same time, 54% of Facebook accounts had posts, while Instagram had 66% and Twitter had 29%. The MT most used was the presence of the product packaging, present in more than 90% of the accounts. Posts with interaction or activities with consumers were found on 67% of Instagram accounts, 62% on Facebook and 53% on Twitter. Promotional strategies were mostly used on Facebook accounts (46%), on Twitter (37%), and to a lesser extent on Instagram (7%). The presence of advertising characters was 26% on Facebook, 20% on Instagram and 16% on Twitter. The offers were observed in 10% of Twitter and in the rest it was less than 7%.

Conclusions: Facebook was the most used social network to promote F&B. The product image was the main MT in all active accounts, followed by publications with interactions with consumers. It is essential that there are public policies that regulate advertising in digital media, specifically policies that focus on children.

Conflict of Interest: The authors declare that they have no competing interests.

Keywords: food/ beverages/ marketing/ social network/ schoolchildren.

O02

CIRCULATING CXCL14 LEVELS INCREASE UPON TWO HOURS OF COLD EXPOSURE IN YOUNG HEALTHY ADULTS: ASSOCIATIONS WITH BROWN ADIPOSE TISSUE VOLUME AND GLUCOSE UPTAKE

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Challenges of nutrition and public health in Ibero-America

Introduction: Brown adipose tissue (BAT) is metabolically active in adult humans, and has been regarded as a promising therapeutic tool for obesity prevention and treatment. One of the potential health-benefits of BAT activation is related to its function as an endocrine organ, secreting the so called batokines. In mice, the chemokine CXCL14 has been identified as one of these batokines whose secretion is increased upon cold-exposure. The increase in CXCL14 circulating levels has been associated with strong promotion of macrophage M2 recruitment, which seems to promote white adipose tissue *browning*. Whether cold-exposure increases CXCL14 secretion in humans, and the contribution of BAT to the CXCL14 circulating pool in humans is unknown.

Objectives: To analyse the effect of an individualized mild cold-exposure on CXCL14 circulating levels and its association with BAT volume and glucose uptake in young healthy adults.

Methods: A total of 29 young healthy adults (12 men, 17 women; 22 ± 2.27 years old; 25.06 ± 5.13 kg/m²) participated in the study. BAT volume and ¹⁸F-Fluorodeoxyglucose (¹⁸F-FDG) uptake were assessed after two hours of an individualized cold-exposure by an ¹⁸F-FDG Positron Emission

Tomography-Computerized Tomography (PET/CT) static scan. Blood samples were collected before and after two hours of cold-exposure.

Results: Circulating levels of CXCL14 increased after two hours of cold-exposure ($6.26 \text{ ng/ml} \pm 0.4$ vs $6.84 \text{ ng/ml} \pm 0.45$, $P=0.008$). No associations were found between CXCL14 levels before or after cold-exposure, nor the cold-induced CXCL14 changes and BAT volume or glucose uptake in young healthy adults

Conclusions: Two hours of cold-exposure increase CXCL14 circulating levels in young healthy adults, similarly to experimental rodent models. However, we observed no associations between CXCL14 circulating levels and BAT volume or glucose uptake. This suggests that CXCL14 is playing a role on the physiological response to cold in humans, but does not support a role for BAT in its secretion. Nevertheless, current limitations for the *in vivo* assessment of BAT volume and activity as well as the short-time of cold-exposure prevents to draw firm conclusions.

Conflict of Interest: There is no conflict of interest.

Keywords: BAT / batokines / browning / humans

003

COMMUNITY'S EXPERIENCE WITH FOOD AND NUTRITION ASSISTANCE DURING AN EMERGENCY SITUATION. THE HIDROITUANGO, COLOMBIA, CASE.

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Challenges of nutrition and public health in Ibero-America

Introduction: The hydroelectric mega-projects have been presented as driving forces for development by the authorities. Nevertheless, these kinds of projects bring about social, cultural, and environmental consequences from their planning stage and during their execution and conclusion. In Colombia, the construction of the Ituango Hydroelectric dam on the Cauca River had been planned as far back as the 1970s; however, actual construction work began in 2010. The project was expected to be completed by December 2018, but, in April 2018, due to the risk of landslide and flooding in the construction site, the authorities declared a state of emergency. The inhabitants of neighboring communities were evacuated and placed in emergency shelters located in the nearby areas. This scenario lasted for more than a year and caused displacement and inability to satisfy basic food and housing needs among those affected by the events.

Objectives: To know about the experience of the community with the food and nutrition assistance program in the context of the Hidroituango dam crisis.

Methods: This study is a qualitative case study. Semi-structured interviews with people from the community who received food assistance were conducted. People were inquired about their perception of the lived experience during the Hidroituango dam crisis. The data was run through

ATLAS.ti 8.0 for analysis based on defined categories and other emerging ones.

Results: The following nine main categories were defined to conduct this study: food production, food supply, food distribution, food consumption, food assistance, sanitation, food culture, vulnerable population, and perception of experience. The community recognizes that food was plentiful in the shelters from the beginning; however, they underline the importance of being included in the assistance process; taking better care of the elderly; establishing places dedicated to food preparation; taking into account their food culture in everything related to ingredients, preparation, times and portions; and the local production. They also highlight the need for continuing food security and autonomy assistance in the community once the emergency has passed.

Conclusions: Food and nutrition assistance must be contextualized to the particular circumstances of the territory during and after the emergency. The community must play a more relevant role in the processes of decision-making, which might contribute to community empowerment and sustainability once the emergency has passed.

Conflict of Interest: The authors declare that there is no conflict of interest that could be perceived as prejudicing the impartiality of the research reported.

Keywords: Assistance in emergencies/ food assistance/ risk management.

004

BREAKFAST PATTERNS IN BRAZILIAN ADOLESCENTS AND BODY MASS INDEX: NATIONAL DIETARY SURVEY 2008-2009

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Challenges of nutrition and public health in Ibero-America

Introduction: Quality of breakfast has been recognized as a relevant component to achieve adequate health growth and development in adolescence. The relationship between breakfast patterns and body mass index (BMI) in this age group needs further investigation.

Objectives: We aimed to describe breakfast patterns and its relationship with BMI in Brazilian adolescents.

Methods: A representative sample ($n = 7,425$) of adolescents aged 10-19 years was examined from the Brazilian National Dietary Survey (2008-2009). Food consumption was obtained by two non-consecutive food records. Dietary patterns of adolescents who had breakfast were analyzed ($n = 4,991$). The occurrence of breakfast was defined as an eating occasion of at least 50 kcal (209.2kJ) from any source of food between 5 and 10 a.m. Breakfast dietary patterns were derived by principal component factor analysis

of 18 food groups. Factor loadings over 0.25 were considered representative of each pattern. Varimax rotation was conducted after definition of factors. We performed linear regressions for the association between factor scores and BMI considering the survey design, and controlling for confounders (sex, age, region of the country and per capita income).

Results: Three breakfast patterns were identified for Brazilian adolescents, which explain 44.8% of data variability. The named regional pattern had positive adherence of cookies, meats, dairy products, preparations with corn, eggs, fruit juices/fruit drinks/soy-based drinks, tubers/roots/potatoes and cereals, and negative adherence of cold cut meat and savory snacks/crackers. The protein diet pattern had positive loadings for cold cut meat, milk and cheese, and negative for cookies, fruit juices/fruit drinks/soy-based drinks, tubers/roots/potatoes and cereals. Traditional Brazilian pattern was characterized by cakes, coffee/tea, bread, fruit juices/fruit drinks/soy-based drinks, chocolate/desserts, savory snacks/crackers. The first and second patterns were both inversely associated with BMI.

Conclusions: Brazilian adolescents presented three dietary patterns for breakfast. The group fruit juices/fruit drinks/soy-based adhered to two patterns while the group fruits did not adhere to any. The quality of breakfast may play a role in BMI in adolescents. Few studies focused on dietary patterns at the meal level and this is the first to address breakfast patterns in adolescents with population-based data.

Conflict of Interest: There is no conflict of interest.

Keywords: Breakfast patterns/ Adolescents/ BMI/ Adiposity/ Dietary patterns

005

SOCIODEMOGRAPHIC AND GYNECOLOGICAL FACTORS ASSOCIATED WITH ANEMIA IN PREGNANT WOMEN WHO HAD THEIR CHILDREN, IN THE DEPARTMENT OF ANTIOQUIA-COLOMBIA: A CASE-CONTROL STUDY

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Challenges of nutrition and public health in Ibero-America

Introduction: Anemia is one of the most frequent nutritional disorders worldwide, mainly affecting vulnerable groups with serious health consequences, however in pregnancy it can have greater consequences for the mother-child binomial. In Colombia, the National Survey of the Nutritional Situation (ENSIN) 2015 showed that 26.2% of pregnant women between 13 and 49 years were anemic, 8.2 percentage points more than the ENSIN 2010, reflecting that it remains a Public health problem, therefore, it is important to provide scientific evidence that strengthens health prevention and promotion strategies for the detection and timely treatment.

Objectives: To determine the sociodemographic and gynecological factors associated with anemia in pregnant women who had their children in the department of Antioquia, Colombia, in 2014.

Methods: A case-control study was conducted based on secondary data from the research project "Relation of maternal hemoglobin and birth weight in pregnant women of the department of Antioquia-Colombia". Pregnant women with and without anemia were selected in the third trimester of pregnancy and the universe consisted of 240 units of analysis: 80 cases and 160 controls, matched by age. Bivariate analysis and multivariate logistic regression were performed. The statistical package SPSS version 23 was used.

Results: Pregnant women of African descent have a higher risk of anemia (OR= 3.1, 95% CI 1.04 - 9.54), compared to mestizo pregnant women. On the other hand, despite not being statistically significant in the pre-pregnancy BMI, it is found that women with overweight pre-pregnancy are 80% more likely to have anemia (OR= 1.8, 95% CI 0.96 - 3.43), compared to women with normal pregestational BMI.

Conclusions: Afro-descendant ethnicity and pre-gestational status could be related to anemia in pregnancy. It is imperative to monitor the concentration of hemoglobin during pregnancy with compliance with current regulations of at least two determinations, in healthy pregnant women.

Conflict of Interest: The authors declare no conflicts of interest.

Keywords: anemia / pregnancy / associated factors.

006

ANALYSIS OF THE CONCORDANCE LEVEL OF FOUR DICOTOMIC NUTRIENT PROFILE SYSTEMS WITH THE FOOD GUIDES FOR THE ARGENTINE POPULATION

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Challenges of nutrition and public health in Ibero-America

Background and objective: A nutrient profile system (NPS) has not yet been defined in Argentina, although there are multiple and diverse systems that are mainly used around the world in front of pack labeling policies. The World Health Organization (WHO) recommends evaluating the degree of adequacy of the NPS to the dietary guidelines of the country where the system is applied. Once a NPS is established, it should not contradict the national dietary and nutritional recommendations, that is why it is necessary to previously validate the systems with the national Dietary Guidelines. The objective was to validate the selected nutrient profile systems (PAHO, Chile, Uruguay, Peru) with the Dietary Guidelines for the Argentine population (DGAP) through the evaluation of the level of agreement.

Methods: observational analytical cross-sectional study. Four dichotomous NPSs developed for front of pack labeling policies were selected for convenience. Total and free sugars were estimated from a list of 3,580 local products divided into

42 categories; nutritional quality was evaluated according to nutritional profiles and compared with the messages from the DGAP. The level of agreement was analyzed through the concordance index.

Results: Four NPSs were validated through the calculation of the degree of agreement with DGAP recommendations. To do this, the implementation of the SPN was modeled on the total food base, classified into 8 groups, each group divided into two subgroups. The NPS with the highest degree of agreement was PAHO (78.84%) followed by those from Uruguay (75.52%), Chile (73.82%) and Peru (71.75%).

Conclusions: This study was the first conducted by a government institution in Argentina. The global analysis of the NPS was carried out taking into account the result of the agreement and a in-depth evaluation of secondary data obtained, which provide useful information to adapt the NPS to national recommendations, in order to establish policies for the prevention of non-communicable diseases.

Keywords: nutritional profile/ validation/ dietary guidelines/ nutrition

Conflict of Interest: None of the authors has a conflict of interest, this research did not receive funding from any type of industry for its entire development.

007

IMPACT OF VITAMIN B12 STATUS ON PREVALENCE OF RBC FOLATE INSUFFICIENCY AMONG NON-PREGNANT WOMEN OF CHILDBEARING AGE IN BELIZE AND PREDICTED RISK OF NEURAL TUBE DEFECT-AFFECTED PREGNANCIES

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Challenges of nutrition and public health in Ibero-America

Background and aim: Recently, Belize, a country with voluntary food fortification, reported that suboptimal levels of red blood cell (RBC) folate and vitamin B12 were present among non-pregnant women of childbearing age (WCBA). Since folic acid has been shown to prevent neural tube defects (NTDs), we plan to assess if the combined effect of folate and vitamin B12 deficiencies exacerbates the risk of NTD-affected pregnancies more than would be expected from a deficiency in folate alone.

Objectives: To estimate the predicted risk of NTD-affected pregnancies based on RBC folate concentrations, stratified by vitamin B12 status, among non-pregnant WCBA in Belize.

Methods: In 2011, a stratified complex survey was carried out with national and regional representation of non-pregnant women ages 15–49 years in Belize. Demographic and health information and blood samples from 937 WCBA were collected and analyzed for RBC folate and serum vitamin B12. We estimated the predicted risk of NTD-affected

pregnancies based on RBC folate concentrations stratified by vitamin B12 status and compared subpopulations of interest using Bayesian methods.

Results: The prevalence of RBC folate insufficiency (<748 nmol/L) was 48.9%. The adjusted geometric means of RBC folate concentration were lowest (610 nmol/L) among WCBA who were vitamin B12 deficient (<148 pmol/L), and highest (783 nmol/L) among WCBA with normal vitamin B12 status (p-trend < 0.001). Overall the predicted risk of NTD-affected pregnancies was 15.5 per 10,000 live births [95% CI 11.8, 20.0]. Predicted risk was significantly (p<0.001) higher among WCBA who were vitamin B12 deficient (18.0 [95% UI 13.6, 23.6] per 10,000 live births) compared to WCBA with normal vitamin B12 status (11.6 [95% UI 9.0, 14.7] per 10,000 live births). Significant differences in predicted risk of NTD-affected pregnancies were observed across other population subgroups; the indigenous and poorest populations were at highest risk.

Conclusions: In Belize, risk of NTD-affected pregnancies remains a public health problem, and it may be exacerbated by vitamin B12 deficiency. Belize may consider their fortification options to address this public health concern to reduce this risk.

Conflicts of interest: None

Keywords: Neural tube defects predicted risk, folate insufficiency, vitamin B12 deficiency, women of reproductive age

008

FEEDING PRACTICES IN ECUADORIAN SCHOOLCHILDREN 8 TO 11 YEARS AND THE RELATIONSHIP WITH THE CONSUMPTION OF PROCESSED AND ULTRA-PROCESSED PRODUCTS

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Challenges of nutrition and public health in Ibero-America

Background and objective: Overweight and obesity is a global epidemic that affects all population groups throughout the life, while increasing chronic non-communicable diseases (NCDs). Its immediate determinants are diets based on unhealthy ultra-processed foods with excessive salt, sugar, fats and sugary drinks and sedentary lifestyles which are the immediate factors of these problems. Thus, this study proposes to estimate the prevalence of overweight and obesity of children from 8 to 11 years of age and characterize food consumption according to the NOVA classification.

Methods: 285 schoolchildren from 8 to 11 years old from two public schools in Quito participated. Trained field workers applied structured questionnaires using standardized procedures. Date of birth and interview date were used to estimate the exact age of participants and sex was recorded. Weight, height, and waist circumference were recorded using the standard methodology, and the prevalence of overweight and obesity was estimated according to WHO. For the collection of food consumption data, a questionnaire validated

by Lera and colleagues was applied, incorporating the NOVA food classification.

Results: 24.6% of children were overweight or obese. At the same time, 36.7% of participants consume natural foods daily and 37% consume them 3 to 6 times weekly. But 27.3% consume processed or ultra-processed foods every day and 48.6 do so 3 to 6 times weekly, which shows that processed and ultra-processed products are already present in the schoolchildren's diets.

Conclusions: The data confirm a serious problem of overweight and obesity in this age group, and corroborate the prevalence presented in the ENSANUT 2014 survey. There is no doubt that this phenomenon is associated with greater consumption of processed foods and ultra-processed products, since children are exposed not only to consumption at home, but also at school and surrounding areas. It is urgent to design comprehensive intervention strategies that guarantee the supply of healthy foods both in school kiosks and in retail locations around schools.

Keywords: Overweight and obesity, food consumption, NOVA classification, schoolchildren

O09

EFFECT OF SUPPLEMENTATION WITH ACTIVATED AND MICRONIZED ZEOLITE ON GENOTOXIC DAMAGE IN NUTRITION STUDENTS OF THE AUTONOMOUS UNIVERSITY OF THE STATE OF MORELOS

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Challenges of nutrition and public health in Ibero-America

Introduction: Cigarette smoke produces free radicals and is one of the main risk factors for developing genotoxic damage. The activated zeolite and micronized has been used as antioxidant and detoxifying in several studies.

Objective: To determine the impact on the level of genotoxic damage by daily supplementation of activated and micronized zeolite, in a group of university students of the degree in nutrition, previously classified as smokers and non-smokers.

Methods: Non-randomized clinical trial. After signing a letter of informed consent approved by the Ethics Committee in Research of the Faculty of Medicine of the UAEM, participants in 4 groups were assigned: smoking with ZAM, non-smoking ZAM, smoking controls and non-smoking controls. The two intervention groups received 3.0g sachets of ZAM for 30 days to consume dissolved in 500ml of natural water. Questionnaires on lifestyle, habits, consumption and exposure to tobacco smoke, among others, were self-applied. Blood sample was taken in 2-5ml- tubes with and without

heparin before and after the study in which a comet assay was performed to determine genotoxic damage. Similarly, anthropometric indicators (after standardization). Statistical analysis was performed with STATA v.14.

Results: Current smokers were those who smoked cigarettes for at least one day in the previous 30 days. It was found that 35.2% of the target population were current smokers, 47.1% were non-smokers and only 17.7% were ex-smokers. Of current smokers, 30.9% were men and 69.1% women. The final sample to evaluate genotoxic damage and zeolite consumption was n = 26. The difference in the mean tail intensity between the intervention and control groups was on average 10% with a p value = 0.08 in the Kruskal-Wallis test.

Conclusions: Consuming zeolite on a regular basis can help decrease the level of genotoxic damage in nonsmokers. Smoking is corroborated as a risk for increasing levels of genotoxic damage.

Conflict of Interest: There are no conflicts of interest.

Keywords: Zeolite / Smoking / Genotoxic damage

O10

SOCIOECONOMIC INEQUALITIES AND QUALITY OF BREAKFAST

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Challenges of nutrition and public health in Ibero-America

Introduction: Population's food consumption attracts researchers' attention due to its importance for preventing individuals' health risks, such as chronic non-communicable diseases - which are the main causes of morbidity and mortality in the world. As a strategy for analyzing food consumption, meal quality indexes have been proposed to monitor the populations' dietary profile. Considering the importance of consuming breakfast, because it contains many nutrients and occurs after a long fasting, it has also been associated with socioeconomic status.

Objectives: To characterize the nutritional quality of breakfast consumed by Brazilian adults from different social backgrounds.

Methods: This is a cross-sectional study, where it we carried out an inequality analysis through the Concentration Index of Inequality. For this, data from the 2008-2009 Brazilian Household Budget Survey and the National Food Survey were used. Individuals aged eighteen years or older with information on food intake were selected (N=31,735). The breakfast quality index based on global

nutritional recommendations was used as a parameter. The index consists of ten components (fruits, calcium, proteins, fibers, carbohydrates, total fat, saturated fat, processed meat, added sugar and energy density) with a score from 0 to 100 points. Individuals were classified according to their per capita family income tertiles.

Results: The general quality index of breakfast was slightly better for individuals in the lowest income group (mean 52.2), when compared to the highest income group (mean 50.1; $p = 0.001$). However, for the components of the index separately, individuals in the higher income class had better scores for fruits, proteins and calcium ($p < 0.001$) and worse score for carbohydrates ($p < 0.001$), saturated fat ($p < 0.001$) and added sugar ($p < 0.001$); nevertheless, they have the same quality of breakfast in relation to energy density ($p = 0.844$) and fiber ($p = 0.579$).

Conclusions: Higher income groups' individuals seem to present a greater access to better nutritional quality food.

Conflict of Interest: There is no conflict of interest.

Keywords: Breakfast/ Meals/ Socioeconomic Factors/ Meal Quality

O11

OVERWEIGHT AND OBESITY IN INDIGENOUS CHILDREN, WHETHER OR NOT THEY BENEFIT FROM THE FOOD SERVICE COMPONENT IN FULL-TIME SCHOOLS IN HIDALGO, MEXICO

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Challenges for an effective and efficient public-private partnership in food and nutrition

Background: School feeding has shown a positive effect on attendance, permanence and weight of children.

Objective: The objective of this work was to describe the nutritional status of indigenous children who receive or do not receive food in schools participating in the Full-Time School Program in Hidalgo, Mexico.

Methods: 1232 school children were evaluated (47.8% male) with an average age of 9.3 ± 1.4 years, enrolled from 2nd to 6th grade in primary schools serving the Nahuatl indigenous population of the Huasteca Hidalguense region during the 2019-2020 school year. One group of school children had been in the food service (SA) for 1-5 years (41.2%) and 58.8% were not benefited (No SA). Weight and height were measured to calculate the Z of BMI and the Z of the indicator Height/Age (T/E). The WHO cut-off points for BMI and S/T were used to classify underweight, normal weight, overweight and obesity, as well as underweight and normal height, respectively.

Results: The prevalences of low height in SA and NSA school children were 5.7% and 7.0% ($p > 0.05$), respectively. The percentage increases of overweight and obesity in year 1 and 5 (2nd and 6th grade) were in SA of 6.8% ($p > 0.05$), and 2.4% ($p > 0.05$); and in NSA of 14.5% ($p < 0.05$), and 5.5% (p

> 0.05), respectively. In all children there were differences in underweight and obesity between SA and NSA, 0.8% vs 3.5% and 9.6% vs 15.6% ($p < 0.05$), respectively.

Conclusions: Children in the Non-SA group during their primary education have percentage increases of overweight and obesity 2.1 and 2.2 more times compared to the SA, as well as higher underweight prevalence. The double burden of malnutrition is aggravated in indigenous children who do not benefit from the school feeding service.

Conflict of interest: The authors declare no conflict of interest.

Keywords: Indigenous children / overweight / obesity / food service.

O12

ATTITUDE ON HEALTHY DIETS AND BODY IMAGE DISSATISFACTION ON MEXICAN ADOLESCENTS, HELENA-MEX

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Challenges of nutrition and public health in Ibero-America

Background: The eating behavior acquired in adolescence can condition future health in European adolescents. However, the attitudes towards a healthy diet, the degree of body dissatisfaction and its association with body composition have been little explored in Mexican adolescents.

Objective: Thus, we propose to determine relationships between body dissatisfaction (BD) and attitude towards healthy eating (HE) with body composition (BC): percentage of fat (PBF), percentage of skeletal muscle mass (PSMM), waist, thigh, and hip circumferences, in Mexican adolescents.

Methods: 468 participants (55.5% female) between 13 and 17 years old (15.23 ± 0.06) were randomly selected from four different high and four secondary schools in the state of Jalisco. BD and HE were evaluated using EWI-C questionnaire. PBF and skeletal muscle mass were measured by bioimpedance (Inbody 120), and circumferences with an anthropometric tape (Lufkin). To analyze whether BD and HE were higher in girls than in boys, U of Mann-Whitney test were performed. To determine the linear relationships between BD and HE with BC, Pearson's correlations were made. Kruskal-Wallis tests were performed to analyze whether there were differences between the subjects' BD regarding each of the dependent variables considered.

Results: Girls reported a higher BD than boys ($Z = 2.41$, $p < 0.05$). No differences were found on HE according to sex ($Z = 1.18$, $p = 0.237$), nor association between HE and BC. Correlations were observed between BD and BC ($r = 0.493$, $p < 0.001$ for PBF and $r = -0.220$, $p < 0.001$ for PSMM). Waist, hip

and thigh circumferences were found greater to a greater degree of BD ($p < 0.05$).

Conclusion: Body dissatisfaction is greater in Mexican girls than in boys, and is related to BC. However, there do not appear to be any differences between the sexes nor associations with BC in attitudes towards healthy eating (HE).

Keywords: body dissatisfaction, healthy diet, body composition, adolescents, Mexico.

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O13

ELEMENTS TO FORMULATE A HEALTHY EDUCATIONAL PROPOSAL IN FOOD AND PHYSICAL ACTIVITY, FROM THE PERSPECTIVE OF SCHOOL CHILDREN IN MEDELLIN (1)

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Nutrition in the prevention and treatment of chronic diseases

Background: The global problem of childhood obesity is growing and occupies the first lines in health agendas. In Colombia, the National Survey of Nutrition Situation (ENSIN, 2015), shows an increase in excess weight in schoolchildren.

In Medellín, a survey on sports and recreational habits and preferences (by INDER, 2017) describes that although children and adolescents maintain an adequate weight, an increasing tendency to becoming overweight and a propensity to sedentary behavior is identified; 8% of schoolchildren aged 6 to 10 declare that they practice sports, recreational or physical activity, while only 3% between the ages of 11 and 14 do so.

Objective: To identify the favoring factors and the barriers to assume a healthy lifestyle in relation to food and physical activity.

Methods: The research is carried out in an EI -Educational Institution- with a sample of 363 schoolchildren between 8 and 12 years old (52.1% men and 47.9% women), with whom four focus groups are formed, two with schoolchildren with overweight and two without.

Results: Based on the codification in Atlas ti, three categories, and primary codes are identified, centered on (1) Meanings and practices; from their analysis family and personal knowledge and actions about food, health, obesity, healthy lifestyles, physical activity, habits, beliefs, and factors that favor weight excess are derived; (2) the internal and external context to the IE; actions or situations that take place in the restaurant or school cafeteria, as well as outside school, and in their households; impacting the lifestyles of schoolchildren and (3) the looming solution strategies, that can be advanced to properly influence a healthy lifestyle in schoolchildren.

Conclusions: the preventive approach to childhood obesity to prevent in turn, ECNT from an ecosocial perspective, involves not only the microsystem of the schoolchild but also the macro, the exosystem, to generate relevant proposals.

Keywords: Childhood obesity, school children, prevention, health education, lifestyles.

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O15

OVERUSE OF NON-CALORIC SWEETENERS IN FOODS AND BEVERAGES IN CHILE

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Challenges of nutrition and public health in Ibero-America

Introduction: The prevalence of obesity among the Chilean population is one of the highest worldwide. To fight the constant expansion of non-communicable diseases, the Chilean government recently enacted a new Law of Food Labeling and Advertising imposing the application of front-of-package warning label in foodstuffs whose composition exceeds limits for critical nutrients including sugar. To avoid these warning labels, the food companies have been reformulating their products, incorporating non-caloric sweeteners (NCSs) in replacement of sucrose.

Objectives: Identify and quantify the NCS-containing products belonging to different food/beverage categories currently available on the Chilean market.

Methods: Nineteen supermarkets and food web pages were visited by trained individuals to carry out a systematic search of ingredient information from the different categories of available foodstuffs.

Results: From 1489 products analyzed, 815 (55.5%) contained at least one NCS. 67.1% of the dairy products, 31.5% of the cereal products, 49% of the processed fruits, 74.3% of the non-alcoholic beverages and 46.2% of sweet and other dessert contained NCS. Considering the food categories more specifically oriented to children, NCSs were present in 98.8% of powder juices, 98.3% of the flavored milk, 91.2% of jellies and 79% of the dairy desserts. Sucralose and steviol glycosides were the most widely used NCSs, being present, alone or mixed with other NCSs, in 73.5% and 39.7% of the NCS-containing products respectively, while the use of saccharin and cyclamate was low. In addition, 80 tabletop NCS were available in the local market, 91.2% of them being sucralose and steviol glycosides (alone or combined).

Conclusions: The proportion of NCS-containing foods and beverage is particularly elevated in Chile, compared with other countries. It is worrying that, for some food categories, the consumers have very few choices in selecting foods without NCS's, especially those designed for children. The average consumption of steviol glycoside in the pediatric population likely exceeds its ADI due to the high proportion of food products containing this NCS.

Conflict of Interest: The author(s) declare(s) that there is no conflict of interest regarding the publication. Financed by FONIS-SA18I0062, CONICYT Chile.

Keywords: non-caloric sweeteners/ acceptable daily intake/ food labelling/ sucralose/ steviol glycosides.

O16

RELATIVE POVERTY AND BREAKFAST HABITS OF BRAZILIAN ADOLESCENTS

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Challenges of nutrition and public health in Ibero-America

Introduction: Meal habits have been associated to adolescent's adequate growth and development. Social inequalities in breakfast habits have attracted particular attention as an important component for policies in developing countries.

Objectives: We aimed to assess the relationship between breakfast habits and poverty in adolescents according to regions of Brazil.

Methods: We used 7,425 adolescents aged 10-19 years (excluding pregnant and breastfeeding) from the National Dietary Survey (2008-2009). Individuals with equalized household income less than 60% of the regional median were classified as poor. Usual food groups' intakes were estimated by NCI method using two non-consecutive food records. Breakfast was defined as an eating occasion of at least 50 kcal (209.2kJ) from any source of food between 5 and 10 a.m. Breakfast dietary patterns were derived by principal component factor analysis (Varimax rotation). All comparisons were made considering the study design for prevalence's and means estimation.

Results: The prevalence of breakfast consumption among Brazilian adolescents was 64.7%, 70.5% in Northeast and 58% in South. The highest and lowest proportion of poor were in Northeast and South, respectively. Prevalence of non-usual breakfast was higher among poor, except in the South. We found similar breakfast pattern among regions, so we derived a general three dietary patterns (44.8% of variability): regional, protein and traditional. The adherence to the traditional breakfast was higher for the poor in the North and in the Southeast when compared to non-poor. The Northeast presented the highest adherence to regional breakfast pattern; the North the lowest to the protein pattern and the Midwest the highest to the traditional.

Conclusion: Social inequality among Brazilian regions may play a role in the breakfast dietary habits in adolescents. The poorer the region, higher is the frequency of breakfast skippers among poor when compared to non-poor. Also, the quality of the breakfast seems better in poor regions and the protein pattern is more likely in the richest regions. This is the first study to address poverty and dietary patterns at the meal level in adolescents in population-based study.

Conflict of Interest: There is no conflict of interest.

Keywords: Breakfast, Adolescents, Socioeconomic Factors, Relative Poverty, Meals, Dietary Patterns, Adolescents, Breakfast

O17

NUTRITIONAL STATUS AND FOOD CONSUMPTION OF OLDER ADULTS BENEFICIARIES OF STATE SUPPLEMENTARY FOOD PROGRAMS IN THE CITY OF SANTIAGO DE CHILE

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Challenges of nutrition and public health in Ibero-America

Introduction: The development and distribution of fortified foods delivered by the state to the older adults (OA) of the Chilean population has proven to be effective in terms of coverage. However, there is little information regarding to the nutritional status and consumption of these products by their beneficiaries.

Objectives: The objective of this research was to characterize the nutritional status and food consumption of a group of OA beneficiaries of the Complementary Food Program for the Elderly (PACAM) in the city of Santiago de Chile.

Methods: For this, a sample of 182 OA (144 women; 38 men) were selected and recruited from different health centers in various communities in the city of Santiago de Chile. Nutritional status was diagnosed according to the criteria of the body mass index (BMI) for OA. Nutrient intake assessment was obtained from three surveys per 24-hour reminder (R24h), on non-consecutive days. Finally, the plasma level of critical micronutrients (calcium, iron, vitamins D3 and B12) was determined using the TRXF methodology for minerals and ECLIA for vitamins.

Results: A 43.8% of the women presented excess malnutrition (overweight 29.9% and 13.9% obesity) versus 31.6% on the men (overweight 21.1 and 10.5% obese). Regarding to micronutrients plasma level, the OA presented an average deficit of ~ 88% for vitamin D3, ~ 34% for B12 and ~ 33% for iron.

Conclusions: These results indicate that the bioavailability of critical micronutrients from fortified foods delivered by PACAM is limited to meet the needs of Chilean OA.

Conflict of Interest: Authors declare no conflict of interest.

Acknowledgments: Authors acknowledge the financial of FONDEF project ID17AM0018.

Keywords: Older adults, micronutrients, fortified foods, bioavailability.

O18

TRICOTOMIC NUTRIENT PROFILE SYSTEMS: ANALYSIS OF THE LEVELS OF AGREEMENT WITH THE FOOD GUIDES FOR THE ARGENTINE POPULATION

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Challenges of nutrition and public health in Ibero-America

Background and objective: The variety of Nutrient Profile Systems (NPS) used around the world in the implementation of front of pack labeling policies is very wide. The World Health Organization (WHO) recommends validating NPSs with the Dietary Guidelines of the country where they are applied, to avoid their opposition to local recommendations. Argentina does not yet have a nationally defined NPS, so it is essential to develop local evidence for decision-making. This research complements the validation of dichotomous NPSs previously carried out. The objective was to evaluate the level of agreement of the selected trichotomic nutritional profiles: Ecuador, Bolivia, United Kingdom and a proposal by the Coordinator of the Food Products Industries of Argentina (COPAL), with the Dietary Guidelines for the Argentine Population (DGAP).

Methods: observational analytical cross-sectional study. Four trichotomic nutritional profiles developed for front of pack labeling policies were selected for convenience. Total and free sugars were estimated from 3,580 local products divided into 42 categories, nutritional quality was assessed according to nutritional profiles and compared with the messages from the DGAP. The level was analyzed according to the concordance index.

Results: Four NPSs were validated through the calculation of the degree of agreement with DGAP recommendations. To do this, the implementation of the NPS was modeled on the total food base, classified into 8 groups, each group divided into three subgroups. The NPS with the highest degree of agreement was the one of Ecuador (64.9%) followed by those of Bolivia (63.18%), the United Kingdom (59.96%) and COPAL (34.24%).

Conclusions: This study complements the previously performed analysis of four dichotomous NPSs (PAHO, Uruguay, Chile and Peru). It is observed that among the trichotomic SPNs, the one with the highest level of agreement is the one developed by Ecuador, however, its degree of agreement is lower than the four dichotomous systems previously analyzed. An analysis of the comparison of results between dichotomous and trichotomic systems would contribute to the discussion of the establishment of an SPN in our country.

Keywords: nutritional profiles, validation, dietary guidelines, nutrition

Conflict of Interest: None of the authors has a conflict of interest, this research did not receive funding from any type of industry for its entire development.

O19

DIFFERENTIAL INFLAMMATORY RESPONSES IN CULTURED ENDOTHELIAL CELLS EXPOSED TO RUMINANT AND INDUSTRIAL TRANS MONOUNSATURATED FATTY ACIDS

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Endothelial dysfunction and inflammation are recognized key factors in the development of atherosclerosis. Evidence suggests that intake of industrial *trans* fatty acids (TFAs) promotes endothelial dysfunction, while ruminant TFAs may have the opposite effect. The mechanisms by which TFAs affect endothelial cell (EC) responses are not fully understood. The aim of this study was to compare the effects of elaidic acid (EA (18:1n-9t); an industrially produced TFA) and *trans* vaccenic acid (TVA (18:1n-7t); a natural TFA found in ruminant milk-meat) on EC inflammatory responses.

Methods: ECs (EA.hy926 cells) were cultured under standard conditions and exposed to TFAs (1 to 50 μ M) for 48 hours. Then, cells were cultured for a further 6 or 24 h with tumour necrosis factor alpha (TNF- α , 1 ng/mL). MTT assay was performed to determine cell viability; incorporation of FA was confirmed by gas chromatography; inflammatory mediators were assessed by multiplex immunoassay; the relative expression of genes related to inflammation was assessed through real-time PCR, static adhesion assay was used to evaluate monocyte attachment to the EC monolayer and cell surface expression of ICAM-1 was assessed by flow cytometry.

Results: ECs remained viable after treatments. In addition, the FAs were incorporated into the ECs in a dose-dependent manner. EA (50 μ M) increased production of MCP-1, RANTES and IL-8, while TVA (1 μ M) caused the reduction of ICAM-1, VEGF and RANTES levels. EA (50 μ M) induced a significant upregulation of toll-like receptor (TLR)-4 and cyclooxygenase (COX)-2 gene expression. In contrast, TVA (1 μ M) induced a significant downregulation of nuclear factor kappa B subunit 1 (NF κ B1). EA (50 μ M) induced a significant increase of THP-1 monocyte cell adhesion to the ECs. In contrast, TVA (1 μ M) reduced THP-1 monocyte adhesion and decreased the level of surface expression of ICAM-1 when used at 50 μ M.

Conclusion: The results suggest that TVA has some anti-inflammatory properties, while EA enhances the response to an inflammatory stimulus. These findings suggest differential effects induced by the TFAs tested, fitting with the idea that industrial TFAs and ruminant TFAs can have different and perhaps opposing biological actions in an inflammatory context.

Conflicts of interest: None

Keywords: *trans* fatty acids, elaidic acid, *trans* vaccenic acid, inflammation, atherosclerosis

O20

BASKETBALL TRAINING VS NON-ACTIVE LIFESTYLE PROMOTES A HEALTHIER INFLAMMATORY PROFILE IN PREPUBERTAL CHILDREN. BIPIC-STUDY

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Inflammation is a natural defence mechanism of body tissues in response to harmful stimuli. It has been observed that adequate levels of physical activity and fitness protect against low-grade inflammation in young people.

Objective: to evaluate the effects of basketball training and Mediterranean diet recommendations in children, on inflammatory biomarkers.

Methods: 17 healthy basketball players (boys, 7-11 years old), who presented two year of experience practicing this sport, were selected to engage in an exercise program. It was divided into two periods: a pre-season (6 weeks), including 5 training sessions per week of 2 hours each one (Monday to Friday); and immediately afterward, a season for 32 weeks, including 3 training sessions per week of 2 hours each one and a game during the weekend. Moreover, this group received individualized Mediterranean dietary recommendations. Additionally, 32 healthy and sedentary children were selected as control group.

Body composition was obtained by bioelectrical impedance analysis. C-reactive protein in plasma was determined. Luminex[®] 200[™] System to determine: adiponectin, resistin, leptin, plasma hepatic growth factor (HGF), interleukin (IL)-6, IL-8, monocyte chemoattractant protein-1 (MCP1), nerve growth factor (NGF), plasminogen activator inhibitor-1 (PAI-1), and tumour necrosis factor (TNF- α) in plasma.

Standardized Eurofit battery tests were performed to evaluate fitness: the 20-meter shuttle run, standing broad jump and flexed arm hang.

Results: The intervention group showed lower levels on Z-score BMI (P<0.05) and most of inflammatory variables:

PAI-1, resitin, NGF, leptin, PCR, HGF, IL-8, MCP-1, TNF- α ($P < 0.05$); and higher levels on fitness tests ($P < 0.01$) compare with control group at the end-of-program.

On the other hand, comparing baseline and end-of-program data, within of intervention group, all players showed a decrease in the average BMI percentile and Z-score BMI decreased ($P < 0.01$); an increase in the aerobic and anaerobic capacity tests ($P < 0.001$) and in the strength tests ($P < 0.001$); and a reduction in several inflammation variables: PAI-1, MCP-1 and resistin ($P = 0.05$).

Conclusions: Practice basketball during three days (two hours per day) seems an effective option to maintain a good health and prevent obesity in childhood.

Keywords: Healthy / fitness / physical activity / youth sports.

O22

LATINA WOMEN'S BELIEFS, ATTITUDES AND KNOWLEDGE ABOUT GESTATIONAL WEIGHT GAIN AND PERCEPTIONS OF PROVIDERS' ADVICE: A SYSTEMATIC REVIEW AND META-SYNTHESIS OF QUALITATIVE EVIDENCE FROM STUDIES CONDUCTED IN THE UNITED

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Latinos/Hispanics (hereafter referred to as Latinos or Latinas) are the largest and fastest growing minority group in the United States. Latinas of childbearing age are at elevated risk of being obese (42.5% Latina/Hispanic vs. 32.6% non-Hispanic) and of beginning pregnancy with overweight as indicated by pre-pregnancy body mass index. Preventing and reducing obesity among Latinas of childbearing age is an important public health goal and may contribute to closing disparities in obesity rates.

Objectives: This systematic review and meta-synthesis seeks to explore Latina women's beliefs, attitudes, and knowledge about gestational weight gain and perceptions of providers' advice.

Methods: The review includes three key steps: (1) a systematic literature search; (2) data evaluation involving a thematic analysis process—data reduction, data display, and drawing and verifying conclusions; and (3) presentation of conclusions. In addition, we used the reporting guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) statement to guide the inclusion and exclusion of research papers.

Results: Thirteen studies conducted in the United States and published between 2000 and 2019 were identified in this review. Emerging themes and subthemes were organized using the socio-ecological model (SEM) and social contextual

model (SCM), an adaptation of the SEM. Findings from this qualitative synthesis provide important information on multi-level factors influencing Latina women's beliefs, attitudes, knowledge and experiences with patient-provider communication related to gestational weight gain.

Conclusions: Findings from this systematic review and meta-synthesis provide important targets for the design and adaptation of interventions to prevent gestational weight gain tailored to meet the needs of multi-ethnic Latinas living in the United States.

Conflict of Interest: The authors declare no conflict of interest.

Keywords: gestational weight gain; Latina; systematic review; United States

O23

CHILDREN'S DIETARY INFLAMMATORY INDEX™ IS ASSOCIATED WITH LEPTIN AND ADIPONECTIN CONCENTRATIONS IN MEXICAN CHILDREN

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Children's Dietary Inflammatory Index™ (C-DII) is a recently validated tool that estimates the inflammatory potential of the diet in children and adolescents. Until now, this index has only been evaluated in high income countries and there is no information about its association with leptin and adiponectin in children, as well as with other inflammatory biomarkers in children of low and middle income countries.

Objectives: To evaluate the association between the Children's Dietary Inflammatory Index™ of Mexican children from a birth cohort at 5, 7 and 11 years with adiposity, as well as with inflammatory biomarkers (IL-6 and CRP), leptin and adiponectin concentrations at 11 years.

Methods Children of women who participated in the POSGRAD study (Prenatal Omega-3 fatty acid Supplementation and child GRowth and Development), followed as a birth cohort, were identified. We analyzed the cases of children with complete multiple-pass 24 hour dietary recalls and anthropometric indicators of Body Mass Index (BMI) z score (calculated based on the WHO child growth standards), sum of skinfolds and abdominal circumference measured at 5, 7 and 11y; as well as those with inflammatory

biomarkers, leptin and adiponectin concentrations and fat mass measured by Bod Pod at 11y. C-DIITM was calculated based on data of 25 nutrients and food components. The associations were analyzed using multivariate linear regression models.

Results: The C-DIITM was significantly associated with leptin ($\beta=0.87$; $p=0.034$) and adiponectin concentrations ($\beta=2.10$; $p=0.037$) at 11y adjusting by fat mass, sex, type of breastfeeding, Mother's BMI, Mother's education, socioeconomic level and randomization group. No significant associations were found for IL-6 and CRP concentrations at 11y or with adiposity indicators at 5, 7 and 11y (BMI, abdominal circumference and skinfold sum at 5, 7 and 11y and fat mass at 11y).

Conclusions: C-DIITM is associated with leptin and adiponectin concentrations in Mexican children independently of fat mass. These results suggest that the inflammatory potential of diet may influence the homeostasis of adipose tissue inflammation.

Conflict of Interest: The authors declare that there is no conflict of interest.

Keywords: Inflammation / Children's Dietary Inflammatory Index / Mexican children

O24

ADIPOSIY INDICATORS IN GERIATRIC POPULATION

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Nutrition in the prevention and treatment of chronic diseases

Introduction: The increase in adiposity is associated with an increased cardiometabolic risk and frailty in older people. There is no consensus on the most useful adiposity indicator in this population.

Objective: The aim was to study adiposity in a group of institutionalized elderly people according to different criteria.

Methods: Cross-sectional study. 331 subjects institutionalized in centers of Castilla y León and Granada (Spain) (106 men; 225 women) over 65 years old (mean age: 84.5 years) participated in the study. Anthropometric variables were measured (SENPE/SEGG protocol). Body composition was analyzed by conventional bioimpedance (BIA) and bioelectrical impedance vector analysis (BIVA) and the following variables were estimated: fat free mass (FFM) and fat mass (FM) and their respective indexes (I-). Adiposity was cataloged based on 2 criteria: Adip1, based on the NHANES population (I-MG's cut-off points of Kelly 2009) and Adip2, based on the European population (I-MG's cut-off

points of Kyle 2003). Results were analyzed by Student-t-test or Chi-square test. The agreement between the cataloging was evaluated with the Kappa index. The BIVA was compared with the Mahalanobis distance and the Hotelling T² test. Statistical significance was set at $P<0.05$.

Results: More than 40% of subjects presented some excess weight according to BMI; obesity was higher in women and overweight, in men. The Adip2 adiposity indicator cataloged 81% of subjects with excess of fat (39.3% obese); while Adip1 classified 71.9% subjects with excess fat (29.3% obese). The BIVA did not show differences between the mean impedance vectors of overweight and obesity subjects according to BMI, but it found differences between the two adiposity indicators analyzed. The agreement between the BMI classification and the adiposity classification was better for Adip1 (Kappa=0.702; 95% CI: 0.661-0.743; $p<0.001$).

Conclusions: BMI does not reflect adiposity in the elderly. There are important differences in the cataloging of adiposity depending on the indicator used. It is necessary to establish a consensus on adiposity indicators useful in clinical practice and specific cut-off points for older people.

Conflicts of interest: the authors declare no conflict of interest.

Keywords: Elderly people/ body composition/ adiposity/ BIVA.

O25

EFFECT OF HIGH PROTEIN DIET OVER ENERGY EXPENDITURE, THERMOGENIC CYTOKINES AND BAT ACTIVITY

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Nutrition in the prevention and treatment of chronic diseases

Introduction. The caloric expenditure and thermogenesis are very important aspects in the obesity problem, mostly underestimated. The Protein Leverage Hypothesis (PLH) promotes the effect of satiety, delaying the hunger sensation; thus entails the regulation of caloric intake and body weight, as well as, the modification of thermogenic activity and energy expenditure. However, the effect of high protein diet over the physiological components of energy expenditure has not been evaluated.

Objective. To evaluate in adults with obesity the effects of a caloric restriction plan with high protein content (25%) compared with low protein content (10%), over components of energy expenditure and thermogenesis, after 4 weeks of intervention.

Methods. We recruited 50 adults with obesity (BMI $\geq 30\text{kg} / \text{m}^2$) aged 20-50, randomized into two diet groups. Before and after the intervention, anthropometric data were measurement. We estimated of caloric expenditure at rest by

indirect calorimetry. Temperature measures in the supraclavicular cavity were recorded for 1 hour with the iButton DS1921H device. Glucose, creatinine and lipid profile were detected. Plasma levels of *N*¹-methylnicotinamide-(MNA-1) and *N*¹,*N*¹²-diacetylspermine were quantified by LC-MS. Circulating cytokines were measurement by flow cytometry.

Results. At baseline individuals from both groups showed no differences between them. After the intervention, significant reduction in body weight, BMI and waist circumference was observed in both groups ($p < 0.0001$, $p = 0.003$ and $p < 0.0001$, respectively). In the diet group with high protein content there was a significant decrease in the levels of MNA-1 ($p = 0.0001$), and increase in the concentrations of *N*¹,*N*¹²-diacetylspermine ($p = 0.03$). It was also observed that the temperature of the supraclavicular cavity decreased significantly ($p < 0.01$), and thermogenic cytokines values trended to increase.

Conclusions. These preliminary data suggest that the diet rich in proteins induce major changes in the components of energy expenditure favoring weight loss. The changes observed in the temperature of the supraclavicular cavity support that the protein favors thermogenic activity. And the lower caloric intake in the high protein group reaffirms the idea of promoting the effect of satiety.

Conflict of interest. The authors declare no competing financial interests

Keywords: obesity; protein leverage hypothesis; energy expenditure; high protein diet; thermogenesis; thermogenic cytokines.

O26

VEGETABLE FIBER INTAKE AND ADIPONECTIN LEVELS IN NONALCOHOLIC FATTY LIVER DISEASE: THE FLIO STUDY

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Nonalcoholic fatty liver disease (NAFLD) is a highly widespread cause of chronic liver disease worldwide.

Inflammation is considered one of the main metabolic mediators involved in the onset/evolution of NAFLD. The interplay of liver status, inflammation and nutrition has important health implications. Vegetables contain phytochemical compounds with anti-inflammatory effects.

Objectives: The aim of this study was to evaluate associations between dietary factors and adiponectin in overweight/obese adults with NAFLD.

Methods: A cross-sectional analysis including one hundred and twelve overweight/obese adults with ultrasound-confirmed liver steatosis from the Fatty Liver in Obesity (FLiO) study was conducted. Anthropometry and body composition, dietary characteristics (by means of a validated 137-item food frequency questionnaire), biochemical and inflammatory variables were assessed at baseline. This work is an ancillary analysis within the FLiO study: NCT03183193.

Results: The average age of participants was 51 years old of which 42% were women. Furthermore, the mean BMI of the studied population was 33.7 kg/m² with a waist circumference of 110 cm. Increased levels of adiponectin were positively correlated with vegetable consumption ($r=0.189$; $p=0.035$) and specifically with the fiber in vegetables ($r=0.234$; $p=0.013$). The multivariate regression model confirmed the positive association of adiponectin with the fiber contained in vegetables ($\beta=0.182$; $p=0.026$) after adjusting for potential confounders (age, sex, energy intake and physical activity). The model explained up to 13.61 % of the variation in adiponectin concentration (Adjusted R² = 0.136; p -model <0.01).

Conclusions: Fiber contained in vegetables may have an anti-inflammatory impact on susceptible population at hepatic risk. Our findings suggest that the consumption of anti-inflammatory dietary components such as fiber, specially from vegetables, might contribute to the prevention/treatment of NAFLD and other inflammatory related comorbidities.

Conflict of Interest: The authors declare no conflict of interest.

Keywords: Fatty Liver; Inflammation; Obesity; Fiber; Vegetables

O27

DIETARY INTERVENTION IN OBESE MOTHERS DURING PREGNANCY AND LACTATION PREVENTS SEX SPECIFIC GLUCOSE ALTERATIONS IN OFFSPRING. A ROLE FOR THE HEPATIC TYPE 1 CANNABINOID RECEPTOR?

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Previous reports have associated high fat diet (HFD)-induced obesity with higher expression of cannabinoid type 1 receptor (CB1R) in liver, and its necessary presence to develop insulin resistance.

Objectives: This study evaluated the impact -in adult offspring- of a nutritional intervention during pregnancy and lactation in obese mothers.

Methods: The model considered three experimental groups, 45 days old female mice (C57/BL/6), separated according to diet: Group A: females with control diet before and during pregnancy and lactation; Group B: females with a HFD (fat: 60% Kcal) before and during pregnancy and lactation; Group C: females with a high-fat diet until mating and control diet (fat: 10% Kcal) in pregnancy and lactation. Males used for mating and respective offspring were fed a post-weaning control diet. Offspring (5 of each group) were subjected to a glucose tolerance (GTT) and insulin sensitivity (IST) tests after intraperitoneal injection of glucose and insulin respectively, at 2 and 4 months of life. Mice (120 days old), were sacrificed and livers were immediately frozen in LIN. Subsequently, frozen livers were ground and extracted for determination of CB1R mRNA by real time RT-PCR and protein abundance by Western blot analysis (WB).

Results: There were clear differences by sex in offspring glucose homeostasis regarding the change of diet in their mothers. In the GTT, male offspring tend to show higher fasting glycemia than females, and during test time (0-120 min), male offspring of the intervened group had fasting glycemia and area under the curve greater than those of the HFD group. Hepatic CB1R mRNA levels were 50% lower in the male offspring from the group of intervened mothers in comparison to the offspring from HFD-mothers, while the proteins abundance is higher.

Conclusions: It is possible to observe a normalization effect on the levels of hepatic CB1R mRNA in the male offspring of mothers who were intervened with a control diet. However, these differences are not observed in female offspring. No statistically differences were found in CB1R expression or protein abundance of this receptor.

Conflict of Interest: The authors declare no conflicts of interest.

Keywords: Nutritional intervention / Endocannabinoid System.

Introduction: Obesity is a world health problem characterized by an excessive adipose tissue that leads to chronic low-grade inflammation. ASC is a main protein on NLRP3 inflammasome activation related to systemic inflammation and metabolic alterations development. Therefore, evidence suggests that the benefits of physical exercise may decrease inflammation through down-regulation of ASC gene.

Objective: To evaluate the effect of physical exercise program and nutritional intervention on inflammatory markers in obese subjects.

Methods: 37 individuals with obesity were randomly grouped to diet-exercise group or diet-group, the follow-up was during four months. The dietary evaluation was analyzed by Nutritionist Pro software. Body composition was evaluated by bioimpedance (InBody 370). All biochemical determinations were analyzed by dry chemistry (Vitros 350). ASC mRNA expression was performed by real-time PCR using Taqman probes and by the 2- $\Delta\Delta$ Cq quantification method. Cytokine levels was performed using the Bio-PlexPro™ HumanTh17Cytokine Assays (MagPix) panel. Statistical analysis was performed with SPSS v.22 software, a *p* value <0.05 was considered significant.

Results: After the intervention period, both groups significantly decreased weight, fat mass, BMI and waist circumference. In addition, the diet-exercise group decreased body fat percentage ($-2.6 \pm 0.7\%$, $p=0.02$), abdominal obesity ($p=0.026$), atherogenic index (-0.6 ± 0.2 , $p=0.04$), ASC mRNA expression (-51.5% , $p=0.03$), MCP-1 (-24.3 pg / mL, $p=0.01$), MIP-1B (-10.2 pg / mL, $p=0.008$), a decrease trend in HOMA-IR (-1.1 ± 2.4 , $p=0.08$), c-LDL (-6.2 ± 7.2 mg / dL, $p=0.07$), as well as, the musculoskeletal (-0.14 ± 0.23 kg, $p=0.5$) and fat free mass (-0.01 ± 0.4 kg, $p=0.9$) had not changes compared to the diet-group. The same group showed a positive correlation between waist circumference and atherogenic index ($r=0.638$, $p=0.014$) and negative correlation between ASC mRNA expression change with the IL-10 levels change ($r=-0.724$, $p=0.005$) after the intervention.

Conclusions: Subjects who performed diet-exercise intervention had greater lost on body fat percentage and abdominal obesity, as well as, better control in body composition and inflammatory markers compared to the diet-group.

Conflicts of interest: The authors have no conflicts of interest to declare.

Keywords: Exercise / Diet / Obesity / Inflammatory markers.

O28

EFFECT OF PHYSICAL EXERCISE PROGRAM AND NUTRITIONAL INTERVENTION ON INFLAMMATORY MARKERS IN OBESE SUBJECTS

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O29

NUTRITIONAL STATUS AND PHYSICAL ACTIVITY IN A ADULT POPULATION OF ASUNCIÓN - PARAGUAY DURING THE YEAR 2019. PRELIMINARY DATA

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Nutrition in the prevention and treatment of chronic
diseases

Introduction: Nutritional status and physical activity level are important risk indicators for most chronic diseases.

Objectives: To determine the nutritional status and physical activity in adults who live in Asunción - Paraguay during the year of 2019.

Methods: Cross-sectional randomized study. The nutritional status was evaluated by Body Mass Index (BMI), waist circumference and relative fat mass. The level of physical activity was determined by using the short version of the International Physical Activity Questionnaire (IPAQ).

Results: Two hundred twenty people were evaluated, 145 were women (65.9%). The average age was 39.62 ± 14.5 years. The average weight was 78.13 ± 15.5 Kg; average height 1.63 ± 9.63 m; BMI 29.46 ± 5.4 Kg / m² and average waist circumference 93.43 ± 15.3 cm. According to the BMI, 80.5% (n = 177) of adult were overweight and 46.8% (n = 103) had an increased waist circumference and the 82.2% (n = 181) had increased relative fat mass. Only 5.4% (n = 12) of adults with healthy weight status presented an increased relative fat mass. Regarding physical activity, the average energy expenditure was 1098.43 ± 1679 MET minutes / week and 63.6% (n = 140) had a low physical activity level. According to the nutritional status, overweight adults showed a higher frequency of low physical activity level (overweight 22.7%; n = 50; obese 31.4%; n=59)

Conclusions: Overweight, cardiovascular risk and low physical activity levels were shown to be very frequent in this population, representing major risk factors for chronic diseases.

Conflict of Interest: No conflict of interest

Keywords: physical activity/ nutritional status/ relative fat mass

O30

VITAMIN D STATUS AND ITS RELATIONSHIP WITH LEVELS OF SEX HORMONES IN CHILDREN

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Introduction: Puberty is associated with vitamin D status. However, there is a lack of studies assessing the relationship between the puberty markers, such as the sex hormones, and the deficiency of Vitamin D.

Objectives: Thus, the aim of this study is to evaluate cross-sectionally the relationship between the sex hormones and the vitamin D in children.

Methods: A total of 467 children from the GENOBX study (244 females), aged 6-18 years, were classified according Cole and pubertal status according Tanner. Serum concentrations of Vitamin D, follicle stimulating hormone (FSH), luteinizing hormone (LH), testosterone and estradiol were measured. Vitamin D levels lower or equal than 20ng/mL were considered deficient, between 21-29ng/mL were considered insufficient and higher or equal to 30ng/mL were considered sufficient. Sex hormones values were adjusted by sex and converted into tertiles. Chi-square, Mann-Whitney and Kruskal-Wallis were performed for the statistical analysis.

Results: Overweight/obese children presented higher percentage of deficiency of vitamin D (47.6%) and lower percentage of sufficiency (28.3%) when comparing with the normalweight (38.7% and 38.7%, respectively). Pubertal group showed lower levels of vitamin D than prepubertal group (median: 20 ng/mL vs 24 ng/mL, respectively; p=0,04). There were differences in Vitamin D according to tertiles of sex hormones. In normal weight children, differences were found in vitamin D by tertiles of testosterone (I: 27 ng/mL; II: 32 ng/mL; III: 19.5 ng/mL, p=0.029). In overweight/obese differences were found in vitamin D by tertiles of FSH (I: 24 ng/mL; II: 21 ng/mL; III: 19 ng/mL, p=0.014), LH (I: 24 ng/mL; II: 22 ng/mL; III: 20 ng/mL, p=0.003) and estradiol (I: 24 ng/mL; II: 21 ng/mL; III: 20 ng/mL, p=0.044).

Conclusions: In this study higher deficiency of vitamin D was found in puberty and in the group of overweight/obesity in children. Also, with the increase of the concentrations of sex hormones (FSH, LH and estradiol) in overweight/obesity less concentrations of vitamin D were found. Diet should take into account the pubertal changes and the body mass index in order to present optimal values of vitamin D in the pubertal development.

Conflict of interest: None

Keywords: Puberty / vitamin D / children

O31

INFLAMMATORY BIOMARKERS AND LIVER STATUS IN SUBJECTS WITH NONALCOHOLIC FATTY LIVER DISEASE AFTER A 6-MONTH WEIGHT LOSS INTERVENTION: THE FLIO STUDY

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Nonalcoholic fatty liver disease (NAFLD) is the most common cause of liver disease in Western countries. The pathogenesis and progression of NAFLD are complex and are strongly associated with obesity and insulin resistance-related comorbidities. NAFLD involves dysregulation of inflammatory biomarkers. However, the role of inflammation in the management of NAFLD is not fully understood.

Objectives: The aim of this study was to evaluate the effect of a dietary weight loss intervention on inflammatory biomarkers and liver status in overweight or obese subjects with NAFLD after a 6-month follow-up.

Methods: Ninety-eight overweight or obese adults with ultrasonography-proven liver steatosis were enrolled to participate in a weight loss intervention following a personalized energy-restricted diet accompanied by healthy lifestyle advice (FLiO: Fatty Liver in Obesity study; NCT03183193). Anthropometry, body composition, biochemical parameters, hepatic enzymes, Fatty Liver Index (FLI) and Hepatic Steatosis Index (HSI) were assessed at baseline and after the 6-month follow-up.

Results: Seventy-six subjects completed the 6-month intervention period. Participants showed significant beneficial effects on anthropometry, body composition, blood pressure, lipid and glycemic profiles as well as on hepatic biomarkers. Moreover, significant improvements in leptin ($p < 0.001$), adiponectin ($p < 0.001$), CRP ($p = 0.009$), FLI ($p < 0.001$) and HSI ($p < 0.001$) were observed after the intervention. The linear regression analysis revealed a positive association between the decrease in leptin levels and the reduction in hepatic indexes (FLI $\beta = 0.316$, $p = 0.003$; HSI $\beta = 0.073$, $p < 0.001$). The multivariate regression models adjusted for age, sex, changes in energy intake and changes in physical activity confirmed the positive association between changes in leptin and liver indexes (FLI $\beta = 0.361$, $p = 0.009$; HSI $\beta = 0.112$, $p < 0.001$). The models explained up to 26.4% of the variation in the change of FLI (Adjusted $R^2 = 0.264$; p -model < 0.001) and up to 35.9% variation in the change of HSI (Adjusted $R^2 = 0.359$; p -model < 0.001) respectively.

Conclusions: A healthy personalized dietary intervention was able to improve general metabolic status, inflammatory biomarkers and hepatic parameters in overweight or obese participants with NAFLD. Moreover, the decrease in leptin was associated with the improvement in liver indexes. Further investigation is needed to clarify the interplay between dietary features, inflammation and liver status in the management of NAFLD.

Conflicts of Interest: The authors declare no conflicts of interest.

Keywords: NAFLD/ fatty liver/ inflammation/ leptin.

O32

PRENATAL RISK FACTORS AND DEGREE OF ADIPOSITY IN CHILDREN AND ADOLESCENTS

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Nutrition in the prevention and treatment of chronic diseases

Background and aim: The obesity epidemic and its current metabolic complications could be due in part to its programming already from the mother's womb. Pre and postnatal nutrition, induce changes in childhood and adolescence postnatal metabolism, leading to an increased susceptibility to chronic non-communicable diseases of the adult. Therefore, the importance of knowing the prenatal factors and their participation in the degree of adiposity in later ages.

Method: 895 children and adolescents (47% males) from 3 to 18 years old (10.25 ± 2.67), who attend pediatric nutrition and endocrinology consultations of 4 Spanish hospitals. Anthropometric assessment is performed and stratified according to the degree of adiposity using the Body Mass Index (BMI) according to Cole2000 international standards. Further, a family history questionnaire with weight gain variables during pregnancy, gestational diabetes, hypertension in pregnancy, type of birth and birth weight is carried out. Statistical analysis is performed using SPSS version 19.

Results: There are not statistical differences in weight gain and the degree of adiposity of children in later ages. However, a higher percentage of obese children is found in the children whose mothers had a high weight gain ($> 18\text{kg}$) (18% vs 16.9%). As for the mothers who presented hypertension and gestational diabetes during pregnancy, the percentage is higher in the obese, demonstrating statistical differences $p < 0.014$ in those who presented hypertension in pregnancy.

The highest percentage of C-section is found in children who are obese (30.8% vs. 24.6%, NS). It is also the obese group the one with the highest birth weight ($\geq 4000\text{kg}$) (11% vs. 5.5%, $p < 0.000$).

Conclusions: Hypertension in pregnancy and high birth weight are associated with obesity at later ages. Weight gain during pregnancy, type of delivery and gestational diabetes are related to the increase in adiposity at later ages, although not significantly.

Keywords: Prenatal risk factors, obesity, birth weight, gestational diabetes, hypertension in pregnancy, weight gain in pregnancy, type of delivery

O33

NUTRITIONAL STATUS AND DYSLIPIDEMIAS IN INSTITUTIONALIZED PATIENTS WITH ANTIRETROVIRAL TREATMENT FOR HIV/AIDS, FROM THE STATE OF HIDALGO, MEXICO

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Nutrition in the prevention and treatment of chronic diseases

Background: Highly active antiretroviral therapy (HAART) has succeeded in increasing the survival of HIV-positive patients; however, its use is not exempt of adverse effects, one of them: dyslipidemias.

Objective: The objective of this work was to describe nutritional status and prevalence of dyslipidemias in HIV-infected male patients who received HAART.

Methods: 261 records of male patients between 25 to 44 years of age, attended at CAPASITS in Hidalgo, Mexico from 2009 to 2019, were reviewed. Lipid profile (total cholesterol, HDL, LDL and triglycerides), weight, height, viral load and CD4+ count, were recorded at the beginning and 6 months after starting HAART. Diagnoses of dyslipidemias were made using criteria of the Adult Treatment Panel III (ATP III). WHO BMI cut-off points were used to classify underweight, normal weight, overweight and obesity.

Results: The average age of patients was 32.8 ± 5.3 years; the most frequent HAART, included a combination of non-nucleoside and nucleoside reverse transcriptase inhibitors. Initial and final mean of viral load and CD4+ count were $311,321 \pm 3.7 \times 10^4$ vs. $13,512 \pm 8.8 \times 10^3$ copies and 244.7 ± 11.6 vs. 357.9 ± 15.3 cell/ ml^3 , respectively. At 6 months with HAART, the percentage changes of abnormal numbers of triglycerides, total cholesterol, HDL and LDL were 14.2, 10.7, -16.8 and 17.5, respectively. Likewise, underweight, overweight and obesity had a percentage change of -6.1, 8.0 and 2.1, respectively.

Conclusions: Six months after starting treatment, HAART significantly reduced the number of copies of the virus, with a

negative effect on the prevalence of dyslipidemias, mostly LDL, followed by triglycerides.

Conflict of Interest: The authors declare no conflicts of interest.

Keywords: Dyslipidemias / antiretroviral therapy / HIV/AIDS

O34

ADMINISTRATION OF PROBIOTICS MODULATES MACROPHAGE POLARIZATION IN A NON-ALCOHOLIC FATTY LIVER DISEASE ANIMAL MODEL

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Nutrition in the prevention and treatment of chronic diseases

Introduction: The incidence of non-alcoholic fatty liver disease (NAFLD) is booming all over the world. This disease is characterized by steatosis and may progress towards hepatocarcinoma. While M1 macrophages are involved in the pathogenesis of steatosis, apoptosis and inflammation, M2 macrophages release antiinflammatory mediators which contribute to tissue healing. Probiotic administration is known to modulate the gut microbiota and the inflammatory response.

Objective: The goal of this study was to evaluate the effects of the administration of 3 probiotic strains (*Lactobacillus paracasei* CNCM I-4034, *Bifidobacterium breve* CNCM I-4035 and *Lactobacillus rhamnosus* CNCM I-4036) on macrophage polarization, inflammation and liver damage in a NAFLD animal model.

Methods: Obese Zucker rats were divided into 4 groups to orally receive either a placebo or 10^{10} CFU of either strain for 30 days. Hepatic expression of various macrophage markers were determined by qRT-PCR: Nos2 and CD86 as markers of M1 macrophages; CD163 and Arg1, as markers of the M2 type; and CD86 as a marker of total macrophages. Hepatic edema was calculated by the wet:dry weight ratio. Hepatic sections were stained with hematoxylin-eosin to quantify neutrophil infiltration. Lipid peroxidation and lactate

dehydrogenase (LDH) activity were also measured as markers of oxidative stress and tissue damage, respectively.

Results: Expression of M1 macrophage markers was greater in the group fed *B. breve*. On the contrary, higher expression of M2 macrophage markers together with an amelioration of lipid peroxidation, LDH activity, edema and neutrophil infiltration were found in the liver of rats that received *L. paracasei*. Administration of *L. rhamnosus* did not modify the expression of either type of macrophages or the markers of liver damage and inflammation.

Conclusion: The effects caused by all 3 strains were different in this NAFLD model. Whereas *L. paracasei* was hepatoprotective, most likely because this strain promoted macrophage polarization towards an M2 phenotype, *B. breve* exerted a harmful effect by the opposite reason.

Conflict of Interest: The authors declare no conflict of interest

Keywords: NAFLD/ probiotics/ inflammation/ macrophages.

O35

ACUTE EFFECT OF HEMODIALYSIS ON CENTRAL AORTIC BLOOD PRESSURE AND ITS DERIVATIVES IN PATIENTS WITH CHRONIC KIDNEY DISEASE DEPENDENT ON MALNUTRITION-INFLAMMATION SCORE (MIS)

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Malnutrition in chronic dialysis patients, which is estimated at 50-70% according to different studies, has a high prevalence and important repercussion on morbidity and mortality, which is higher than in the normal population. The extent of metabolic inflammation, as assessed by the Malnutrition-Inflammation Score (MIS) and the rates of blood pressure and vascular disease are frequent complications associated with this morbimortality.

Objectives: The objective is to study the acute effect of hemodialysis on Central Aortic Blood Pressure (CBP) and its derivatives, based on the Malnutrition-Inflammation Score (MIS), in order to take preventive and therapeutic measures according to these parameters.

Methods: Prospective and analytical cross-sectional study. Patients with a history of hemodialysis for ≥ 3 months, due to End Stage Renal Disease (ESRD) of any etiology, who attended the Hemodialysis Unit during the period of February-August 2019. After signing a consent form, the CBP and its derivatives, Pulse Wave Velocity (PWV) and Augmentation

Index (AiX), were taken by non-invasive oscillometric method, using TensioMed Arteriograph® equipment, before (1) and after (2) the hemodialysis. Blood samples were obtained on the same day and albumin and serum transferrin were analyzed. The Malnutrition-Inflammation Score (MIS) was calculated for each patient using a standardized method.

Results: 25 patients, 18 men and 7 women, with an average age of 62.3 ± 15.4 years old. 16 patients with low risk (LR) MIS score (≤ 7 points) and 9 high risk (HR) (≥ 8 points). Paired Sample Test was used:

MIS Low Risk

CBP1-CBP2: (32.1 ± 29.1 p=.001)

AiX1-AiX2: (17.6 ± 15.4 p=.000)

PWV1-PWV2: (-0.35 ± 1.5 p=.366)

MIS High Risk

CBP1-CBP2: (-0.80 ± 4.6 p=.617)

AiX1-AiX2: (-11.4 ± 19.7 p=.121)

PWV1-PWV2: (-1.5 ± 1.8 p=.043)

Conclusions: The MIS score in hemodialysis patients is an important independent risk factor, which has an impact on acute hemodynamic changes. It can be seen that CBP and AiX in low-scoring patients are significantly modified and so is PWV in high-scoring patients, so it follows that arterial stiffness in these patients is independent of CBP values.

Conflict of Interest: The authors declare no conflict of interest in this project.

Keywords: Malnutrition-Inflammation score / Central Aortic Blood Pressure / Hemodialysis

O36

UTILITY OF THE PHASE ANGLE FOR THE DIAGNOSIS OF SARCOPENIA IN GERIATRIC POPULATION

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Sarcopenia is defined as a decrease in muscle mass and function. In clinical practice there are many difficulties for early identification of sarcopenia, since it depends on the method and cut-off points used to assess each variable. The phase angle (PA) is a bioelectric variable that reflects the quantity and quality of soft tissues. It reflects the body cell mass and the integrity of cell membranes.

Objective: The aim of the study was to evaluate the usefulness of the phase angle as an indicator of sarcopenia in a group of institutionalized elderly people.

Methods: Cross-sectional study. 331 subjects institutionalized in centers of Castilla y León and Granada

(Spain) (106 men; 225 women) over 65 years old (mean age: 84.5 years) participated in the study. Appendicular skeletal muscle mass (ASMM) and its index (I-MMEA) were estimated using conventional bioimpedance analysis (BIA). Muscle strength was determined through handgrip strength. Sarcopenia was evaluated based on the algorithm of the European Working Group on Sarcopenia in Older People (EWGSOP2). Results were analyzed by Student-t-test, Chi-square test and R² Pearson. Statistical significance was reached at p<0.05.

Results: The prevalence of sarcopenia in the sample was 48% (n=159) [39.6% (n=42) in men and 52.0% (n=117) in women; p<0.05]. The mean PA was 4,344 (0,870) [4,613 (0,847) in men and 4,218 (0,854) in women; p<0.001]. Statistically significant differences in PA were observed based on the presence of sarcopenia: 4,654 (0.813) in non-sarcopenic subjects vs. 4,012 (0.808) in sarcopenic patients (p<0.001). These differences were also seen according to sex. Significant associations between PA and ASMM were documented (r=0.487; p<0.001). The association between the PA and the handgrip strength was very weak (r= -0.160; p=0.004).

Conclusions: The phase angle seems to be a good sarcopenia indicator in institutionalized elderly people. This variable is simple, safe, rapid, reproducible, noninvasive, and low cost, and reflects the changes in muscle mass that occur with age.

Conflicts of interest: the authors declare no conflict of interest.

Keywords: elderly people/ sarcopenia/ bioelectrical impedance analysis/ phase angle.

O37

IDENTIFICATION AND QUANTIFICATION OF PHENOLIC COMPOUNDS (ANTHOCYANIDINS) IN THREE NATIVE POTATOES VARIETIES (*Solanum tuberosum* sp.) COOKED UNDER BOILING AND MICROWAVE

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Safe, healthful and sustainable food

Introduction: In the Andean highlands of Peru (over 3800 masl), native potatoes are grown. There are more than 3500 varieties of native potatoes, which are highly appreciated for their colour, shape and size. This tuber is a great energy source that provides more vitamins and minerals, and fewer calories (80 cal/100 g cooked potato) than other products; therefore, the WHO recommends its consumption. Due to the color of their skin and pulp, native potatoes contain phenolic compounds such as anthocyanidins, which are important because of their beneficial health effects.

Objectives: To identify and quantify anthocyanidin content in native potatoes, and to evaluate the effect of boiling (5-10 min) and microwave cooking (150 W, 3 min) on anthocyanidins.

Methods: Three varieties of native potatoes (1009, 1571, and 1817) from Cusco-Perú, with purple skin and pulp, were

used. For the extraction of anthocyanidins, the sample (raw/cooked) was crushed with a homogenizer, 2 g of crushed sample was weighed and mixed with 10 mL of methanol: hydrochloric acid (99: 1) for 3 min in a vortex mixer. The supernatant obtained was centrifuged, and filtered (0.45 µm) for analysis in UHPLC-DAD, using formic acid and acetonitrile as eluents.

Results: The 1571 microwave-cooked variety showed the highest content of petunidin (22.81 mg/100 g) and the 1817 variety had the lowest content (0.02 mg/100 g) in raw potato; this anthocyanidin being the predominant one in the three native potato varieties. After cooking (boiling and microwave), native potatoes showed an increase in anthocyanidin content compared with their initial content; but the microwave cooking process favored the highest concentration of anthocyanidins. This increase could be due to the fact that during cooking the cell wall is modified and disintegrates, releasing the anthocyanidins present in the potatoes.

Conclusions: the cooking process (boiling or microwave) of native potatoes increases the content of anthocyanidins in cooked native potatoes, which is beneficial for health.

Conflict of interest: anthocyanidin, healthy compound
Keywords: native potato/anthocyanidin/cooking/UHPLC.

O38

GROWTH PROMOTING EFFECT OF CAVA LEES ON A HISTAMINE-DEGRADING BACTERIAL STRAIN: STRATEGIES TOWARDS FOOD SAFETY AND SUSTAINABILITY

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Safe, healthful and sustainable food

Introduction: Microbiologically spoiled and fermented-foods are susceptible to contain high levels of histamine, the causative agent of both histamine intoxication and intolerance. In addition to the known measures to prevent the formation of histamine, the possibility of using starter cultures with histamine-degrading (histaminase) activity is recently being studied. *Lactobacillus sakei* is a bacterial specie commonly used as starter culture in the manufacture of dry-fermented sausages and, for certain strains of this specie, a protective effect against aminogenesis has been described. Moreover, cava lees are byproduct of cava industry consisting in non-viable cells of *Saccharomyces cerevisiae* that owing to its composition, rich in different types of fibers, could be a suitable candidate to be revalorized as promoters of the growth of starter cultures. A faster fermentation could have a positive impact on the food safety of fermented products.

Objectives: The aim was to evaluate in vitro the histaminase activity of a specific strain of *L. sakei* and to study the effect of cava lees on the growth of this microorganism.

Methods: The in vitro histaminase activity was assessed through a resting-cells procedure and determination of degraded histamine by UHPLC-FL. The promoter effect of lees was assayed by growing *L. sakei* with (5% w/v) or without lees for 72 h in MRS media (30°C).

Results: *L. sakei* showed the ability to reduce histamine in vitro with a mean efficacy rate of 17% (± 4.1). The addition of 5% lees in the culture media significantly increased ($p < 0.05$) the growth and survival of this strain in comparison with the control (without lees). In detail, the growth of *L. sakei* was increased by 1.6 log CFU/mL due to the presence of lees, which represents a rise of 25%. The pH value in the media with lees was slightly lower, although no statistically significant differences were found.

Conclusions: The addition of cava lees promotes the in vitro growth of *L. sakei*, a bacterial strain that shows histamine-degrading capacity. The combined use of lees and histamine-degrading strains in the formulation of dry-fermented sausages could potentially enhance the safety of this food product while being a sustainable strategy to manage byproducts in the cava industry.

Conflict of Interest: The authors declare no conflict of interest.

Keywords: Histamine / cava lees / *Lactobacillus sakei* / safety / sustainability

O39

WATCHDOG CLUBS (WdC): STUDENTS MONITORING SCHOOL HEALTH IN EL RECREO-DURAN, ECUADOR

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Safe, healthful and sustainable food

Introduction: Over 150 students formed WdC using surveys and participatory monitoring to promote access to healthy food, clean water, sanitation, and physical activity in nine schools in El Recreo, Duran District, Ecuador.

Objectives: Sensitize school children and train them as watchdogs for healthy eating, physical activity, sanitary conditions, and monitoring of water quality; Identify positive leaders to act as watchdog club leaders and health promoters; and Involve the school community in healthy practices.

Methods: The WdC used community-based monitoring to engage the members of the community—the schools—interested in solving a specific problem—health outcomes. The children used an Oversight Checklist – designed by them – to collect data and make recommendations on school services, presented the recommendations to decision makers— school principals- and received an action plan that was executed.

Results: *Students as active citizens:* The Clubs were promoted as a means of building awareness about their responsibility over their right to a healthy environment.

The value of participatory approaches in learning democracy: The Clubs created a safe environment where schoolchildren were able to understand and exercise their rights and responsibilities, and see the response to their actions.

Building accountability relationships for mutual benefit: Their findings and opinions served as a credible foundation for increased accountability and improvements in the quality of their school environment.

Enhancing rights awareness: By actively monitoring the determinants of health in their educational establishment, students gained knowledge about their right to health determinants.

Conclusions: First, sustainability of WdC requires support from authorities or external actors. Partnerships with community organizations can solve this challenge. Second, students need ongoing and positive feedback and encouragement on their participation. Third, execution of activities that make the work visible to the broader community, for example, organizing a photo exhibit or a video contest, increase the motivation of students. Lastly, learning about health and nutrition is effective when using a participatory and experiential approach.

Conflict of Interest: The author declares that there is no conflict of interests.

Keywords: Watchdog clubs/citizenship/democracy/oversight/community-based

O40

CHARACTERIZATION OF METABOLIC PATHWAYS OF THE INTESTINAL MICROBIOTA INVOLVED IN THE DEGRADATION OF DIETARY CONTAMINANTS

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Safe, healthful and sustainable food

Introduction: This study is part of the preparatory work of a European project accomplished through the consortium OBEMIRISK, which analyzes the impact of obesogens present in the diet through modifications in microbiota. The species of the intestinal microbiota are more than 500 or 1000 species and they have an enzymatic arsenal involved in multiple and varied metabolic pathways. We specifically highlight enzymes involved in metabolism routes of those dietary hazardous compounds present in small quantities, and specifically those that might be considered obesogens: e.g. bisphenols, parabens, phthalates, benzophenones, metals heavy. These compounds can alter microbiota eubiosis generating long-term dysbiosis associated with obesity, diabetes, metabolic syndrome and other endocrine disorders.

Objectives: To identify specific microbial metabolism routes involved on obesogenic phenotype dysbiosis triggered by dietary contaminants exposure.

Methods: Culture and isolation of microorganisms from intestinal microbiota in media enriched with polluting substances, xenobiotics or obesogens. Sequencing partial sequences, their genomes (WGS) and identification by means of a bioinformatic analysis of genes and proteins of the key enzymatic pathways.

Results: Microorganisms from obese xenobiotics media have been isolated from human faecal samples and have been typed using 16S rRNA, showing higher similarity values with: *Bacillus* sp., *Streptococcus* sp., *Lactobacillus* sp., *Staphylococcus* sp. The more resistant colonies have been selected, they showed also biopolymer production capacities, and the complete genome sequencing has been performed for further protein identification: *Bacillus* sp. *oleaginous* strain. Specific genome analysis allows the prediction and identification of BPA degradation enzymes, and might be shared for parabens metabolization. In addition, we have seen that other obesogens such as heavy metals can be adsorbed in the EPS synthesized.

Conclusions: The potential of the microbiota as metabolizer and modulator agent of pathophysiological effects of dietary contaminant substances, to which we are currently affected, is an incipient area of development that will be decisive for the control and impact of the key nutritional aspects in health.

Conflict of Interest: No conflict of Interest.

Keywords: Microbiota, Dysbiosis, Diet, Obesogens, xenobiotic metabolism routes.

O41

INNOVATIVE STRATEGIES FOR IMPROVING NUTRITIONAL VALUE IN POULTRY MEAT

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Safe, healthful and sustainable food

Background and objectives: Poultry meat is a complete food of high nutritional value, functional and versatile for use in the diet. Its availability and cost makes it ideal for flexitarian diets. Through the feeding of the bird it is possible to modify meat attributes and increase its nutritional and functional value. In this investigation, which included three studies, the objective was to determine: - antioxidant content as GSH and GPx activity; - the oxidative status of lipids and proteins; - and the change in nutritional components of impact on health, selenium and fatty acid profile, in the *Pectoralis* and *Gastrocnemius* muscles of birds supplemented with organic and inorganic selenium (0.3 ppm) in the termination phase (35-53 days of age).

Methods: In both muscles, corresponding to breast and leg cut, from birds that received one of the 3 diets (control, without selenium; inorganic selenium, 0.3 ppm as sodium

selenite and organic selenium, 0.3 ppm as Selenium yeast), it was determined: Glutathione (GSH, Rakoswka et al., 2017), GPx activity (del Puerto et al., 2017), protein solubility (Turgut et al., 2017), TBARs and carbonyls (Terevinto et al., 2017), sulfhydryl's (SH, Marquez et al., 2018), selenium (Cabrera et al., 2010) and fatty acid profile (Puerto et al., 2017). The data were analyzed through an Anova GLM, with diet, muscle and interaction effects, followed by Tukey-Kramer test to differentiate the means (p<0.05; NCSS, 2019).

Results: Selenium supplementation increased the content of GSH, the activity of GPx, decreased protein oxidation (SH), increased the content of selenium in meat, which was more lean and with a higher content of polyunsaturated fatty acids. These effects were dependent on the type of selenium supplemented.

Conclusions: Supplementation with selenium in the diet of meat poultry is a strategy that improves innovative aspects of the nutritional and functional quality. An increase of the antioxidants such as GSH, and the nutritional compounds as selenium and n-3 fatty acids in poultry meat are the most interesting results of this study.

Conflict of interest: no

Keywords: Dietary selenium; Antioxidants; GPx; Oxidation of lipids and proteins; Fatty acids.

O42

HEALTHY LUNCH BOX, HEALTHY LIVES: COOKERY WORKSHOPS APPLIED FOR ADULTS IN NUTRITION EDUCATION TUPPER REVOLUTION: COOKERY WORKSHOPS APPLIED FOR ADULTS IN NUTRITION EDUCATION

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Safe, healthful and sustainable food

Background and aim: Nowadays, the quality of life and nutrition of patients or general public is carried out with nutrition education, however certain aspects of practice need to be reinforced, for example, with tools which help to healthy cooking to be applied in the daily life. The use of cookery workshops allows to develop competence in kitchen skills and to create new healthy dishes (Keller et al., 2005; Reicks et al., 2018). The aim of this study is to evaluate the use of cookery workshops for adults applied to the improvement of nutrition and quality of life as a good educational tool.

Methods: One-day hands-on cookery workshops focussed to the healthy lunch box was carried out in the Nutt's studio kitchen. The sample included sixty respondents to the cookery experience. These workshops included pre and post session questionnaires to assess learning and the use of the

Kirkpatrick's model (Kirkpatrick and Kirkpatrick, 2006) as the theoretical framework to evaluate the blended learning approach. The model had four criteria or levels of evaluation as are: i) reaction (content, materials and delivery), ii) learning (knowledge, skills and attitudes), iii) behaviour (application of newly acquired skills/knowledge), and iv) outcomes (job performance and organisational change).

Results: Results reflected a satisfactory successful outcome (90.2% satisfaction), a highly significant posttest-pretest difference ($P < 0.001$), and a satisfactory rate of behavioral change (89.7%) based on attendance at this cookery workshop. Furthermore, workshop participants report increased knowledge and confidence in cooking. At the first level of Kirkpatrick's model, 45.4% of the participants evaluated different aspects of the programme (including trainers, content and installations) as excellent. At the second and third levels, the participant's learning ($p < 0.0001$) and performance ($p < 0.0001$) had improved. At the fourth level, the mean \pm standard deviation score of the programme outcome was 27.8 ± 1.87 , indicating that the volunteers believed that the training course had been effective. On the other hand, a significant positive effect in increasing adult's fruit intake by one-fifth of a portion per day and vegetable intake by nearly one-fifth of a portion per day.

Conclusions: Workshops focussed in healthy lunch box to be applied instead of work is a beneficial nutrition education activity

Keywords: Cookery workshops, nutrition education, healthy lunch box

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O43

ACRYLAMIDE IN TRADITIONAL COLOMBIAN FOODS

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Safe, healthful and sustainable food

Introduction: Acrylamide is a potential carcinogenic substance produced when starchy food are heated above 120°C, as occurs during baking and frying. Information about

acrylamide in Colombian food processed is limited and is necessary to risk assessment.

Objectives: To study the raw material, ingredients used in the formulation, presentation forms, and heat treatments related to acrylamide. Develop the acrylamide method considering the matrix effect and validity using reference foods (e.g. plantain and panela)

Methods: 626 homemade preparations, representative of eight regions of Colombia, were reviewed. Raw ingredients and preparation methods were considered. Acrylamide was analyzed through the adaptation of the method designed by Liu et al., 2008.

Results: 35% of the samples analyzed involved frying or baking. These preparations include mainly plantains, potatoes, corn, cornmeal, and wheat flours. These ingredients have varying amounts of asparagine (457-12,886 ppm) and reducing sugars (0-18.0 gram-%). The Pacific and Atlantic regions have high percentage of fried preparations and in Central and Amazonia the baked is more common. The temperature applied is between 170 °C and 190 °C and cooking time from 2 to 40 minutes. Twenty-four (24) preparations were identified with the highest potential risk. Estimated acrylamide values ranged between 104 and 580 ppb.

Conclusions: Traditional Colombian food preparations use ingredients and process that favor acrylamide formation and could represent a health risk. The determination of acrylamide is necessary to risk assessment

Declaration of interest: The authors report no conflicts of interest.

Keywords: Acrylamide/ Colombian food/ starchy foods.

O44

MEAL PLATE LEFTOVERS FROM SPANISH HOUSEHOLDS AND OUT-OF-HOME CONSUMPTION: RESULTS FROM THE ANIBES STUDY

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Safe, healthful and sustainable food

Introduction: Food waste is a major environmental issue that must be tackled in order to achieve a sustainable food supply chain. Several studies have identified that the main source of food waste, both in the service sector and households, is food that remains on the plate (leftovers). Latest research has mainly focused on the overall waste generated by the Spanish population. However, to date, there are no studies that examine the amount and sources of plate leftovers produced by household and out-of-home consumption,

Objectives: The present study aims to provide this information segmented by different food and beverage

groups, eating occasions and types of dishes consumed by different age groups of participants from the ANIBES study.

Methods: A total of 2009 individuals, aged 9–75 years from the ANIBES cross-sectional Study using a nationally-representative sample from the Spanish population were studied. A three-day dietary record, collected by a tablet device, was used to record by taking photos of all foods and beverages consumed, both at home and outside. Pictures had to be taken before and after finishing the meals. Additionally, a brief description of the meals, recipes, brands, etc. was also recorded.

Results: The main meals contributing to plate leftovers across all age groups were lunch (40%), dinner (27%), breakfast (11%), afternoon snack (8%) and mid-morning and other occasions (7% respectively). The highest amounts when assessing the food groups or types of dishes corresponded to bread and derivatives (25%) main courses (16%), first and second courses (15% respectively) and starters (8%). The main sources that contributed to food leftovers were vegetables and fruits (12%), ready-to-eat meals (10%), cereals and grains (10%), oils and fats (10%), pulses (10%) followed by meat products (8%) and sauces and condiments (8%).

Conclusions: Our results reinforce the need for new strategies to focus on reducing plate leftovers, and this is crucial from both a nutritional, economic and environmental point of view, but also to rely on more accurate information on the actual intake when using dietary surveys.

Conflict of Interest: We have no competing interests.

Keywords: Food waste, Leftovers, Food losses; ANIBES Study

O45

THE FOOD PROGRAMME: A EUROPEAN BEST PRACTICE IN HEALTHY PROMOTION DURING THE WORKING DAY

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Challenges for an effective and efficient public-private partnership in food and nutrition

Background and aim: Obesity was still responsible for 1 in 5 deaths in different parts of Europe in 2018 and the WHO defines unhealthy diets as one of the four main behavioural risk factors to focus on worldwide. Since people spend a major part of their waking hours at work, it is a designated place to act. Indeed, a balanced diet positively influences employees' health, well-being and productivity in the long run.

Hence, the core objective of the FOOD programme that promotes healthy eating habits during the working day towards two complementary target groups: workers and commercial restaurants, making "the healthy choice the easy choice".

Methods: The FOOD programme is a public private partnership gathering Public Health Authorities, Nutritionists and Universities around the coordinator Edenred in 10

countries (AT, BE, CZ, FR, ES, IT, PT, RO, SK). It started thanks to EU funding in 2009.

The Consortium followed a five-step methodology enabling a qualitative and adapted set of actions. It developed tools and messages adapted to cultural and professional constraints in each country.

As part of the evaluation, barometers are being conducted every year towards employees and restaurants in order to collect their eating habits and perception. Since 2012, 130,000 workers and 9,500 restaurants answered the questionnaire. Results confirm a change of perception as well as a change of decision making when it comes to the choice of place where to have lunch or to the meal they will choose.

Results: Since 2009, 400 communication tools have reached 6.9 million employees and 521,000 restaurants.

In 2019, the FOOD programme received a Best practice certificate by the European Commission and an Award from the UN Task Force, recognizing the programme's contribution to achieving NCD-related Sustainable Development Goals.

Conclusions: The FOOD programme is a unique example of EU funded project that could continue as a long-term programme. Thanks to the partners' knowledge sharing, it could be implemented in Latin-America with the right partners and adapted communication campaigns.

Keywords: Nutrition/ prevention/ communication

O46

SCHOOL ENVIRONMENT, OBESOGENIC FACTORS FROM THE PERSPECTIVE OF THE EDUCATIONAL COMMUNITY AT A SCHOOL IN MEDELLÍN, COLOMBIA.

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Nutrition in the prevention and treatment of chronic diseases

Background: The World Health Organization -WHO- considers obesity among the first causes of death, for conditioning the development of Chronic Noncommunicable Diseases -CNCD-, which in 2016 caused 72% of deaths worldwide. By 2016, the WHO and the World Bank report that the prevalence of excess weight in children exceeds 30% of the population. Early occurrences of these diseases can be preventable from childhood, as they are related to people's lifestyle and exposure to obesogenic environments characterized by food availability and conditions for physical activity, not conducive to health. Children in obesogenic environments will have rapid weight gains and increased risk of obesity in adult life, of up to 50% (Muñoz & Arango, 2017).

Objective: To identify the obesogenic factors from the perspective of the educational community, seeking solutions in the prevention of obesity, all the while taking into account the school environment.

Methods: Qualitative research and hermeneutical paradigm; eight focus groups (4 to school children and 4 to teachers) were studied. The analysis was based on fundamental theory.

Results: The obesogenic factors identified by the educational community are located at the individual and institutional levels. The first level refers to eating habits, purchasing power, and emotional aspects, which influence the choice and consumption of inappropriate food - both in quantity and quality, by schoolchildren. The second one is the institutional conditions, such as the locative infrastructure, the quality of the food supply, and other issues involving the teachers themselves and the teaching activities and processes, which condition both food intake and physical activity.

Conclusions: Identifying the favorable aspects of excess weight in the school environment, based on its microenvironments; provides sufficient and necessary supplies and materials for the construction of a comprehensive educational proposal, taking into account the individual and environmental conditions of the subjects, their practices, knowledge, meanings, and beliefs; aimed at going beyond the transmission of mere knowledge through significant interventions - relevant and consistent with their possibilities-, and actions that transform these environments.

Keywords: school/excess/ weight/ environment.

Conflicts of interest: none

This work is part of the Colon Cancer Prevention (ECNT) project. Educational perspective against obesity, in food, nutrition, and physical activity, in schoolchildren in Antioquia and Quindío, within the Scientific Academic Alliance for the strengthening of IES, focused on nanobioengineering for the prevention, diagnosis, and treatment of Colon-cancerNanobio. Scientific Colombia 2017.

Objectives: This study aimed to evaluate whether different treatments for obesity are able to modify epigenetic signature related to adiposity.

Methods: 35 obese women were assessed before and after 6-week of hypocaloric dietary intervention (n=11, age: 36.9±10.3 years; BMI: 58.5±10.5kg/m²) or before and after 6-months of gastric bypass (n=24, age: 36.9±10.2 years; BMI: 43.3±5.7kg/m²). These participants were compared with sex- and age-matched normal-weight women (BMI: 22.5±1.6kg/m²). Anthropometric and body composition evaluation were performed in each time. Genome-wide DNA methylation analysis was performed in DNA extracted from peripheral blood leukocytes using Infinium Human Methylation 450 BeadChip assay. Changes ($\Delta\beta$) in methylation level of each CpGs were calculated. A threshold for the significant CpG sites based on $\Delta\beta$ with a minimum value of 10%, p<0.001 and q<0.05 was applied.

Results: Significant reduction in body weight and fat mass was observed after both interventions. As first results, linear regression analyzes showed that 4,631 CpGs were associated with BMI, 3,437 CpGs abdominal circumference and 10,587 CpGs body fat, totaling 11,111 CpGs associated with obesity/adiposity. Before and after interventions, methylation profile from obese women was compared with normal-weight women. It showed that methylation level of 82 CpGs associated with adiposity were different between obese and normal-weight women, even after bariatric surgery. In the same way, 249 CpGs associated with adiposity were different between obese and normal-weight women, even after hypocaloric dietary intervention. Those CpGs were in genes related to Wnt, cadherin and PI3 kinase signaling pathways. These pathways are involved with adipocytes differentiation, lipid metabolism and insulin resistance, which characterize the main comorbidities related to obesity. These data suggest that there is a group of genes associated with adiposity that are epigenetically different among individuals with different BMIs, even after weight-loss strategies.

Conclusions: DNA methylation analysis of the entire genome has revealed that there is a cluster of genes associated with adiposity having different methylation levels between individuals with obesity and normal-weight even after dietary intervention or bariatric surgery, indicating the existence of an epigenetic signature associated with obesity that even with significant weight loss is not modified.

Conflict of Interest: None to declare.

Keywords: epigenetic / DNA methylation / obesity / adiposity / BMI

Financial support: São Paulo Research Foundation (FAPESP) (grants #2016/05638-1 and #2015/18669-0).

O47

IS THERE AN EPIGENETIC SIGNATURE ASSOCIATED WITH ADIPOSITY? LONGITUDINAL RESULTS IN RELATION TO TWO WEIGHT LOSS STRATEGIES

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Studies have shown that weight loss through interventions such as exercise, low calorie diet and bariatric surgery can modulate the dynamics and reverse methylation levels in different human tissues, providing the search for target markers to treat obesity-related comorbidities.

O48

INFLUENCE OF THE POLYMORPHISM G1359A OF THE CANNABINOID RECEPTOR GENE CNR1 ON LIPID PANEL IN SUBJECTS WITH AND WITHOUT OBESITY

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Nutrition in the prevention and treatment of chronic diseases

Introduction: It has been described that the hyperactivity of the endocannabinoid system (SEC) and its CB1 receptor contributes to the development of insulin resistance and diabetes, when using antagonists of this receptor it decreases glucose intolerance and insulin resistance. There are few studies that evaluate the genetic variations of the CB1 receptor, in the CNR1 gene it has been described that carriers of the G1359A polymorphism have better glucose levels and insulin resistance.

Objective: To evaluate the influence of the G1359A polymorphism of the CNR1 gene on the lipid panel of subjects with and without obesity.

Materials and Methods: 202 subjects were included in the study (normal weight = 100 and obesity = 102), anthropometric and body composition evaluation was performed through bioimpedance, glucose levels and lipid panel were quantified. The genotyping of the samples to assess the presence of the G1359A polymorphism was performed using the qPCR method.

Results: When genotyping, 78% (n = 158) of the samples were carriers of the wild genotype G-G and 22% (n = 44) of the mutated genotype G-A / A-A. When comparing the anthropometric and biochemical variables, it was found that the carriers of the mutated genotypes had levels of VLDL cholesterol (26 ± 10 vs. 32 ± 13 mg / dl, p = 0.030) and triglycerides (133 ± 50 vs. 159 ± 68 mg / dl, p = 0.030) lower. When analyzing grouping by BMI and genotype, it was observed that the group of normal weight and carrier of polymorphism had significantly lower levels of BMI (21.5 ± 2.2 vs 22.8 ± 1.7 kg / m², p = 0.004), percentage of fat mass (22.2 ± 6.5 vs 25.5 ± 6.5, p = 0.045), LDL cholesterol (21 ± 7 vs 27 ± 9 mg / dl, p = 0.011) and triglycerides (108 ± 36 vs 136 ± 45 mg / dl, p = 0.011) compared to genotype wild type.

Conclusions: The carriers of G1359A polymorphism of the CNR1 gene presented better levels of LDL cholesterol and triglycerides, as well as lower levels of BMI and percentage of fat were observed in subjects with normal weight, which seems to indicate that SEC is involved in homeostasis of the adipose tissue.

Conflict of Interest: Nothing to declare

Keywords: endocannabinoid system/dyslipidemia/G1359A/obesity.

O50

EFFECT OF ZINC SUPPLEMENTATION AND STRENGTH EXERCISE ON NON-ALCOHOLIC FAT LIVER DISEASE AND HEPATIC PHOSPHORYLATION OF AKT AND PTP1B, IN RATS WITH INDUCED TYPE 2 DIABETES

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Type 2 diabetes (T2D) is a chronic disorder characterized by chronic hyperglycemia. Seventy % of these patients suffer from non-alcoholic fatty liver disease (NAFLD). Zinc (Zn) and strength exercise (Ex) could play a key role by increasing the activity of insulin signaling in the liver by improving the sensitivity of the hormone.

Objective: To evaluate the effect of supplementation with Zn and strength exercise on NAFLD, phosphorylation of protein kinase B (Akt) and Tyrosine Phosphatase Protein 1B (PTP1B) in livers of rats with T2D.

Methods: Wistar rats were fed with high-fat diet (HFD) for 18 weeks to induce T2D. Then, treatments (HFD, HFD-Zn, HFD-Ex and HFD-ZnEx) were started (n=6/treatment) for 12 weeks. Serum Zn, lipid profile, glycemia and insulinemia were determined. Western blots were performed using antibodies against total and phosphorylated Akt and PTP1B (pAktSer⁴⁷³ and pPTP1BSer⁵⁰). NAFLD was evaluated by histological staining with Oil Red, intrahepatic triglyceride levels (IHTG) and transaminases.

Results: HFD-ZnEx group had higher levels of pAkt with and without insulin. HFD-ZnEx had higher levels of pPTP1B compared to HFD and HFD-Zn groups when it was treated with insulin. HFD-ZnEx had higher levels of pPTP1B with insulin treatment. Higher levels of pAkt were associated with higher levels of pPTP1B. Liver histology shows higher integrity and less staining with Oil Red in HFD-Ex and HFD-ZnEx. HFD-Ex and HFD-ZnEx had lower levels of IHTG. There were no changes in the levels of aspartate aminotransferase and alanine aminotransferase. Higher levels of pPTP1B were associated with lower levels of IHTG.

Conclusion: Zn and Ex improved insulin signaling and attenuated NAFLD in a DM2 model. The effects of these treatments in patients with DM2 remain to be resolved in a clinical model.

Conflict of Interest: The authors have no conflicts of interest to declare

Keywords: zinc / strength exercise / Akt / PTP1B / type 2 diabetes.

O51

A POOR DIET QUALITY DURING PUBERTY IS ABLE TO INDUCE EPIGENETIC CHANGES IN KEY GENES PARTICIPATING IN PATHOGENIC PATHWAYS OF OBESITY AND IR

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Several lines of evidence indicate that epigenetics has important effects on obesity and diabetes in humans. Particularly, many studies suggest that the unhealthy diet of obese and diabetic patients may be one of the environmental factors most strongly affecting their epigenome and thereby disease pathogenesis. Since pubertal maturation has been proposed as a metabolic risky life-stage (especially for children with obesity), it would be interesting to study the particular effect of diet on human epigenetics during this period of life.

Objectives: In this work, we aimed to evaluate the association between whole-genome DNA methylation and diet habits in children with obesity and insulin-resistance (IR) undergoing pubertal development.

Methods: A longitudinal study was conducted on 138 Spanish children distributed into six experimental conditions according to their obesity and IR trajectories (before and after the onset of puberty). Anthropometric and biochemical parameters, food frequency habits and blood whole-genome DNA methylation levels (Infinium MethylationEPICArray) were evaluated in all subjects before and after puberty entrance. At the pubertal stage, a dietary quality index (DQI) was further computed from available food frequency data in order to assess diet quality, diversity and equilibrium. For statistical analyses, all possible cross-sectional and

longitudinal group comparisons were carried out in order to reveal the DNA methylation changes associated with obesity and IR. Moreover, we tested for association between the generated DQI and genome-wide DNA methylation levels at the pubertal stage.

Results: At a genome-wide significance level of FDR=0.05, our analyses reported significant changes in the DNA methylation status of 13508 CpG sites across the genome associated with obesity or IR. Interestingly, our results evidenced some genes previously reported as epigenetics targets of diet components (CDK5,NFAM1,SLCO5A1,TCF7L2,VAC14). The association between DNA methylation levels and DQI further reported significant results for CpGs in two of the previously-mentioned genes (CDK5,CDK5-RAP3,SLCO5A1 with P-Value<=0.0006). These analyses were adjusted for BMI and HOMA, suggesting that the DNA methylation status of these genes was directly downregulated by unhealthy diet behaviours.

Conclusions: Diet habits during pubertal maturation are able to induce epigenetic changes in key genes participating in pathogenic pathways of obesity and IR.

Conflict of Interest: None to disclose.

Keywords: Puberty / epigenetics / diet / obesity / insulin-resistance / children

O52

DIETARY PATTERNS, NUTRITIONAL COMPONENTS AND PREVALENCE OF DYSLIPIDEMIAS IN SCHOOLCHILDREN

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Nutrition in the prevention and treatment of chronic diseases

Introduction: A significant number of school-age Mexican children have high concentrations of triglycerides (TG), total-cholesterol (TC), low-density lipoprotein (LDL), and very low-density lipoprotein (VLDL). Sedentary lifestyle and inadequate diet have been the best identified risk factors for these premature health conditions, recognizing that certain dietary patterns (DP) and some of its components are related to these dyslipidemias. However, this relationship in schoolchildren has not been clear.

Methods: Longitudinal study in 790 schoolchildren in social and food vulnerability in a central region in México. DP were evaluated over ten months during a school year. Serum TC, TG, LDL-cholesterol and VLDL-cholesterol concentrations were measured at the last diet measurements, assuming regular food consumption based on diet data derived from 10 three-day food records. We identified PCA-derived habitual dietary patterns by factor analysis and Varimax rotation for

the calculation of factorial loads in each food group. Dietary data were adjusted by energy density. The cut-off points for identifying dyslipidemias were: for TG: ≥ 150 mg/dL, for TC: ≥ 200 mg/dL, for LDL-High cholesterol: ≥ 130 mg/dL, and for low HDL-Cholesterol ≤ 40 mg/dL. Pearson correlation coefficients were obtained to analyze diet components between PD; and Chi-square test was used to compare the prevalence of dyslipidemias between DP.

Results: Three DP obtained explain 75% of the variance: PD-1-Vegetal, PD-2-Dairy-food with cereals and PD-3-Meat-products. Dietary amounts of Carbohydrates, proteins, iron and vitamin-D had statistically significant differences between DP. Low HDL-Cholesterol and high-triacylglycerol concentrations were the most prevalent dyslipidemias, especially in children in PD-2 and PD-3.

Conclusions: In this population the three DP provide necessary nutritional-components for the normal growth and development of schoolchildren; however, high consumption of animal-products was related to dyslipidemias.

Conflict of interest: Neither author reported a conflict of interest related to this study.

Keywords: Dietary patterns / dislipidemias / schoolchildren / healthy eating practices.

O53

EFFECT OF ADIPONECTIN AGONIST ADMINISTRATION DURING PREGNANCY ON OXIDATIVE AND INFLAMMATORY STATUS IN THE ADULT OFFSPRING OF DIABETIC RATS

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Gestational diabetes mellitus (GDM) is associated with elevated risk of obesity and cardiometabolic diseases in the offspring. Adiponectin level is decreased in GDM pregnancies. Recent studies have suggested that adiponectin agonists could exert anti-diabetic properties and it is unknown whether they could alleviate GDM-related oxidative stress in the offspring.

Objectives: Our aim was to evaluate the effects of the administration of a novel adiponectin agonist during pregnancy (AdipoRon) in diabetic rats and the long-term consequences on oxidative stress, immunological markers and eicosanoids level in the offspring.

Methods: Pregnant rats were randomized to three experimental groups: diabetic rats (GDM), diabetic rats treated with adiponectin agonist (GDM+ADI) and controls without GDM. Diabetes was induced on day 12 of pregnancy via single intraperitoneal injection of streptozocin (50mg/kg). GDM+ADI received orally 50mg/kg/d of an adiponectin agonist (AdipoRon) from day 14 until the end of gestation. In

the adult offspring (12 wo), fatty acid profile and total antioxidant activity (TAA) were analyzed in plasma (GDM n=20, GDM+ADI n=14, Control n=16). Nitrotyrosine (oxidative stress marker), IL-1, IL-6, and TNF- α were quantified in renal cortex and eicosanoids excretion measured in urine samples. ANOVA test was used for data analysis, significant differences were set at $P < 0.05$. Results are expressed as means \pm SEM.

Results: The administration of AdipoRon during pregnancy in the mother significantly reduced n-6/n-3 polyunsaturated fatty acids ratio in plasma of adult offspring (GDM: 14.83 ± 0.82^b %, GDM+ADI: 11.49 ± 0.56^a %, Control: 10.03 ± 1.15^a %; $P = 0.001$). Nitrotyrosine (GDM: 6.69 ± 0.33^a pmol/mg protein, GDM+ADI: 5.47 ± 0.23^b pmol/mg protein, Control: 6.60 ± 0.27^a pmol/mg protein; $P = 0.006$) and immunological markers (IL-1, IL-6, and TNF- α) were also reduced in renal cortex by AdipoRon, indicating a positive effect of the adiponectin agonist on immune system. In the same line, reduced TAA was observed in plasma and renal cortex of GDM+ADI offspring compared to GDM and control animals. Nevertheless, no differences were found in urinary eicosanoids between experimental groups.

Conclusions: AdipoRon treatment in the mother improved n-6/n-3 polyunsaturated fatty acid ratio in the adult offspring at long-term and showed positive effects on antioxidant and inflammatory status.

Conflict of Interest: All authors declare no conflicts of interest to report.

Keywords: Adiponectin / diabetes / antioxidant / offspring / fatty acids.

O54

EVALUATION OF THE HEARING FUNCTION IN AVIATION STAFF FROM SPAIN AND ITS RELATIONSHIP WITH THE NUTRITIONAL STATUS

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Nutrition in the prevention and treatment of chronic diseases

Background: Noise-induced hearing loss (NIHL) is the most frequent and preventable occupational disease. Moreover, about 11% of the world's adult population works in a noisy environment with the involved risk. Recently, different studies suggest that diet could be playing a key role in the development of this pathology. In this regard, there is evidence of a possible etiology and potential protective effect of folic acid (FA) and related nutrients against hearing loss and damage.

Objective: To study the relationship between the auditory function and the dietary intake in aviation workers, who are exposed to noise pollution in the work environment.

Methods: A sample of 61 aviation pilots, 38 civilians and 23 military (23-62 years), that undergo a periodic medical examination at the Centro de Instrucción de Medicina Aeroespacial (CIMA), was evaluated. Auditory function was assessed by tonal audiometry. Energy and nutrient intake were estimated by 24-hour recall using the DIAL™ program. Statistical analysis was performed by SPSS v.24 program.

Results: Overall hearing loss percentage in the studied sample was 3.12% ± 4.64. NIHL begins to be evident in frequencies 1000-4000 Hz, related to speech and language comprehension and accentuates in frequencies 4000 and 8000 Hz, related to aviation. Overall hearing loss percentage was negatively correlated with dietary FA consumption ($r = -0.395$; $p = 0.014$), vitamin B₁₂ ($r = -0.330$; $p = 0.043$) and vitamin D ($r = -0.383$; $p = 0.018$) in civilians. A negative correlation between omega 3 fatty acids consumption and global hearing loss percentage was obtained for the military ($r = 0.427$; $p = 0.042$), although no significant differences were found in civil pilots.

Conclusions: FA and others micronutrient insufficient intake may be related to NIHL. Nutritional interventions would be of great interest in slowing down the hearing loss progression in populations exposed to noise pollution in their workplace. However, more studies are being carried out to confirm or refuse these pioneers results.

Conflicts of interest: The authors declare no conflicts of interest.

Keywords: folic acid/ hearing loss/ noise/ aviation/ nutrients/ vitamin B12/ omega 3 fatty acids

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Dietary misreporting is a major concern when addressing diet-disease associations. Although dietary misreporting is linked to body mass index, little is known about its role on cardiometabolic risk (CMR) factors in adolescents.

Objectives: The aim of this study is to examine the associations between dietary misreporting and CMR factors in European adolescents and to assess the potential bias on the association between CMR and energy intake (EI) driven by dietary intake misreporting.

Methods: Two 24-hour dietary recalls were obtained from 1,512 European adolescents (54.8% girls) aged 12.5-17.5 years. Physical activity was measured by accelerometry. Cut-offs suggested by Huang were applied to identify misreporters. Height, waist circumference (WC), four skinfolds, diastolic (DBP) and systolic blood pressure (SBP), and cardiorespiratory fitness (CRF) were taken and triglycerides and total cholesterol/high-density lipoprotein cholesterol ratio (TC/HDL-c) were analyzed. A sex- and age-specific clustered CMR score ($n=364$) was computed. Associations were investigated by multilevel regression analyses after adjustments for age, sex and centre.

Results: Underreporting (24.8% of the sample) was significantly ($p<0.05$) associated with higher WC, waist-to-height ratio (WHeR) sum of skinfolds and lower DBP whereas overreporting (23.4% of the sample) was significantly associated with lower WC, WHeR, sum of skinfolds and SBP. Also, underreporters were more likely to have higher WHeR and sum of skinfolds while overreporters were at risk of lower WC, WHeR and sum of skinfolds. Finally, associations between CMR factors and EI were significantly affected by misreporting considering various approaches.

Conclusion: CMR factors differed among misreporting groups and both abdominal and total fat mass indicators were strongly associated with all forms of misreporting. Moreover, misreporting seems to bias EI and CMR associations in adolescents. Therefore, energy misreporting should be taken into account when examining these associations.

Conflicts of interest: none

Keywords: Diet / cardiometabolic risk /energy misreporting/ fat mass /adolescence/ HELENA study

O55

DIETARY MISREPORTING AND CARDIOMETABOLIC RISK FACTORS IN EUROPEAN ADOLESCENTS: IS THERE AN ASSOCIATION? THE HELENA STUDY

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O56

CHARACTERISTICS OF METABOLIC FAT LIVER DISEASE (EHMG) IN PATIENTS WITH TYPE 2 DIABETES MELLITUS (DM2)

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Fatty Metabolic Liver Disease (FMLD) is the main cause of chronic liver disease in Spain and the incidence is increasing in parallel with the increase in type 2 diabetes (DM2) and obesity. Lifestyle modifications to achieve weight loss are the main objective in the management of EHMG. Liver fibrosis is the main prognostic factor that impacts on the survival of these patients and more advanced forms have been described in patients with DM2.

Objectives: The objective of this study was to analyze the clinical-analytic and histopathological characteristics in patients with HMMG and DM2.

Methods: Prospective cohort study where 57 patients were included, with a simple consecutive sampling, over a year, diagnosed with HMMG with liver biopsy according to usual clinical practice of the Hospital and after ruling out other causes of liver disease. Anthropometric measurements, Mediterranean diet adherence questionnaire (Predimed), biochemical tests, and non-invasive indices of fibrosis such as NAFLD Fibrosis Score were performed.

Results: Mean age was 55.3 ±12.8 years. Of the total number of patients, 27(47.4%) were men and 30(52.6%) women, body mass index (BMI) 34.4±6.9Kg/m², of which a total of 28(49.3%) presented DM2. Patients with DM2 presented statistically significant differences with respect to non-diabetic patients in terms of lower adherence to the Mediterranean diet (Predimed (9.2 ±2.27 vs 7.78±1.89, p=0.02)), higher waist-hip index (1.02±0.06 vs 0.97±0.81, p=0.03), higher HOMA RI (9.23±4.47 vs 6.09±4.02, p=0.01), AST (GOT) levels (43±24.47vs 31.14±15.12, p=0.04), and lower platelets x(10)⁹/L (192.33 ±77.73 vs 250.57±59.27, p=0.004). DM2s presented a significantly higher frequency of advanced fibrosis (F>2) in liver biopsy (71.4%vs 22.7%) than non-diabetics as well as a higher fibrosis index (NADLD-FS) (0.1±1.4 vs-2.2±1.1; p<0.001).

Conclusions: Patients with DM2 present an EHMG with more advanced stages of fibrosis. At the same time, the metabolic profile of these patients is worse so in every patient with DM2 it is necessary to study the presence and severity of EHMG since this aspect can influence their survival.

Conflict of interest: None.

Keywords: Fatty Liver, Diabetes Mellitus.

O57

BODYWEIGHT CHANGES IN NEWLY RECRUITED STUDENTS AT A MEXICAN PUBLIC UNIVERSITY

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Challenges of nutrition and public health in Ibero-America

Introduction: The transition from high school to college or University is a risk period for adopting an unhealthy lifestyle, which could persist into adulthood. In some countries, this phenomenon is known as Freshman 15, and it is associated with lifestyle changes such as living independently and high levels of perceived stress. However, this phenomenon has not been observed in all countries and students.

Objective: To determine if there is a weight gain in Mexican students during the first semester at the University and identify possible associated modifiable factors.

Methods: Anthropometric characteristics and lifestyle habits were evaluated in 226 individuals aged 17 to 21 y.o., at the beginning and end of the semester. The differences intra-subjects were evaluated through the general linear model with repeated measures, and the categorical variables by X².

Results: There was a significant increase of 0.8 kg of body weight, regardless of sex (0.6 And 0.5 kg for men and women, respectively). According to the WHO BMI classification, the number of overweight and obese adolescents increased by 30% at the end of semester. The highest weight gain was for adolescents who eat in less than 20 min or living in an assisted home.

Conclusion: The transition to University is a period of vulnerability for weight gain associated with lifestyle changes.

Conflict of Interest: The Authors declare that there is no conflict of interest.

Keywords: adolescent obesity / bodyweight gain / adolescence / freshman 15 / lifestyle behaviours.

O58

INFLAMMATORY AND CYTOTOXIC EFFECTS OF SUCRALOSE ON MACROPHAGES DIFFERENTIATED OF THP-1 MONOCYTES

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Sucralose is a non-nutritive sweetener used to sweet without glycemic effects and energy intake. However, results from randomized controlled trials shown an association of BMI increase and cardiometabolic risk. At the cellular level, its consumption has been associated with morphological, cell proliferation, and differentiation alterations. Also, exist biological plausibility about the effects of their consumption impacts on infiltrated immune system cells, as macrophages on adipose tissue, increasing the risk of triggering diabetes mellitus and metabolic syndrome.

Objective. To evaluate the cytotoxic and inflammatory effects of sucralose on macrophages differentiated from THP-1 monocyte.

Methods: 1×10^6 THP-1 monocytes were differentiated to macrophages using 25 ng/mL of PMA for 24h; they were then stimulated with 6, 12.5, 25, 50, and 100 $\mu\text{g/mL}$ of sucralose by 24h. The cytotoxicity was evaluated using the MTT assay for metabolic activity and trypan blue for cell viability; the inflammatory response was assessed by qPCR, analyzing the genetic expression of SOCS3, SOCS1, TNF-alpha y TGF-beta.

Results: A concentration-dependent cytotoxic effect was observed, decreasing to 54, 38, and 23% viability with 6, 25, and 100 $\mu\text{g/mL}$ of sucralose, respectively ($P < 0.0001$). The metabolic activity remained around 100% with 6 and 12.5 $\mu\text{g/mL}$ but significantly decreased by 40% with concentrations higher than 25 $\mu\text{g/mL}$, maintaining the level of activity up to 100 $\mu\text{g/mL}$. The gene expression of TGF-beta and TNF-alpha increased 1.4 and 1.7 fold compared to the control ($p < 0.05$) with 6.25 $\mu\text{g/mL}$ of sucralose, without significant changes at 25 $\mu\text{g/mL}$ (0.81 and 0.95 times, $p > 0.05$, respectively). Positive SOCS1/SOCS3 ratios of 2.6 and 3.4 were observed, with 6.25 and 25 $\mu\text{g/mL}$ of sucralose, respectively, inducing pro-inflammatory M1 macrophages.

Conclusions: Sucralose has cytotoxic effects and triggers pro-inflammatory processes at low concentrations on differentiated macrophages THP-1.

Conflicts of interest: none author has any conflicts of interest to disclose.

Keywords: cytotoxicity / macrophage / sucralose / inflammation

Introduction: The persistence of food insecurity and the double burden of malnutrition in Mexican adolescents suggest that more effective and comprehensive prevention efforts are needed. Eating habits for Mexicans generally fall short of vegetables and fruit consumption recommendations for adults and children. This study was conducted to develop and verify the effects of a culinary and garden-based psychoeducation intervention for improving adolescent's eating behavior for vegetables.

Methodology: A pre-post-test experimental design was employed. 76 students aged from 10 and 14 years (mean age 10 years) participated to the pre post evaluation, of which there were 50 girls and 26 boys. Height, weight, eating behavior and minimal dietary diversity via questionnaire, were collected at baseline and postintervention. Awareness of fruit and vegetables was measured by adolescents's ability to give the correct names of 20 common fruits and vegetables from color photos. The program, based on a psychoeducation model for improving adolescent's eating behavior, included gardening, nutritional education, cooking activities utilizing harvests and testing sessions and was conducted during regular school hours for a total of 12 weeks.

Results: No significant changes were observed in eating practices and attitudes. Awareness of fruit and vegetables significantly improved ($p = 0.02$). Regarding the Minimum Dietary Diversity, an increase in the consumption of fruits ($p = 0.08$) and vegetables ($p = 0.02$) was observed. Adolescents in the obese category dropped from 12% to 8% ($p = < 0.05$).

Conclusions: School-based interventions that incorporate psychoeducation, gardening and cooking components can represent an interesting approach to improve fruit and vegetable preferences and consumption among adolescents. Preliminary findings offer support for future, large-scale efficacy studies of school-based interventions designed to target multiple factors that contribute to promote sustainable healthy eating behaviors.

Conflicts of interest: No potential conflict of interest was reported by the authors.

Keywords: psychoeducation/ nutrition education/ double burden of malnutrition/ adolescents/ gardening.

O59

CULINARY AND GARDENING BASED PSYCHOEDUCATIONAL INTERVENTION TO PROMOTE SUSTAINABLE HEALTHY EATING BEHAVIOR FOR ADOLESCENTS IN THE NORTH OF MEXICO.

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O60

NEWBORN BIRTHWEIGHT IN ANTIOQUIA, COLOMBIA: EFFECT OF MATERNAL HEMOGLOBIN BY TRIMESTER OF PREGNANCY

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Challenges of nutrition and public health in Ibero-America

Introduction: Maternal hemoglobin (MHb) presents physiological changes during pregnancy that are associated with birthweight (BW). The relationship is consistent between anemia and low birthweight, but controversial between MHb by trimester and BW. This can be contributed to not knowing gestational age and using multiple cut-off points or ranges to establish adequate HbM values. Recent studies indicate the importance of MHb and achieving a physiological change (delta) between the first and third trimesters.

Objectives: The objective of this study was to evaluate maternal hemoglobin by gestational trimester and the delta of hemoglobin and its effects on birthweight.

Methods: Analytical, observational, cross-sectional study using the medical records of 494 pregnant women who gave birth to live infants in the department of Antioquia. Using the prenatal medical history (Latin American Center for Perinatology and Human Development), hemoglobin and birthweight data, along with obstetric measurements, anthropometrics, and maternal health indicators were recorded and analyzed. **Results:** MHb in the third trimester was significantly associated with birthweight ($p=0.029$); HbM in each trimester, as well as delta, showed an important effect size on birthweight, as such: HbM first trimester: ES = 0.44 (95% CI 0.183 to 0.697); HbM second trimester: ES = 0.49 (95% CI 0.187 to 0.79); HbM third trimester: ES = 0.43 (95% CI 0.202 to 0.658); delta first trimester vs. third trimester: ES = 0.50 (95% CI 0.208 to 0.792). The prevalence of anemia was measured as 4.2%, 11.2% and 21.4% in the first, second and third trimesters, respectively.

Conclusions: Timely monitoring and evaluation of MHb is needed to promote gestational health and ideal birthweights, regardless of the usefulness of hemoglobin measurement for the diagnosis of anemia in pregnant women. The monitoring should follow the guidelines as established in the Comprehensive Routes for Maternal and Perinatal Health Care (RIAS-MP) in Colombia, in order to promote the maternal and child health binomial, to prevent anemia, and for the favorable development of human capital.

Conflict of Interest: the authors declare no conflicts of interest.

Keywords: birthweight/ maternal hemoglobin/ pregnancy/ trimester/ hemoglobin delta

Introduction: *Moringa oleifera* (MO) is a multipurpose plant with a high polyphenol content, which is being increasingly consumed to lessen chronic metabolic alterations development such as Type 2 diabetes; however, scientific evidence from clinical trials is scarce.

Objectives: Our aim was to study the usefulness of MO leaves as a dietary supplement for the glycemic control of prediabetic subjects.

Methods: A double-blind placebo-controlled, parallel group intervention study was conducted. Seventy-three prediabetic subjects aged between 40 and 75 y. were recruited (55% females) and 65 finished the study. Prediabetes was diagnosed using the American Diabetic Association criteria (ADA, 2013). Subjects under pharmacological treatment for hyperglycemia, dietary supplement consumption, BMI>35, suffering autoimmune or any serious disease or taking medications that influence glucose levels, were excluded. Participating subject consumed 6 daily capsules of MO dry leaves powder (400 mg each, distributed among the three main meals) (MO group, N=31) or 6 placebo capsules (PLC group, N=34) during 12 weeks. Fasting glucose, HbA1c and insulin were measured in serum at the beginning (T0) and the end (T12) of the intervention by standard methods in a reference laboratory. HOMA-IR was also calculated. The difference between pre and post-intervention measurements was assessed by paired T test.

Results: No differences were found between groups in outcome variables before the intervention (T0). Following the intervention, significant differences were observed in HbA1C in the MO group, which showed a significant decrease compared to initial values (T12: 5.79 ± 0.37 % vs. T0: 5.88 ± 0.31 %; $P=0.025$). Insulin concentration increased significantly both in the MO group (T12: 12.4 ± 5.2 vs. T0: 11.0 ± 5.2 μ UI/mL; $P=0.032$) and the PLC group (T12: 10.6 ± 5.9 vs. T0: 8.7 ± 4.3 μ UI/mL; $P=0.026$). No other differences were observed in the PLC group. Finally, a non-significant trend towards lower fasting glucose was found in the MO group (T12: 100.6 ± 8.7 vs. T0: 103.4 ± 10.7 mg/dL; $P=0.110$).

Conclusions: MO dry leaves can improve glucose control in prediabetic subjects without any adverse effects reported.

Conflict of Interest: The authors report no conflicts of interest and acknowledge funding from the Ministerio de Economía, Industria y Competitividad (MINECO), Agencia Estatal de Investigación (AEI) and Fondo Europeo de Desarrollo Regional (FEDER, UE) (ref. AGL2017-86044-C2-1-R.)

Keywords: *Moringa oleifera* / dietary supplement / prediabetes / glucose homeostasis.

O61

EFFECT OF MORINGA OLEIFERA AS A DIETARY SUPPLEMENT ON THE CONTROL OF PREDIABETIC SUBJECTS' GLYCAEMIA

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Poster Abstract Presentations

P001

DIETETIC PRESCRIPTION, NUTRITIONAL RECOMMENDATION AND SUSTAINABLE

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Safe, healthful and sustainable food

Introduction: Dietetic prescription has been changing over the last few decades and beside to meeting nutritional requirements, in addition, must to respect several aspects, such as sustainability.

Objectives: The objective was to evaluate the nutritional and sustainability aspects of dietary prescription for different population groups.

Methods: The dietetic prescriptions of different population groups of studies carried out with undergraduate students in Nutrition at a Federal Public University were evaluated. Dietetic prescription for preschoolers/schoolers, adolescents, elderly and athletes were analyzed. To evaluate the diet, the Total Energy Values (TEV) (kcal), carbohydrates (g), proteins (g) and lipids (g) were determined, and then the percentage of their distribution in relation to the TEV and the assessment of the adequacy performed according to the recommendations of the Food and Agriculture Organization. For the assessment of sustainability, the means of the carbon footprints (gCO₂eq) (CF), water (L) (WF) and ecological (g-m²) (EF) were analyzed, using the publication as reference: "Footprints of food and culinary preparations consumed in Brazil".

Results: The percentage of carbohydrates, proteins and lipids for preschoolers/ schoolers were: 59.66%; 16.07% and 24.26%, respectively and for adolescents, 47.28%; 24.47% and 28.24%. For the elderly and athletes, the percentage was: 60.54%; 15.29% and 24.16%, for carbohydrates, proteins and lipids. All age groups showed % distribution of adequate macronutrients in relation to VET. The values of FC, WF and EF of the preschool / school diets were: 3147.35gCO₂eq; 3415.90L and 21.31g-m², while adolescents: 3426.19gCO₂eq; 3941.49L and 22.33g-m². For the elderly and athletes, respectively, the following were observed: 2530.55 gCO₂eq of CF; 3345.05 WF and 35.53g-m² EF and 3498.01gCO₂eq CF; 4468.32L WF and 25.21g-m²EF. The products that caused the increase in footprints were mainly red meats and dairy products. Black beans and bananas stood out with high values in the water footprint, as well as coffee, which presented approximately 741L in 50ml of the product.

Conclusions: The dietary prescription must be planned in order to meet the nutritional needs as well as, it must reflect more sustainable production processes. Reflection on these aspects during graduation is fundamental for the training of future nutritionists.

Conflict of Interest: There were no conflict of interest.

Keywords: Dietetic / Nutrition / Sustainable,

P002

EFFECTS OF DIFFERENT ESSENTIAL OILS ON GENE EXPRESSION AND CYTOKINE SECRETION IN CACO-2 CELLS

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Safe, healthful and sustainable food

Introduction: Essential oils (EOs) are a mixture of natural, volatile, and aromatic compounds obtained from plants. From ancient times, EOs were used in medicine due to its aromatic properties and even in cosmetics. Recently, several studies have shown that some of the EOs benefits can be attributed to their antimicrobial, antioxidant, anti-inflammatory, and also immunomodulatory properties.

Objectives: Evaluate the effects of three different EOs on gene expression and cytokine secretion in the Caco-2 cell line.

Methods: Caco-2 cell media was supplemented with the EOs -cinnamon, clove, and thyme- at a final concentration of 0.01% and gene expression and cytokine secretion were evaluated in the presence or absence of bacterial lipopolysaccharide (20 ng/μl). Briefly, total RNA was extracted using the RNeasy Mini Kit (Qiagen, Barcelona, Spain), and the cDNA was synthesized from total RNA with an RT² First-Strand Kit (Qiagen, Barcelona, Spain). Real-time qRT-PCR analysis was performed using an RT² Profiler PCR Arrays & Assays (Qiagen), including primer pairs specific for 19 genes involved in the toll-like receptor (TLR) cascade and inflammation, nitric oxide, and apoptotic pathways according to the manufacturer's recommendations. Cytokine determination (IL-1β, IL-2, IL-4, IL-6, IL-7, IL-8 and TNF-α) was performed using Luminex technology in the cell culture supernatant.

Results: Cinnamon significantly decreased NOS2, TOLLIP, NF-κB1, and CASP8 gene expression and significantly increased IRAK4, TLR4, NOS3, and TLR1 gene expression. Similarly, clove significantly decreased TOLLIP and significantly increased PTGS2 gene expression, finally, thyme significantly decreased NF-κB1 gene expression. In the presence of LPS, cinnamon significantly decreased PTGS2, CASP8, and TBK1 gene expression. With respect to cytokine

secretion, cinnamon and clove EOs significantly decreased IL-2 gene expression in the absence of LPS.

Conclusions: The EOs tested -cinnamon, clove, and thyme- showed effects on several TLR-cascade components gene expression. Of the three EOs evaluated, cinnamon caused the greater effect on gene expression and IL-2 secretion.

Conflict of Interest: The authors declare no conflict of interest.

Keywords: essential oils / volatile oils / immunomodulatory effects / biofilm formation

P003

ENERGY, NUTRIENT INTAKE AND FOOD QUALITY IN THE ADULT POPULATION OF ASUNCIÓN - PARAGUAY DURING THE YEAR 2019. PRELIMINARY DATA

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Safe, healthful and sustainable food

Introduction: Adequate eating patterns and nutrient intakes are essential to stay healthy and prevent diseases.

Objectives: To describe food intake and food quality of the adult population of Asunción - Paraguay during the year 2019.

Methods: Cross-sectional randomized study. The 24-hour dietary recall and food frequency questionnaire were applied recommendations of FAO and the EARs of the IOM were considered. The quality of the diet was evaluated according to the recommendations of the Dietary Guidelines of Paraguay.

Results: Two hundred twenty people were evaluated, 145 were women (65.9%). The mean age was 39.6 ± 14.5 years old. The average energy intake was 2029.3 ± 1024 calories (median 1763, minimum 392 and maximum 5778 calories), the average intake of carbohydrates 250.9 ± 133 grams (median 222.53 minimum 3.1 and maximum 801.9), of proteins 88.1 ± 42.4 grams (median of 75.4, minimum 27.7 and maximum of 313.6 grams) and fats 72.9 ± 52.3 grams (median of 58.1 minimum of 2.69 and maximum 314.4). The average sodium intake was 1309.4 ± 769.5 mg/day (median of 1212.1, minimum 110.9 and maximum of 4990.19); iron 14.4 ± 16.3 mg / day (median of 10.89, minimum of 1.2 and maximum of 194.15), and calcium 608.1 ± 356.3 mg / day (median of 523.3, minimum of 18, 6 and maximum of 1972.02). The risk of energy deficiency was 65% (n = 143), protein 2.7% (n = 6), carbohydrates 5.5% (n = 12), iron 21.8% (n = 48) and calcium 82.7% (n = 182). The consumption frequency analysis indicated a high consumption of sugars and a low consumption of legumes. The average score was 146 points and 95.5% (n = 210) of the subjects needed dietary changes.

Conclusions: Though an important part of the population did not meet the energy requirements, the risk of macronutrient deficiency was low. The lowest intake of critical micronutrients were calcium and iron. Calcium and iron

intakes were the lowest of the critical micronutrients. It is necessary to improve the quality of the diet.

Conflict of Interest: No Interest conflict

Keywords: Food intake/ macronutrients/ micronutrients/ quality diet

P004

COME, DISFRUTA Y VIVE (EAT, ENJOY AND LIVE): PROJECT FOR THE PROMOTION OF HEALTHY FOOD CONSUMPTION IN A COLOMBIAN UNIVERSITY

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Safe, healthful and sustainable food

Introduction: Healthy eating initiatives in institutions of higher education have a wide trajectory at the international level. They promote the adoption of healthy eating habits among community members, mainly through communicative strategies and food environment structuring that lead to the development of nutritional processes that favor health (Cousineau et al, 2004; Ramos, 2013; Rideout et al 2015; Contento, 2016).

Objectives: Advertise the process followed by the Pontificia Universidad Javeriana (Pontifical Javeriana University) from Bogotá, Colombia in the project "Come, Disfruta y Vive" (Eat, Enjoy and Live) to promote food practices that enhance the wellbeing of the educational community.

Methods: The implementation of the project involved providing Food and Nutrition Education strategies for voluntary adoption, improvement, and strengthening of eating habits in the university community. Also, it has sought to strengthen interdisciplinary work between University units, consolidating strategic alliances and offering evaluation strategies for the initiatives implemented.

Results: The project has consolidated an array of services that includes theoretical-practical workshops, thematic cycles, virtualization strategies, and spaces for analysis. Similarly, it has strengthened the options of healthy foods offered at the University, and the creation of spaces dedicated to the advocacy of healthy eating habits with the main topics of food and nutritional interest for the educational community.

Conclusions: Healthy eating habits in university communities are a major issue in nutritional transition contexts such as Latin American. The presence of malnutrition both by excess and by default demand action on several fronts. For the case raised, the positioning of food and nutrition education strategies, the formulation of intra- and inter-institutional strategic alliances, as well as the implementation of components for the monitoring and evaluation of actions have been fundamental.

Keywords: Healthy eating / Health promotion / Food and Nutrition Education / Care / University

P005

QUANTITY, COMPOSITION, COST AND NUTRITIONAL CONTRIBUTION OF FOOD WASTE GENERATED BY CHILEAN HOMES: PILOT STUDY

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Safe, healthful and sustainable food

Introduction: Waste is defined as the decrease in food suitable for human consumption in the stages of sale and consumption. Worldwide, one third of food production is lost or wasted. In Chile, data on food loss or waste is unknown, but it is believed that the role of families is important as international data shows that many of the waste occur at home.

Objectives: Determine the quantity and composition of food waste generated by Chilean households and its family impact at an economic and nutritional level.

Methods: 15 Chilean households of medium / medium-low socioeconomic status in the Metropolitan Region were selected (non-probabilistic sampling for convenience). Each family made a daily registration and weighing for 7 days of their waste. Wastes were classified into 4 categories: fruits and vegetables (FV), prepared foods (PF), bakery products (BP) and other foods (OF). The cost of the wasted foods was obtained from their average costs during the second half of 2019 as delivered by governmental agencies, and their nutritional value in energy, macro and micronutrients, was obtained from the USDA database.

Results: The 15 participating families wasted an average of 3,75 kg / week of food (1,5 Kg/week FV; 1,4 Kg/week PF; 0,57 Kg/week BP; 0, 26 Kg/week OF). The total cost of waste was \$7.183/family/week (8,59 dollars), which would represent an annually expense of \$373,516 (446,84 dollars) per family (i.e. higher than the monthly minimum income). Regarding the nutritional value, among the 15 families they threw away in a week, 70.000 Kcal., 4.011 g of protein, 2.133 g of lipids and 10,651 g of carbohydrates. Regarding the micronutrients, the most wasted were calcium, iron, B1, B2, B3, folates and vitamin D.

Conclusions: This study provides initial characterization of the wasted foods produced at the household level in Chile. Such data will be useful for supporting public policies and to establish education and communication campaigns to reduce waste and promote sustainable consumption.

Conflict of Interest: The author(s) declare(s) that there is no conflict of interest.

Keywords: food waste / cost of waste / wasted calories / household waste / sustainable consumption.

P006

DIETARY MANAGEMENT OF HISTAMINE INTOLERANCE: ESTABLISHING THE BIOGENIC AMINE PROFILE OF FOODS EXCLUDED IN LOW-HISTAMINE DIETS

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Safe, healthful and sustainable food

Introduction: Low-histamine diets are currently advised to reduce symptoms of histamine intolerance, a disorder in histamine homeostasis that increases plasmatic levels histamine, mainly due to a reduced diamine oxidase (DAO) activity. These diets should exclude foods susceptible to content high amounts of histamine, but current recommendations also advise the exclusion of other foods that patients have related to the onset of the symptomatology and, a priori, do not contain histamine.

Objectives: In order to validate the adequacy of dietary recommendations of low-histamine diets reported in the literature, the aim of this work was to study the qualitative and quantitative biogenic amine profile of frequently excluded foods.

Methods: A selective search of scientific literature dealing with low-histamine diets was performed in PubMed database. Twelve biogenic amines were determined in food samples through UHPLC coupled with fluorometric detection.

Results: Reviewed low-histamine diet recommendations allowed to identify 50 excluded food products, although no general consensus was found among works. Fish and fishery products, dry-fermented sausages, cheese, fermented soybean products and certain vegetables (i.e. tomato, eggplant and spinach) showed histamine occurrence, with highly variable concentrations even within different batches of the same product. Overall, mean histamine content was usually low, but some samples achieved extremely high levels above 450 mg/kg in fermented products and up to 650 mg/kg for seafoods. Moreover, other biogenic amines were also found in those foods (i.e. tyramine, putrescine, cadaverine, spermidine and spermine). However, histamine was not detected in certain plant-origin foods, in which high levels of putrescine were found. Finally, in few food products excluded by low-histamine diets, such as milk, avocado and plums, any biogenic amine was detected.

Conclusions: Apart from those foods avoided due to their histamine content, the exclusion of certain foods may be justified by the occurrence of other biogenic amines, mainly putrescine. The fact that other amines are also substrate of DAO enzyme could explain their co-responsibility in the triggering of histamine intolerance symptoms by competing with histamine for the same catabolic enzyme. Further studies

are needed to assess until what extent the presence of other amines interferes in the intestinal degradation of histamine.

Conflict of Interest: The authors declare no conflict of interest.

Keywords: Biogenic amines / histamine / low-histamine diets / histamine intolerance

P007

FURAN, METHYLFURANS (2-METHYLFURAN, 3-METHYLFURAN AND 2,5-DIMETHYLFURAN) AND HYDROXYMETHYLFURFURAL (HMF) IN COMMERCIAL SAMPLES OF SOLUBLE COFFEE

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Safe, healthful and sustainable food

Introduction: Furans and their methylated derivatives are potentially toxic compounds, generated during heating. The International Agency for Research on Cancer (IARC) has classified them in group 2B (possible carcinogens in humans). In 2017, the European Food Safety Authority (EFSA) ratified that coffee contributed the greatest amount of these compounds in diet. The soluble coffee demand in Spain exceeded 25% of the volume compared to previous year (MAPA, 2018), a condition that suggests greater dietary exposure.

Objectives: Estimate the content of furan and its methylated derivatives in commercial soluble coffee samples and establish their relationship with HMF.

Methods: Twenty-seven samples of soluble coffee were studied. Furans and methylfurans were analyzed by gas chromatography coupled to mass spectrometry with Head Space auto sampler (HS-GC/MS) adapting a technique proposed by the FDA, 2004. The identification was made with commercial patterns and by coincidence of their spectra of masses. The HMF was analyzed HPLC with a UV detector.

Results: The levels found, expressed in ppb, were furan (50 - 1200), 2-methylfuran (215-4200), 3-methylfuran (0-210) and 2,5-dimethylfuran (0-370). Higher levels of 2-methylfuran were found, followed by furan, 3-methylfuran and 2,5-dimethylfuran. The 2-methylfuran / furan ratio was greater (1.1-12). The 3-methylfuran / furan ratio (0.03-0.4). Decaffeinated coffees showed higher concentrations in all analytes compared to Traditional ones. The levels of HMF varied between 315 and 4300 ppm and the correlation between this compound and furans and derivatives was very variable. The correlation between HMF and 2-methylfuran was positive and significant.

Conclusions: The determined values are within the ranges reported in the literature. The high values of 2-methylfuran found suggest the need to deepen the toxicity study of this compound.

Declaration of interest: The authors report no conflicts of interest.

Keywords: Soluble coffee/ furan/ 2-methyl furan/ 3-methyl furan/ 2,5-dimethyl furan/ Mass-coupled gas chromatography-GC-MS-/ HMF.

P008

THE DEFOLIATING WORM (*Rothschildia orizaba*) AND ITS CONTRIBUTION TO HUMAN NUTRITION

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Safe, healthful and sustainable food

Introduction: In various parts of the world, insects have been used by man in different areas, especially as food, but despite their great variety they have not been taken as an alternative to human overpopulation. It is the case of the caterpillar defolia of the leaf of the coffee (*R. orizaba*), Pirul (*Schinus molle*), Japanese Thunder (*Ligustrum japonicum*) and Colorín (*Erythrina americana*), who may be a food supplement option and not waste its nutraceutical characteristics for being considered a plague.

Objectives: The aim of the study was to investigate the macronutrient content of the caterpillar *R. orizaba*, as a contribution to nutrition and possible integration into the human diet.

Methods: The work was carried out in two phases, in the first one in summer 2017, in the town of Juchitepec, State of Mexico, where a targeted sampling was carried out for the collection of larval states. In the second phase, taxonomy was identified, followed by proximal chemical analysis based on the methods AOAC, 1995 to quantify macronutrients.

Results: The taxonomic data of the insect correspond to the genus *Rothschildia* species *orizaba*. According to the proximal analysis carried out on a dry basis, the following results were obtained: humidity 74.64 %, dry matter 25.36%, protein 42.22%, inorganic matter 5.92%, lipids 13.65%, fibre 12.33% and soluble carbohydrates 25.88%.

Conclusions: In conclusion, the worm has a high protein content, like other insect species, being this macronutrient fundamental for the metabolic processes of the human body. In addition, because of the insect's gregarious habits, man is allowed to be an easily accessible and potential nutrient source food and to obtain a more varied diet.

Keywords: food / Insect / nutrition

P009

CHALLENGES MARKED BY THE BEDCA NETWORK "SPANISH FOOD COMPOSITION DATA BASE", FOR EFFECTIVE COOPERATION WITH THE SPANISH PUBLIC AND PRIVATE AGRO-FOOD SECTORS

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Challenges for an effective and efficient public-private partnership in food and nutrition

Introduction: Food composition databases (BDCAs) contain the composition of nutrients, energy, and / or other bioactive components of food mostly consumed by a population. They are among the most important resources used by professionals in food control, nutritional research, and health promotion. However, the availability of these data depends mainly on economic resources (Marconi, et al. 2018).

In 2004 the BEDCA (Spanish Food Composition Base) network was created. In 2005, BEDCA secured funding from the EU's sixth and seventh food quality and safety framework programs, and the Spanish Food Safety and Nutrition Authority (AESAN). It is currently compiled following European quality standards, proposed by EuroFIR.

Objectives: Overall objective: Permanent cooperation with the Spanish food industry sector, to obtain information on the composition of Spanish food as complete and of quality as possible. Specific objectives: BEDCA update, based on: analytical data on the composition of white label foods, specifically used for intolerances and allergies, and their sustainability parameters.

Methods: 1.- LanguaL, FoodEx2. 2.- Scientific literature. 3.- FoodExplorer. 4.- EvalFINUT. 5.- SPSS V.22.0.

Results: The challenges achieved have been: classification of 950 foods (IdiomaL and FoodEx2), inclusion of 48 components, data on natural and added sugars, gluten-free, foods rich in FODMAPs, 50 most consumed recipes in Spain, which include a calculation system proposed by EuroFIR and inclusion of BEDCA in EVALFINUT.

The challenges in process consist of those proposed in the objectives. These data will be visualized by QR codes and nutritional alert traffic lights, according to user requirements.

Conclusion: The growing usefulness and demand for the digitization of nutritional information, with a scientific, rigorous and reliable basis for the consumer, establishes the cooperation between industry and research, in order to obtain quality food composition data, computerized and visible in the only Spanish Food Composition Database, built under EuroFIR quality standards: BEDCA.

Conflict of interests: Does not exist

Keywords: Spanish Food Composition Databases/ BEDCA/ Food Industry/ EuroFIR

P010

ASSOCIATION OF OBESITY PHENOTYPES AND PRO12ALA POLYMORPHISM OF PPARGG2 GENE, IN WOMEN FROM 18 TO 50 YEARS OLD

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Pro12Ala polymorphism of *PPAR* γ 2 gene (rs1801282) has been associated with obesity. In the last time, several obesity phenotypes have been described and related to different health risks. These phenotypes included both BMI values and other characteristics as biochemical and anthropometric parameters.

Objective: to evaluate the association of the Pro12Ala polymorphism of *PPAR* γ 2 gene with obesity phenotypes present in women aged 18 to 50 years.

Methods: 214 women -18 to 50 years old- from Nuevo León, Mexico were included. After the informed consent, anthropometric, body composition and biochemical measurements were made. In the basis of these parameters the participants were included in the different groups of obesity phenotypes. For the association analysis, the genotypic and allelic frequencies of the SNP rs1801282 were determined in the different groups and then, their association with obesity phenotypes was evaluated, using a statistical model of generalized linear regression.

Results: the distribution of the different genotypes was normal weight obese, 42% (the most frequent phenotype); metabolically healthy obese, 23%; metabolically unhealthy obese, 19%; normal weight lean 14% and metabolically obese normal weight, 2%. The ancestral allele (C) was found in 89.95% of the studied population while the G allele was found more frequently in women with obesity phenotypes that present alterations with greater health risk. Women carriers of the G allele had higher values of total body fat, serum glucose levels, LDL and total cholesterol, besides she had a lower amount of fat-free mass. In each phenotype increases and decreases ($p < 0.05$) in each analyzed parameter were observed; these variations were associated with the presence of the G allele, which presence implied a greater health risk within each phenotype, compared to women that present the CC genotype.

Conclusions: the presence of the G allele is associated with a tendency towards a health risk profile. Our findings

suggest that the (rs1801282) polymorphism could be used as a genetic marker of susceptibility to obesity and an increased health risk in Mexican women.

Conflict of interest: The authors have no conflict of interest to disclose

Keywords: genetic polymorphism / PPARgamma / phenotypes of obesity

P011

EFFECT OF BIOACCESSIBLE PHENOLIC COMPOUNDS FROM SWEET ORANGE (*CITRUS SINENSIS*) ON LIPID ACCUMULATION IN 3T3-L1 CELLS

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Isolated phenolic compounds (PC) from fruits, such as orange, have had a regulatory role on lipid accumulation (Kim *et al.*, 2012). However, it has not been contemplated the complex process of human digestion.

Objective: To assess the *in vitro* bioaccessibility of Sweet orange (*Citrus sinensis*) phenolic compounds and its effect on lipid accumulation in 3T3-L1 cells.

Methods: Lyophilized orange sample was digested according to Minekus *et al.* (2014) with some modifications (Monente *et al.* 2015). Methanolic extracts were used to the quantification of Total Phenolic Content (TPC) by Folin-Ciocalteu method (Singleton *et al.*, 1965). Subsequently, intestinal digestion was dialyzed (Dinnella *et al.*, 2007) to obtain the bioaccessible fraction of phenolic compounds (BPC) with ethanol (80%). In cellular treatment, 2,500 3T3-L1 preadipocyte cells were plated per well to determine the mean lethal dose (LD₅₀) of the BPC (Crouch *et al.*, 1993). Different concentrations of BPC (50-400 µg/mL) were tested to assess the effect on adipogenesis and lipolysis according to Torres-Villarreal *et al.* (2018). Results are expressed as mean ± standard deviation (n=3). A value of *p*<0.05 was set as statistically significant.

Results: The bioaccessibility of TPC significantly decreased 25% after the *in vitro* digestion process (645.96 ± 11.95 to 487.36 ± 15.04 mg GAE/100 g) (*p*<0.001). A LD₅₀ concentration of BPC was 400 µg/mL to perform cell treatment. The anti-adipogenic effect of BPC showed a non-significant decrease in the percentage of lipid accumulation (14%) in cells treated with 150 µg/mL. Moreover, no

significant decrease in lipid content was found when evaluating the lipolytic effect of BPC treatment.

Conclusions: The bioaccessibility of phenolic compounds from *C. sinensis* and its effect on lipid accumulation in 3T3-L1 cells decreases after an *in vitro* digestion process.

Conflict of Interest: The authors declare no conflict of interest.

Keywords: *in vitro* digestion / phenolic compounds / bioaccessibility / adipogenesis / lipolysis

P012

HUMAN GUT EXFOLIOME RNAM PROFILING USING NON-INVASIVE FECAL SAMPLES

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Gastrointestinal tract functionality is influenced by different factors which could affect the gut transcriptome. Dietary exposure influences gut cellular pathways and hence child growth. Since eukaryotic mRNA presents poly A sequence that distinguishes them from the prokaryotes mRNA, we could analyze gene expression of human gut cells using exfoliated gut cells available in stool samples.

Objectives: We aimed to optimize a non-invasive technique of analyses of human exfoliated intestinal cells using fecal samples to be used in epidemiological and interventional studies.

Methods: Stool samples of 2 children were collected at 3 months, 18 months and 8 years old and samples were stored at -80°C. The samples at 3 and 18 months belong to the same subjects. RNA was extracted with PoweMicrobiome Kit and integrity analyzed by Bioanalyzer 2100 (Agilent Technologies, Inc. USA). All groups were assayed for selective amplification using spin columns for binding poly A+ mRNA previous to the microarray analysis and also by direct oligo dT from poly (A) RNA amplification with the GeneChip 3' IVT Pico Reagent kit and Human Clariom S Arrays (Thermo Fisher Scientific Inc. USA) was further used. Gastrointestinal tract functionality is influenced by different factors which could affect the gut transcriptome. Dietary exposure influences gut cellular pathways and hence child growth. Since eukaryotic mRNA presents poly A sequence that distinguishes them from the prokaryotes mRNA, we could analyze gene expression of human gut cells using exfoliated gut cells available in stool samples. We aimed to optimize a non-invasive technique of analyses of human exfoliated intestinal cells using fecal samples to be used in epidemiological and interventional studies.

Results: The quality of human RNA samples obtained following this procedure was optimal in all cases. As expected, Principal Components Analysis (PCA) and Biological Interpretation Analyses (Partek Genomics Suite, Partek, Inc. USA) showed differences by age groups. There were common differences in some metabolic pathways (KEGG database) included PI3K-Akt signaling pathway and in growth process (Go Enrichment) in the microarray analyses between children aged 3 and 18 months old and 8 years old.

Conclusions: Human exfoliome analysis by microarray using total RNA from feces plus spin columns resin binding poly A+ was satisfactory. Microarray analyses were suitable for evaluating transcriptome analyses to detect differences in gene expression that can affect intestinal biological processes. This technique can be applied to larger studies to evaluate intestinal function in humans with non-invasive samples.

Conflict of Interest: Authors declare no conflict of interest

Keywords: Exfoliome, Heces, Dietary, Microarray, Growth

P013

EFFECT OF MATERNAL CAFETERIA DIET OVERFEEDING AND METHYL DONOR SUPPLEMENTATION ON WEIGHT GAIN AND INTAKE BEFORE AND DURING GESTATION IN A MURINE MODEL

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Diverse maternal diets have been proposed for the study of metabolic processes of fetal programming in the offspring; among them is the cafeteria diet (high in sugar and lipids) that simulate the occidental diet, and the methyl donor supplemented diet (folic acid, cobalamin, betaine, and choline). Nevertheless, it has not been well described the effect of these diets on weight gain and intake in the mother.

Objectives: To evaluate the effect of cafeteria diet overfeeding and methyl donor supplementation on weight gain and intake in the pregestational and gestational period.

Methods: The experimental design included female C57BL/6 mice which were divided into four groups with distinct diet: 1) Control (Ct), 2) Control supplemented with methyl donors (CtSup), 3) Cafeteria (Caf), and 4) Cafeteria

supplemented with methyl donors (CafSup). The diets were maintained during the pregestational and gestational period.

Results: The Caf group had the higher pregestational weight gain respect the Ct group in weeks 1 & 2; the CafSup group also displayed greater weight gain compared to the Ct group in week 1. Regarding the gestational weight gain, there were no significant differences among the groups. About the pregestational intake, the CtSup and CafSup showed greater intake compared to the Ct group during weeks 1 & 3. During the gestational period, the CtSup and Caf group showed greater intake in weeks 1, 2 & 3 compared to the Ct group, as well as CafSup had greater intake at the beginning and end of the gestation (weeks 1 & 3).

Conclusions: A cafeteria diet can have an impact on weight gain and intake during the pregestational and gestational period, however, a methyl donor supplementation can alter these indicators. This suggests that the addition of one or several methyl donors can modify the intake mechanisms regulated at a hypothalamic level.

Conflict of Interest: The authors declare no conflict of interest.

Keywords: Gestation / intake / methyl / cafeteria diet

P014

COMPARATIVE EFFECTS OF RESVERATROL AND PTEROSTILBENE ON LIVER TRIGLYCERIDE ACCUMULATION AND INFLAMMATION IN A MODEL OF DIET-INDUCED STEATOSIS

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Nutrition in the prevention and treatment of chronic diseases

Non-alcoholic fatty liver disease is characterized by triglyceride accumulation in hepatocytes (hepatic steatosis) and, in some cases, the presence of inflammation. Phenolic compounds represent an interesting tool against this disease. This study aimed to analyze the effects of two phenolic compounds (stilbenes), resveratrol and its methoxy-derivative pterostilbene, on triglyceride accumulation and inflammation in a rodent model of diet-induced liver steatosis. Wistar rats were divided in four groups and fed either a standard diet (control group), or a diet rich in saturated fat and fructose (HFHF diet) supplemented or not with resveratrol or pterostilbene (30 mg/kg body weight/day) for 8 weeks. Histological analysis revealed that the HFHF diet feeding increased triglyceride accumulation (1 animal with grade 1 steatosis, 8 animals with grade 2 and 1 animal with grade 3) and induced inflammation (5 animals with grade 1 and 5 animals with grade 2). By contrast, in the group treated with resveratrol, lower hepatic triglyceride accumulation (9 animals showed grade 1 steatosis and 1 animal grade 2) and

inflammation (7 animals showed grade 1 inflammation and 3 animals grade 2) were appreciated. Regarding pterostilbene, similar results were obtained in terms of liver steatosis, while a stronger effect was observed on inflammation (8 animals showed grade 1 inflammation and 2 animals did not show inflammation). As far as the expression of inflammation-related genes are concerned, RT-PCR analysis showed that HFHF feeding increased *Il-1 β* and *Tnf- α* expressions. The increase in *Il-1 β* , but not that in *Tnf- α* , was totally prevented by both phenolic compounds. Concerning macrophage infiltration-related genes, HFHF diet induced an increase in *Mcp1* expression and a decrease in *CD206*, without changes in *F4/80*. No effects were induced by none of the phenolic compounds. Both phenolic compounds show the same effectiveness in reducing triglyceride accumulation, while pterostilbene seems to be more effective to prevent liver inflammation.

Keywords: liver, steatosis, inflammation, resveratrol, pterostilbene.

P015

ENERGY BALANCE IN NOR ANDEAN REGION: COLOMBIA, ECUADOR AND VENEZUELA ELANS SUBGROUP RESEARCH

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Nutrition in the prevention and treatment of chronic diseases

Background: Body changes are associated with an imbalance between the energy content of consumed food and energy expenditure by the body functions and physical activity. The increase in obesity prevalence throughout the world, responds to the demographic, epidemiological and nutritional transition process that have permeated every society.

Objective: We aimed to study energy balance and its components in a subgroup of countries of the ELANS study: Colombia, Ecuador and Venezuela and establish similarities and differences within this subregion.

Methods: The Latin American Study of Nutrition and Health (ELANS) is a multicentric cross sectional study in eight countries within Latin America conducted during 2015. A subgroup of neighbor countries of the Nor Andean region was chosen. Randomized representative multistage sample of 1230 subjects in Colombia, 800 in Ecuador and 1132 in Venezuela, ages between 15 -65, were evaluated and underwent through anthropometric measurements: weight and height and an adapted version of long IPAQ was applied. Also, two 24 hour recall following the Multiple Pass Method. Descriptive statistics, contingency tables to compare intake, BMI, vigorous activities and MET categorization were

performed and determination of sedentary behaviors and level of physical activity.

Results: Ecuador had the highest energy intake (2110 kcal/d) and Venezuela had the lowest (18887Kcal/d). Venezuelan had the highest average BMI (27.4 \pm 5.6) whereas Colombia had the lowest (25.5 \pm 5.0). Overall Venezuela had the lowest level of moderate to vigorous physical activity whereas Ecuador had the highest.

Conclusions: There are differences between neighboring countries, particularly on the characteristics of patterns of physical activities and consumption of energy, with a trend toward an important average overweight and sedentary behaviors in Venezuela at the time of the study.

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Conflict of Interest: The authors declare no conflict of interest

Keywords: ELANS/ Colombia/Ecuador/Venezuela/Energy Balance

P016

DIABETES CONDITION AND DIETARY PATTERNS IN ADULTS FROM MEXICO CITY

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Diet is a key component of diabetes management. However, evidence the evidence of dietary quality among individuals with diabetes is scarce.

Objective: To evaluate whether diabetes condition time since diagnosis and glycemic control are associated with dietary patterns.

Methods. We used data from 1,113 adults aged 20-69 years participants in the 2015 Mexico City Diabetes Representative Study (MCDRS). Diabetes condition (without diabetes, prediabetes, and diabetes), time since diagnosis (without diabetes, with <10 years, and with \geq 10 years) and glycemic control (without diabetes, glycemic control, and without glycemic control) were defined by using information collected through questionnaires and blood samples. Dietary

patterns were determined with cluster analysis by using a semi quantitative food frequency questionnaire. Multinomial logistic regression models were used to assess associations between exposures (i.e., diabetes condition, time since diagnosis, and glycemic control) and dietary patterns. Models were adjusted for sociodemographic, clinical, and anthropometric indicators. Survey's complex sampling design was also considered.

Results: Three dietary patterns were identified: 'Prudent', 'Fast food', and 'Basic'. The prevalence of diabetes and prediabetes was 14.76% and 26.42%, respectively. Adjusted models showed that the relative likelihood of having a Fast food dietary pattern versus a Prudent dietary pattern among adults with diabetes was 63% (RRR=0.37; 95% CI: 0.21,0.67) the relative likelihood among adults without diabetes. Likewise, the relative likelihood of having a Fast food versus a Prudent dietary among adults with prediabetes condition, with time of diagnosis ≥ 10 years, and with glycemic control was 0.6 (95% CI: 0.38,0.96), 0.25 (95% CI: 0.12,0.56), and 0.39 (95% CI: 0.18,0.83), respectively, the relative likelihood among adults without diabetes.

Conclusions: In the MCDRS, adults with diabetes and prediabetes diagnosis, with time of diagnosis ≥ 10 years, and with glycemic control had less probability of consuming a diet characterized by sweetened cereals, corn-based foods, sweets and desserts, sweetened beverages, and fast food. Although these findings suggest that patients with diabetes had received nutritional education, only 27.8% of patients with diabetes had glycemic control. These results remark the importance of integrated interventions that improve the glycemic control to assist in the prevention of complications.

Conflict of Interest: The authors declare that there is no conflict of interest.

Keywords: Dietary patterns, diabetes condition, adults, Mexico.

P017

HIGHER CUMULATIVE EXPOSURE TO A PRO-INFLAMMATORY DIET IS ASSOCIATED WITH HIGHER METABOLIC SYNDROME SCORE AND BLOOD PRESSURE IN YOUNG MEXICAN ADULTS

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Low-grade inflammation is a suggested mechanism in the development of Metabolic Syndrome (MetS), where diet could act as a regulator. The dietary inflammatory index (DII®) was developed to estimate the overall inflammatory potential of diet.

Objectives: evaluate the association between the cumulative DII exposure through life with MetS in young Mexican adults.

Methods: 100 participants from the ELEMENT cohort were included in this analysis. The DII score calculation was based on repeated food frequency questionnaires (1-22 years). The cumulative exposure of DII was constructed using the Area Under the Curve (AUC of DII). The MetS was defined using the International Diabetes Federation criteria and the Metabolic Syndrome Risk Z-score (MetRisk Z-score) was estimated. Linear regressions were conducted to assess the association between the AUC of DII with MetRisk Z-score and MetS components, adjusting for sex, socioeconomic status, and smoking status, sitting hours per day, birth weight and BMI.

Results: In adulthood, the mean age was 21.5 years, 54% were male and 17% had MetS. Positive associations were found between AUC of DII with MetRisk Z-score ($\beta = 0.13$; 95% CI: 0.04, 0.22; $p < 0.01$), systolic ($\beta = 0.35$; 95% CI: 0.06, 0.63; $p < 0.05$) and diastolic blood pressure ($\beta = 0.26$; 95% CI: 0.03, 0.49; $p < 0.05$).

Conclusions: A cumulative proinflammatory diet from infancy through young adulthood is associated with higher MetRisk Z-scores, as well as blood pressure. These findings may provide evidence for the implementation of anti-inflammatory diet interventions in early life.

Conflict of Interest: The authors declared no conflict of interest. However, we wish to disclose that Dr. James R. Hébert owns controlling interest in Connecting Health Innovations LLC (CHI), a company that has licensed the right to his invention of the Dietary Inflammatory Index (DII®) from the University of South Carolina in order to develop computer and smartphone applications for patient counseling and dietary intervention in clinical settings. Drs. Shivappa and Wirth are both employees of CHI.

Keywords: Diet / Inflammation / Metabolic Syndrome / Young Adult / Blood Pressure

P018

A CONNECTION BETWEEN OBESITY AND DEPRESSION. A GENETIC RISK SCORE IN THE SPANISH POPULATION STUDY PISMA-EP

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Depression and obesity are highly prevalent, and leading causes of disease burden and disability worldwide. Both conditions are major risk factors for chronic

physical diseases. The reason why these disorders cluster together is not totally understood. Different mechanisms are implicated in this association, including biological and genetic factors.

Objectives: Our aim is to investigate whether a genetic risk score (GRS) combining 52 candidate SNPs for depression and other major psychiatric disorders is associated with depression and predicts depression in individuals with obesity.

Methods: The sample consists of 429 individuals (37 depression cases, 391 controls) from the PISMA-ep study, a cross-sectional epidemiological study of mental disorders based on a representative sample of the adult population of Andalusia, Spain. The MINI interview was used to diagnose depression according to the DSM-IV and BMI was calculated. All individuals were genotyped for 52 candidate polymorphisms. Logistic regression models were conducted to predict depression. We calculated an unweighted GRS by summation of the number of risk alleles. Receiver operating characteristic (ROC) analyses were used to compare the discriminatory ability of predictors of depression. We constructed three predictive models using the GRS and adding traditional risk factors: 1. only GRS; 2. GRS, sex and age; 3. GRS, sex, age and BMI.

Results: We found an association between the unweighted GRS and depression ($p=0.0002$; $OR=1.23$; $SE=3.72$) which explained approximately 7.89% of variance of depression. Adding 'traditional' risk factors (sex and age) to GRS improved the predictive ability with the area under the curve (AUC) in the ROC analysis from 0.688 to 0.698. The best model was achieved using all genetic information, traditional risk factors and BMI (AUC= 0.716, 95% CI: 0.633 – 0.799).

Conclusions: The GRS constructed in our study was associated with depression and was implemented in different predictive models. The model combining genetic information, traditional risk factors and BMI improved the predicting ability for depression. Addressing obesity in people with depression or vice versa is highly important as both disorders are associated with substantial personal and societal economic costs worldwide.

Conflict of Interest: There is no conflict of interest.

Keywords: Depression / BMI / Genetic risk / Obesity

P019

BELIEFS, BEHAVIORS, EXPERIENCES AND KNOWLEDGE ABOUT FRUITS AND VEGETABLES AMONG WORKING ADULTS: AN ANALYSIS USING THE SOCIAL COGNITIVE THEORY

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Vegetables and fruits (VF) contain a variety of vitamins, minerals, antioxidants and fiber that contribute to the prevention of non-communicable diseases, which affect Mexican adults, particularly those in the working-age. Despite VF benefits, the consumption among Mexican population is insufficient. Moreover, VF consumption is determined by diverse environmental and cognitive factors.

Objectives: To analyze the beliefs, behaviors, experiences and knowledge of workers regarding vegetables and fruits, based on the constructs of the Social Cognitive Theory.

Methods: A qualitative exploratory research, with a phenomenological study design in a manufacture and marketing of healing material, personal care and baby products company, located in Guadalajara, Jalisco, Mexico. Qualitative techniques applied were: focus groups with blue-collar workers, in-depth interviews with supervisors, and indirect non-participatory observation. The sessions were audio-recorded and transcribed verbatim, with prior informed consent. The data analysis was conducted using a hybrid approach.

Results: Participants were 45 workers (mean age: 41.22 (SD ± 9.30) years. Workers consume VF mostly once a week. Influencing factors for VF consumption found were negative reinforcements (work environment and the family); absence of facilitators (availability and low cost); and low self-control to improve their consumption due to perceptions, taste and customs. Workers mentioned that they try to control their emotions to avoid these from affecting their eating behaviors. However, lacking knowledge about the VF and the lack of information on culinary techniques prevent workers from having a higher VF intake. Participants indicated to not feel capable to eat VF due to factors such as time and taste. Other negative influencing elements were observational learning (through coworkers and family), and outcome expectations (i.e. the belief that eating VF will improve one's health).

Conclusions: The elements that influence worker's VF consumption are: work environment, food availability, taste preferences (which determine low self-control and self-efficacy), knowledge about the benefits of a healthy diet obtained through observational learning, and outcome expectations related to health improvement. Therefore, it is necessary to consider these factors to develop interventions for the improvement of VF intake among workers.

Conflict of Interest: The authors declare no conflict of interest.

Keywords: Social Cognitive Theory/ Vegetables/ Fruits/ Workers.

P020

ASSOCIATION BETWEEN PREFERENCES OF FRUITS AND VEGETABLES, ADEQUACY OF CONSUMPTION AND OVERWEIGHT IN SPANISH POPULATION AGED 3 TO 18 YEARS: ENPE STUDY

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Adequate consumption of fruit and vegetables is a protective factor for chronic diseases and has been associated with a lower risk of being overweight. Healthy eating strategies consider health as the motor of food choices, even in schoolchildren and young people. However, food preferences and dislikes are highly influential for food acceptance and food choices.

Objectives: This work analyzes the relationship between preferences and aversions for fruits and vegetables, adequacy of consumption, and possible association with excess weight in Spanish children and young people.

Methods: We analyzed data from the ENPE study, related to the subsample of population aged between 3 and 18 years (n= 1050). Food group preferences and aversions were assessed using questionnaires. Preference score (PSc) and aversion score (ASc) were calculated. The information about fruit and vegetable intake was collected using a food frequency questionnaire. The influence of preferences on adequate consumption and its association with the prevalence of overweight were analyzed using binary logistic regression, adjusted for age, sex, socioeconomic level and region.

Results: The estimated prevalence of overweight (overweight + obesity), using IOTF criteria, was 33.5%, higher in boys. Some 21% of the sample reported a dislike for vegetables. A positive correlation between vegetables PSc and vegetable consumption zscore was observed ($r = 0.269$), but a negative correlation between vegetables ASc and vegetable consumption ($r = -0.142$). Some 33.7% of overweight girls ($p = 0.03$) and 42.2% of overweight boys and girls aged between 3yr and 8 yr rejected vegetables ($p = 0.02$). The Odds Ratio (OR) of prevalence of overweight in girls for vegetable ASc was 1.03 (1.003-1.05), and in boys and girls aged between 3yr to 8yr OR = 1.04 (1.01-1.06).

Conclusions: One out of 5 overweight girls and one in every 3 boys and girls under 9 year-olds reject vegetables. PSc is associated with higher consumption and ASc with lower consumption of vegetables. Greater aversion to vegetables is associated with a higher risk of overweight in girls and in children under 9 years of age. Preferences and learning to enjoy eating vegetables should be considered in interventions aimed to prevent overweight, especially those targeted to girls and schoolchildren.

Conflict of Interest: The ENPE study received funding from the Eroski Foundation in collaboration with SENC.

Keywords: Fruit & vegetables / Food preferences/ Food dislikes / Overweight / Schoolchildren / Adolescents

P021

USUAL FATTY ACID INTAKE IN MEXICAN ADULT POPULATION, RESULTS OF THE NATIONAL HEALTH AND NUTRITION SURVEY 2012 AND 2016

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Fatty acid intake is known to play an important role in the etiology of Noncommunicable diseases(NCDs), where among others, an adequate or inadequate intake of Saturated fatty acids(SFA), n-6 and n-3 polyunsaturated fatty acids(PUFA) can represents protection or risk factors on NCD's development. However, there is no updated data on the adequacy of their consumption in Mexican adults to guide recommendations and strategies at the population level.

Objectives: To describe the usual intake(UI) and prevalence of inadequacy(PI) of fatty acids in the Mexican adult population from dietetic information of 24-hour dietary recalls (24-h recall) of the National Health and Nutrition Survey(ENSANUT) 2012 and 2016.

Methods: We estimated UI, contribution to the total energy intake(%E) and PI of fatty acid intake in adult population of the ENSANUT 2012 and 2016. Dietary information was collected through the automated multiple-pass 24-h recall method. The cut-off points used for the adequacy were those suggested by FAO/WHO, 2008. To account for intra-individual variability in estimations, we used the Iowa State University method for adjustment through the PC-Side program.

Results: The UI in 2012 and 2016 of total fat intake was 64.5 ± 23.8 g/day and 65.9 ± 23.6 g/d, SFA 22.2 ± 8.6 g/d and 21.1 ± 10.2 g/d, n-6 4.4 ± 5.1 g/d y 6.4 ± 0.1 g/d y n-3 0.5 ± 0.7 g/d y 0.7 ± 0.3 g/d respectively. The PI of total fat(>30%E) in 2012 and 2016 was 58.4 y 50.3% for adults, SFA(>10%E) was 61.8% in 2012 and 45.5% in 2016, for n-6(<2.5%E) was 61% in 2012 and 21.8% in 2016 and for n-3 PI(<0.5%E) was 83.4% in 2012 and 90.7% in 2016. By sociodemographic characteristics, the population with the highest PI were male adults>65 years, from urban areas, low socioeconomic status and of the northern region in Mexico compared to their counterparts.

Conclusions: We observed high PI of total fat, SFA, n-6 and n-3 in the Mexican adult population both in 2012 and 2016. It is suggested to promote the consumption of foods with a

favorable fatty acid profile in the identified risk groups to help reduce the burden of NCDs.

Conflict of Interest: The authors declared no conflict of interest

Keywords: Usual intake / fatty acids / Mexican adult population

P022

PRO-INFLAMMATORY DIET IS ASSOCIATED WITH ACCUMULATION OF CORONARY ARTERIAL DISEASE PHASES: RESULTS FROM BALANCE PROGRAM TRIAL BASELINE

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Nutrition in the prevention and treatment of chronic diseases

Introduction Coronary arterial disease (CAD) leads to disabilities and deaths worldwide. The pro-inflammatory diet consumption is associated with cardiovascular diseases (CVDs) however, no study evaluated the association between the dietary inflammatory index (DII) with the accumulation of CAD phases.

Objectives: We aim to evaluate the association between the DII with the accumulation of CAD phases and food groups.

Methods: The baseline data of patients in secondary care in cardiology from the Brazilian Cardioprotective Nutritional Program Trial (BALANCE Program Trial) were analyzed. Patients had one or all CAD phases: Asymptomatic: for those with a history of angina (clinical diagnosis without complementary tests or history of positive stress test); symptomatic: characterized by angiography or coronary angiotomography, which showed atherosclerotic stenosis \geq 70% of the diameter of any coronary artery, or treated: when the patient presented angioplasty, stent, or revascularization. The DII was calculated and ranked in tertiles, which could values range from -8 (more anti-inflammatory) to +8 (more pro-inflammatory). Multinomial logistic regression was used to evaluate the association using the STATA software version 14.0. For analyses, the 95% confidence interval (CI) was considered.

Results: We evaluated 1,732 patients, of which 60% were male and 63.8% elderly. Regarding the number of CAD phases, 62.5% had 1 phase, 31.8% had 2 phases and 5.7% had 3 phases. We observed that the patients with a more pro-inflammatory diet (DII = 1.25) were 1.75 (95% CI: 1.05-2.90) times more likely to have 3 CAD phases compared to patients with a more anti-inflammatory diet regardless of sex, age and medicines use. Moreover, the higher consumption of red meats (OR 1.41; 95% CI: 1.08-1.85), sugars (OR 5.5; 95% CI:

4.04-7.49) and junk foods (OR: 3.13; 95% CI: 2.13-4.62) was positively associated with a more pro-inflammatory diet.

Conclusions: Our findings demonstrated that a poor metabolic profile, which is characterized by higher CAD phases accumulation is associated with a more pro-inflammatory diet. Thereby, we confirm that the quality of foods has an impact on health and the foods could be a strategy to avoid the poorer metabolic profile and the incidence of new disorders.

Conflict of Interest: None.

Keywords: atherosclerosis / cardiovascular diseases / dietary inflammatory index / nutrition

P023

URSOLIC ACID EFFECT ON INSULIN SIGNALING PATHWAY ACTIVATION AND ITS ANTIINFLAMMATORY ACTIVITY IN ADIPOCYTES STIMULATED WITH TNF α

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Obesity (OB) is defined as an excessive accumulation of adipose tissue. Increased secretion of proinflammatory adipokines, such as tumor necrosis factor alpha (TNF α), and interleukin 6 (IL-6), is observed in OB. On the other hand, adiponectin exerts an insulin sensitizing effect and a possible anti-inflammatory effect; however, its secretion is diminished in obese individuals contributing to the development of insulin resistance. Ursolic acid (UA) is a pentacyclic triterpene, present in rosemary and in apples peel. UA has been shown to exert a beneficial effect on inflammatory and metabolic diseases; though, its activity on key proteins of the insulin signaling pathway has not been described.

Objective: to describe the effect of UA on IRS-1 and Akt activation sites, and its antiinflammatory effect in an *in vitro* OB model using TNF α -stimulated adipocytes culture.

Methods: Pre-adipocytes 3T3-L1 were differentiated into mature adipocytes, subsequently TNF α was added to the culture medium (10 ng/mL) and UA at 10 μ M, 20 μ M or 30 μ M. At the end of the stimulus, IRS-1pY612 and IRS-1pS307 concentration were determined by Western Blot. IL-6 and adiponectin were quantified in the supernatant by enzyme-linked immunosorbent assay (ELISA). Data were analyzed with Kruskal-Wallis and Mann-Whitney U tests. Statistical difference was considered when $p < 0.05$.

Results: UA (10, 20 and 30 μ M) significantly promoted the phosphorylation of IRS-1pY612. On the other hand, UA (10, 20 and 30 μ M) reversed the TNF α -induce proinflammatory effect by reducing IL-6 and increasing adiponectin concentrations.

Conclusions: UA reverses TNF α -induced inflammatory effect, indirectly improves the activation of the insulin signaling pathway and increases the secretion of adiponectin.

Conflict of Interest: The authors declare no conflict of interest.

Keywords: Obesity / insulin resistance / ursolic acid / phytochemicals

P024

PREVALENCE OF IGG4 ANTIBODIES AGAINST MEDITERRANEAN FOOD ALLERGENS IN PATIENTS WITH SYMPTOMS ASSOCIATED WITH ADVERSE REACTIONS TO FOOD

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Immune reactions to specific food allergens can be indicative for adverse reactions to food (ARFs), an increasing concern for public health. Diagnosis of ARFs can be supported by the analysis of the occurrence of food specific antibodies and study of the levels of antibody reactions (AbRs).

Objectives: To describe body composition, symptomatology and total predominance percentage (TPP%) of non-IgE mediated reactions to food in a Mediterranean Spanish sample.

Methods: Two-hundred five men and women from 20 to 79 years (mean 45.4 \pm 14.9), 69.8% women (44.6 \pm 15.5 years), living in the region of Madrid (Spain) with symptomatology associated to undiagnosed food allergies and food intolerances participated in the study. Height was measured with a calibrated stadiometer (SECA 240, UK). Body composition was assessed using bioelectric impedance analysis (BIA; OMRON BF-511, Japan). IgG4 AbRs to fifty-seven Mediterranean food allergens were determined using In-Vitro Diagnostic antibody testing (DST NutriSMART, Germany), AbRs were classified in three semiquantitative levels of reaction. Symptomatology was categorized according to the Spanish Agency of Food Safety and Nutrition (AESAN) classification.

Results: Mean measurements were: Height: 1.67 \pm 0.09m; Weight: 73.4 \pm 16.1kg; BMI: 26.3 \pm 5kg/m²; Body fat: 33.2 \pm 9%; Muscle mass: 42.6 \pm 10.2kg. Most frequent allergens were: sheep milk (TPP%: 69.1%), casein (66.7%), cow milk (65.5%),

yolk (63.1%), egg white, pea, green bean (both 61.6%) and wheat (60.3%). AbRs were high (level 3) for participants exhibiting eczema, dermatitis, acne, abdominal gas and swelling. Women had higher (levels 2 and 3) AbRs than men for: yeast (p=0.029), pea and green bean (both p=0.044). Furthermore, elevated values of body weight were related to participants presenting moderate and high AbRs against wheat (p=0.001) and goat's milk (p=0.014); elevated values of body fat, to participants with high AbRs for wheat (p=0.008); elevated values of BMI, to moderate and high AbRs against wheat (p=0.001), sheep's milk (p=0.014) and yeast (p=0.019). No significant correlation was found for patients' blood type and AbRs (p>0.05).

Conclusions: The most frequent AbRs found in Spanish adults were related to milk, egg, legumes and wheat. Wheat allergen was linked to body weight, body fat and BMI.

Conflict of Interest: none

Keywords: Mediterranean diet, allergen, adverse reaction, nutrition

P025

MUCILAGE OF CHIA AS A FUNCTIONAL INGREDIENT: STUDY OF ITS EFFECTS ON SOLUBILITY AND GLUCOSE TRANSPORTERS IN AN IN VITRO MODEL

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Nutrition in the prevention and treatment of chronic diseases

Introduction Soluble fiber is a component of diet that has fundamental functions in decreasing the energy density of the diet, by reducing the absorption of fats and carbohydrates, and promoting colonic health. The mechanisms by which these results are obtained are not entirely clear.

Objectives: to assess the effects of chia mucilage on glucose solubility and on GLUT-2 and SGLT-1 glucose transporters both in an *in vitro* model of glucose digestibility and of intestinal epithelium with Caco-2 cells, respectively.

Methods: Starch from the potato was subjected to oral, gastric and intestinal digestion in an *in vitro* model, with two conditions 25 and 50 mg of chia mucilage, using the enzymes corresponding to each stage; finally the glucose solubility was determined by reaction with glucose oxidase. Furthermore, the activity of the buccal and intestinal amylase was determined by the method with dinitrosalicylic acid that uses starch as substrate. In addition, Caco-2 cells were challenged with 10 mM glucose for 2 and 12 hours, with or without mucilage, and the relative abundance of Glut-2, SGLT-1 and maltose glucosidase genes was determined.

Results: 50 mg of mucilage decreased the dialyzability of glucose (one-way ANOVA p <0.05), likewise decreased the activity of oral and intestinal amylase in a similar way as the gold standard which is acarbose. Chia mucilage had no effect

on the expression of GLUT-2 and SGLT-1 transporters at 2 hours; however, at 12 hours reversed the increased expression of the transporters produced by the increase of glucose in the medium and it did significantly decrease the expression of the maltose glucosidase gene.

Conclusions: The results obtained allowed us to observe an effect of chia mucilage on oral and intestinal amylase, which suggests that this fiber has hypoglycemic effects, generating new evidence to include chia's mucilage as a functional ingredient without forgetting that more research is needed on the mechanisms that underlie this finding.

Conflict of Interest: The authors declare that they have no conflict of interest.

Keywords: chia's mucilage, glucose transporters, amylase activity

P026

REPRODUCIBILITY AND ABILITY OF IDENTIFY DIETARY PATTERNS OF A MINI SURVEY TO EVALUATE FOOD INTAKE QUALITY

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Using validated tools to evaluate food intake quality allows professionals to provide recommendations to improve dietary patterns.

Objectives: The aim was to evaluate the reproducibility and ability to identify dietary patterns of the second version of the Mini-Survey to Evaluate Food Intake Quality (Mini-ECCA v.2, by its initials in Spanish).

Methods: This survey has 14 questions with 3–4 answer options about frequency and quantity of consumption of food groups or beverages; it also includes photographs to support food quantity estimation. The questionnaire was applied by an audience response system (SUNVOTE V3.1.0.20), two times (test-retest) with 4 weeks of separation, to University of Guadalajara's health sciences students (October 2017–May 2018). Reproducibility was calculated by a weighted kappa (WK) in each Mini-ECCA question. The ability to identify dietary patterns was determined by cluster analysis with city block distance and Ward's none standardized method, an ANOVA ($p < 0.05$) by each item of the survey with the identified clusters, and discriminant analysis.

Results: We included 276 students (mean age= 20.1 SD 3.1 years; 68% women). The reproducibility and concordance from each question were from moderate (WK= 0.422–0.585) to excellent (WK= 0.606–0.662). Three groups were obtained from cluster analysis: (1) food consumption considered as healthy (19.9%), (2) food consumption to enhance (47.1%), and (3) non-healthy food consumption (33%). In addition, this analysis demonstrated that 85.7% of individuals were correctly classified: cluster 1: 96.4%, cluster 2: 78.5%, and cluster 3: 90.1%. Vegetable consumption (classification function coefficient = 8.63136) explained better the differences between clusters, followed by water intake (6.2692).

Conclusions: As a conclusion, Mini-ECCA v. 2 has from moderate to excellent reproducibility and concordance, and it is able to identify dietary patterns in university students.

Conflict of Interest: The authors declare no conflicts of interest.

Keywords: Food intake quality/ Reproducibility / Dietary patterns

P027

A CALAFATE EXTRACT IMPROVES THE GLYCIDIC PROFILE IN MICE WITH OBESITY INDUCED BY HIGH FAT DIET

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Nutrition in the prevention and treatment of chronic diseases

Background: Since in the etiology of obesity a strong component of oxidative stress and inflammation has been described, it is relevant to study foods with antioxidant and/or anti-inflammatory properties, such as *calafate*, a Chilean native fruit rich in polyphenols.

Objective: To evaluate the effect of the treatment of a *calafate* extract in mice with obesity induced by high fat diet.

Methods: 25 C57BL6 mice of 8 weeks of age were divided into 3 dietary regimens or treatments: Control (n=5), High fat diet (n=10) and High Fat Diet + *calafate* (n=10). All groups received food and water *ad libitum* during 4 months. After 3 months, the High Fat Diet + *calafate* group was treated with a daily dose of 50 mg total polyphenols per kg of weight of *calafate* extract rich in polyphenols (added to water) for 3 weeks. After 3.5 months, an intraperitoneal glucose tolerance test (IPGTT) and indirect calorimetry were performed. At the fourth month the animals were sacrificed. Final body weights were recorded, and serum was isolated. In addition, interscapular Brown Adipose Tissue (BAT) and epididymal White Adipose Tissue (WAT) were obtained. Serum insulin levels were determined through ELISA. Serum levels of inflammatory cytokines MCP-1, TNF- α and IL6, were evaluated through Luminex kit. Statistical analysis was performed using ANOVA.

Results: Mice with a High Fat Diet had a significantly greater weight gain than controls ($p < 0.05$). According to IPGTT, 15-min glycemia was significantly higher in mice with High Fat Diet compared to mice with High Fat Diet + *calafate* ($p < 0.05$). HOMA was significantly higher in mice with High Fat Diet compared to those with High Fat Diet + *calafate* ($p < 0.05$). Resting energy expenditure and WAT weight were significantly lower in control mice ($p < 0.05$). No significant differences were observed in serum levels of MCP-1, IL-6 and TNF- α .

Conclusions: An extract of *calafate*, rich in polyphenols, improves the glycidic profile in mice with obesity induced by high fat diet.

Financing: FONDECYT 1171550

Conflicts of Interest: nothing to declare

Keywords: Obesity / Polyphenols / Inflammation

P028

NUTRITIONAL ALTERATIONS IN DIALYSIS PATIENTS WITH DEPRESSION AND SUICIDAL IDEATION

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Nutrition in the prevention and treatment of chronic diseases

Introduction: The main precursor of suicidal ideation is depression, which is the most common psychiatric disorder in dialysis patients. Studies have shown an association of depression with nutritional alterations and systematic inflammation; however, in patients with kidney disease there is no data about a possible relation between malnutrition, inflammation and suicidal ideation.

Objectives: To describe and compare the nutritional and inflammation statuses in dialysis patients with suicidal ideation and depression.

Methods: Cross sectional study; 36 dialysis patients >18 years old, any gender, who signed informed consent were included. Depression was measured by one psychiatrist using the Beck Depression Inventory, and suicidal ideation with the Beck Scale for Suicidal Ideation. A dietitian evaluated nutritional status by means of anthropometric and biochemical variables, and the Dialysis Malnutrition Score. Additionally, C-reactive protein and fibrinogen were measured.

Results: Prevalence of malnutrition, depression and suicidal ideation were 31%, 97% and 63%, respectively. Comparisons of values of hemoglobin, albumin, creatine, lipid profile and anthropometric parameters did not show significant differences according to the presence or not of depression and suicidal ideation. In the same way, there were no differences according to the presence of malnutrition

between the patients with and without depression and suicidal ideation.

Conclusions: Patients with depression or suicidal ideation did not show significant differences in any of the assessed nutritional variables. However, patients with depression and suicidal ideation seemed to have higher concentrations of C-reactive protein and fibrinogen. The present study opens an opportunity for future research.

Conflict of Interest: Authors declare no conflicts of interest.

Keywords: Nutritional status / Depression / Suicidal ideation / Dialysis

P029

NUTRITIONAL STATE OF SCHOOLS OF ANTIOQUIA AND QUINDÍO; EPIDEMIOLOGICAL ALERT FOR COLOMBIA¹

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Obesity is considered a serious public health problem, associated with the development of chronic non-communicable diseases. Serving the overweight school population is an imperative, since weight gain during this stage conditions excess weight in adulthood.

Objectives: To analyze the nutritional status of the school population of the city of Medellín and the city of Armenia, Colombia

Methods: Two elementary and high school basic education institutions were selected from the cities of Medellín and Armenia. Anthropometric measurements (weight, height, age, and sex) were collected, and BMI was classified according to age, using the Anthro Plus program and the SPSS. Verification of data collection was carried out, anthropometrically reassessing 10% of the population already nutritionally classified, in addition, expert validation of the BMI classification according to age was carried out.

Results: 593 schoolchildren were evaluated, 416 in Medellín and 177 in Armenia.

In Medellín, 53.1% presented adequate nutritional status, 37.8% excess weight; (25.5% overweight and 12.3% obesity), 9.1% weight deficit, (7.9% risk of thinness and 1.2% in thinness); the greater obesity in men.

In Armenia, 33.5% were overweight (20.6 overweight and 12.9% obese), 9.1% weight deficit (7.6% risk of thinness and 1.8% thinness) and 57, 1% adequacy.

Conclusions: The obesity level was found similar in both cities, but the overweight level was higher in Medellín. According to the National Survey of the Nutritional situation - ENSIN- 2015, the excess weight index for Colombia was 24.4% for this population group, which indicates that, four years later, in 2019 in Medellín, the national average of excess in 54.9%, and in Armenia in 37.3%, with the aggravating circumstance that at the age of 11 years, it exceeds 100% of

the national average in Medellín, with 51% of schoolchildren with excess of weight, generating an alert at the national level to identify its determining factors and generate relevant interventions.

Conflict of Interest: The study has no conflict of interest

Keywords: schoolchildren / malnutrition / obesity.

P030

EFFECTS OF PHYSICAL ACTIVITY ON THE REGULATION OF SACAROSE CONSUMPTION, FOOD, BODY COMPOSITION AND GLUCOSE LEVELS AND LIPID PROFILE

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Continuous and excessive intake of sucrose has been linked with the development and maintenance of pathological patterns, being a risk factor for chronic and cardiovascular diseases. Knowing why an organism continuous consuming a food in quantities that make it sick is of interest, as well as identifying and generating strategies that can reduce this consumption and counteract the health damage. The realization of physical activity (PA) is a mechanism with physiological and behavioral regulation effects.

Objetives: Thus, the aim was to evaluate the effect of PA on drinking and eating, body composition and glucose levels and the lipid profile of rats exposed to daily consumption of a sucrose beverage (SB) at 8% (p/v) concentration.

Methods: ABC experimental design, consisting of 3 phases of 30 days each. Sixteen Wistar rats grouped into four groups: sedentary-sedentary, sedentary-active, active-active, active-sedentary. Throughout the study the feeding was at libitum. The first phase was established as the baseline period. The SB was added to the diet from the second phase for all groups and the induced PA at 15 m/min for the active groups. In the third phase, half of the sedentary ones carried out PA and half of the active ones transitioned to a sedentary condition. At the end of each phase a blood extraction was performed to determine glucose levels and lipid profile. At the end of the study the subjects were euthanized to obtain fat mass.

Results: During the period of exposure to PA it was determined: (a) Decrease in the intake of SB during the period of exposure to PA and an increase in the consumption of the standard diet; (b) regulation of caloric intake; (c) constancy in glucose levels and lipid profile; (d) lower fat mass and delay in body weight gain.

Conclusions: Performing PA is an effective mechanism in the regulation of the intake of a SB, promoting the adjustment of disturbed homeostatic and behavioral processes, delaying health damage.

Conflict of interest: not conflict of interest

Keywords: Physical activity, sucrose, regulation, eating behavior.

P031

ANTINOCICEPTIVE EFFECT OF JUICE AND ETHANOLIC EXTRACT OF GRANADA (*PUNICA GRANATUM L.*) IN AN EXPERIMENTAL MODEL OF NOCICEPTIVE AND INFLAMMATORY PAIN

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Currently, a wide range of medications are used for the treatment of pain, however, these do not always exhibit good pharmacological efficacy or lead to adverse or undesirable effects. That is why, it is considered important to propose alternative treatments to help mitigate the nociceptive behavior. In this sense, the use of traditional medicine, as in the case of Granada (*Punica granatum L.*) as an antinociceptive agent, due to its therapeutic effects traditionally reported and because they are not yet well established possible mechanisms of action proposed its analgesic effect.

Objetives: To evaluate the antinociceptive effect of lyophilized juice and the ethanolic extract of pomegranate peel (*Punica granatum L.*) in an experimental model of formalin in rats.

Methods: The pomegranate was collected in the municipality of Tasquillo, state of Hidalgo, Mexico in the months of August-October 2019. The juice was extracted manually and dried in a freeze dryer. The peel was macerated in ethanol for 2 weeks, then filtered and concentrated under reduced pressure with the help of a rotary evaporator. The antinociceptive activity was evaluated using the formalin model (2%). 30 minutes before the test, a dose of 316 mg / kg p.o (lyophilized juice and ethanol extract of peel) and acetylsalicylic acid as a reference drug (100 mg/Kg p.o) were administered intragastrically.

Results: The juice and the pomegranate peel ethanolic extract (316 mg/kg p.o.), showed statistically significant antinociceptive activity in nociceptive and inflammatory pain (p <0.05). Pain inhibition rates were 34% for juice and 45% for ethanolic extract.

Conclusions: The ethanol extract of peel and the lyophilized juice of pomegranate endemic to the state of Hidalgo, have an antinociceptive effect in two types of pain: nociceptive and inflammatory. However, more research is needed to elucidate one of the possible mechanisms of action responsible for this pharmacological activity.

Conflict of Interest: All of the authors declares that we have no conflict of interest.

Keywords: Lyophilized juice / formalin/ antinociception/ peel/ *Punica granatum*.

P032

EFFECT OF IN-UTERO AND LACTATION EXPOSURE TO LOW-CALORIE SWEETENERS ON ABDOMINAL ADIPOSE TISSUE AND SERIC LIPIDS OF WISTAR RATS

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Low calorie sweeteners (LCS) have been detected in amniotic fluid and breast milk. Evidence suggests that exposure to LCS during pregnancy and /or lactation has an impact on metabolism.

Objective: The aim of this study was to evaluate the effect of exposure in utero and during lactation to LCS, after six weeks of free access to two diets: a standard diet (SD) and a lipidic diet (LD), on accumulation of abdominal adipose tissue (AAT) and seric concentrations of glucose, cholesterol and triglycerides in offspring of Wistar rats.

Methods: Twelve 8-week-old female rats were randomly assigned into 3 experimental groups: unexposed group (UG), sucralose group (SG) and stevia group (STG), according to the drink they consumed, for 4 weeks prior mating and throughout pregnancy and lactation. The UG drank water, the SG drank sucralose solution (1%) and the STG drank stevia solution (0.5%); all mothers consumed ad-libitum SD. Offspring were weaned and grouped by sex and by mother's exposure; during the postnatal week 4 they consumed water and SD. Subsequently, for 6 weeks they had ad-libitum water and free access to SD and LD (containing 40% lipids), finally, they were sacrificed. AAT (perigonadal, mesenteric and retroperitoneal adipose tissue) were dissected. Concentrations of glucose, cholesterol and triglycerides in serum were quantified.

Results: SG rats accumulated more TAA than descendants of the UG; in contrast, only the males of the STG accumulated more TAA than males of the GNE. No differences were found between the experimental groups in serum glucose and triglyceride concentrations. Seric cholesterol was significantly lower in females of the STG, compared to the females of the UG.

Conclusions: The effect of maternal exposure to LCS during pregnancy and lactation on adipose tissue accumulation depends on the sweetener tested and the sex of the offspring. The role of each sweetener and the possible participation of sexual hormones in modulating this effect requires further investigation.

Conflict of Interest: The authors declare that there are no conflicts of interest. The authors declare that there are no conflicts of interest.

Keywords: low-calorie sweeteners / sucralose /stevia / pregnancy-lactation / adipose tissue.

P033

TELEVISION VIEWING DURING MEALS AND FOOD INTAKE IN CHILDREN AND ADOLESCENTS

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Nutrition in the prevention and treatment of chronic diseases

Background and aim: Childhood and adolescent obesity is a multifactorial disease in which inadequate nutrition and sedentary lifestyle play a decisive role. Amongst the environmental factors that influence eating habits of children and adolescents, recent studies highlight the important role of television viewing during meals. Therefore, the objective of this work is to know the use of television during meals and its role in the food pattern.

Method: 895 children and adolescents (47% males) from 3 to 18 years old (10.25 ± 2.67), who attend pediatric nutrition and endocrinology consultations of 4 Spanish hospitals. Anthropometric assessment is performed and stratified according to the degree of adiposity using the Body Mass Index (BMI) according to Cole2000 international standards. Further, a validated questionnaire of frequency of food consumption and use of ICTs is carried out. Statistical analysis is performed using SPSS versión 19.

Results: 57.4% of the sample claim to eat in front of the television on a regular basis. The highest percentage of children who eat in front of the television are obese compared to with normal weight (39.1% vs. 34.7%) (NS). As for the consumption of fruits and vegetables is higher in those who never or almost never eat with the television on, presenting significant differences in the consumption of fruits ($p = 0.008$). There are also significant differences in the consumption of salty snacks, being higher in those who eat without television ($p = 0.003$). Further, the consumption of juices or soft drinks is significantly higher in those who eat in front of the TV, ≥ 1 per day (30.4% vs. 20.6, $p = 0.026$).

Conclusions: The eating pattern of children who eat in front of the television is less healthy, presenting a decrease in fruit consumption and an increase in sugary drinks. Therefore, amongst the strategies of prevention of overweight and obesity and their associated diseases we must include the decrease of meals in front of the screens.

Keywords: television viewing, obesity, lifestyle, eating pattern.

P034

AD-36 AS A RISK FACTOR FOR OBESITY AND INCREASED BODY FAT IN A UNIVERSITY POPULATION IN WESTERN MEXICO

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Obesity is a serious public health problem, affecting more than 650 million adults worldwide, some etiologies are low physical activity, genetics or infectobesity. Adenovirus 36 (Ad-36) is associated with the development of overweight and obesity in humans. Most of the research on Ad-36 focuses on the process by which the accumulation of lipids in adipocytes, but there are very few studies aimed at evaluating the effect of the virus and the risk of increase the fat body.

Objective: To determine the association of Ad-36 with a anthropometric measures.

Methods: A cross-sectional study included 157 subjects that were recruited from the medical school and nutrition clinics of the Centro Universitario del SUR (CUSUR) in Western Mexico, all of whom answered the questionnaire to assess their healthy habits. The anthropometric measurements were determined included body mass index (BMI), waist circumference, body fat, bone mass, and weight. A blood sample was taken to identify Ad-36, using the ELISA technique. Finally, the participants were classified according

to their BMI in (Normal weight group and Overweight and obese group) and the presence of Ad-36, and a statistical analysis was performed.

Results: Of the 157 subjects included, the overall Ad-36 prevalence was 30 (19.5%) subjects were positive of Ad-36 antibodies, 6 of those subjects (3.81%) corresponding to the Normal weight group and another 24 subjects (15.28%) corresponding to the Overweight and obese group. Student's t test shows significant differences in BMI $p=0.016$, waist circumference $p=0.047$ and body fat $p=0.009$ with respect to the prevalence of Ad-36. The X² test BMI reveal $p=0.001$ OR of 4.61 95% CI (1.76-12.04), body fat $p=0.001$ OR 5.92 (2.14-16.52).

Conclusions: The prevalence of Ad-36 were relations with an obesity and anthropometric measures in a university population in Western Mexico.

Conflicts of interest: the authors declare no conflict of interest.

Keywords: Adenovirus 36 - nutrition - obesity.

P035

ANOREXIA AS A NUTRITIONAL DISORDER CONDITIONED BY MENTAL HEALTH STATUS IN INSTITUTIONALIZED VERY OLD ADULTS

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Nutritional disorders such as anorexia and depression are frequent comorbidities in very old adults (VOA).

Objectives: The aim of this study was to evaluate the relation between anorexia and depression in institutionalized elders without cognitive impairment.

Methods: A cross-sectional study was carried out with 172 subjects (aged ≥ 85 years; 75% women, mean age: 90.8 ± 3.8 years, time of institutionalization: 32.5 ± 29.6 months). Socio-demographic, clinical and nutritional data from each volunteer were registered. Nutritional status was evaluated by a Mini-Nutritional Assessment (MNA) questionnaire, anthropometric measurements and biochemical parameters. Anorexia was analyzed by the Functional assessment of anorexia-cachexia questionnaire. A cut-off < 24 point was considered as anorexia diagnostic criteria. Mental health status was explored by Goldberg's depression questionnaire. Body composition analysis was explored by bioelectrical impedance. Functional capacity assessment was measured by a 6 meter-gait-speed test. Statistical analysis was carried out using SPSS v.24 software.

Results: The prevalence of concomitant anorexia, depression and comprised nutritional status was 18.7% in the evaluated population. Significant differences between

subjects with normal appetite vs. anorectic were found with depression questionnaire ($p < 0.001$), percentage of fat-free mass ($p = 0.014$), muscle mass ($p = 0.001$) and total lymphocytes count ($p = 0.001$). Linear regression analysis showed that both depression questionnaire and gait-speed in 6 meters were potential predictors of anorectic state in elders ($p < 0.01$; $R = 0.68$; $R^2 = 0.40$).

Conclusions: Anorexia is partially modulated by depression, being both conditions leading factors of a higher risk of compromised nutritional status in institutionalized very old adults.

Conflicts of interest: None

Keywords: Anorexia/ Depression/ Nutritional Status/ Geriatric Assessment/ Very old adults/ Ageing.

P036

EFFECT OF INTAKING AVENA SATIVA (OATS), CHENOPODIUM PALLIDICAULE (CAÑIHUA), ANANAS COMOSUS (PINEAPPLE) AND OLEA EUROPAEA OIL (OLIVE OIL) IN RATS INDUCED TO OBESITY

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Excessive food consumption and sedentary lifestyle favor an increase in the body weight of people; sustained overweight over a long period is a risk factor for developing metabolic syndrome, cardiovascular disorders, obesity, among others. It is necessary to look for different preventive or control measures to avoid them.

Objetives: The present study demonstrated the effect of oats, pineapple, cañihua and olive oil in rats induced to obesity.

Methods: 32 male Wistar rats 21-day-old were used, which were randomized into four groups, of which two groups were induced to obesity by the administration of sucrose. Then they were given free-demand diets for 45 days as detailed below: group I consisting of normal-weight rats received a balanced diet; Group II integrated by normal-weight rats received the diet consisting of Avena sativa, Chenopodium pallidicaule, Ananas comosus and oil from Olea europaea; group III consisting of obese rats received balanced food and group IV constituted by obese rats received the proposed diet.

Results.: Weight reduction was observed in the obese rats that received the proposed diet of Avena sativa, Chenopodium pallidicaule, Ananas comosus and Olea europaea oil; No

changes were evident in the normal weight rats. Likewise, no change was observed in the weight of the obese rats that did not receive the proposed diet. Significant differences in body weight were observed: in group I 302.0 ± 14.12 g at the beginning and 331.13 ± 20.76 g at the end, group II 320.25 ± 10.61 g at the beginning and 352.5 ± 22.58 g at the end, in group III 398.13 ± 19.3 g at the beginning and 455.25 ± 23.62 g at the end and in group IV 417.63 ± 70.0 g at the beginning and 347.63 ± 26.16 at the end; significant effect of the proposed diet is appreciated ($p < 0.05$).

Conclusions: The present study demonstrated that the consumption of a food prepared with Avena sativa, Chenopodium pallidicaule, Ananas comosus and oil of Olea europaea have beneficial effects in weight reduction in rats induced to obesity.

Conflict of Interest: The authors declare that they have no conflicts of interest.

Keywords: obesity / cañihua / sucrose

P037

NUTRITIONAL STATUS, DIET QUALITY AND LIFESTYLES IN OFFICIALS OF THE UNIVERSITY OF BIO-BIO, CHILE

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Nutrition in the prevention and treatment of chronic diseases

Introduction: The prevalence of cardiovascular diseases worldwide and the morbidity and mortality they generate is related to lifestyles.

Objetives: Determine the nutritional status and lifestyles of officials of the University of Bio-Bio, Chile.

Methods: A descriptive cross-sectional study approved by the Bioethics Committee of the University of Bio-Bio was carried out. The sample was convenience, with a margin of error of 5% with a confidence interval of 95%; It consisted of 157 officials between 25 and 75 years. Previously they signed informed consent, and general background surveys, tobacco consumption by means of Fagerström test, and alcohol with AUDIT-TEST were applied. The quality of the diet was determined by the Healthy Eating Index and food consumption survey. Nutritional status was classified according to body mass index and Waist Index.

Results: The sample consisted of 69.2% of women and 30.8% of men. The average age of the subjects studied was 45 years, the weight was 71.6 kg, height 1.67 m, waist circumference 89.3 cm and a body mass index of 27.1 kg / m²

. 48% of the sample was classified as overweight and 22.6% as obese. According to sex, 80% of men had poor nutrition due to excess and 67.7% of women. 49.3% of the women had a waist circumference > 80 cm and 25.3% of the men > 90 cm. 67.8% of people had low physical activity and 18.5% had a moderate level. In relation to the diet quality index, 61% of them are classified as unhealthy and 39% need changes. It was observed that 20.5% of people consumed tobacco and 43.2% alcohol.

Conclusions: In most of the University of Bio-Bio officials studied, poor nutrition was evidenced by excess and sedentary lifestyle due to low physical activity and unhealthy eating.

Conflict of Interest: The authors declare no conflict of interest.

Keywords: Nutritional status / University officials / Diet quality.

inserted in linear regression models (dependent variable), adjusted for income, education and age. Significance $P \leq 0,05$.

Results: Patients in early CS have reduced Xc ($p = 0.00$) and PA ($p = 0.01$) and increased leptin at T1. $T \leq 2\text{cm}$ shows a reduction in Xc ($p = 0.00$) and $T > 2\text{cm}$ shows a reduction in PA ($p = 0.02$). With N^+ there is an increase of %FM ($p = 0.01$), a reduction of %LM ($p = 0.01$) and PA ($p = 0.01$) during follow-up. The initial CS (0, I and II) imply a greater risk of changes in PA and in the serum leptin concentration and tumors $\leq 2\text{cm}$ increase the risk of an increase in leptin.

Conclusion: Tumor aggressiveness promotes changes in the body composition of breast cancer survivors throughout the follow-up and less aggressive parameters significantly influence these changes. CNPq (401856/2016-0).

Conflict of interest: there is no conflict of interest.

Keywords: Breast cancer / clinical stage / body composition / leptin.

P038

LOWER TUMOR AGGRESSIVITY INFLUENCES REDUCED PHASE ANGLE AND INCREASED SERUM LEPTIN IN BREAST CANCER SURVIVING WOMEN: A FOLLOW-UP STUDY

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Breast cancer is most common in women and survival rates have been increasing. However, it's known that the risk of disease recurrence remains 20 years after the initial diagnosis. Therefore, the identification of factors associated with late recurrence in breast cancer survivors is essential to plan preventive measures related to lifestyle.

Objectives: to evaluate the influence of tumor aggressiveness on the change in body composition of breast cancer survivors.

Methods: Observational and longitudinal study with 114 adult women with breast cancer, attended at the mastology service in Brazil. Data collection in two moments (T0 - diagnosis; T1 - 5 years after). We collected clinical information (clinical staging (CS); tumor size (T); presence of lympho nodes (N^+) and hormonal characteristics. With tetrapolar bioimpedance (Biodynamics 450 - 50 kHz) and following the protocol for the exam, we analyzed lean mass (% LM), fat mass (% FM), phase angle (PA), resistance (R) and reactance (Xc). The plasma leptin concentration was measured by immunoassay. The normality of the quantitative variables was tested by Shapiro-Wilk and the differences between T0 and T1 by test - paired T (parametric) or Wilcoxon (non-parametric). Values of Δ (T1-T0) were

P039

ASSESSMENT OF A SHORT-TERM INTERVENTION PROGRAM IN OBESE ADOLESCENTS WITH METABOLIC SYNDROME

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Obesity is a rapidly growing public health problem affecting people around the world that may be associated with comorbidities such as high blood pressure and type 2 diabetes. As a direct consequence of the globesity epidemic, the current prevalence of metabolic syndrome appears to be increasing in adolescents, therefore is of paramount importance to develop effective therapeutic measures.

Objectives: To determine the effect of a 12-week intervention program consisting of nutritional guidance, a low-calorie diet plan and supervised exercise sessions over different anthropometric and metabolic variables in a cohort of obese Mexican adolescents with metabolic syndrome.

Methods: Prospective study performed in 52 adolescents (12-18 years of age, male and female) from Ciudad del Carmen (State in Campeche, México) admitted in a private health facility diagnosed with both obesity (according to body mass index Z-score value – WHO 2007) and metabolic syndrome (Cook et al criteria). Studied variables included weight, body mass index, waist circumference, blood pressure, serum triglycerides, HDL cholesterol, basal serum insulin and fasting

glycemia. Measures were taken pre and post intervention. Control visits were scheduled every two weeks during the duration of the study.

Results: 34 subjects successfully completed the intervention study (50% male). All studied variables showed statistically significant improvement ($p < 0.001$). Mean weight loss was 7% (5.5 kg) for the whole study cohort, translating in a decrease of 2.5 kg/m² in the body mass index. Waist circumference decreased 5.7% (5.5 cm), systolic and diastolic blood pressure decreased 5.6% and 9.5% respectively. Serum triglycerides decreased 15.7%, HDL cholesterol increased 7.5%, basal serum insulina decreased 22% and fasting glycemia was 6.6% lower. At the end of the intervention, 18/34 patients no longer fulfilled diagnostic criteria for metabolic syndrome, which represents an overall decrease of 53%.

Conclusions: Our pilot intervention program based on nutritional guidance, a low-calorie diet plan and increased physical activity is both secure and effective to decrease metabolic syndrome in obese adolescents on a short-term basis. More studies to properly identify effective therapeutic strategies in order to address this concerning health problem are urgently needed.

Conflict of interest: None.

Keywords: obesity, metabolic syndrome, adolescents

P040

CHANGES IN DIETARY CONSUMPTION IN CHILDREN AGED 1 TO 7 YEARS BELONGING TO A COHORT STUDY IN MEXICO CITY

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Overweight and obesity affects approximately one-third of the school population in Mexico. Under the approach of the life course, infancy and childhood are critical stages in the development of obesity due to the correlation of the quality of diet adopted in these stages with the quality of the diet at later ages.

Objective: To evaluate changes in dietary patterns in children aged 1-7 years belonging to a cohort study.

Methods: We performed a secondary analysis of the cohort "Programming Research in Obesity, Growth, Environment and Social Stressors" (PROGRESS) of children residing in Mexico City. The diet information was collected by a semi quantitative food frequency questionnaire in the visits of 12, 24, 48 and 72 months. Dietary patterns were derived at each wave by factor analysis and we analyzed changes in dietary intake over time.

Results: Regarding the age of 12 months, the percentage of consumers of breakfast cereals, corn-based food, dairy products, animal fats, sausages, salted snacks, fast food and sweetened non-dairy drinks increased significantly in later

ages. Likewise, a high percentage of consumers of fruits, vegetables, corn tortillas, pastries, desserts, legumes, chicken, milk, rice and soups were observed from the baseline stage. At each stage, except for 48 months, both healthy and unhealthy dietary patterns were observed but a consistent and stable pattern was not observed in the follow-up period.

Conclusions: The consumption of unhealthy food groups is high from early stages of life and increases or remains stable during childhood; such exposure increases the risk of excessive weight gain in children.

Conflict of Interest: The authors declare that there is no conflict of interest.

Keywords: Diet / Infancy / Childhood / Obesity.

P041

DEVELOPMENT OF A COMPLEMENTARY FOOD FOR THE OLDER ADULT WITH CRITICAL MICRONUTRIENTS (VITAMINS D3, B12, CALCIUM AND IRON) BIOAVAILABLE

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Challenges of nutrition and public health in Ibero-America

Introduction: The development and distribution of foods fortified with micronutrients (MN) is a state initiative to improve nutrition in Chilean older adults (OA). However, recent studies indicate plasma MN deficits in OA that consume these foods. Various physical-chemical interactions between MN and other ingredients of the food matrix decrease its bioavailability and, consequently, its absorption.

Objectives: The objective of this work was to improve the bioavailability of critical MNs (vitamins D3, B12, calcium and iron) from the lentil cream delivered by the state as a dietary complement to Chilean OAs. For this, the effect of encapsulation on the bioavailability of MN used in food fortification was evaluated.

Methods: For calcium and vitamin D3, emulsions were prepared using maltodextrin / inulin / caseinate (1: 1: 0; 1: 0: 1; 3: 0: 1 and 3: 1: 0 ratio). For iron or vitamin B12, dispersions were prepared using the same encapsulants and proportions. Both emulsions and dispersions were subjected to a spray drying process at 130 and 120 ° C respectively. To select the best encapsulation conditions, the drying yield (R%) and the MN retention efficiency (ER%) were determined. The microparticles with the highest R% and ER%; they were subjected to in vitro digestion, according to the INFOGEST

protocol, before and after their incorporation into the food matrix.

Results: The R% were similar ($p \geq 0.05$) in all the microparticles (~ 71%). The ER% was significantly affected ($p < 0.05$) by the design of the encapsulating mixture, with the maltodextrin / inulin / caseinate mixture (1: 1: 0) being the most effective (~ 68%), except for vitamin D3 where the 1: 0: 1 maltodextrin / inulin / caseinate emulsion had a significantly higher ER% (~ 71%).

Conclusions: The encapsulation of the MNs significantly improved their bioavailability from the food matrix. Vitamin D3 increased 44%, vitamin B12 59%, calcium 40%, while iron 38% compared to the control food.

Conflict of Interest: Authors declare no conflict of interest.

Acknowledgments: Authors acknowledge the financial of FONDEF project ID17AM0018.

Keywords: Older adults, micronutrients, fortified foods, bioavailability.

P042

VALIDATION AND CULTURAL ADAPTATION OF THE AUSTRALIAN BREASTFEEDING ATTITUDE QUESTIONNAIRE (ABAKQ SCALE) FOR MEXICAN POPULATION

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Challenges of nutrition and public health in Ibero-America

Introduction: The negative attitudes about breastfeeding of the health professionals and students, have been associated with a decrease in confidence to provide support and caring to mothers during this stage. In Mexico, there is no a valid and reliable tool that assessed attitudes towards breastfeeding in these health professionals/students. The Australian Breastfeeding Knowledge and Attitude Questionnaire (ABAKQ) has been used in different contexts for the evaluation of attitudes in health students; therefore, we wanted to use it in Mexican population.

Objective: To make a cultural adaptation of the ABAKQ and to validate it according psychometric properties in Mexican students of the health area.

Methods: Quantitative study that included undergraduate students from 3rd to 7th semester of the CUCS-

UDG, in June-July 2018. The survey (ABAKQ) consists of 20 items (answers in a 5-point Likert scale). Higher scores indicate better attitudes. Two translations into Spanish in a Mexican context were performed independently and compared; their integration suffers a reverse translation into English and was sent to the original author of the ABAKQ for review. To assess the psychometric properties, reliability analysis was performed through Cronbach's alpha. Construct validity was assessed by exploratory factor analysis (AFE) by main components and by confirmatory factor analysis (AFC) using IBM-SPSS and IBM-AMOS (v.23).

Results: We included 148 students (88% women) of 21±2 years of average age. Cronbach's alpha showed adequate internal consistency ($\alpha = 0.87$). The AFC identified a structure of a component, eliminating seven items according to the item-total correlation (< 0.3) and the low factor load (0.3). The AFC with the remaining 13 items confirms the structure of one factor, showing adequate adjustment rates ($\chi^2=78,596$; Freedom degrees=58; $p=0.037$; comparative fit index (CFI)=0.984 and a root mean square error of approximation (RMSEA)=0.049).

Conclusion: The Mexican adapted ABAKQ scale of 13 items is a reliable and valid instrument that allows us to measure attitudes towards breastfeeding in health students in the Mexican context.

Conflict of Interest: The authors declare no potential conflicts of interest.

Keywords: Breastfeeding / attitudes / validation survey / university students.

P043

FOOD CONSUMPTION AND AVAILABILITY OF ESSENTIAL FATTY ACIDS IN BREASTFEEDING HONDURAN WOMEN

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Challenges of nutrition and public health in Ibero-America

Introduction: Dietary habits and maternal nutritional status are the most important modifiable factors that will determine the concentration of certain essential components and nutrients in breast milk (BF).

Objectives: Identify the main food sources that contribute to the consumption of essential fatty acids (EFA) in lactating women in the semi-rural area of Honduras, which in turn are reflected in the fatty acid content of their breast milk.

Methods: The study is transversal, part of an international study. The sample was conventional, and with inclusion criteria. The protocol was approved by the ethics committee IRB # 00003070. Nutritional status was evaluated using electrical bioimpedance and the consumption of food sources of EFA, in 25 mothers between 26-64 days postpartum. Breast milk was analyzed using the dry drop

method using filter paper or Guthrie cards, handled properly prior to being sent to the laboratory in the United States.

Results: 56% of mothers provided exclusive breastfeeding, 52% of mothers were overweight, and 68% had excess body fat. Positive correlations were established between the body mass index and body fat ($p = 0.00$), and between visceral fat and body fat ($p = 0.000$). The average consumption of marine foods was 1.44, 0.60 and 0.68 servings of fish, sardines and tuna, respectively. The average consumption of docosahexaenoic acid (DHA) and arachidonic acid (ARA) was 0.05 g / day. The content of DHA, EPA and ARA fatty acids in breast milk was 0.14, 0.01 and 0.4% respectively

Conclusions: The consumption of processed foods displaces the consumption of EFA source foods, compromising the quality of BF. Overweight and obesity in women of reproductive age exerts a metabolic programming effect that increases the risk in their children of being overweight or obese.

Conflict of Interest: The authors express that there are no conflicts of interest when writing the manuscript.

Keywords: Arachidonic acid / breastfeeding / docosahexaenoic acids / human milk / intra-abdominal fat / obesity

P044

GLUTEN-FREE PASTA AS A HEALTHY ALTERNATIVE IN THE DIET OF PATIENTS WITH CELIAC DISEASE

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Challenges of nutrition and public health in Ibero-America

Introduction: Gluten-free pastas commercialized in Mexico are mostly imported and have a protein content of less than 5g/100g of product, lower than that established in NMX-F-023-NORMEX-2002 for wheat pasta. Several authors have reported the use of amaranth, quinoa and its mixtures with rice-soy, amaranth-yucca, amaranth-corn, rice-amaranth and corn-soy, as an alternative to vary and improve the nutritional quality of gluten-free pasta, and obtain a product with similar characteristics to those of a conventional pasta (Caperuto et al; 2001, Kupper 2005; Alamprese et al; 2007, Álvarez-Jubete et al; 2010, Mariotti et al; 2011, Islas-Rubio et al; 2014).

Objectives: The aims of this project were: 1) to develop gluten-free pasta with a protein content greater than 11 g/100g of product, a chemical rating of not less than 70% of the FAO standard (1985) and a gluten content less than 20 mg/kg 2) Evaluate the physicochemical, microbiological and sensory characteristics of the elaborated products.

Methods: We developed different pastas formulated with cornmeal, amaranth, soybean, and rice and the additives carboxymethyl cellulose, emulsifier and egg albumin. Then, we compared them with, a commercial gluten-free pasta. We established the processing conditions (mixing time, extrusion

and drying temperature) and we determined the cooking time, % of crashed pasta, % of sedimentation, degree of absorption, cooking tolerance index, increase in volume, chemical composition, microbiological analysis, gluten content and sensory evaluation. An ANOVA and the Kruskal Wallis test ($P < 0.05$) were applied for the physical tests and the R index.

Results: Three corn-rice-soybeans, corn-soybeans and corn-rice-amaranth pastas were obtained. The physical characteristics: % of sedimentation, degree of absorption and % of crashed pasta were better in the experimental pastas. The protein content in the developed products was 14g/100g and contained less than 20 mg/kg of gluten. The sensory analysis revealed that the corn-rice-soybean pasta had an acceptance and a level of preference similar to the commercial pasta.

Conclusions: We developed pastas that the nutritional, physicochemical and microbiological characteristics of the NMX-F-023-NORMEX-2002 and are suitable for people with celiac disease.

Conflict of Interest: They do not exist

Keywords: Celiac disease / pasta / gluten/ rice / corn / amaranth

P045

ASSOCIATIONS BETWEEN LONG CHAIN OMEGA-3 FATTY ACIDS: EICOSAPENTAENOIC ACID {EPA}, DOCOSAHEXAENOIC ACID {DHA} AND DOCOSAPENTAENOIC ACID {DPA} IN MILK OF GUATEMALAN LACTATING WOMEN

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Challenges of nutrition and public health in Ibero-America

Introduction: Breast milk is the only food that provides all the essential nutrients for the newborn. In Guatemala, there is a significant variation in the abundance of long-chain omegas-3 acids such as EPA and DHA, the best know species; and DPA, an omega-3 acid with less scientific visibility.

Objectives: Evaluate the variation of the associations of EPA, DHA and DPA in the milk of lactating women in Guatemala.

Methods: 130 lactating women between 26 and 172 days postpartum were included; 85 from Quetzaltenango (rural and urban areas), 30 from Sololá (rural and urban) and 15 from Retalhuleu (rural and urban). Breast milk (full breast) was extracted from each participant and a sample was retained for further analysis using the dry drop method on PerkinElmer 226 five spot RUO cards. The samples were analyzed at the Lipid Technologies LLC Laboratory in MN, USA. Differences in the composition of EPA, DHA and DPA, expressed in g/%, were evaluated. Associations between types of fatty acids were calculated by Spearman (rho) correlation.

Results: The EPA/DHA association had a value of $\rho=0.529$ at $n=130$ ($p<0.001$); DHA/DPA $\rho=0.717$ ($p<0.001$) and EPA/DPA $\rho=0.489$ ($p<0.001$). In a subgroup of 10 women, oral supplementation intervention with omega-3 fatty acids ($n=5$) 450 mg of DHA/90 mg of EPA and ($n=5$) 225 mg of DHA/45 mg of EPA was performed. In both cases, a response was observed in the abundance of DPA in milk $\Delta 0.04$ in the first group and $\Delta 0.03$ in the second group.

Conclusions: From this experience in Guatemalan women in the lactation phase, our observations increase the knowledge of the behavior of fatty acid DPA in breast milk.

Conflict of Interest: No conflict of interest.

Keywords: EPA / DHA / DPA / Breast milk / Guatemala.

P046

ESSENTIAL MINERALS IN BREAST MILK FROM URBAN WOMEN LIVING IN QUETZALTENANGO, GUATEMALA

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Challenges of nutrition and public health in Ibero-America

Background and Objective: In 1973, WHO conducted a study in 9 countries, including Guatemala, assessing essential minerals and trace elements concentrations in human breast milk (BM). The findings revealed deficiencies in almost all of the minerals analyzed in the Guatemalan samples, according to nutritional standards of the time. The objective of this study was to determine the intake and adequacy to dietary recommendations of 9 minerals present in BM samples from urban women living in the Western Highlands of Guatemala.

Methods: The study was approved by CeSSIAM's Human Subjects Ethics Committee. Forty volunteers, up to 160 days postpartum, provided at least 30 mL of BM, which was homogenized, frozen and later microwave-digested to be analyzed by ICP-MS (Agilent 8900 triple quadrupole) at the laboratories of the Universidad de Granada, Spain, to determine the concentration of essential minerals. The infant's daily mineral intake was estimated by assuming an average intake volume of 780 mL BM/day, which later was compared to the daily recommended intakes (DRI) from the Institute of Medicine.

Results: Average daily intakes \pm SD and the average adequacy % for all the minerals in BM for infants 0-6 mo. were: Sodium (240.7 \pm 289.5 mg/day, 219%); magnesium (38.6 \pm 6.3 mg/day, 129%); potassium (408.1 \pm 65.6 mg/day, 102%); calcium (217.9 \pm 26.5 mg/day, 109%); manganese (3.9 \pm 5.1 μ g/day, 131%); iron (0.31 \pm 0.3 mg/day, 115%); copper (268.9 \pm 93.2 μ g/day, 135%); zinc (2.2 \pm 1.2 mg/day, 111%) and selenium (14.5 \pm 4.2 μ g/day, 96%).

Conclusion: Over the last five decades, an improved panorama in adequacy in essential elements in breast milk

seems to have emerged at least in this province, and intakes for infants in this population are generally adequate. As subclinical mastitis, characterized by sodium leakage into milk, has been reported with moderate frequency in lactating women in the same province, the large variation in sodium concentration may be related to this ailment.

Keywords: Minerals, breast milk, nutrient adequacy, Guatemala

P047

WNT16 GENE RS3801387 AND RS7108738 SOX6 GENE POLYMORPHISMS AND ITS RELATION WITH OSTEOPENIA / OSTEOPOROSIS IN POSTMENOPAUSAL WOMEN FROM THE METROPOLITAN AREA OF MONTERREY, NUEVO LEON

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Challenges of nutrition and public health in Ibero-America

Introduction: The osteopenia/osteoporosis (OA / OS) phenotype is a condition characterized by low bone mineral density (BMD) that results in risk of the bone's microarchitecture. By 2050 is predicted that 1 in 12 postmenopausal Mexican women will have osteoporosis, increasing the risk of fracture and consequently morbidity and mortality. Variations in BMD are attributed to environmental and genetic factors (50 to 80%). Single nucleotide polymorphisms (SNPs) rs3801387 of the *WNT16* gene and rs7108738 of the *SOX6* gene have been associated with decreased BMD in hip and spine regions in Asian and European women.

Objective: The study was to analyze the association of these polymorphisms in postmenopausal women with OA / OS from Monterrey.

Methods: 245 postmenopausal women from Monterrey, N.L., without chronic diseases nor diagnosis or treatment for bone diseases took part in the study; Prior informed consent, anthropometry was performed and BMD was determined by dual x-ray absorptiometry. The WHO criteria were used for the classifying subjects in "Normal" and "with OA / OS" groups (less than -1.0 standard deviation). A blood sample was used for genotyping by TaqMan probes specific for the SNPs. The associations of interest were evaluated by multiple logistic

regression for the different genetic models, and adjusted for age and BMI.

Results: 67% of the participants were classified in the "Normal" group and 33% in the "OA / OS" group, the median age was 55 and 58 years, respectively; BMI was lower in the OA / OS group compared to the normal group (26.52 vs. 29.76 kg / m²). Hardy-Weinberg equilibrium was met in both SNPs for the population. Genotypic and allelic frequencies were similar between groups (normal vs. OA / OS). For rs3801387 of *WNT16* gene, a positive association with OA / OS (OR 1.86, *p* = 0.028, 95% CI 1.06-3.25) was found in the overweight / obesity group (adjusted for BMI) using the additive model.

Conclusion: A statistically significant association of rs3801387 of the *WNT16* gene with OA / OS was found in overweight / obese women.

Conflict of interest: The authors have no conflict of interest to disclose

Keywords: Osteoporosis / genetic polymorphisms / BMD/ postmenopausal women

P048

MALNUTRITION AND ASSOCIATED FACTORS IN THE ELDERLY OF FREE LIFE OF A STATE IN THE NORTHEAST OF THE MEXICAN REPUBLIC

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Challenges of nutrition and public health in Ibero-America

Introduction: Malnutrition is a geriatric syndrome associated with: sarcopenia, frailty, functional depression, cognitive impairment, fall syndrome, hip fracture (osteoporosis), delirium, immobility and polypharmacy (Ministry of Health, 2014). The prevalence of malnutrition according to the National Health and Nutrition Survey (2012), in people over 60 years of age was 1.6% and in those over 80 years old it increased to 6.9%. There are extrinsic factors related to malnutrition such as dependence, depression and cognitive impairment, which should be considered when performing the nutritional intervention.

Objectives: The objective of this study was to identify the frequency of malnutrition or the risk of malnutrition in a group of older adults in the Nuevo León metropolitan area.

Methods: Cross-sectional study of 134 older adults, selected for convenience. The average age was 71.3 ± 7.96 years, 70.1% were women and the rest (29.9%) men. The nutritional status was evaluated with Mini Nutritional Assessment (MNA), the risk of depression with the Yesavage Scale, risk of cognitive impairment with Mini-Mental State Examination (MMSE), dependence for instrumental life activities the Lawton Scale was applied and Brody and for basic activities of daily life the Barthel Scale. For the association of the risk of malnutrition and malnutrition with the related variables, a logistic regression model was determined and the Odds Ratio (OR) was calculated with its respective 95% confidence interval (95% CI).

Results: The group of older adults studied, 30.6% presented a risk of malnutrition and malnutrition, 6.7%. Those who presented a positive result at risk of depression (OR = 6.13, 95% CI: 2.64-14.22), cognitive impairment (OR = 4.43, 95% CI: 2.03 - 9.68), dependence (OR = 13, 95% CI: 5.57-30.36) and Lawton dependence (OR = 5.47, 95% CI: 2.56 - 11.71); they presented a greater risk of malnutrition or malnutrition.

Conclusions: Results show the association between a nutritional state of deficit and the presence of risk of depression, cognitive impairment, dependence on the basic and instrumental activities of life; what should be considered when planning nutritional intervention to address the risk of malnutrition and malnutrition in the elderly.

Conflict of Interest: I declare that there is no conflict of interest.

Keywords: Depression/ dependence/ deterioration

P049

SEDENTARISM TEST IN UNIVERSITY STUDENTS

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Challenges of nutrition and public health in Ibero-America

Introduction: Mexico suffers from a crisis of overweight and obesity, which has resulted in the main causes of death, having a causal relationship with this condition, whose causes can be multiple, in addition to the constant consumption of densely energetic foods, so is sedentary lifestyle. Physical tests should be performed and not only self-report physical activity questionnaires to know the physical condition of patients. It is necessary to design and validate accessible and ergonomic physical tests that allow diagnosing a sedentary lifestyle reliably. It is important to identify physical activity tests that allow distinguishing the level of sedentary lifestyle that the population has, as well as allowing a real evaluation of the patients in the office.

Objectives: The objective of this work is to describe the characteristics of the tests to evaluate the physical activity and that can be used for the detection of a sedentary lifestyle, in relation to the body composition in students of the Degree in Nutrition during the period January to June 2018.

Methods: A cross-sectional study was carried out in 55 students to whom was applied a battery of validated tests for the diagnosis of a sedentary lifestyle, together with the proposal of the test protocol, for the subsequent comparison between them: Pérez-Rojas sedentary test, squats, jump height and effort with dynamometer. Anthropometric indicators (body mass index, waist circumference) were evaluated. Statistical analysis was performed with the Stata® V.14 program.

Results: The sample was distributed by 21.8% men and 78.2% women, due to the characteristics of the students, no differences were found between variables that characterize the population by sex. Significant differences were found with a $p < 0.10$ value between the standardized Pérez Rojas test and the squat movement range, marginally with the result of effort by dynamometer and jump height.

Conclusions: The Pérez-Rojas test used in adults does not correctly discriminate sedentary lifestyle in young adults. This study can lay the foundations for conducting accessible and ergonomic tests that allow prescribing an optimal physical exercise.

Conflict of Interest: There are no conflicts of interest.

Keywords: sedentarism / physical activity / nutrition

P050

GLUTEN-FREE BREAD BASED ON RICE, CORN AND AMARANTH SUITABLE FOR PEOPLE WITH CELIAC DISEASE

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Challenges of nutrition and public health in Ibero-America

Introduction: In Mexico, bread is part of the diet and there are no low-cost gluten-free products on the market with good quality and quantity of protein, the prevalence of celiac disease in varies between 0.7 and 1%.

Objectives: Making bread formulated with a mix of gluten-free flours, with good sensory and nutritional characteristics and a gluten content of less than 20 ppm.

Methods: We used the calculation program to select the best combinations of rice, corn and amaranth flours that met the established criteria for protein content, chemical score and cost per 100 g. The different flours and selected mixtures were characterized by granulometry, moisture and water absorption. The bread was prepared according to the process conditions established in previous studies, and the physical and sensory characteristics were evaluated, then, the gluten content was determined using the Ridascreen gliadin kit (R-Biopharma).

Results: Six different combinations of rice, corn and amaranth, fitting the established criteria, were prepared. The physical characterization of the different flours and their mixtures reported a particle size of less than 0.15 mm and a maximum humidity of 15%. The amount of water needed to form a dough was 45 and 50 mL per 50 g of sample. The

different breads were smooth, had a specific volume of 1.56 to 1.85 cm³ / g; and a humidity greater than 40.0%, similar to gluten-free bread. Pantone 467 U and 7502 U that corresponded to brown color. For the sensory analysis, we quantified the degree of liking of the different breads, where thirty regular consumers of this product participated. The results of the sensory evaluation showed non-significant differences in the degree of preference ($P=0.096$). However, an Ancova analysis showed that the degree of liking of the formulations was significantly influenced by age and gender ($P < 0.05$). The bread with the highest degree of acceptance contained less than 20 ppm of gluten that meets the maximum gluten content allowed for gluten-free products established by the FDA.

Conclusions: We developed a bread formulated with rice, corn and amaranth flour with good nutritional quality and acceptability, suitable for people with celiac disease.

Conflicts of interest: The authors declare no conflict of interest.

Keywords: bread/ gluten free/ amaranth/ protein.

P051

ABSENCE OF DIFFERENCE IN HYDRATATION STATUS BETWEEN LACTATING AND NO LACTATING WOMEN ASSESSED BY BIOELECTRIC IMPEDANCE (BIA) IN THE WESTERN HIGHLANDS OF GUATEMALA

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Challenges of nutrition and public health in Ibero-America

Introduction: During breastfeeding the liquids intakes demand to maintain an adequate hydration state increase (EFSA 2010). According to previous observations from CeSSIAM not published yet, urinary parameters of hydration status suggest better hydration in no lactating women in tropical settings from Guatemala.

Objective: To comparison of the state of hydration between lactating and no lactating women assessed by BIA in the western highlands of Guatemala.

Methods: The study was conducted in two arms approved by CeSSIAM's human studies committee. The hydration degree was evaluated by means of extracellular water (ECW) and total body water (TBW) using BIA from Medical Body Composition Analyzer SECA®525. The first arm included 40 lactating women, and the second arm a total of 80 non-lactating women. The hydration percentage was calculated using the formula $ECW / (TBW - ECW) * 100$ (Software version 1.0SECA525®). The parameter for euhydration was $\geq 73.2\%$ and $< 73.2\%$ for hypohydration. A t-test for independent samples was used to determine differences.

Results: Median age in years was 24 ± 5 (range:16-37) for 40 lactating women and 36 ± 12 (range:18-66) for the 80 non lactating women ($p=0.000$). The median, standard deviation,

range and hypohydration % for lactating women were 75.9±5.8; (55-85; 20%), and for non-lactating women 75.8±7 (55-94; 34%), (p= 0.931). Taking into account only the 45 non-lactating women data in the age range of <38 years the results were 74.2±5.7 (55-85; 42%), (p=0.161). No differences among both women groups were found.

Conclusion: Using BIA, breastfeeding does not have a significant influence in the hydration status in warm temperatures for this population.

Keywords: hydration/ BIA/ lactating women/ Guatemala

P052

FACTORS ASSOCIATED WITH CONSUMPTION OF FIBERS IN CHILDREN WITH FEEDING DIFFICULTIES

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Challenges of nutrition and public health in Ibero-America

Introduction: Children with feeding difficulties (FD) may have low fiber intake, because in most cases, they have a restricted diet.

Objectives: To evaluate possible factors related to fiber consumption (total, soluble, insoluble and pectin) in children with FD. Factors such as the FD type, breastfeeding, parental education, parental styles, characteristics of eating at home, and constipation.

Methods: We analyzed the medical records of 194 patients diagnosed with FD of both sexes treated at the Feeding Difficulties Center in São Paulo, Brazil. To evaluate fiber consumption according to the factors mentioned (the FD type, breastfeeding, parental education, parental styles, characteristics of eating at home, and constipation), the statistical tests Mann-Whitney and Kruskal-Wallis (p <0.05) were used.

Results: The average age was 48.2 months, and the majority were male (64.4%), without associated organic disease (56.2%), and diagnosed with food selectivity (58.2%). Only 56.2% of the sample reached the fiber consumption recommendation. No statistically significant associations were found between fiber consumption and the variables studied, with the exception of the correlation between total breastfeeding time and fiber consumption. There was a strong and inverse correlation between the total breastfeeding time and the total consumption of fiber (r = -0.60) and of insoluble fiber (r = -0.61), which shows that the longer the total breastfeeding time, the lower the total fiber and the insoluble fiber intake.

Conclusions: There was no association between fiber intake and the FD type, parental education, parental styles, characteristics of eating at home, and constipation. There was an inverse correlation between total breastfeeding time and fiber consumption. Therefore, excessive consumption of liquid with low contribution of solid and semi-solid foods can reduce fiber intake.

Conflict of Interest: The authors declare no conflict of interest.

Keywords: feeding difficulties/ dietary fiber/ infant feeding.

P053

PREVALENCE AND DISPARITIES OF FOLATE AND VITAMIN B12 DEFICIENCY AMONG PRESCHOOL CHILDREN IN GUATEMALA, 2009–2010

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Challenges of nutrition and public health in Ibero-America

Background and Objective: Folate and vitamin B12 (B12) deficiencies can impair proper growth and brain development in children. Data on the folate and vitamin B12 status of children 6-59 months of age in Guatemala are scarce; knowledge about the distribution of these micronutrients is needed for national and regional policymakers.

Objective To describe national and regional post-fortification folate and vitamin B12 status of children 6-59 months in Guatemala.

Methods: A multistage, cluster probability study was carried out in 2009-2010 with national and regional representation of children 6–59 months. Demographic and health information, and blood samples for serum, red blood cell (RBC) folate and B12 were collected and analyzed for 1,245 preschool children. Prevalence ratios of folate, vitamin B12 were estimated comparing subpopulations of interest.

Results: National prevalence estimates of serum and RBC folate deficiency were 0.9% [95% CI 0.5, 1.7] and 33.5% [95% CI 29.1, 38.3], respectively. The prevalences of B12 deficiency and marginal deficiency were 22.5% [95% CI 18.2, 27.5] and 27.5% [95% CI 23.7, 31.7], respectively. The prevalence of RBC folate deficiency showed wide variation by age (27.2%-46.8%) –significantly higher among children 6-11 months and 12-23 months (46.6% and 37.0% respectively), compared to children 48-59 months (20.3%; p<0.001) – geographic region (27.2%-44.3%), and wealth index (22.6%-42.0%). The prevalence of B12 deficiency also varied widely among geographic regions (14.2%-49.4%).

Conclusions: Our study revealed a high prevalence of RBC folate and B12 deficiencies in children aged 6–59 months in Guatemala and remain a public health concern. Younger children and children from the poorest households were more likely to present with folate and vitamin B12 deficiency. These findings suggest that Guatemala's children might be impaired from proper growth and brain development and the fortification program might address these gaps in coverage.

Conflicts of interest: None

Keywords: Folate deficiency, vitamin B12 deficiency, preschool children, growth

P054

FOOD AND NUTRITION ASSISTANCE TEAMS MEMBERS' EXPERIENCES IN EMERGENCY SITUATIONS. THE HIDROITUANGO, COLOMBIA, CASE

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Challenges of nutrition and public health in Ibero-America

Introduction: In 2010, Colombia began the construction of the largest energy generation project ever built in the country: the "Hidroeléctrica Ituango" (Ituango Hydroelectric Project). This dam is located in the north of Antioquia and is built on the Cauca River. The project was expected to become operational by 2018, but in April of that year, a landslide blocked a diversion tunnel. These events posed a flood and landslide threat; therefore, the authorities declared a state of emergency, and the inhabitants of the neighboring communities were evacuated. Approximately one hundred thirty thousand people were affected, so the required disaster assistance protocols were activated by different national bodies like the Unidad Nacional de Gestión del Riesgo y Desastres (National Unit for Risk and Disaster Management), other regional bodies, and the company in charge of the project.

Objectives: To identify the perceptions about food and nutrition assistance in the context of the Hidroituango dam crisis, based on the lived experiences of the assistance teams members.

Methods: This study is a qualitative case study. Semi-structured interviews with people from different organizations and assistance teams that participated in food and nutrition assistance programs with affected communities were conducted. The data was run through ATLAS.ti 8.0 for analysis based on defined categories and other emerging ones.

Results: The following twelve main categories were defined to conduct this study: assistance process, assistance types, assistance distribution, community training, vulnerable population, food production, food consumption spaces, experience perception, issues to be improved, and sanitation. Professionals declared that, in Colombia, there is a general lack of preparation to face any sudden emergency. They also recognize the importance of involving the community in all the stages of the assistance process, and the importance of knowing well the nutritional needs and food culture for creating and differentiating the menus. Once the emergency has passed, it is necessary to strengthen the return support and the restoration of the community's daily activities to reinforce food security and autonomy.

Conclusions: Protocols have essential information, but they neither take into account the community context nor the accompanying dynamic. People who deal with emergency situations get emotionally and physically exhausted during their work. These circumstances should be taken into consideration to improve the community assistance process; and minimize setbacks, diseases, and fatigue.

Conflict of Interest: The authors declare that there is no conflict of interest that could be perceived as prejudicing the impartiality of the research reported.

Keywords: Emergency feeding/ food assistance/ food services/ risk management.

P055

STANDARDIZATION OF LOCAL UTENSILS FOR FOOD PORTION SIZE ESTIMATION IN A CITY FROM ECUADORIAN ANDES

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Challenges of nutrition and public health in Ibero-America

Introduction: Estimation of food portion size, is an essential item of an accurate nutritional evaluation, whether in individuals or populations. To select an adequate tool for estimate food quantity consumed should be according to common local resources used on the population studied. Nowadays, in Cuenca-Ecuador, there's not an objective tool to get food quantity intake.

Objectives: The objective of this work is to standardized local utensils as instruments for food portion size estimation in Cuenca-Ecuador.

Methods: Based on the criteria of experts, common local recipes were selected and classified by their consistency in a) liquids, represented by water; b) semiliquid, constituted by cauliflower soup and oats beverage; c) soft solid, represented by cooked rice; and d) dense solid, constituted by jelly. Local representative utensils were used to measure the mass, volume, and density of each item classified. These measurements were performed according to food consistency and the most common cookware where the food is served. Each cookware was marked until the conventionally considered capacity. To obtain the mass, the served food was weighed in grams on a digital scale. The volume of liquids and semiliquids was got by placing the amount of food in the utensil into a volumetric test tube and was listed in milliliters. To measure the volume of solids, the Archimedes' principle was applied. Finally, to obtain the food density, the formula where the density is equal to mass over volume was used.

Results: A total of 24 utensils were part of local standardized kits, including plates, spoons, mugs, cups, and glasses with different diameters. The mass, volume, and density of 24 utensils for liquid foods were obtained, as well as of 19 utensils for semiliquids, and of 14 utensils for soft or dense solids.

Conclusions: Local representative utensils were standardized in order to help healthcare professionals to improve the accuracy of food intake estimation in any dietary evaluation method and work in sustainable politics that

consider the standardization method as part of the evaluation per population.

Conflict of Interest: The authors declare no conflicts of interest related to this work.

Keywords: Nutritional assessment / standardization / food

P056

SUSTAINABLE FOOD: DIVERSE DIET AND RESPONSIBLE CONSUMPTION PRACTICES, IN ALTERNATIVE CONSUMERS IN COLOMBIA: COMPARATIVE STUDY OF FIVE CITIES - ARMENIA, BOGOTÁ, MEDELLÍN, MANIZALES AND PEREIRA

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Safe, healthful and sustainable food

Introduction. Food sustainability aims to ensure that food consumption does not affect the balance of the environment by increasing the Carbon footprint or the loss of biodiversity; nor does it aim to affect the economy of the actors immersed in the food system.

Objective. Analyze the sustainable eating practices of regular consumers by the alternative model of food distribution in the cities of Armenia, Bogotá, Medellín, Manizales and Pereira.

Methods: Through qualitative and quantitative information based on surveys of individuals and certain groups, the diversity in the consumers diet, their consumption practices and the consumption, the management of food, organic waste and the use of plastic, was analysed from a perspective of sustainability are disclosed.

Results. The diversity of the diet of the study participants was evaluated as low, medium or high, with Medellín being the city where the majority consumed a diverse diet, followed by Bogotá and Pereira. Consumers prefer a diverse diet, that does not compromise the consumption of food, and one that contains Vitamin A and D as nutrients of interest. It is found that responsible consumption practices are not common due to different factors such as: compromised or imprecise information that motivates the selection of foods with health properties; economic limitation for other people to access, preventing equitable development of responsible consumption practices motivated in these aspects; generation of food waste in food groups of interest (to a greater extent: fruits, vegetables and cereals); frequent use of single-use plastics; and inadequate waste management.

Conclusions. The eating pattern in relation to dietary diversity contributes to the consumption of food sources of Vitamin A and D. Despite the identification of a wide and free

intention to have a sustainable diet and responsible consumption practices, these occur in a limited way.

Conflicts of interest. The Authors declares that there is no conflict of interest.

Keywords: Food security / Responsible consumption / Sustainable diet / Food waste / Waste management.

P057

NUTRIENT VALUE IN DANDELION FLOWER (*Taraxacum officinale*)

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Safe, healthful and sustainable food

Introduction: The study of the flower of the plant Dandelion is framed in the clinical aspect and mainly in attention to different symptoms in man, also in certain regions of Mexico is used as alternative food, In this regard, there is no information to support the nutritional quality of plant structures as a source of food.

Objectives: The aim of the study was to investigate the macronutrient content of the Dandelion flower as a food supplement.

Methods: The work was carried out in two phases, the first, in summer 2017 in the Ecological Park of the town hall Xochimilco, CDMX, Mexico. The sampling of floral buttons was carried out under a targeted sampling. In the second phase, the botanical classification and the proximal chemical analysis were carried out on a dry basis based on the techniques of AOAC 1995 to quantify of the nutritional content.

Results: The botanical description of the plant indicates that this Asteraceae corresponds to the genus *Taraxacum* species *officinale*. The percentages obtained expressed values of humidity 83.33%, dry matter 16.67%, protein 0.02%, inorganic matter 16.67%, lipids 2.1%, fiber 3.22% and soluble carbohydrates 77.99%. On base of the content the mineral were quantified Iron 36 mg/100g; calcio 187 mg/100g; phosphorus 66 mg/100g; potassium 397 mg/100g; and sodium 76 mg/100g. The percentage of proteins was almost nil, however, it presents high percentage in minerals, in which iron is listed as a favorable option to fight its deficiency in protein and avoid anemia, serious problem with severe consequences on health.

Conclusions: It is considered a wild herb, which spreads easily can be used in both rural and urban communities.

Keywords: Food / Dandelion flower / Minerals / Nutrition

P058

EXTRACTION AND ENRICHMENT OF γ -ORYZANOL FROM RICE BRAN FOR HUMAN HEALTH

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Safe, healthful and sustainable food

Introduction: Rice bran (RB) is a byproduct that is obtained from the rice polishing process. It represents 7 to 8% of the weight of the whole grain. It contains about 20% of lipids, in this fraction there is a high concentration of biologically active substances, including γ -oryzanol, which has been tested for hypocholesterolemic, antioxidant activity and has also been attributed activity as a regulator of glucose metabolism. In the purification or isolation of γ -oryzanol, the main problem is to separate it from the unsaponifiable fraction of the oil, since certain components that are naturally found in it can act as impurities that interfere with the separation process.

Objective: The work objective was to extract and isolate γ -oryzanol from rice bran oil for possible use in functional foods.

Methods: The work was divided into 5 stages: RB oil extraction by means of soxhlet techniques, accelerated solvent extraction (ASE) and supercritical fluid extraction (SFE); γ -oryzanol isolation by chemical semi-refinement; determination by UV spectrophotometry of the amount and yield of γ -oryzanol and the identification of the best γ -oryzanol extraction technique.

Results: The oil extraction yields for the 3 techniques were 21.6%, for soxhlet, 18.7% for ASE and 13% for SFE, with statistically significant differences between them ($p < 0.05$). From the semi-refining process, 4 fractions were obtained: fraction of gums, waxes, oil and soaps, in the latter the highest amount of γ -oryzanol ($836.8 \pm 12.8 \mu\text{g} / \text{g}$) was found and was statistically significant ($p < 0.05$) to the others. With the ASE technique, the highest yield was obtained in the extraction of γ -oryzanol, compared ($p < 0.05$) with the extraction by soxhlet and SFE, using the 50/50 iso-propanol/hexane ratio.

Conclusions: According to the results, the ASE technique was the best for the extraction of γ -oryzanol oil considering the time taken and the solvent invested.

Conflict of interest: There is no conflict of interest.

Keywords: γ -oryzanol / Rice bran

P060

CHARACTERIZATION OF PHYTOCHEMISTRY OF GERMINATES OF FAVA BEAN (*VICIA FABA* L.)

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Safe, healthful and sustainable food

Introduction: Legumes are part of the *Fabaceae* or *Leguminosae* family, which have the characteristic that their seeds grow inside a pod. These seeds have a high content of nutrients and phenolic compounds, which would present diverse beneficial effects in the body. Worldwide, one of the most cultivated legumes is the fava bean (*Vicia faba* L.). Scientific studies with fava bean show that it has a high content of phenolic compounds, mainly flavonoids, so they propose its use as a possible treatment for noncommunicable diseases such as obesity or diabetes. Additionally, germination in legumes is a natural, economic, effective, and sustainable process, and it would increase the concentration of bioactive compounds up to one hundred times.

Objetives: Quantificate the phenolic compounds on different fava bean germination days.

Methods: The bean seeds were disinfected and kept moist and in the dark for six days (Bolívar A. Cevallos-Casals, 2010). Methanol extracts and acetone: acidified water extracts were according to (Jimenez-Escrig, 2001), analyzing total phenolic compounds and antioxidant capacity by the DPPH method, as well as the quantification of phenolic compounds according to (K. Thaipong, 2006) with modifications by López-Contreras et al. (2015). The standards used were caffeic acid, gallic acid, quercetin, myricetin, and luteolin.

Results: Total polyphenols: on day 6 he presented twice as much control (1697.12 mgEAG/L vs 793.27 mgEAG/L). DPPH: there was no significant difference ($p < 0.05$) compared to 6 days (average value: 698.50 Trolox microME). Quantification: the amount of gallic acid was significantly increased ($p < 0.05$) over time, quercetin remained without significant change and within reported values.

Conclusions: The amount of total polyphenols was increased, with gallic acid being the most present. However, the diversity of compounds present and their biological effect need to be explored.

Conflict of Interest: No conflict of interest.

Keywords: Fava bean / sustainable food / functional food.

P061

VALIDATION AND CONCORDANCE OF A FOOD FREQUENCY QUESTIONNAIRE TO DETERMINE NON-CALORIC SWEETENERS INTAKE AMONG PREGNANT WOMEN IN SANTIAGO, CHILE

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Safe, healthful and sustainable food

Introduction: In Chile, more than 60% of women in childbearing age have excess weight and have increased their Non-Caloric Sweeteners (NCSs) intake during key periods such as pregnancy and breastfeeding. Previously, the NCSs intake has been associated with preterm delivery and probably with higher weight gain during the first year in their offspring. In addition, this intake has been favored due to the steady and rapid increase of NCSs available in the Chilean market.

Objectives: to assess the validity and the concordance of a Food Frequency Questionnaire (FFQ) against the average of three-day dietary records (3-DR) to determine daily NCSs intake among pregnant women in Santiago, Chile.

Methods: Trained personal identified the presence of sucralose, saccharin, acesulfame-K, cyclamate, steviol glycosides and aspartame in dairy products, cereals, beverages, canned fruits, sweets and desserts available in 19 supermarkets from Santiago. A database and a photographic atlas were developed with 815 products to characterize the NCSs in terms of identity and concentration per portion and per 100 grams. The study included 45 pregnant women, 29 of them completed both the FFQ and the 3-DR. Spearman correlation, Lin's concordance correlation coefficient (CCC) and the Bland-Altman plots were used to assess the validity and concordance.

Results: The median age was 31.2 years [25th- 75th percentile: 26.9-34.7 years] and 65.5% had college studies. The NCSs most frequently consumed were sucralose, steviol glycosides and acesulfame K. There was a moderate correlation between both methods FFQ and 3-DR ($\rho=0.62$). While the CCC was better for aspartame, acesulfame-K and saccharin.

Conclusions: An FFQ of NCSs was successfully validated among pregnant women. The use of this FFQ will allow to scale-up the knowledge about NCSs intake during pregnancy and to determine the impact of such consumption during the first year of their offspring.

Conflict of Interest: The author(s) declare(s) that there is no conflict of interest regarding the publication. Financed by FONIS-SA18I0062, CONICYT Chile.

Keywords: non-caloric sweeteners/ food frequency questionnaire/ validity/ food labeling/ pregnancy/ obesity

P062

IMPACT OF THE QUALITY AND HEALTH OF SOIL IN THE NUTRITIONAL CONTENT OF FRUITS OF XOCONOSTLE *Opuntia joconostle* cv. Burro

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Safe, healthful and sustainable food

Introduction: The xoconostle is native to the high plateau of Mexico. Genetic diversity is concentrated in high valleys, arid and semi-arid zones. In Mexico there are 21 species of acidic fruits with alimentary and nutritional character, of these *O. joconostle* cv Burro presents quality parameters used in the culinary gastronomy of Mexico. However, the impact of the nutritional content of the fruits on the site of origin is unknown.

Objective: The aim of this research was to determine the impact of soil quality and health on the nutritional content of fruits of xoconostle *O. joconostle* cv. Burro cultivated and wild of Hidalgo state. The studio was in Chapantongo and Huichapan.

Methods: By site and randomly took five sampling points, 10 plants/diameter 25m² were selected. Each plant was taken 5 fruits (250 fruits per site) pink (harvest index). The quality parameters were Proximal Chemical Analysis, pH, °Brix and fruit weight. In the soils were determined texture, colour, porosity, bulk density and real density. Also Cation Exchange Capacity, Electric Conductivity, pH and Organic material. The results were analyzed with the JMP program using a random experimental design, the differences between the means were tested with an ANOVA and the comparison of means with the Tukey test with a level of significance of $p<0.05$.

Results: By site, significant differences were observed in Brix, fruit weight, protein, ethereal extract, minerals and raw fibre. In the wild fruits of Chapantongo, significant differences were observed in sugar content (6.65%), pH (3.19), fruit weight (94.28g), protein (6.14%), ethereal extract (3.47%) and raw fiber (29.31%). However, the fruits cultivated in Huichapan showed lower values in sugar content (5.41), fruit weight (67.38g) and protein (3.39%). The soils in the two sites were sandy-loam, brown-grey color with pH moderately acidic to neutral (5.20-6.03). In Chapantongo soils had greater porosity (58.51%), bulk density (0.95g/cm³) and Cation Exchange Capacity (5.28 cMol). Huichapan soils with lower porosity (55.31%), bulk density (1.06g/cm³) and higher Cation Exchange Capacity (7.92 cMol).

Conclusions: The soil quality and health impact on the nutritional content of the fruits of xoconostle wild *O. joconostle* cv. Burro.

Conflict of Interest: The cultivated xoconostle fruits presented lower physicochemical quality.

Keywords: nutritional content / quality / xoconostle / soil

P063

APPLICATION OF THE PHOTOVOICE METHOD TO PROMOTE PARTNERSHIPS AND ENGAGEMENT WITH THE COMMUNITY IN A SLUM IN PAKISTAN

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Challenges for an effective and efficient public-private partnership in food and nutrition

Introduction: Photovoice is a community-based participatory action research method that aims to involve community members in the research process to produce meaningful data for the community and ultimately cause social transformation (action).

Objectives: This project main objective is to understand malnutrition and potential causes among schooled adolescents living in a slum in Karachi (Pakistan) using photovoice.

Methods: Photovoice places cameras in the hand of the community so that their worldviews and feelings can be expressed. The process of photovoice involves participants' photo production, reflection and collective interpretation of the images, and dissemination of the findings aimed to cause social change. In this photovoice project, disposable cameras will be given to 20 adolescents aged between 10 to 19 years who live in a slum in Karachi. To effectively carry out this project, the research team will need to gain access to the school through community leaders and develop a research consensus with the collaborating community which will allow partnership and engagement. At this first stage, it is important to consider and minimize the power imbalances between the research team and the collaborating community. In this collaborative and participative project, the participants will become co-researchers, so the distinction between researchers and participants will be minimized.

Results: Since community-based participatory action research principles will underpin this photovoice project, the research team is expected to build partnerships with the community before undertaking any research-related action. The research team will ensure collaboration firstly with community leaders, and secondly with the school team in order to gain access to the target population. We expect that local authorities and community leaders will facilitate access, social change, and knowledge dissemination. However, we could face unwillingness to cooperate and engage with the project, which may block the research project.

Conclusions: This study will make a unique contribution to the evidence on adolescents living in slums by using the unique method of photovoice to understand malnutrition and potential causes. It will also explore ways for community partnership and engagement with research.

Conflict of Interest: None.

Keywords: Photovoice / partnership / malnutrition / adolescents / slum.

P064

POTENTIALITIES AND CHARACTERISTICS OF QUINOA (CHENOPODIUM QUINOA WILLD.) VALUE CHAIN IN NORTHWEST ARGENTINA

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Challenges for an effective and efficient public-private partnership in food and nutrition

Introduction: Jujuy is a province located in the Andean Region of Argentina. In pre-Inca times its inhabitants consumed quinoa as a rich source of energy and protein. However, in the mid-20th century only few families produce and consumed it. In last decades, the implementation of promotion policies improved its commercial cultivation -by replication of regional models of associativism- but without adding value in the production chain. On the other hand, the National University of Jujuy (UNJu), has a food development laboratory, where quinoa is one of the main crops studied. Although food innovation is a way to add value, a comprehensive analysis is required to address cross-cutting strategies compatible with the traditions of the region and feasible to be implemented locally.

Objectives: The objective of the work was to analyze the articulation between government policies to promote the cultivation of quinoa, the dynamics of associativism among local producers and the scientific and technological academic innovations for adding value locally, as a strategy to enhance regional economies.

Methods: For this, information searches were carried out in databases of public organizations (INTA, INDEC, Ministry of Popular Economy), interviews with independent producers and associates in cooperatives and a survey of food developed at UNJu in the last 10 years.

Results: Results found indicate that the main drawbacks of the current state of the situation are the disjointed work among all the actors involved in the productive framework -producers, government and academy- and the lack of coordination and available information, necessary for the definition of strategic policies. Among the relevant experiences, a local enterprise stands out -supported by the government through microcredits- that produce energy bars, nutritionally formulated at UNJu and made with regional agro-ecological quinoa.

Conclusions: In conclusion, this success story of a product originated at the University, industrially scaled at origin, commercialized in the national market and close to be exported, demonstrates the potential of scientific-technological convergence with the support of political policies as the key of adding value in quinoa chain.

Conflict of Interest: none

Keywords: Quinoa value chain/ associativism/ energy bars/ regional economies

P065

ADIPOSIY TRAJECTORIES IN MEXICAN CHILDREN AND THEIR EARLY DETERMINANTS. A PROSPECTIVE BIRTH COHORT STUDY

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Adiposity trajectories (AT) in childhood have been little studied, and there is lack of evidence on the factors associated with the trajectories that lead to obesity.

Objective: Identify Mexican children AT in 0-10 years old, and their associated determinants.

Methods: Information from 286 children in the "POSGRAD" cohort was analyzed with complete data on 8 measurements from 0 to 10 years of BMI Z score. AT were identified by sex, through latent class growth mixed models. Association of AT with maternal and child factors was studied through logistic and multinomial regression models.

Results: Two trajectories in boys (high and low) and three trajectories in girls (high, moderate, and low) were identified. For boys, factors associated with high AT compared to low AT were: primigravida (OR, 2.65; 95% CI: 1.00, 6.99, $p = 0.05$), high maternal BMI (OR, 1.24; 95% CI: 1.10, 1.39, $p < 0.001$), abnormal birth weight (OR, 3.21; 95% CI: 1.02, 10.16, $p < 0.05$), none breastfeeding (OR, 6.26; 95% CI: 1.61, 24.30, $p < 0.001$) and C-DII proinflammatory cluster (OR, 3.93; 95% CI: 1.52, 10.15, $p < 0.01$). For girls, high maternal BMI with high AT (OR, 1.30; 1.09, 1.54, $p < 0.001$) and moderate (OR, 1.25; 95% CI: 1.07, 1.47, $p < 0.001$); highest maternal schooling with moderate AT (OR, 1.17; 95% CI: 1.00, 1.37, $p = 0.05$) and more time screen with high AT (OR, 5.45; 95% CI: 1.63, 18.26, $p < 0.01$) and moderate (OR, 3.52; 95% CI: 1.21, 10.20, $p < 0.05$).

Conclusions: Different AT were assessed by sex as well as their associated determinants. Additional studies are required to understand these differences. A high maternal BMI during pregnancy was the unique predictor associated with high AT in both sexes, this suggest that adequate weight control during pregnancy reduces the risk of obesity in childhood.

Conflict of Interest: None

Keywords: Adiposity trajectories / early determinants / childhood / latent class growth mixed models

P066

FOLIC ACID SUPPLEMENTATED AND DEFICIENT DIET CAN ALTER *TNF- α* GENE EXPRESSION

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Changes in epigenetic patterns have been proposed as an important cause of the development of autoimmunity by regulating the expression of pro-inflammatory cytokines, such as tumor necrosis factor alpha (*TNF- α*). Increased production of these cytokines may lead to bigger risk of autoimmune diseases and may accelerate the pathogenesis/ activity of the established disease.

Objectives: This study aimed to investigate the pattern of *TNF- α* gene expression in offspring of rats submitted to folic acid deficient and supplemented diets.

Methods: The study involved females pups Wistar ($n = 20$) that were weaned at the same diet of their mothers for 13 weeks. The animals were divided in three treatment groups: control group (2,0 mg/kg of folic acid), deficient group (0,5 mg/kg of folic acid) and the supplemented group (8,0 mg/kg of folic acid). During the intervention period, the weight and food intake were measured three times a week. At the end of treatment, the pups were euthanized and liver samples were collected from which mRNA was extracted to perform *TNF- α* (Rn99999017_m1) gene expression analysis by real-time PCR on the 7500 Fast Thermocycler (Applied Biosystem®).

Results: After interventions, female offspring from the folic acid-supplemented diet group weighed ($p = 0.04$) and consumed ($p = 0.008$) significantly more than the control group. *TNF- α* gene expression was significantly higher in offspring of the supplemented ($p = 0.02$) and deficient ($p=0.01$) folic acid group compared with the control group.

Conclusions: Folic acid supplementation and deficient diet was able to alter *TNF- α* gene expression. Thus, it is suggested that the amount of folic acid in the diet should be adequate to prevent the increase of inflammatory cytokines that predispose the risk to several diseases, such as autoimmune diseases.

Conflict of Interest: All authors declare no conflict of interest.

Keywords: folic acid / tumor necrosis factor alpha / autoimmune disease

P067

EFFECT OF HEMODIALYSIS AND TOTAL BODY WATER PERCENTAGE ON CENTRAL AORTIC BLOOD PRESSURE AND ITS DERIVATIVES IN PATIENTS WITH CHRONIC KIDNEY DISEASE

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Nutrition in the prevention and treatment of chronic diseases

Introduction: There is evidence of a relationship between arterial stiffness and high blood pressure in patients with End Stage Renal Disease (ESRD) undergoing hemodialysis. Any isolated or combined alteration is a predictor of cardiovascular disease. The hemodynamic state of the patient is modified by the loss of body fluids.

Objectives: The aim is to study the association between these independent factors, which could help the treatment and prevention of complications, in order to improve the evolution of the chronic degenerative disease.

Methods: Prospective and analytical cross-sectional study. Patients on Hemodialysis for ≥ 3 months, with ESRD of any etiology, who attended from February-August 2019 for hemodialysis. After signing a consent form, Central Aortic Blood Pressure (CBP) and its derivatives, Pulse Wave Velocity (PWV) and Augmentation Index (AiX) were taken by non-invasive oscillometric method, using a standardized technique, with TensioMed Arteriograph® equipment, 15 minutes before (1) and 15 minutes after (2) the hemodialysis. The percentage of total body water (TBW) loss was calculated by the body segmental electrical bioimpedance technique, before (1) and after (2) the hemodialysis, with a standardized technique.

Results: 25 patients, 18 men and 7 women, with an average age of 62.3 ± 15.4 years. T test of paired samples: CBP1 170.7 ± 37.4 , CBP2 154.3 ± 36.4 ($p=0.02$); AiX1 45.1 ± 12.76 , AiX2 34.0 ± 17.6 ($p=0.002$); PWV1 10.0 ± 1.7 , PWV2 10.7 ± 2.0 ($p=0.03$); TBW1 52.6 ± 8.22 , TBW2 51.1 ± 8.49 ($p=0.01$). We analyze the correlation (r , Spearman) between the variables, only the significant one is shown TBW%/CBP $r=.494^*$ $p=0.012$.

Conclusions: There is a statistically significant difference in CBP and its derivatives when comparing pre and post-hemodialysis values with improvement in all variables studied, including % loss of TBW. It is observed that this loss correlates with the decrease in CBP and not the other variables, suggesting that both arterial stiffness and arterial compliance are independent of the patient's hemodynamic status, so it should be taken into account when prescribing hypertensive treatment.

Conflict of Interest: The authors declare no conflict of interest in this project.

Keywords: Central Aortic Blood Pressure / Hemodialysis / Total Body Water / Blood Pressure / Arterial Stiffness.

P068

SARCOPENIA IN PATIENTS UNDERGOING DIALYSIS: PREVALENCE AND ASSOCIATION WITH FUNCTIONAL CAPACITY

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Patients with chronic kidney disease (CKD) on dialysis may be affected by sarcopenia, which is a chronic condition that is characterized by a reduction of muscle mass, strength, and physical performance, and it is associated with increased morbidity and mortality.

Objectives: To investigate the prevalence of sarcopenia in patients with CKD undergoing dialysis according to update of the European Working Group on Sarcopenia in Older People (EWGSOP) and, its association with functional capacity (FC).

Methods: Fifty-three dialysis patients (75.5% men) aged 70.1 ± 8.5 participated in this study. Body composition was measured by bioelectrical impedance (BCM, Fresenius Medical Care). Muscle strength and physical performance were evaluated by handgrip strength (kg) and 6-minute walk test (m), respectively. FC was evaluated using 3 validated tests: the chair stand test (time/10 rep.) and the timed chair stand test (repetitions/30 and 60 seconds). The EWGSOP defines sarcopenia as the presence of both low muscle strength (LMS) and low muscle mass (LMM), and severe sarcopenia as the presence of sarcopenia plus low physical performance (LPP).

Results: According to the EWGSOP criteria, the 35.8% of the sample presented LMS (handgrip strength < 27 kg < 16 kg, men and women respectively) and 17% showed LMM (considering normal values > 8.61 kg m^{-2} in men and > 6.19 kg m^{-2} in women, according to Spanish reference values). Low LPP was observed in 71.7% of patients (less than 400 meters in 6 min). A total of 13.2% of participants presented severe sarcopenia. Deterioration of FC was significantly associated with sarcopenic stage, and with sarcopenic dialysis patients obtaining lower levels of FC compared with no sarcopenic patients ($p < 0.05$), except for the chair stand test ($p > 0.05$). No differences were found between FC and sex.

Conclusions: The prevalence of sarcopenia was 13.2% according to cut points and references used. Dialysis patients

with severe sarcopenia have a significantly lower level of FC, which may have a negative influence on quality of life and carrying out activities of daily living. Sex differences disappear with increasing levels of sarcopenia.

Conflicts of interest: No conflict of interest was declared.

Keywords: Sarcopenia / dialysis / physical performance / functional capacity.

P069

ADENOVIRUS 36 INCREASED KILOCALORIE AND LIPID CONSUMPTION INTAKE IN A CROSS-SECTIONAL STUDY ON INDIVIDUALS FROM WESTERN MEXICO

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Adenovirus 36 (Ad-36) is associated with the development of overweight and obesity in humans. Most of the research on Ad-36 focuses on the process by which the accumulation of lipids in adipocytes is favored, but there are very few studies aimed at evaluating the effect of the virus on dietary intake.

Objective: To determine the association of Ad-36 on food consumption in healthy and overweight subjects.

Methods: A cross-sectional study included 174 subjects that were recruited from the medical school and nutrition clinics of the Centro Universitario del SUR (CUSUR) in Western Mexico, all of whom answered the semi-quantitative food frequency questionnaire (SFFQ) to assess their eating habits. Their body mass index (BMI) was determined and a blood sample was taken to identify Ad-36, using the ELISA technique. Finally, the participants were classified according to their BMI and the presence of Ad-36, the statistical analysis was performed with t-test or U-test.

Results: Of the 174 subjects included, 52.3% had a BMI ≥ 25 kg/m² and 47.7% had a BMI < 25 kg/m². Additionally, 17.2% of the population was positive for Ad-36 antibodies (Ad-36 +), whereas 82.8% was negative for Ad-36 (Ad-36 -). When the study groups were compared, the Ad-36(+) subjects were found to have a higher BMI than the Ad-36(-) individuals (28.13 kg/m² vs 25.7 kg/m², $p = 0.014$). There was an increase in the consumption of kilocalories (2861.66 kcal vs 2182.40 kcal, $p = 0.018$) and lipids (95.33g vs 73.67g, $p = 0.002$) in individuals with a BMI < 25 kg/m² Ad-36(+), as well. However, in subjects with a BMI ≥ 25 kg/m² there were no significant differences in their food intake.

Conclusions: The presence of Ad-36 was associated with an increase in caloric intake and lipid intake in subjects with a BMI < 25 kg/m², but not in the group with a BMI ≥ 25 kg/m².

Conflicts of interest: the authors declare no conflict of interest.

Keywords: Adenovirus 36 - SFFQ - obesity.

P070

METABOLIC EFFECT OF INDOL 3 CARBINOL ON ADIPOSITY AND INSULIN RESISTANCE IN RATS WITH HIGH FAT DIET-INDUCED OBESITY

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Obesity (OB) is a disease characterized by increased adipose tissue and hyperinsulinemia associated with the development of insulin resistance (IR) and type 2 diabetes mellitus. The phytochemical Indol 3 carbinol (I3C) is a product of glucosinolates degradation present in vegetables of the cruciferous family Brassica genus, such as broccoli and Brussels sprouts. I3C improves insulin sensitivity and decreases the storage of fatty acids in cultured adipocytes.

Objectives: To assess the effects of I3C on adiposity and IR in an OB model induced by a high-fat diet in rats.

Methods: The study was conducted in male Wistar rats. Eight study groups were formed (n=5 each): one baseline group, three control groups fed high-fat diet (DAG) containing 45.2% fat, for 3, 6 and 9 weeks; three prevention groups that received DAG simultaneously with I3C (250 mg/kg weight, orally) for 3, 6 and 9 weeks; one reversal group that received DAG for 6 weeks and subsequently DAG simultaneously with I3C (250 mg / kg body weight, orally) during 3 additional weeks. Body weight was registered, blood glucose and insulin concentration was determined, IR was estimated using the homeostatic evaluation model (HOMA-IR). After sacrifice, adiposity was calculated by quantifying visceral adipose tissue. Data were analyzed with the Kruskal-Wallis and Mann-Whitney U tests, statistical difference was considered when $p < 0.05$.

Results: Decreased body weight, adiposity, circulating insulin and HOMA-IR were observed in the prevention group (9 weeks DAG + I3C) and in the reversal group (6 weeks DAG plus 3 weeks DAG + I3C).

Conclusions: I3C prevents the development of OB and improves IR through the decrease in weight gain and adiposity.

Conflict of Interest: The authors declare no conflict of interest.

Keywords: Obesity / Insulin resistance / Diabetes Mellitus / phytochemicals

P071

RELATIONSHIP BETWEEN FOODS RICH IN CHOLESTEROL AND SATURATED FATTY ACIDS WITH CARDIOVASCULAR DISEASE. A BRIEF REVIEW

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Nutrition in the prevention and treatment of chronic diseases

Abstract: The elevation of cholesterol and saturated fatty acids in blood, has been and is a serious problem, together with high blood pressure, smoking, lack of physical exercise, overweight, diabetes, and genetic predisposition, are risk factors for coronary heart disease or cardiovascular.

Methods: A review was conducted on the effects that may predominate in the association between foods rich in dietary cholesterol and saturated fatty acids with cardiovascular disease, through the PICO strategy for the construction of the research questions and bibliographic search, following the PRISMA guidelines using a control list of 27 items. The selection criteria were based on the keywords used: cardiovascular disease, dietary cholesterol, saturated fat, milk and derivatives, egg and red meat, the review was carried out in original articles and reviews published between 2009-2019, in languages English and Spanish, where were eliminated, communications to conferences, case reports, "in vitro" studies and animal research. A total of 100 articles were reviewed and a cross-reference search of 31 more articles was performed. The selection process identified 60 works, which met the inclusion criteria established from the beginning.

Results: The results are inconsistent and diverse scientific opinions; some authors are in favor, others against and others more neutral, regarding the consumption of the food sources of these nutrients and the risk of contracting cardiovascular diseases.

Conclusions: It is proposed that the recommendations go beyond the established classifications considering the food from which they are obtained. It is not the same to ingest saturated fatty acids or cholesterol from ultra-processed products than from the natural foods, the composition and effect are different.

Conflict of Interest: The authors of the article declare no conflict of interest.

Keywords: Cardiovascular disease/dietary cholesterol/saturated fat/milk and derivatives/ eggs/ red meat,

P072

EATING BEHAVIOUR: PRACTICE, HABITS AND CONSUME IN CHILDREN AND TEENAGERS BETWEEN FIVE TO FOURTEEN YEARS OLD IN METROPOLITAN AREA OF JALISCO

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Feeding behaviour in childhood and adolescence plays an important role in health status, since inadequate nutrition during these stages can have serious consequences in adulthood (Westenhoefer, 2002).

Objectives: Evaluate eating behaviour: consumption, habits and food practices in participants aged 5 to 14 who come to the university sports complex, where it receives population from the Jalisco metropolitan area.

Methods: descriptive-transversal study shows 119 users, an adaptation of the questionnaire to evaluate the consumption, habits and food practices (Lera 2015) with 29 items, for analysis it was divided into 3 factors, F1. Food practices: items 1 to 6, F2. Eating habits: items 7 to 20 to 29, and F3. Food consumption: items 21 to 24, 27 and 28. For interpreting healthy eating behaviour: F1. ≥ 2 hits, F2. ≥ 4 hits and F3. ≤ 2 hits, total score ≥ 14 hits.

Results: 58% male, 42% female, mean age 8.2 years old of 1.94, 87.3% study elementary school, 15.6% high school. For F1 56% have unhealthy behaviour, for F2 100% healthy behaviour and F3. 90% healthy behaviour, 83% have healthy eating behaviour globally. Regarding sex vs unhealthy behaviour: 64% of males in F1 and 64% female in F3, 68% globally in eating behaviour ($p < 0.05$); according to age group vs unhealthy behaviour: for F1 53% ($p < 0.05$) in the group of 6 and 7 years, 36% in F3 group 8 and 9 years, 27% ($p < 0.05$) for eating behaviour group 6 and 7 years.

Conclusion: The best knowledge of the determinants of eating behaviour in children and teenagers will allow to design more effective intervention strategies, based in nutritional education addressed to the student community, their parents and teachers for the promotion of healthy eating habits and lifestyle.

Conflict of Interest: the authors declare no conflicts of interest

Keywords: Eating behaviour/ habits/ children/ teenagers/

P073

POSSIBLE ROLE OF YOGURT AS FUNCIONAL FOOD IN HEALTHY ADULTS

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Nutrition in the prevention and treatment of chronic diseases

Introduction: The immunomodulatory properties of yogurt have been barely explored in healthy adults, despite being a key target due to the worsening of lifestyle habits.

Methods: Observational study of yogurt consumption habits (by a specific questionnaire) performed in 260 healthy adults (48,4% women), divided in 4 groups: 1) Non-consumers (NC-Y: 0 yogurt/week; n=40); 2) Low consumption (LC: >0-2 yogurt/week; n=41); 3) Medium consumption (MC: 3-4 yogurt/week, n=44); 4) High consumption (HC: ≥ 5 yogurt/week; n=50). Gut microbiota was analysed by 16sRNA gene sequencing (Illumina), intestinal symptoms by a specific questionnaire, and diet by a food frequency questionnaire. Differences among yogurt groups in the gut microbiota and the score of intestinal symptoms were analyzed by Kruskal Wallis with Bonferroni posthoc test, whereas differences in the nutritional profile were evaluated by general linear models, adjusted by BMI and gender.

Results: Yogurt consumption was not related to any specific bacterial group, but higher levels of the yogurt starter *Streptococcus thermophilus* were observed in the HC group compared to NC-Y and LC groups ($P < 0,001$). Men belonging to the HC group showed a lower intestinal symptomatology, as observed in the lower score of global intestinal symptoms ($P = 0,028$ and $P = 0,003$, respectively), and in particular, of flatulence ($P = 0,018$ and $P = 0,036$), as well as a better nutritional profile with a higher intake of fiber in comparison to the NC-Y group ($P = 0,032$) and a lower intake of saturated fat compared to the LC group ($P = 0,025$).

Conclusion: These findings suggest a need of further interventional studies aimed to confirm the possible role of yogurt as functional food for healthy adults.

Conflict of interest: Authors declare no conflict of interest.

Keywords: yogurt / gut microbiota/ healthy adults.

P074

EFFECT OF HEMODIALYSIS AND TOTAL BODY WATER PERCENTAGE ON CENTRAL AORTIC BLOOD PRESSURE AND ITS DERIVATIVES IN PATIENTS WITH CHRONIC KIDNEY DISEASE

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Nutrition in the prevention and treatment of chronic diseases

Introduction: There is evidence of a relationship between arterial stiffness and high blood pressure in patients with End Stage Renal Disease (ESRD) undergoing hemodialysis. Any isolated or combined alteration is a predictor of cardiovascular disease. The hemodynamic state of the patient is modified by the loss of body fluids.

Objectives: The aim is to study the association between these independent factors, which could help the treatment and prevention of complications, in order to improve the evolution of the chronic degenerative disease.

Methods: Prospective and analytical cross-sectional study. Patients on Hemodialysis for ≥ 3 months, with ESRD of any etiology, who attended from February-August 2019 for hemodialysis. After signing a consent form, Central Aortic Blood Pressure (CBP) and its derivatives, Pulse Wave Velocity (PWV) and Augmentation Index (AiX) were taken by non-invasive oscillometric method, using a standardized technique, with TensioMed Arteriograph® equipment, 15 minutes before (1) and 15 minutes after (2) the hemodialysis. The percentage of total body water (TBW) loss was calculated by the body segmental electrical bioimpedance technique, before (1) and after (2) the hemodialysis, with a standardized technique.

Results: 25 patients, 18 men and 7 women, with an average age of 62.3 ± 15.4 years. T test of paired samples: CBP1 170.7 ± 37.4 , CBP2 154.3 ± 36.4 ($p = 0.02$); AiX1 45.1 ± 12.76 , AiX2 34.0 ± 17.6 ($p = 0.002$); PWV1 10.0 ± 1.7 , PWV2 10.7 ± 2.0 ($p = 0.03$); TBW1 52.6 ± 8.22 , TBW2 51.1 ± 8.49 ($p = 0.01$). We analyze the correlation (r , Spearman) between the variables, only the significant one is shown TBW%/CBP $r = 0.494^*$ $p = 0.012$.

Conclusions: There is a statistically significant difference in CBP and its derivatives when comparing pre and post-hemodialysis values with improvement in all variables studied, including % loss of TBW. It is observed that this loss correlates with the decrease in CBP and not the other variables, suggesting that both arterial stiffness and arterial compliance are independent of the patient's hemodynamic status, so it should be taken into account when prescribing hypertensive treatment.

Conflict of Interest: The authors declare no conflict of interest in this project.

Keywords: Central Aortic Blood Pressure / Hemodialysis / Total Body Water / Blood Pressure / Arterial Stiffness.

P075

A DIET SUPPLEMENTED WITH OMEGA 3 IMPROVES LIPID PROFILE IN ERYTHROCYTE MEMBRANES IN SUBJECTS WITH OBESITY

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Nutrition in the prevention and treatment of chronic
diseases

Background: Obesity has a high prevalence in Mexico and in the World, it is an abnormal accumulation of fat mass that can be harmful to health, interaction of genetics and environmental factors, including diet composition, are related to the development of this pathology. According to the diet, an adequate ratio of omega 6 and omega 3 determine the composition of the fatty acids (FAs) in erythrocytes membranes and consequently trigger pro or anti-inflammatory pathways.

Objective: To analyze the effect of omega 3 supplementation on lipid profile in erythrocyte membranes in subjects with obesity.

Methods: In a randomized controlled clinical trial a total of 41 subjects with obesity were included. They received a diet supplemented with omega 3 (1.5 g) or placebo during 16 weeks. The analyses of diet records were performed in Nutritionist Pro software. Fatty acids were analyzed by gas chromatography (Agilent Technologies), and identified by comparison with a FA standard mixture and expressed as a percentage of the total identified FAs. The statistical analysis was performed in the SPSS software. Paired t-test were used for the longitudinal differences and pearson correlation between to quantitative variables.

Results: After the intervention, it was shown a significant reduction in total energy (-695kcal), saturated fat (-13.04g), trans fatty acid (-0.4g), total sugar (-28g), and an increase of polyunsaturated fatty acids (6.3g), particularly EPA (80mg) and DHA (150mg). Besides the omega 3 group showed a significant increase in linolenic acid (2.9%) DHA (1.2%) and total omega 3 (3.6%) and in placebo group just an increase in DHA (1.4%) but also an increase in total saturated (3.3%) palmitic (1.6%) and stearic FA (2.5%) in erythrocytes membranes. Furthermore, a positive correlation between total PUFA intake and the concentration of stearidonic FA, ($R=0.579$, $p=0.02$), a negative correlation between linoleic FA and arachidonic concentration in erythrocytes membranes ($r=-0.544$, $p<0.001$) and a negative correlations between saturated FAs and omega 3 FAs ($r=-0.376$ $p=0.015$) were founded.

Conclusions: Our results demonstrated a possible interaction between saturated, omega 6 and omega 3 fatty acids, that should be consider in the design of new strategies to improve the management of obesity.

Conflict of Interest: Non conflict of interest is declare.

Keywords: fatty acids / omega 3 / obesity.

P076

LONGITUDINAL STUDY OF ADULT HEALTH (ELSA-BRAZIL): WINE CONSUMPTION AND SERIC LIPIDS IN AN ELSA-BRAZIL MULTICENTRIC STUDY

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Nutrition in the prevention and treatment of chronic
diseases

Introduction: Wine consumption has been directly related to cardiovascular health, based on the French paradox where it is observed that this population having a high consumption of saturated fats developed less atherosclerosis, compared to other countries¹, an explanation for this behavior was the high consumption of red wine of this population being caused by the content of polyphenols and its antioxidant effect that results in better cardiovascular health.²

Objective: Associate wine consumption with plasma triglycerides

Methods: the population was composed of 12,179 Brazilians aged 35-79. It is an observational, cross-sectional, quantitative and analytical study, developed based on data from the ELSA baseline - Brazil, a cohort made up of 15,105 adults, public servants, both sexes, 35 to 74 years old, active and heavy workers of 6 Brazilian institutions the exposure variable was wine consumption, categorized in abstemious (0 ml), low consumption (1 ml - 840 ml), medium consumption (841 ml - 1680 ml), and high consumption (> 1681 ml), the effect variable was serum triglyceride levels

Results: The population was mainly made up of women (57.7%), with high school education (36%), Married (51.6%), white (34%), with high monthly income (39%), overweight (39.7%), smokers (69.7%), consumers of alcoholic beverages (69.8%) and practice low physical activity (76.5%) the average triglycerides was $132,3 \pm 81$ mg / dL. When analyzing the association of these variables by means of a linear regression and after adjustment for the confounding variables (sociodemographic, lifestyle and kilocalories variables) a decrease is found in the TGL β -6.0 p value (<0.001). being thus found a statistical association in the low consumption of wine and decrease in triglycerides.

Conclusions: that low wine consumption is associated with the decrease of 6 mg / dL of triglycerides, no statistically significant association was found with the other categories of consumption (medium and high).

Conflict of Interest: we do not declare conflict of interest

Keywords: Wine, Lipids, Antioxidants

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P077

VIRGIN OLIVE OIL ENRICHED WITH BIOACTIVE COMPOUNDS ENHANCE OXIDATIVE STATUS IN SPONTANEOUSLY HYPERTENSIVE RATS

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Nutrition in the prevention and treatment of chronic diseases

Introduction: We studied the effects of the administration of an extra virgin olive oil (EVOO) enriched with bioactive compounds from the olive fruit compared with a virgin olive oil (VOO) with low amount of bioactive compound on oxidative status in spontaneously hypertensive rats (SHR).

Method: Thirty rats SHR were randomly assigned to three groups: a control untreated SHR group, a SHR-CO group treated with 1 ml/rat/day of a control VOO (17.6 ppm of phenolic compounds), and a SHR-FOO group treated with 1 ml/rat/day of the functional EVOO (FOO) (750 ppm of phenolic compounds) during 8 weeks. Ten Wistar Kyoto rats (WKY-H) were included as healthy controls. All rats had ad libitum access to food and water. Urinary 8-hidroxy-20-deoxyguanosine (8-OH-dG) and F2-isoprostanes were determined after 8 weeks of intervention.

Results: Urinary 8-OH-dG was lower after the treatment with the FOO than in the SHR and SHR-CO animals. No differences were observed urinary F2-isoprostanes after any treatment.

Conclusion: Our results show that the EVOO enriched in phenolic compounds from the olive fruit improves the oxidative status in SHR, and could be a good tool for the nutritional prevention and treatment of cardiovascular disease.

Conflict of Interest: the authors declare no conflict of interest. The founding sponsors had no role in the desing of the study, in the collection, analyses, or interpretation of data, in the writing of the manuscript, or in decision to publish the results.

Keywords: Extra virgin olive oil/ phenolic compounds/ oxidative stress.

P078

EVALUATION OF THE INTAKE OF GLYCIDOL AND MCPDs IN UNIVERSITY STUDENTS USERS OF COLLECTIVE CATERINGS

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Nutrition in the prevention and treatment of chronic diseases

Introduction. The compounds 3-monochloropropane-1,2-diol (3-MCPD), 2-monochloropropane-1,2-diol (2-MCPD) and glycidol are components of the group known as 'chloropropanols'. They are found in processed foods, mainly in edible fats such as refined oils which are broadly employed in collective catering. Once consumed, the chloroesters turn into their free forms which could be carcinogenic.

Objectives. The main objective of this pilot research was to estimate the intake of 3-MCPD, 2-MCPD and glycidol from meals by university students who frequent a cafeteria close to their faculty.

Methods. The intake of 3-MCPD, 2-MCPD and glycidol by university students (n=71) who frequent periodically a cafeteria near the Faculty of Medicine in Alcalá de Henares (Madrid) was evaluated. This cafeteria offers a wide range of daily menus and combo dishes. A survey including age, gender, cafeteria consumption frequency, daily menus/combo dishes intake frequency, determining factors to choose daily food and anthropometric data i.e. weight, height and BMI was employed.

Results. The average intake of 3-MCPD, 2-MCPD and glycidol by university students who choose daily menu for lunch was 0.083, 0.068 and y 0.067 µg/bw, respectively while the average intake for those students who chose a combo dish was 0.11, 0.05 y 0.12 µg/bw, respectively. The only compound with a preliminary exposure assessment published by the European Food Safety Authority is the 3-MCPD esters which has been established as a daily 2 µg/bw. Thus, all participants showed an intake of 3-MCPD under the tolerable daily intake. However, the compiled data only evaluated the intake from the lunch, thus, reaching the maximum recommended daily dose will depend on type and quantity of the rest foods included in the meals.

Conclusions. The intake of combo dishes with fried foods implicates a higher intake of chloropropanols. It has to be highlighted that fries and croquettes are the foods that contribute the most to the total intake of chloropropanols. The present preliminary data reveal the necessity of including nutritional education actions to promote the choice of healthier dishes from the university population.

Conflict of Interest: The authors declare no conflicts of interest.

Keywords: Glycidol/ MCPDs/ Collective caterings/ University students

P079

IMPACT OF NUTRITIONAL STATUS AND DIETARY HABITS ON THE QUALITY OF LIFE OF MULTIPLE SCLEROSIS PATIENTS

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Multiple sclerosis (MS) is an inflammatory disease resulting in demyelination and neuronal degeneration. Among the multiple risk factors that contribute to MS progression, malnutrition plays a pivotal role in the impact and quality of life of MS patients.

Objectives: The aim of this study was to evaluate the effect of nutritional status and dietary habits on daily function and well-being of patients presenting relapsing-remitting (RR), primary progressive (PP) and secondary progressive (SP) MS forms.

Methods: A cross-sectional observational design was used in this work. The nutritional status of MS patients was determined by collecting anthropometric measurements (weight, height and Body Mass Index: BMI), dietary (Mini Nutritional Assessment, MNA) and clinical (biochemical serum parameters: glucose, cholesterol, lipids and proteins) data. Health-related and disablement outcomes were assessed by the questionnaires comprising the Multiple Sclerosis Impact Scale (MSIS-29) and the Expanded Disability Status Scale (EDSS), respectively. This study is a continuation of a placebo controlled nutritional intervention that evaluated the effectiveness of antioxidant dietary supplementation on inflammatory markers of patients with different clinical subtypes of multiple sclerosis.

Results: A convenience sample of 19 participants classified as relapsing-remitting (n=9), primary progressive (n=4) and secondary progressive (n=6) MS presentations was selected for the study. There was no difference in BMI values between groups whilst most of the biochemical parameters were within ordinary ranges. The risk of malnutrition (MNA<23.5) was higher in the progressive MS forms (21.4 vs 22.1, p=0.723). Patients in the SP group obtained higher scores on the MSIS-29 physical scale (69.25±8.77, p=0.197). EDSS mean scores showed statistical differences among the groups (p=0.038). The comparison between MNA mean scores and the MSIS-29 psychological scores produced good correlation values (rho=-0.589, p=0.013) for all the MS forms. A positive and statistically significant association was also observed between EDSS and MSIS-29 scores (rho=0.710, p=0.001).

Conclusions: Our results showed that the risk of malnutrition is correlated with higher MS impact and lower quality of life perceptions. These findings suggest that an accurate nutritional monitoring of MS patients may contribute to ameliorate the impact and relapse of MS related symptoms.

Conflict of Interest: The authors declare no conflicts of interest associated with this publication.

Keywords: Nutritional status; Malnutrition; Multiple sclerosis; Quality of Life, Disability

P080

CORRELATION BETWEEN THE ADHESION TO A MEDITERRANEAN FOOD PATTERN (MFP) ASSESSED BY MEANS OF THE 14 ITEMS MEDITERRANEAN DIET ADHERENCE SCREENER (MEDAS) AND % THE FAT MASS (%FM)

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Nutrition in the prevention and treatment of chronic diseases

Introduction: The prevalence of overweight plus obesity in Spain according to Estudio Nutricional de la Población Española (ENPE) is 60,9%. The Food Pattern (FP) is defined as the assortment, amount, proportion and blend of several foods and drinks in the diet and its frequency of regular intake. The adherence to a healthy FP *a posteriori* produces a protective effect against central obesity. The Mediterranean Food Pattern (MFP) seems to contribute to the prevention and treatment of obesity. The Mediterranean Diet Adherence Screener questionnaire (MEDAS) validated in Spanish population allows for capturing the adherence to MFP.

Objectives: Assess whether there is an association *a priori* (before dieting) between the adherence to a MFP and the basal % Fat Mass (%FM), and if so, to know the magnitude and direction and if there is a sexual dimorphism.

Methods: Cross-sectional study about a sample (n=58: 24 men -M- and 34 women -W-), who attend to a private office with different goals. The inclusion criteria were adults (≥18 years-old) assessed in the first consultation. It was registered height (stadiometer SECA 222 -Seca GmbH-), % FM (BIA Inbody 770 -Inbody Co.-) and adherence to MFP (MEDAS questionnaire). Statistics were computed with SPSS (V.19). While %FM and MEDAS distributions obey a normality pattern, it was not the case when discriminating by sex. The

Pearson (r) and the Spearman (rho) correlation coefficient were applied respectively.

Results: The %FM=35,15±11,09 (M: 28,63±10,18 and W: 39,75±9,35) and MEDAS=7±2 (M: 7±2 y W: 8±2). The r (Pearson)=0,067, p=0,617>0,05 for the whole distributions and rho (Spearman) (M: 0,063, p=0,770>0,05 and W: 0,101, p=0,570>0,05).

Conclusions: There is not a correlation between adhesion to a MFP, assessed by means of MEDAS, and basal %FM neither in the whole sample nor discriminating by sex. This study questions previous findings that suggest that overweight and obesity are associated with a deviation from the MFP. It is postulated that adiposity would be more the result of an increase in the amount of food than a decrease in the overall diet quality.

Conflict of Interest: The authors declare no conflict of interest.

Keywords: Food Pattern (FP)- Diet Quality Indexes (DWIs)- Mediterranean Diet Adherence Screener (MEDAS)

P081

LIFESTYLES RELATED TO HYPERTENSION ARTERIAL, MELLITUS DIABETES TYPE 2, AND OBESITY, IN ADULT POPULATION OF BARRANQUILLA- COLOMBIA, YEAR 2018

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Chronic noncommunicable diseases (NCDs) are a public health problem worldwide, to which the burden of morbidity (49%) and mortality (61%) is attributed, (WHO 2005); It is estimated that in 2030 the proportion of the total world deaths will reach 70% and morbidity at 56%. This research was carried out in the Riomar sector of the District of Barranquilla-Barrio las flores-, located in a nucleus where the manufacturing industry of port services and some type of sea and river capture fishing is concentrated; surrounded by an environment that does not allow contact with other residential areas, it was a reception center for migrants, with a predominance of fishermen who have now adopted urban lifestyle habits.

Objectives: Determine lifestyles present in population with AHT, DM2 and obesity self-reported by adults of the District of Barranquilla.

Methods: Descriptive, cross-sectional study; The universe of 1759 homes in Barrio Las Flores, data provided by an Institution of the District Secretariat of Barranquilla, was randomly selected a sample of 376 homes calculated using formula for finite populations, from 20 blocks with the Step sampling application of the WHO Stepwise instrument. 59 people who self-reported Hypertension (HTA), 13 people who reported DM2 and 91 people took some degree of Obesity,

according to IMC. The data were collected in 2018 by surveys conducted by the research team.

Results: In the group of people with AHT, a statistically significant relationship (p <0.05) was found between alcohol consumption in the last month, non-practice of leisure time sports activity, hypercholesterolemia, obesity and overweight and the age over 45 years. A strong association was observed with the risk of suffering from DM2 when there is overweight and obesity (RP 7.6), age (RP 6.39), consumption of vegetables (RP 4.8) and hypercholesterolemia (RP 4.4), moderate non-practice of sport (RP3,3).

Conclusions: It was found that in the population of Barrio Las Flores, there is a significant relationship of lifestyles with NCDs such as HTN, DM2 and obesity; which relate not only to habits and behaviors but also to the determinants of access and availability of the basic family basket.

Conflict of Interest: We declare no conflict of interest.

Keywords: lifestyles/ hypertension arterial /mellitus diabetes type 2/ obesity/

P082

FAT CONTENT AND FATTY ACID PROFILE IN BREASTMILK FROM GUATEMALAN WOMAN DURING THE FIRST SIX MONTHS OF EXCLUSIVE BREASTFEEDING PERIOD

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Consumption of fatty acids in infancy and especially during the period of breastfeeding plays an important role in the normal development and growth of the child. In Guatemala, exclusive breastfeeding is the most common way in which the infant ingests such essential lipids especially in rural and semi urban areas.

Objectives: To establish a fatty acid profile in breastmilk samples from women who live in the western-highlands of Guatemala and are exclusively breastfeeding during the infant's first six months of life.

Methods: Fifty women, exclusively breastfeeding, were recruited in the western-highlands of Guatemala and equally distributed in five groups according to their infant's age: 40, 80, 120, 160 and 180 days. A milk sample obtained by full-breast expression of one mammary gland was extracted with a manual breast pump and mixed. Samples were applied to cover spots of the stabilized PerkinElmer 226 five-spot RUO cards, dried at room temperature and frozen-stored until their analyses by a GS-MS system. Descriptive statistics were applied to the results.

Results: The average fat % for all groups was 5.1±2.3. Thirty-four fatty acids were evaluated to establish a profile. Values were calculated as weight%, the highest values found were for palmitic (C16:0), oleic (C18:1) and linoleic (C18:2)

acids, with mean values of 22.5 ± 2.3 , 33.4 ± 4.7 , 19.6 ± 4.1 respectively. On the contrary the lowest values quantified were for several fatty acids of the omega-3 family.

Conclusions: Polyunsaturated fatty acids (PUFAS) consumption is essential to the child's growth and cognitive development, results showed that infants in the western highlands of Guatemala have an alarming low ingestion of PUFAS during their first six months of the lactating period.

Conflict of Interest: No conflict of interest.

Keywords: fatty acids / fat content /breastfeeding / Guatemala.

P083 CARDIOVASCULAR RISK IN ADULTS OF A TEACHING INSTITUTION OF PUEBLA, MEXICO

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Nutrition in the prevention and treatment of chronic
diseases

Introduction: Lifestyle as well as type and quality of food play a significant role in the onset and prevention of cardiovascular diseases. Body Mass Index (BMI), the amount of body fat and waist circumference (WC) are usually used as predictors of cardiovascular risk.

Objectives: The present work aims to assess cardiovascular risk and associate it with nutritional status.

Methods: Students and professionals from a private education institution were evaluated. Anthropometric measurements (weight, height, waist circumference WC and hip circumference) were carried out, BMI was calculated and nutritional status was classified as eutrophic and weight excess ($BMI > 25 \text{ kg} / \text{m}^2$). The cardiovascular risk was estimated by means of WC, considering that men with $WC \geq 94 \text{ cm}$ and women with $WC \geq 80 \text{ cm}$ present cardiovascular risk. The Waist-Hip Index (WHI) was calculated to classify the distribution of body fat in android or gynocoid. Descriptive statistics, chi-square test and t-test were applied for independent samples through the SPSS 18.0 program with a 5% significance level.

Results: 105 individuals were evaluated (63.8% women and 36.2% men). The mean age was 25.1 ± 9.0 years. 32% presented weight excess. The average BMI was $24.3 \pm 3.8 \text{ kg} / \text{m}^2$, the WC in men $87.7 \pm 10.9 \text{ cm}$ and in women $79.5 \pm 8.9 \text{ cm}$. Hip circumference in men $100.4 \pm 8.2 \text{ cm}$ and in women $97.8 \pm 9.3 \text{ cm}$. 35.2% ($n = 37$) presented cardiovascular risk according to WC. 26.3% ($n = 10$) of men and 40.3% ($n = 27$) of women presented android fat distribution. It was observed that 69.4% ($n = 25$) of those with cardiovascular risk presented weight excess ($p > 0.001$).

Conclusions: Nutritional status was associated with cardiovascular risk, which favors the appearance of chronic noncommunicable diseases.

Conflict of Interest: None

Keywords: Nutrition Status / Cardiovascular Risk /

P084 CARDIOVASCULAR RISK AND NUTRITIONAL STATUS IN PUBLIC SCHOOLS ADOLESCENTS FROM NORTHEAST BRAZIL

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Nutrition in the prevention and treatment of chronic
diseases

Introduction: Cardiovascular diseases (CVD) are the main causes of death worldwide. Assessing the likelihood that a person will suffer cardiovascular disease in the future is called cardiovascular risk (CVR). This risk assessment is important in all age groups, considering that children and adolescents have increased risk factors for CVD, mainly for inadequate nutrition and physical activity. The CVR can be assessed by means of isolated lipid fractions and for reasons between lipoproteins, such as Castelli I and II Risk Index, which relate total cholesterol (CT) and LDL-c to HDL-c, respectively.

Objectives: To analyze the risk of cardiovascular diseases in adolescents, verifying the association with nutritional status.

Methods: Cross-sectional epidemiological study conducted with 807 adolescents enrolled in public schools in the capital of Northeast Brazil. Nutritional status was classified according to the BMI/age percentile. They were performed as CT, LDL-c and HDL-c for each participant and Cardiovascular Risk, classified according to the risk indexes of Castelli I (CRI-I) and II (CRI-II). For statistical analysis, the program SPSS versión 20.0 was used, using Mann-Whitney and Kruskal Wallis tests.

Results: Most adolescents were female (57.7%) with an average age of 13 ± 1.2 years. Excess weight was present in 32% of the participants. There was difference between the CT (143.7 and 150.3 mg/dL ; $p < 0.001$), LDL-c (83.3 and 86.0 mg/dL ; $p = 0.048$) and HDL-c (44.8 and 46.5 mg/dL ; $p < 0.001$) between genders, being higher for girls. The diagnoses CRI-I and II indicate 37.3% and 8.4% of CVR, respectively, showing a higher prevalence in boys. Nutritional status according to BMI/age had a statistically significant effect ($p < 0.001$) on calculated indexes.

Conclusions: The prevalence of overweight increased in both sexes and in the nutritional status affected by the indexes. CRI-I and II diagnosed a greater number of boys with CVR, which suggests the cardiovascular protection factor of HDL-c in girls.

Conflict of Interest: The authors declare no conflict of interest

Keywords: Cardiovascular risk / Teenagers / Cardiovascular disease

P085

GENDER, BODY MEASURES AND BIOCHEMICAL MARKERS IN PEOPLE WITH OBESITY AND DIABETES

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Obesity and Type 2 Diabetes Mellitus (DM2) have reached epidemic proportions, worldwide, currently affecting 600 million and 380 million adults, respectively. More than 80% of deaths from diabetes are in low- and middle-income countries. Almost half of these deaths correspond to people under 70 years of age, and 55% to women, in the same way the prevention of obesity is higher by 13% in women than in men

Objectives: to compare the differences between body measurements and biochemical markers in people with obesity, DM2 and adults with normal weight.

Methods: 232 patients were recruited, of which 102 presented obesity, 100 were eutrophic and 31 with diabetes. Anthropometric measurements of body weight, percentage of visceral fat, of water and body fat mass were taken, it was measured using a Tanita FitScan Segmental scale (Body Composition Monitor, BC-601F). A blood sample was taken for glucose and lipid profile measurement by conventional methods.

Results: Subjects with obesity have a significantly higher BMI than those with DM2 and have a percentage of water inversely related to their BMI ($r=-0.74$, $p<0.05$); female diabetic patients have a significantly higher body fat mass; both men and women with DM2 have visceral fat percentage decreased; the cholesterol level is higher in female patients with obesity, triglycerides are similar between male patients with obesity and eutrophic females.

Conclusions: Female patients with obesity represent a higher amount of visceral fat and higher cholesterol levels; men are less affected even in conditions of obesity or diabetes.

Conflict of Interest: Authors declare that there are no conflicts of interests.

Keywords: Gender/ Body measurements/ Biochemical markers/ DM2

P086

THE IMPACT OF A NUTRITIONAL INTERVENTION PROGRAMME ON NUTRITIONAL STATUS AND QUALITY OF LIFE IN HEMODIALYSIS PATIENTS

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Nutrition is a key factor in the assessment and treatment of kidney disease condition. Malnutrition is a frequent condition in hemodialysis (HD) caused by insufficient feeding by uremia, dietary restrictions and loss of nutrients during therapy. Nutritional impairment is usually triggered a loss of validity, autonomy and functional capacity that could have an impact on a worse quality of life. Accordingly, the implementation of a nutritional intervention programme (NIP) to identify and intervene in patients with nutritional problems can indirectly influence the improvement of the quality of life.

Objectives: This study aims to assess the correlation between nutritional status and quality of life according to malnutrition-scores (MIS) in HD patients, also uses to describe the prevalence of nutritional risk (NR).

Methods: Twenty HD patients were included. Participants were assessed at baseline and every reassessment each three months. The following-up was during twelve months. The NR was assessed by MIS and the QOL by Kidney Disease Quality of life short form version 1.2 (KDQOL-SF TM).

Results: At baseline, MIS score was 7,5 (3,25-9,75) detecting malnutrition in 55% of the patients. Mild, moderate and severe protein-energy malnutrition (PEM) was detected in 25%, 15% and 10%, respectively. 5% of patients presented protein malnutrition (PM).

Regarding to basal QOL, role emotional and emotional well-being were the most scores items and the lowest score in general health. Well nourished patients got better scores in role physical, energy/fatigue and symptom/problem list of kidney disease areas.

After 12 months of the NIP, an amelioration of nutritional status was produced, MIS score was 5 (4- 6,75). The percentage of well-nourished patients increased by 18% and the presence of severe PEM and PM was eradicated. In QOL, patient satisfaction regarding the care received had a final score of 100 ($p=0,03$). Malnourished patients got better score in effects of kidney disease area than baseline, where diet and liquid limitations were included ($p=0,002$)

Conclusions: The identification of NR using a specific nutritional screening allows an early intervention that improves nutritional status. Providing individualised nutritional counselling improves some components of QOL, it may suppose that QOL is related to nutritional status in HD patients.

Conflict of Interest: No conflict of interest to declare

Keywords: Quality of life, malnutrition, hemodialysis

P087

WAIST CIRCUMFERENCE AS VISCERAL ADIPOSE TISSUE PREDICTOR IN CHILDREN AND ADOLESCENTS FROM PUBLIC SCHOOLS IN HERMOSILLO, SONORA

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Obesity among children and adolescent has become worrying worldwide, and particularly among Mexican population. Excess adiposity during early ages increase the probability of comorbidities through adulthood. Usual measures of adiposity include BMI, although recent research suggests alternative indexes such as Waist Circumference (WC), in addition to the Body Mass Index (BMI) to have more reliable measures.

Objectives: The aim of this study is to explore the existing differences between BMI and WC to predict visceral adipose tissue (VAT) content in children and adolescents.

Methods: We evaluated 29 school-age children (35% boys and 65% girls, mean age 8.5 ± 0.3 years) and 30 adolescents (70% boys and 30% girls, mean age 12.6 ± 0.4 years) from public schools in Hermosillo, Sonora, Mexico. Anthropometry included weight, height, BMI and WC; VAT was measured by the Dual Energy X-ray Absorptiometry (DEXA); prediction capacity of both indexes was evaluated by linear regression.

Results: VAT (g) in school-age children was 258.7 ± 127.8 in boys and 154.1 ± 110.5 in girls, while WC (cm) was 66.3 ± 13.9 in boys and 61.2 ± 8.3 in girls. Adolescents had a VAT of 330.5 ± 140.6 in boys and 273.8 ± 111.5 in girls; while WC was 75.2 ± 13.9 cm in boys and 76.3 ± 8.9 in girls. BMI (z-score) in school-age children was 1.0 ± 2.3 in boys and 0.7 ± 1.1 in girls, while for adolescents BMI scored 0.9 ± 1.4 in boys and 1.1 ± 0.9 in girls. On the other hand, WC has been better predictor of VAT in school-age children and adolescents than BMI (R²=0.948 and R²=0.916 vs R²=0.873 and R²=0.689 respectively); BMI was a better predictor of VAT among school-age girls (BMI R²=0.813 vs WC R²=0.759) but not among female adolescents (BMI R²=0.646 vs WC R²=0.778).

Conclusions: WC is more sensitive than BMI to describe VAT in this study population. Consequently, even without an international cut point agreement, this study suggests that WC should be included as a complementary measure to describe obesity in children and adolescents.

Conflict of Interest: All the authors declare that there is not a conflict of interest.

Keywords: Waist circumference/ Visceral Adipose Tissue/ Dual Energy X-ray Absorptiometry

P088

NUTRITIONAL STATUS AND ITS ASSOCIATION WITH ORAL HEALTH IN A SAMPLE OF OLDER ADULTS IN MORELIA, MICHOACÁN MEXICO

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Nutrition in the prevention and treatment of chronic diseases

Background: In Mexico, 26.9% of older adults (OA) over 60 years of age are limited to food. One of the causes is poor oral health such as caries, periodontal disease, edentulism and dry mouth (1-3), which could condition malnutrition and increased morbidity and mortality. The objective of the study was to associate nutritional status and oral health in OA > 60 years in the city of Morelia, Michoacán México.

Methods: Cross-sectional observational study. In OA, weight and height were obtained to calculate Body Mass Index (BMI) adjusted for the elderly; 3 surveys were applied: the Mini Nutrition Assessment (MNA) to estimate nutritional status; the Geriatric / General Oral Health Assessment Index (GOHAI) for oral health and the Fried scale for frailty of the elderly (4). Descriptive statistics, X2 test and relative risk were performed.

Results: 1139 surveys were applied. The age was 70.9 ± 8.3 years. BMI: 14.4% had low weight, 53.3% had normal weight; and 32.5 % overweight-obesity. The results for Malnutrition were 9%, and 32.5% fell into the "At risk category". 58.5% were well nourished. 13.3% of the elderly had a poor dental status, those with regular oral health 73.2% and y those with good oral health: 13.5%. 13.7% of the OA had fragility; Pre-fragility: 44.3% and non-fragility: 42%. Fragile OA had a 15.66 times higher risk of malnutrition (RR 15.661; 95% CI 10.533-23.287) and those with malnutrition 2.29 times more risk of poor oral health (RR 2.291 IC95% 1.991-2.639).

Conclusions: The present findings reveal that OA with a poor oral health have a higher risk of malnutrition. More attention is required by nutritionists to estimate oral health and to send OD for dental treatment. On the other hand, further dissemination among dentists is proposed for timely delivery for nutritional treatment.

Keywords: Older adults, malnutrition, fragility, oral health.

P089

VIGOROUS PRACTICE OF PHYSICAL ACTIVITY IS PROFILED AS A USEFUL TOOL IN THE PREVENTION OF OBESITY AND ASSOCIATED METABOLIC ALTERATIONS

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Epidemiological studies have observed that people who are overweight and obese do not always show a high frequency of cardiovascular diseases. On the other hand, there is a growing consensus on the influence of physical activity (PA) in the prevention of obesity and the risk of associated metabolic disorders.

Objectives: The aim was to determine the relationship between the practice of PA and a healthy metabolic state.

Methods: 611 prepubertal children from Córdoba, Santiago de Compostela and Zaragoza were selected. It was carried out an exhaustive test on lifestyle habits and nutritional surveys in each participant, as well as a study of body composition by bioimpedanciometry and a plasma analysis of metabolic markers (lipid profile, glucose and insulin, among others) and hormonal. The level of PA was measured by accelerometers. Those who met metabolic risk criteria (MUO) were classified in one group, and those without risk parameters (MHO) in another group, regardless of body mass index. This classification was made according to classification criteria for metabolic syndrome. In turn, they were also classified according to the BMI in normal weight, overweight or obese following the criteria established by Cole et al.

Results: Obese children added more minutes of sedentary activities compared to children who were overweight

($P < 0.001$) and normal weight ($P < 0.01$); they practiced less light PA compared to normal weight ($P = 0.05$); and less moderate PA compared to the overweight group ($P < 0.05$) and normal weight ($P < 0.01$). In addition, within of obese children, the MHO subgroup showed more minutes of intense activity than the MUO group ($P < 0.01$).

Conclusions: To reduce sedentary time and supplement with moderate and light PA can be useful tools in controlling the development of obesity and specifically in maintaining a healthy metabolic state.

Conflict of Interest: the authors no present conflict of interest.

Keywords: sedentary / children / healthy lifestyle / obesity

P090

DIAGNOSIS OF BREAST CANCER ASSOCIATED WITH THE TIME OF SURVIVAL INFLUENCE CHANGES IN THE BODY COMPOSITION OF WOMEN AFTER 5 YEARS OF FOLLOW-UP

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Breast cancer is the neoplasm that most affects women, and body composition emerges as an important prognostic factor related to recurrence and mortality.

Objectives: to assess if clinical stage associated with time change body composition of breast cancer survivors after 5 years of diagnosis.

Methods: Longitudinal and prospective study with 114 adult women with breast cancer attended at the mastology service. We added a control group with 100 women without cancer. Data collection occurred at diagnosis (T0) and 5 years later (T1). We collected lean mass (% LM), fat mass (% FM), phase angle (PA), resistance (R) and reactance (Xc) using tetrapolar bioimpedance (450 - 50 kHz) and following the protocol. We measured the current weight (CW) and height (m) for the body mass index (BMI) (kg/m^2), classified by the World Health Organization for adults and the North American Dietetic Association for elderly. The plasma leptin concentration was measured by immunoassay and presented in ng/mL . The differences between T0 and T1 we did the paired T-test for the parametric variables and Wilcoxon for the non-parametric ones. The analysis of the effect of the disease associated with the time of diagnosis on BMI, body composition and leptin were performed using a generalized linear model of repeated measures with Bonferroni adjustment for multiple comparisons ($P \leq 0,05$).

Results: Women with breast cancer have a significant reduction in Xc ($p = < 0.000$) and PA ($p = < 0.000$), and an increase in serum leptin concentration ($p = 0.001$). The effect

of breast cancer associated with the time of diagnosis is well established among patients in the variables weight ($p = 0.03$), BMI ($p = 0.00$), PA ($p = 0.00$), Xc ($p = 0.00$), %LM ($p = 0.00$) and %FM ($p = 0.00$), but not among women without breast cancer.

Conclusion: The diagnosis of breast cancer associated with the time of follow-up interferes in changes in body composition among survivors of the disease, but this effect does not appear among women without a diagnosis of the disease. CNPq (401856/2016-0).

Conflict of Interest: there is no conflict of interest.

Keywords: Breast cancer/ body composition/ fat mass/ phase angle.

P091

SELF-REPORTED PHYSICAL ACTIVITY LEVEL AND MUSCULAR DENSITY IN OLDER MEN FROM THE WESTERN HIGHLANDS OF GUATEMALA

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Nutrition in the prevention and treatment of chronic diseases

Background and Objectives: Body composition changes have been associated with aging processes, including a decrease in muscle mass. Physical inactivity and age have an impact on muscle loss. The objective of the study was to identify if there was a difference between the levels of self-reported physical activity (SPAL) and a decrease in the lean soft tissue density (LST), derived from an electrical bioimpedance analysis (BIA) in older adults from the Western Highlands of Guatemala. In the context of the upper and lower extremities, LST represents skeletal muscle.

Methods: 47 older adults (≥ 60 years) were recruited from the municipality of Nahualá, Sololá, Guatemala. Informed consent was provided. General information, SPAL, full body sagittal photography and anthropometric measurements were collected. Body composition was estimated using Quantum V Segmental BIA RJL Systems®. The physical activity levels established by BIA were grouped in low and high for analysis purposes. The muscular density of each leg was calculated using LST (total LST of the lower limb [kg] / leg length from the ratio between photography measurement and height [cm]). The results were analyzed using t-Student and Pearson correlation.

Results: Mean age was 72.5 ± 8.2 years (Range between 60-85 years). Regarding SPAL levels, 70% ($n=33$) reported a high and 30% ($n=14$) low. The average age of low SPAL was 77.0 ± 10.6 years and high SPAL 71.0 ± 6.5 years ($p=0.059$). No significant differences were found between leg LST and SPAL: Right leg LST density and SPAL: 0.057 ± 0.011 kg / cm (high SPAL) and 0.060 ± 0.010 kg / cm (low SPAL) ($p = 0.389$); Left leg LST and SPAL: 0.057 ± 0.010 kg / cm (high SPAL) and 0.055 ± 0.010 kg / cm (low SPAL) ($p = 0.532$). According to Pearson

regression results a higher age implies a lower LST density for both legs (right $r = -0.457$, $p=0.001$, left $r = -0.478$, $p = 0.001$).

Conclusions: For this population, still active, muscle deterioration is not affected by the level of physical activity, however, age does influence a lower density of LST in lower extremities

Keywords: Physical activity, Older men, BIA, Muscle Density.

Thematic Area: Nutrition in the prevention and treatment of chronic diseases

P092

CARDIOVASCULAR RISK FACTORS AMONG ADOLESCENTS FROM INDIGENOUS AREAS OF CHIAPAS

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Cardiovascular diseases is a world public health problem and at present are occurring at an earlier age. Children and adolescents at with risk of cardiovascular disease maintain this condition until adulthood. The prevalence of these factors in children is alarming. In Mexico, these diseases are the main cause of general mortality.

Objectives: Determine the prevalence of cardiovascular risk factors among adolescents from indigenous areas of Chiapas.

Methods: In a cross-sectional study, anthropometric, clinical and biochemical data were collected from 253 adolescents in Chiapas, Mexico. We estimated prevalences (95% CI) of alterations in: blood pressure, fasting glucose levels and serum lipids by stratifying the population according to z-score body mass index (z-score BMI) $\leq 1z$ normal and $\geq 1z$ overweight/obesity

Results: The 28.9% of adolescents were overweight/obese. High prevalence of low HDL cholesterol (54.8%) and high triglycerides (47.9%) was identified in overweight/obese adolescents. Low levels of HDL cholesterol were found in 48.9% of normal-weight adolescents. In urban areas, we found greater prevalences of overweight/obesity

and of insulin resistance, while abnormal blood pressure levels were more prevalent in rural areas.

Conclusions: The prevalence of cardiometabolic risk factors was high in adolescents who are overweight or obese. The sample comes from regions with low human development index and high marginalization, so it is a priority to promote healthy lifestyles in this population to prevent cardiovascular disease in adulthood.

Conflict of interest: The authors declare that they have no competing interests

Keywords: Cardiovascular risk factors, obesity, adolescents, Chiapas-Mexico

P093

POLYMORPHISMS rs7108738 IN THE GENE SOX6 AND rs627174 IN THE GENE LRP5 AND THEIR ASSOCIATION WITH OBESITY PHENOTYPES IN ADULT WOMEN FROM MONTERREY, N.L.

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Nutrition in the prevention and treatment of chronic diseases

Introduction: The *LRP5* and *SOX6* genes have been proposed to be candidate markers for obesity due to their participation in the WNT/ β -catenin pathway (with function in the adipocyte metabolism regulation). Genetic variations as the single nucleotide polymorphisms (SNPs) in these genes could be associated with obesity phenotypes and metabolic alterations.

Objective: To evaluate the association between the rs7108738 in the gene *SOX6* and rs627174 in the gene *LRP5* with obesity phenotypes as well as in body composition and biochemical variables of women.

Methods: 209 adult women aged from 18 to 45 years, residents of the metropolitan area of Monterrey participated in the study. Anthropometric measurements were obtained (weight, height and waist/hip circumferences) and body composition was evaluated through DXA. Blood sample was obtained after 12 hours fasting for biochemical determinations and DNA extraction. Genotyping was performed with RT-PCR. The study subjects were classified in 4 phenotypes according to the body mass index (BMI), body fat percentage (BFP) and metabolic status. To compare these groups U de Mann Whitney was performed, and to establish the

associations, logistic and linear regression was performed using the dominant genetic model.

Results: The median age was 24 years; 39.2% of the women had BMI ≥ 25 kg/m², 58.4% had waist circumference ≥ 80 cm and 85.2% had BFP $\geq 30\%$. 16.3% of the women were classified as normal-weight lean, 44.5% as normal-weight obese/metabolically unhealthy, 23.4% as metabolically healthy obese and 15.8% as metabolically unhealthy obese. The Minor Allele Frequency for rs627174-C was 0.189 and for the rs7108738-G was 0.23. No statistically significant differences were observed with the rs627174. Nevertheless, for the rs7108738 it was observed an association with the risk of waist circumference ≥ 80 cm (OR=0.505 CI: 0.2719-0.9387 p=0.031) and those with at least one copy of the minor allele had less android fat distribution (p= 0.033).

Conclusions: There is a high prevalence of elevated BFP and metabolic alterations in the study population. The results obtained of rs7108738 with waist circumference and android fat distribution suggest a protective effect of obesity.

Conflict of Interest: The authors report no conflicts of interest.

Keywords: Obesity phenotypes/SNPs/polymorphism/metabolic alterations.

P094

ECUADORIAN EXOTIC FRUITS AS A SOURCE OF VITAMIN C

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Nutrition in the prevention and treatment of chronic diseases

Introduction: The fruits are edible vegetable structures of plants cultivated or wild. They present sweet-acidulated flavors and varied aromas, so they are generally consumed in fresh. The fruits have nutritional properties due to the presence of macro and micronutrients such as vitamins and minerals. In addition, these foods have compounds such as antioxidants, with beneficial metabolic properties for the consumer. Ecuador is a country with a wide variety of exotic fruits with particular organoleptic characteristics and which have slowly spread in local markets. Several fruits show nutritional and commercialization potential in international markets.

Objetives: The aim of the present study was to characterize eight Ecuadorian exotic fruits giant granadilla (*Passiflora quadrangularis*), star fruit (*Averrhoa carambola*), bitter melon (*Momordica charantia*), banana passion fruit (*Passiflora tripartita*), red siriguela (*Spondias purpurea*),

peach (*Prunus Persian*), yellow siriguela (*Spondias purpurea*) and cape gooseberry (*Physalis peruviana*).

Methods: The fruits were bought in different markets in the city of Quito-Ecuador and the commercial quality analysis was carried out (weight, equatorial and longitudinal diameter, soluble solids, titratable acidity, pH, ash and humidity), determination of external and internal color of the fruit, and the content of vitamin C was quantified by RRLC in lyophilized material.

Results: The results showed ranges of pH between 3 (banana passion fruit, red siriguela and yellow siriguela) to 5 (star fruit), soluble solids between 5 (star fruit and bitter melon) at 15 ° Brix (yellow siriguela), titratable acidity between 0.01% (red siriguela) to 0.1% (cape gooseberry), ash between 0.5% (red siriguela, yellow siriguela and star fruit) to 4% (peach), humidity between 75% (yellow siriguela) to 85% (star fruit and bitter melon) and vitamin C between the undetectable limit (peach to 121.6 mg / 100 g of dry matter (banana passion fruit).

Conclusions: The results showed that Ecuadorian exotic fruits have commercial quality with high content of vitamin C, so they could be of interest as food with health and nutritional functions.

Conflict of Interest: The authors declare no conflict of interest

Keywords: ascorb acid – exotic fruits - RRLC

P095

SPANISH HOME ENTERAL NUTRITION REGISTRY OF THE YEAR 2019 FROM THE NADYA-SENPE GROUP

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Nutrition in the prevention and treatment of chronic diseases

Objectives: To present the data of the Registry of the NADYA SENPE Group of home enteral nutrition (NED) in Spain of the year 2019.

Material and Method: Descriptive study of the database of the national scope registry of home enteral nutrition of the NADYA-SENPE group from January 1, 2019 to December 10, 2019. The latest data published by the National Statistics Institute (1-1-2019; 47,007,367 inhabitants) was used to calculate prevalence.

Results: 4644 patients were obtained from 46 hospitals. 4530 (97.5%) adults and 114 (2.5%) children were registered. The prevalence of NED was 99 patients / million inhabitants. In adults: The median age was 72 years (IIQ 58-83), women (49.3%) were significantly older than men (65.12 vs. 73.13; p < 0.006). The most frequent diagnosis was neurological disease with severe dysphagia in 2670 patients (59.0%) (figure 1), followed by head and neck tumors (16.9%). The

most frequent route of administration (Figure 2), SNG 46.1% and PEG in 45.6%. Children: The median age was 7 months (IIQ 0.75-38.25), girls (58.8%) were no different in age than boys (36.60 vs. 26.94 months; p = 0.254). The most frequent diagnosis was "other pathologies" (43.0%) followed by neurological disease with severe dysphagia (41.2%). The most frequent route of administration (Figure 3) Gastrostomy in 60.7% of cases. The activity level of 49.0% of the patients was "bed-chair life". 54.9% were totally dependent. Completed 828 nutrition, the most frequent cause was 50.0% death and 34.3% recovered the oral route (Figure 4).

Conclusions: The number of registered patients remains stable, and the number of participating hospitals has increased. Neurological disease remains the most common reason for NED in all ages. An objective of improving the registry is the more detailed collection of clinical evolution and nutritional monitoring parameters, as well as quality of life for patients and caregivers, which allows to demonstrate the effectiveness and efficiency of this type of nutritional support.

P096

NUTRITIONAL EDUCATIONAL INTERVENTION IN ON UNDERGRADUATE STUDENTS TO IMPROVE NUTRITIONAL STATUS AND BIOCHEMICAL MARKERS

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Obesity is a consequence of the alteration in the energy balance that is reflected in the weight, the excess energy will be accumulated in the form of adipose tissue. Among the complications that occur with these conditions are insulin resistance, type 2 diabetes, dyslipidemia, high blood pressure, and cardiovascular disease. Hence the importance of carrying out intervention actions that improve nutritional status.

Objective: Implement an intervention on nutritional education and adherence to a food plan in undergraduate students in philosophy, in order to improve food consumption, body composition and metabolic markers.

Materials and methods: The intervention lasted three months and was divided into three stages: 1) initial evaluation (anthropometric, biochemical parameters such as glucose, lipid profile, atherogenic index (AI); and evaluation of food consumption). 2) implementation of nutrition education sessions and adherence to a meal plan. 3) final evaluation considering the parameters initially measured.

Results: The average age was 25 ± 5.4 years, an improvement was achieved in body composition markers such as: weight (88.2 ± 20.20 to 86.3 ± 20.3 kg; p = 0.021), abdominal circumference (101.1 ± 17.5 to 99.8 ± 17.2 cm; p = 0.002), percentage of body fat (31.7 ± 7.3 at 30.6 ± 7.9; p = 0.012) and visceral fat (11.6 ± 4.8 at 11.1 ± 4.9 cm; p = 0.010);

biochemical markers such as: glucose (96.4 ± 9.0 to 85.2 ± 10.8 mg / dl; $p = 0.001$), VLDL cholesterol (34.4 ± 10.7 to 30.3 ± 9.7 2.6 mg / dl; $p = 0.012$), triglycerides (172.0 ± 53.5 to 151.6 ± 48.8 mg / dl; $p = 0.012$) and AI (6.0 ± 1.5 to 4.5 ± 0.9 ; $p < 0.001$), as well as an increase in HDL cholesterol (28.6 ± 15.6 to 36.9 ± 17.2 mg / dl; $p < 0.001$). On the other hand, the consumption of fruits increased (0.61 ± 0.35 to 0.73 ± 0.31 ; $p = 0.024$) and fish (0.17 ± 0.16 to 0.33 ± 0.27 ; $p = 0.003$) and the consumption of white bread decreased (0.59 ± 0.41 to 0.39 ± 0.36 ; $p = 0.021$), soda (0.48 ± 0.38 to 0.29 ± 0.26 ; $p = 0.013$) and candy (0.48 ± 0.38 to 0.29 ± 0.26 ; $p = 0.013$).

Conclusions: Our results show an improvement in food consumption, generating a positive effect on body composition and biochemical markers, such as a significant decrease in the atherogenic index, thus demonstrating the importance of nutritional education programs to improve health.

Conflict of Interest: Nothing to declare

Keywords: intervention, atherogenic index, nutrition

P097

ASSOCIATION BETWEEN NUTRITIONAL STATUS AND QUALITY OF LIFE OF THE ELDERLY

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Adequate food and nutritional status represent essential conditions for human beings and are directly linked to health and the prevention and rehabilitation of diseases, being fundamental to quality of life and the well-being of the elderly population.

Objectives: To evaluate the association between nutritional status and quality of life (QL) of the elderly population assisted by the Steps of Longevity Project of the Food Bank of Rio Grande do Sul.

Methods: Cross-sectional and retrospective study that used secondary data, collected between March and December 2017, of 185 non-institutionalized elderly aged 60 and over. Sociodemographic information was obtained from a questionnaire with simple and direct questions. Anthropometric data collected were weight, height and Body Mass Index and scores related to QL were measured using the Short Form Health Survey 36 (SF-36).

Results: The mean BMI was 29.7 kg/m², but when individuals were stratified by BMI range, a higher prevalence of obesity was observed. Analyzing the association of QL

scores related to the eight domains of the SF36 questionnaire, in general, obese individuals had worse QL in practically all domains, except for social and mental health aspects. Functional capacity and limitation by physical aspects showed a positive association ($p < 0.001$ and $p = 0.042$, respectively) with obesity.

Conclusions: Obese individuals had worse QL in practically all domains, except for social and mental health aspects. In addition, those who were obese presented worse functional capacity and greater physical limitations compared to all the other weight ranges and greater physical limitations in relation to those who were overweight.

Conflict of Interest: There are no conflicts of interest.

Keywords: Elderly / Quality of Life / Nutritional Status

P098

PURIFIED OIL DEODORIZER DISTILLATES PREVENT TRIACYLGLYCEROL METABOLISM ALTERATIONS CAUSED BY HIGH FAT DIETS

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Nutrition in the prevention and treatment of chronic diseases

Introduction: high fat diets lead to a deregulation of lipid metabolism. Purified oil deodorizer distillates (DD) are composed mainly by β -sitosterol and α -tocopherol. These components could have different beneficial properties such as: anti-atherogenic, hypotriglyceridemic and anti-inflammatory effects.

Objectives: investigate DD's effects on the prevention of triacylglycerol (TG) metabolism alterations induced by high fat diets in mice.

Methods: male CF1 mice (22g) were fed during 30 days with diets containing different soybean oil levels: 7% (C7), 30% (C30) or 29% + 1% DD (DD30). Determinations were: body weight gain; relative liver, epididymal (EAT) and retroperitoneal (RPAT) adipose tissue weights; plasmatic and hepatic TG and cholesterol (CHO) levels; lipoprotein lipase activity in EAT; hepatic TG secretion rate (TG-SR) and transcription factors (SREBP1c and PPAR α), acetyl-CoA carboxylase (ACC) and carnitine palmitoyltransferase I (CPT1a) mRNA levels in liver. Results were analyzed by One-Way ANOVA followed by Tukey's test (mean \pm SEM, $p < 0.05$).

Results: these preliminary results showed that DD reduced (31%) serum TG but not CHO levels, as a consequence of a higher (21%) LPL enzyme activity in TAE. On the other hand, hepatic CHO and TG levels were reduced (12% and 31%, respectively) by DD, without changes in TG-SR. The lower hepatic TG levels were associated with decreased mRNA levels of SREBP1c (55%), but not with a higher fatty acids oxidation (lower -20%- mRNA levels of CPT1a were observed).

Conclusions: consumption of β -sitosterol and α -tocopherol from vegetable oils DD prevents serum and hepatic TG increase induced by a high fat diet.

Conflict of interest: there is no conflict of interest.

Keywords: Lipid metabolism / β -sitosterol / α -tocopherol

P099

COMPARISON OF BODY FAT PERCENTAGE, BMI, WAIST CIRCUMFERENCE AND WAIST-TO-HEIGHT INDEX IN ELDERLY MEN FROM THE WESTERN HIGHLANDS OF GUATEMALA

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Nutrition in the prevention and treatment of chronic diseases

Background and objective: Overweight and obesity are public health problems in Guatemalan population. Aging drives changes in the body, including an increase of body fat. Body mass index (BMI), waist circumference (WC) and waist-height index (WHI) are considered anthropometric adiposity predictors. The objective of this study was to establish the relationship between anthropometric indicators of body fat percentage (BF%), BMI, WC and WHI in elderly men from the rural Western Highlands of Guatemala.

Methods: The study included 47 elderly men (≥ 60 years old) from rural Nahualá, Sololá, Guatemala. Participation was voluntary, written consent was provided. Standardized professionals measured weight, height and WC. Fat mass was determined through the Quantum V Segmental BIA, from RJL Systems®. BMI, WHI and BF% were calculated. To associate the indicators, Pearson's correlation was used.

Results: The average age (\pm SD) was 72.5 ± 8.2 years, in a range between 60-95 years of age. The results averages were: 52.8 ± 10.4 Kg (weight), 150.5 ± 5.5 cm (height), 26.9 ± 6.3 (BF%), 23.2 ± 3.7 kg/m² (BMI), 84.9 ± 10.3 cm (WC) y 0.56 ± 0.10 (WHI), respectively. 34.0% had BF% $\geq 30\%$, 27.7% had a BMI ≥ 25 kg/m², 19.0% had a CC ≥ 94 cm and 91.5% WHI ≥ 0.5 . All measurements were significantly related to BF% ($p < .001$). The BF% has a strongest correlation with WHI than with WC and BMI. The BMI, WC and WHI were significantly correlated with each other than with BF%.

Conclusions: For this population, WHI proved to be the best adiposity predictor when associated with BF%. The WHI results reflect a high prevalence of central adiposity among participants.

Keywords: Anthropometry, body composition, older adults, Guatemala.

Thematic area: Nutrition in the prevention and treatment of chronic diseases.

P100

ACTIVE AND SEDENTARY BEHAVIOR OF ADULTS FROM A PRIVATE EDUCATIONAL INSTITUTION IN PUEBLA, MÉXICO

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Nutrition in the prevention and treatment of chronic diseases

Background and Objectives: The practice of physical activity (AF for its name in Spanish) contributes to the prevention of chronic degenerative diseases, particularly obesity. However, it is important to consider the total activity pattern of individuals, since prolonged sitting is a risk factor for chronic diseases despite the level of AF or the body mass index (IMC for its name in Spanish). The objective of this study is to identify active and sedentary behaviors and relate them to the nutritional status of adults from a private educational institution in Puebla, México.

Methods: Anthropometric measurements (weight and height) were used to calculate the IMC. The nutritional status was classified as eutrophic and overweight (IMC > 25 kg/m²). Questionnaires were used to gather health and sociodemographic information. The International Physical Activity Questionnaire Short Form (IPAQ) was used to evaluate the time spent in AF. According to the recommendations of the World Health Organization, the individuals who practice AF for 150 minutes a week or longer were considered active. The individuals were asked how long they spend sitting per day to estimate the time spent sitting. The statistical tests were performed using SPSS Statistics 18.0 with a significance level of 5%.

Results: 105 individuals were evaluated (63.8% women and 36.2% men). The mean age was 25.1 ± 9.0 years. 75.2% of individuals are classified as A/B socio-economic class. 32% of individuals are overweight. The mean IMC was 24.3 ± 3.8 kg/m². 29.5% of the total sample ($n=31$) was considered active. The mean AF was 136.5 ± 120.7 minutes/week. The mean time spent sitting was 6.9 ± 3.7 hours/day. Men were more active (167.5 ± 155.5 minutes/week) than women (118.9 ± 92.4 minutes/week) ($p=0.047$). The time spent sitting did not present a statistically significant difference. No statistically significant differences were observed when the nutritional status was associated.

Conclusions: No differences were observed between the time spent in AF or the time spent sitting and the nutritional status. On the other hand, men were more active than women.

Keywords: Obesity/ sedentary/ body mass index / anthropometry / nutritional status.

P101

NUTRITIONAL STATUS AND CHARACTERISTICS OF LUNCH BOXES OF SCHOOLCHILDREN FROM TWO PRIMARY SCHOOLS IN LIMA

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Several studies have observed that the prevalence of overweight and obesity among worldwide and almost all stages of life and has been increasing progressively. It is known that overweight at an early age will have the impact of increase the risk of developing chronic disease in adults.

Objective: The study aimed to assess the nutritional status and characteristics of the lunch boxes of schoolchildren aged 9 to 11 who attended two public schools in Lima.

Methods: Descriptive cross-sectional study conducted on 474 girls from fourth, fifth and sixth grade of two public schools selected. Anthropometric measurements of weight, height, age, and Body Mass Index (BMI) were conducted for the subjects in order to determine their nutritional status. A survey developed and previously validated was applied to observe and write down the components of the lunchbox that the child showed at the request of the interviewer in order to assess the snack.

Results: Overall 30% of girls schoolchildren were overweight and 20% were obese in both public schools. It was also observed that more than 80% of girls schoolchildren brought unhealthy lunch boxes contained foods and products with high caloric content and lower fruit portions.

Conclusions: High and double burden of overweight and obese girls schoolchildren were found in the both school population as well as unhealthy lunch boxes according to the standards established by the Ministry of Health.

Conflict of Interest: None to declare.

Keywords: Overweight / Obesity / lunch boxes / Schoolchildren.

Introduction: Understanding different food sources can help inform behavioral change strategies and public health policies.

Objectives: The aim was to identify food sources of energy most consumed by adults and older adults according to diet quality.

Methods: The 2015 Health Survey of São Paulo is a cross-sectional, population-based study, with adults (n=643) and older adults (n=545) from São Paulo, Brazil. Dietary intake was collected through 24h-recalls. Adapted version of "What We Eat in America" classification system was used for foods and beverages consumed. Top-5 food sources of energy were sample weighted and ranked based on percentage of contribution. Diet quality terciles were provided using the Revised Brazilian Health Eating Index (BHEI-R) according to age groups.

Results: Diet quality overall score increased as energy intake decreased (terciles of adults intake: 1st: 2135 ± SE 67 kcal/d; 2nd: 1864 ± SE 53 kcal/d; | 3rd: 1739 ± SE 69 kcal/d vs. terciles of older adults intake: 1st: 2044 ± SE 54 kcal/d | 2nd: 1804 ± SE 39 kcal/d | 3rd: 1627 ± SE 38 kcal/d). Rice was the first food source at both age groups, regardless diet quality, ranging from 10.4 to 17.7% of energy. Medium and high BHEI-R terciles presented similar food groups: rice, yeast breads, beef, chicken, and beans, legumes and peas (with differences in % of contribution and age group). Main differences in energy sources for adults were at 1st tercile: rice, meat, breads, beer and soft drinks vs. 3rd: rice, yeast breads, chicken, beef, and beans, legumes and peas; and for older adults at 1st tercile: rice, yeast breads, beef, cookies and brownies, and soft drinks vs. 3rd: rice, breads, red meat, chicken, and beans, legumes and peas. Participants with lower diet quality consumed more energy-dense-food sources and those at higher diet quality consumed more traditional foods from Brazilian diet (rice, beans and bread).

Conclusions: Participants with better diet quality consumed more low-energy food sources. Dietary sources such as cookies and brownies, soft drinks and alcohol were identified in low diet quality. Comprehending food sources and diet quality are critical to better food choices and help to meet recommendations within energy needs.

Conflict of Interest: There is no conflict of interest.

Keywords: Diet Quality/ Energy/ Food Source.

P103

PERCEPTIONS OF A GROUP OF OVERWEIGHT PREGNANT WOMEN ON NUTRITION EDUCATION AS PART OF PRE-NATAL CARE

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Challenges of nutrition and public health in Ibero-America

P102

ARE FOOD SOURCES OF ENERGY DIFFERENT DEPENDING ON DIET QUALITY?

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Background: Overweight and obesity is a public health problem that especially affects women and influences pre-pregnancy weight. In Colombia, according to the latest national nutrition survey (2015), 39.9% of pregnant women present with excess weight. This situation impacts birth weight; a study based on the National Live Birth Registry of Colombia done between the years 2002 – 2011 found that macrosomia (4.5%) exceeded low birth weight (3.8%); a condition that shapes maternal – fetal health status and influences health in various later stages of life.

Objective: Identify perceptions regarding nutrition education during prenatal care visits in a group of overweight pregnant women.

Methods: Qualitative study from the focused ethnography perspective. Inclusion criteria included: over 18 years of age, overweight, obese, and/or excessive weight gain during pregnancy. 13 semi-structured, individual interviews were carried out as well as three group interviews, with a total of nine participants. For data analysis, open and axial coding was performed.

Results: participants reported that professionals such as nurses, doctors, and gynecologists, given the generally limited access to nutrition care, are those who most often give diet and nutrition recommendations. These professionals, in most cases, restrict the recommendations to generic advice on which food groups to limit or include in daily consumption, without first considering prenatal micronutrient needs, nutritional state, and socioeconomic status of their pregnant patients. This leads to confusion in food selection as well as limited adherence to the recommendations. As such, women tend to give up when it comes to trying to adopt healthy eating behaviors.

This study confirms the importance of nutritionists and dietitians working with women before, during, and after pregnancy, especially given that it is vital to mitigate the intergenerational cycle of excess weight. Additionally, health professionals working in prenatal care need to be properly trained to adequately manage the needs of this population in a differentiated manner.

Conclusion: The nutrition education provided to overweight pregnant women does not contribute to a modification of dietary behaviors and habits, a situation exacerbated by the limited supply of nutritionists working in prenatal care.

Conflict of Interest: The authors declares no conflict of interest.

Keywords: overweight / obesity / pregnant women / perception / nutrition education

P104
CONSTRUCTION AND VALIDATION OF THE ULTRA-PROCESSED FOOD CONSUMPTION QUESTIONNAIRE (CAUP) IN MEXICAN SCHOOL-AGE CHILDREN

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Challenges of nutrition and public health in Ibero-America

Introduction: During the last decades, the diets in many countries have a dramatic increase in the consumption of ultra-processed foods (UPF) that have as main characteristic a high energy density, a high content of fats, sugars and sodium, so the consumption of these foods is involved in the development of chronic diseases such as obesity in adults and higher prevalence of metabolic syndrome in adolescents and alteration of lipoprotein profiles in children.

Objectives: To construct and validate one Ultra-Processed Food Consumption Questionnaire (*Cuestionario de Alimentos Ultra-Procesados, CAUP*) in children.

Methods: 14 items were designed to evaluate the consumption of UPF, according to various national and international classification sources; the present report presents early result about 58% of total sample. For the reliability analysis, the Cronbach's Alpha test was used; for the analysis of the validity the factorial analysis was analyzed with method of extraction of the principal components with the component rotation of Varimax with Kaiser.

Results: The feasibility of the factor analysis is assumed (KMO=0.6, p=0.00). Five factors are extracted that explain 68% of the variance: cakes, cookies, salty snacks, fruit drinks, meats and sweet snacks (factor 1); bread, cereals, and dressings (factor 2); ice cream, popsicles, yogurt and desserts (factor 3); soft drinks and potato derivatives (factor 4), instant soups (factor 5). There is interrelation between factors extracted with $R > 0.6$ and $p < 0.05$.

Conclusions: Ultra-Processed Food Consumption Questionnaire presents acceptable reliability and well-estimated validity in children; it is necessary to wait to complete the estimated sample size to conclude with its validation.

Conflict of Interest: Authors declare that there are no conflicts of interests.

Keywords: Ultra-Processed Food / Children / Psychometric properties

P105
COMPARISON WAIST INDEX/ SIZE AND WAIST INDEX/ HIP FOR THE ABDOMINAL OBESITY DIAGNOSIS IN CHILDREN AND ADOLESCENT

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Challenges of nutrition and public health in Ibero-America

Introduction: Obesity is a multifactorial, chronic public health problem with concomitant diseases; since the increase in abdominal adipose tissue leads to greater synthesis and release of adipokines and other substances, which can impair lipid and glucidic metabolism through increased insulin resistance, and increase cardiovascular risk.

Objectives: analyze the effectiveness of the waist/height index and waist/hip index to diagnose abdominal obesity in children and adolescent

Methods: cross-sectional descriptive study, sample 118 schoolchildren, from 5 to 15 years old who attend a sports complex. Nutritional status was evaluated using the anthropometric technique ISAK, using the Waist/Hip index (WHI) where according to Rodriguez (2015) obesity: men 0.91, women 0.89, Overweight: men 0.83, women 0.85 and the waist/height index (WHtI) where according to Hernandez (2015) obesity: women 0.50, men 0.51, overweight: women 0.47 and men 0.48

Results: 58.5% male, 41.5% female, average age of: 8.3 , waist 62.9 cm, hip 72.69 cm, size 131.7 cm WHtI 0.67, WHI .87 , The prevalence of obesity is higher in 98.6% males vs 91.8% female, being the most predominant age group in school according to WHtI, while WHI 41.2% overweight and 26.1% obesity, the combined analysis of overweight and obesity according to sex was presented more in male population with 76.8%. The WHI was the best predictive indicator for abdominal obesity (area under the ABC curve=0.61 (95% CI, 0.48-0.73), with sensitivity 0.6, while WHtI is more predictive [area under the ABC curve=0.59 (95% IC .0.46 - 0.73) when sensitivity is < 0.6

Conclusions: The literature shows that indicators of central obesity such as WHI are related and/or better predict the metabolic risk, since it indirectly evaluates abdominal fat, in addition to indicating the type of obesity, therefore it is an excellent nutritional index to be used as a diagnostic measure of nutritional status, in addition to being simple to apply, low cost and easy to interpret, favouring the prevention of chronic degenerative non-transmissible diseases.

Conflict of Interest: the authors declare no conflicts of interest

Keywords: waist hip index/ waist height index/ school children/ adolescent

development, cultural competency, ethics in health promotion, health and nutrition literacy, skin-to-skin contact and breastfeeding, and critical research methods. Research in Novanet, ProQuest and Eric-, and Google Academics. With analytical purposes, a knowledge map was designed. Keywords for academic search are at the knowledge map. Consultation meetings, 40 articles literature review.

Results: The dominant model used to deliver health education is biomedical, where messages are delivered in scientific language with low impact on community settings. The educational model strengthens autonomy; empowerment for health influences social determinants of health. Health literacy promotes control through education. Skin-to-skin contact is an easy and accessible intervention sustaining breastfeeding. Nutrition education and counseling during pregnancy have positive health outcomes. Adult education develops critical thinking and people's creative power; popular educations and critical pedagogy contribute to promote social change. A critical social research paradigm examines power relations and promotes reflection on social change. Community-based Research is rooted in communities; participants are at the center of the research. Cultural competency, cultural humility.

Conclusions: A critical pedagogy paradigm responds to communities' needs, acknowledges participants as protagonists of health advancement. Critical pedagogy eliminates the perception's disparities between health workers and community members. Critical health literacy and empowerment for health correspond to diverse populations' health perceptions. A reflective educator uses critical approaches to convey culturally sensitive health messages with positive results.

Conflict of Interest: The author declares that there is no conflict of interests.

Keywords: Community-Based Learning/ Health Literacy/ Skin-to-Skin Contact/Critical pedagogy/Cultural Competence

P106

COMMUNITY-BASED LEARNING AND HEALTH LITERACY OF SKIN-TO-SKIN CONTACT – LITERATURE REVIEW

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Challenges of nutrition and public health in Ibero-America

Introduction: Maternal and child health education are essential interventions in Latin America; Mother-infant skin-to-skin contact is a natural and accessible health practice with a high impact on health and nutrition; it is adequate to develop a new model of community based-learning. Critical pedagogical approach addresses the needs of communities.

Objectives: To analyze critical pedagogy and community-based research approach, to design Community-Based Learning and Health Literacy of Skin-to-Skin Contact

Methods: A bibliographic research strategy in seven areas: critical pedagogy, popular education and community

P107

INFANT HEAVY METAL EXPOSURE FROM THE BREAST MILK OF WOMEN LIVING IN THE GUATEMALAN HIGHLANDS

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Challenges of nutrition and public health in Ibero-America

Background and Objective: Human breast milk (BM) is the best vehicle for the delivery of essential nutrients to the infant. Nonetheless, it can also be a source of heavy metals, which not only are potentially harmful elements, but also the reflection of the environment in which the mother is living. The objective of this study was to determine the concentration of seven heavy metals (cobalt, nickel, arsenic, cadmium,

mercury, thallium and lead), in BM samples from urban women living in the Western Highlands of Guatemala.

Methods: Forty women signed informed consent forms to participate in this study, approved by CeSSIAM's Human Subjects Ethics Committee. The participants, up to 160 days postpartum, provided at least 30 mL of BM, which was homogenized, frozen and later sent to the laboratories of the Universidad de Granada, Spain, where they were microwave-digested and analyzed with ICP-MS (Agilent 8900 triple quadrupole) to determine the concentration and limit of detection (LOD) of each metal of interest.

Results: The median concentration ($\mu\text{g/L}$), percentage of samples with detectable levels above the LOD, as well as the LOD for each metal ($\mu\text{g/L}$) were: Cobalt 0.21 (97.5%), (0.0001); nickel 3.42 (90%), (0.0183); arsenic 0.00 (0%), (0.0196); cadmium 0.03 (67.5%), (0.0051); mercury 0.21 (100%), (0.0060); thallium 0.66 (62.5%), (0.0085); and lead 0.00 (22.5%), (N/A). These metals were within the minimum risk ranges in this sample Guatemalan women, except for the lead, with several cases in which the concentrations were 3-fold the safe range for this toxic element.

Conclusions: With the exception of arsenic, all the studied metals presented detectable levels in BM in this sample of Guatemalan women. Further research is required to assess the daily variations in concentration, as well as the impact of the chronic and cumulative exposure to these elements on the infants' health. The problem with lead requires specific and urgent attention.

Keywords: Heavy metals, breast milk, Guatemala

P108

STUNTING AND ANTHROPOMETRY IN OLDER ADULTS FROM THE WESTERN HIGHLANDS OF GUATEMALA: BODY MASS INDEX DISTRIBUTION BY SEX AND HEIGHT

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Challenges of nutrition and public health in Ibero-America

Background and objective: Stunting, overweight and obesity are prevalent public health problems in Guatemalan population (FAO et al 2018). The aim of this study was to measure anthropometric indicators of Body Mass Index (BMI) and stunting in adults over 60 years of age from the Western Highlands of Guatemala.

Methods: A total of 236 older adults (138 women, 98 men) were included in the study. Participation was voluntary and written consent was provided. The weight, height (H), armspan (A) and knee-height (KH) were measured. BMI was calculated for height measurements as follows: BMI1 (Weight/H²), BMI2 (Weight/A²) and BMI3 [Weight/(knee-height equation)²] (Bermúdez, 1999). Height less than 150.0 cm and 145.0 cm for women and men respectively were considered as stunting.

Results: The mean age \pm SD was 72.0 \pm 7.7 years (range between 60-95 years). The average BMI (kg/m^2) for women and men (W/M) was: BMI1 24.8 \pm 4.6/23.4 \pm 3.6, BMI2 23.8 \pm 4.6/20.5 \pm 3.0 and BMI3 24.7 \pm 4.7/22.6 \pm 3.7, with significant differences between sexes for each BMI ($p < 0.05$). All height measures were correlated to BMI in both sexes, finding a relationship only between A and BMI2 in women. The prevalence of stunting in women using H, A and KH was 72.5%, 49.3% and 72.5%, men 32.7%, 16.3% and 8.2% respectively. 45.6% of women and 32.6% of men were overweight or obese according to BMI1.

Conclusions: Women were more overweight-obese and presented more stunting than men. Differences in prevalence of low stature by sex, may be due to a difference between the size of lower extremities. Differences in height in older populations may be taken into account when evaluating older adults.

Keywords: anthropometry, older adults, Guatemala.

Thematic area: Challenges of nutrition and public health in Latin America

P109

DIFFERENCES OF HYDRATION URINARY BIOMARKERS BETWEEN LACTATING WOMEN FROM THE WESTERN HIGHLANDS AND FROM THE CARIBBEAN OF GUATEMALA

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Challenges of nutrition and public health in Ibero-America

Introduction: The hydration status can be affected by water consumption, weather and physiological state, like breastfeeding. According to studies conducted by CESSIAM in Guatemala Highlands using urinary osmolality, lactating women presented a certain degree of hypohydration.

Objective: To identify differences in hydration status among lactating women from two different geographical areas assessed by three different methods.

Methods: The study participants were lactating women who attended public health clinics in Quetzaltenango (n=13), and the north-eastern tropics in Livingston (n=40), Guatemala. The hydration status was measured using urinary density (Usg), urine osmolality (Uosm) and colorimetry (Ucol) in urine samples. The cut-off points to classify the hydration status as euhydration for each assessment method were: Usg \leq 1.010, for Uosm $<$ 800 mosm/kg and for Ucol 1 a 3. The comparison between geographical areas was done using t test and chi square formulas.

Results: The mean, standard deviation and ranges for the highlands and Caribbean women, were: Usg 1.016 \pm 0.006 (1.005-1.028) and 1.023 \pm 0.008 (1.006-1.037) ($p=0.003$); Uosm 699 \pm 370(201-1464) and 772 \pm 405 (642-902)($p=0.556$) and Ucol 3 \pm 2 (1-7) and 4 \pm 1(2-7) ($p=0.338$) respectively. The percentage of euhydrated women for the highlands and Caribbean were 61% and 27.5% ($p=0.031$), for Usg: 76.9%

and 62.5% ($p=0.274$), for Uosm; and 53.8% and 27% ($p=0.082$), for Ucol.

Conclusions: A significant difference between the Usg mean in two populations was found, which also indicates a significantly lower proportion of euhydrated women in the Caribbean. It is necessary to conduct more studies with a greater number of lactating women to stratify them by type and extend of breastfeeding.

Keywords: Hydration/euhydrated/ biomarkers/ lactating women/ Guatemala.

P110

DIETARY PATTERNS AMONG MEXICAN ADOLESCENTS LIVING IN THE URBAN AREA AND ADOLESCENTS LIVING IN THE RURAL AREA, HELENA-MEX STUDY

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Challenges of nutrition and public health in Ibero-America

Introduction. The description of the dietary patterns (DPs) allows knowing the food combinations generally eaten. This information is useful for implementing specific interventions, aimed at improving food selection and combination.

Objectives: To describe DPs among adolescents (12-17 years old) living in an urban area (UA) (Guadalajara) and adolescents living in rural areas (RA) (northern Jalisco), Mexico.

Methods: Cross-sectional study. Weight, height, and body fat percentage (BFP) were measured by bioimpedance and BMI was calculated. Participants completed two 24-h dietary recalls (one related to a weekend day) with the help of a nutritionist. Dietary recalls were analyzed with Nutricloud® software (average daily intake of energy, macronutrients, and food groups). The DPs were identified by principal component analysis using 15 food groups; DPs were classified into tertiles. U-de-Mann-Whitney (non-parametric variables), t-student, ANOVA with Bonferroni Post-Hoc (parametric variables; SD=standard-deviation) and Chi² (proportions) were applied. A value of $p<0.05$ was considered as significant.

Results: The study was carried-out in 428 adolescents (55.8% women; 52.6% from UA). The RA adolescents presented significantly higher BMI [mean=22.4kg/m² (SD=4.2)] and BFP [mean=27.7% (SD=9.5)], compared with UA adolescents [mean=21.6kg/m² (SD=4.5) and 25.1% (SD=10.7), respectively, $p=0.049$ and $p=0.008$]. There was no significant energy intake and macronutrient differences

between participants of both areas. The UA adolescents adhered to the following three DPs (31% variance): DPU1 includes red meat, corn products, prepared foods. DPU2 includes wheat products, sweetened drinks, industrialized foods, dairy products, legumes. Men and those with lower BFP adhered significantly to this DPU2 (Tertil_3), compared with those with less adherence (Tertil_1). DPU3 includes sugar-free drinks, whole grains, fruits, vegetables. RA Adolescents adhered to the following three DPs (31.5% variance): DPR1 includes rice, legumes, poultry, fruits, vegetables. DPR2 includes dairy products, industrialized foods, fats, fruits, wheat products. DPR3 includes red meat, corn products, sugar-free beverages, and sweetened drinks. Men and those with lower BMI and BFP adhered significantly more frequently to this DPR3.

Conclusions: There are no significant differences in energy intake and macronutrients among adolescents from UA and RA; however, differences in the DPs were identified.

Conflicts of interest: The authors declare that they have no conflicts of interest.

Keywords: Dietary patterns / adolescents / Mexico

P111

CLASSIFICATION OF NUTRITIONAL STATUS BY AGE GROUPS AND DEVELOPMENT OF OBESITY IN YOUNG PEOPLE WITH DOWN SYNDROME OF THE FUNDACIÓN LUISA FERNANDA SIMDROME DOWN OF MEDELLÍN, COLOMBIA

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Challenges of nutrition and public health in Ibero-America

Introduction: Investigating obesity is essential, especially when it comes to specific groups with permanent special needs, such as population with Down Syndrome (SD)

Objectives: Determine the classification of the nutritional status by age groups and the development of obesity in population with Down syndrome.

Methods: Descriptive, relational and cross-sectional study; Children and adolescents (53% men and 47% women) between 9 and 14 years old were evaluated, separated into three groups as follows: 9-10 years (33%), 11-13 years (60%), and over 14 years (7%); using the WHO method to determine BMI / Age and, additionally, the Brazilian parameters for classification of nutritional status, since these were constructed after evaluating the Latino population with this condition.

Results: There is a relationship between the classification of nutritional status and BMI / Age, finding that between 9-10 years, 50% of men and 29% of women were classified as deficit. In the group of 11-13 years, 38% of men and 71% of women were classified as adequacy, showing a change that, according to other studies, could lead to obesity. Perhaps triggered by modifiable environmental factors, like those found in this study, such as a food pattern with abundance of

energy foods, largely ultra-processed, to the detriment of groups such as fruits and vegetables, in direct correspondence with the levels of excess weight observed, since 13% of men over 14 years presented obesity, culminating in the process of progressive increase in body weight.

Conclusions: The nutritional status classification methods for people with SD are not recognized or validated in all countries, so the studies are not easily comparable in Colombia. It is proposed to conduct longitudinal studies to determine the relationship between the nutritional classification of each individual throughout the life course. In this way, confirm and correlate findings of this study, as well as derive relevant tables and homologated them with the International ones.

Conflict of Interest: None declared.

Keywords: Body Mass Index / Down syndrome / obesity.

P112

FOOD HABITS, DIETARY SUFFICIENCY AND NUTRITIONAL STATUS IN CHILDREN BETWEEN 6 AND 18 MONTHS FROM THE CITY OF SANTIAGO DE CHILE

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Challenges of nutrition and public health in Ibero-America

Introduction: Diet among children presents specific qualitative and quantitative characteristics. For this reason, the variety and adequacy of the diet, in both quantity and quality, have great relevance in order to achieve optimal growth and development.

Objective: To identify the dietary characteristics and nutritional status in children between 6 to 18 months old in the city of Santiago.

Methods: A retrospective study, Dietary intake was assessed by a validated 24-hour Recall Survey through 4 to 7-days, applied on mothers of children. The data obtained then was analyzed with The Food Processor 11.3 software. Demographics, anthropometry and dietary intake were assessed. The numerical variables were shown as averages and standard deviation, and compared with Student's test. The categorical variables as percentages, compared with the chi-square test. A $p < 0.05$ was considered significant and the statistical analyzes were performed with SAS 9.4 and SPSS 17.

Results: The sample consisted of 199 children, 54.8% women, 53.3% from 12 to 18 months of age. Nutritional status: 0.5% of malnutrition, 8.5% risk of malnutrition, 62.3% normal, 21.1% overweight and 7.6% obesity. 59.3% of the children referred a number of meals according to their age, while their daily energy consumption had an adequacy of 90.1% in calories, 190.7% protein, 142.2% carbohydrates, 64.5 % lipids, 13.1% vitamin D, 104.2% calcium, 113.8% iron and 107.7% zinc.

Conclusions: In this sample of children between 6 and 18 months, high representativeness of the nutritional states in

relation to the national prevalence was observed. Regarding dietary patterns, 4 out of 10 children referred a higher numbers of meals per day than those suggested at their age according to ministerial guidance, in addition to having high protein and carbohydrate intakes, and low lipid and vitamin D.

Conflicts of interest: The authors declare no conflict of interest.

Keywords: food habits, food intake, nutritional status, children.

P113

MALNUTRITION AND FOOD PRACTICES INDICATORS, IN CHILDREN UNDER 24 MONTHS: ANTIOQUIA, COLOMBIA 2019

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Challenges of nutrition and public health in Ibero-America

Background: The World Health Organization (WHO) encourages the monitoring of infants and young child feeding practices (IYCF) to promote healthy habits and learn about the progress in the global feeding strategy. Colombia registers different burdens of malnutrition in child population that affects nutrition in the first 1000 days of life with serious implications for health and human capital.

Objectives: Evaluate the compliance of the indicators IYCF in the different malnutrition status of the children under 24 months for the Antioquia department, Colombia 2019.

Methods: Descriptive observational study. We use data from the Food and Nutrition Profile of the Antioquia Department of 2019. Sociodemographic variables, indicators IYCF and anthropometry according to WHO were analyzed. The information was available for 265 children under 24 months.

Results: Of the households evaluated, 78.1% had food insecurity, 49.4% without service of potable water. Median household income, USD 241.82. The prevalence of stunting, wasting and underweight ($\leq 2Z$ Length / Age, Weight / Length, and Weight / Age) was 6.4%, 2.6% and 1.1%, respectively. Childhood overweight was 6.4% (Weight / Length $> 2Z$). In the groups of stunting and overweight, the indicators IYCF with the highest rates of non-compliance correspond to exclusive breastfeeding (100% and 80%, respectively), followed by the indicators of adequate breastfeeding for age, predominant and continues until year and two years, minimum acceptable diet (MAD) and bottle feeding. In wasting the high non-compliance was in the indicators such as MAD, minimum dietary diversity, bottle feeding and consumption of iron-fortified foods.

Conclusions: Colombia has little documentation of the analysis proposed in this investigation. This approximation suggests the possible effect of inadequate feeding practices on child malnutrition, strengthens the protective role of breastfeeding and encourages the need for priority

understanding and monitoring, of complementary feeding indicators.

Conflict of interest: The authors declare that they have no competing interests.

Keywords: infant and young child feeding/ WHO feeding indicators/ child growth/ stunting/ wasting/ overweight.

P114

DESIGN OF A SCHOOL FOOD AND NUTRITION PUBLIC POLICY "STUDY WITHOUT HUNGER" IN PANAMA. DIAGNOSTIC STUDY

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Challenges of nutrition and public health in Ibero-America

Introduction: Malnutrition, due to deficit and excess, are scourges that continue to affect the child population of Panama. To this reality, the inadequate dietary diversity and the insufficient knowledge concerning food are added.

Objectives: To determine the food-nutritional and cognitive-behavioral situation about the feeding of schoolchildren belonging to the pilot study "Study without hunger."

Methods: This is an analytical and cross-sectional study in 660 schoolchildren from four educational centers of different sociodemographic and low economic level conditions in Panama (urban, rural, and indigenous). An anthropometric evaluation was carried out according to the WHO 2007 growth standards. Sociodemographic and dietary diversity data were obtained. A previously validated test on cognitive-behavioral aspects about diet was applied.

Results: the mean and standard deviation (SD) of age was 9.1 ± 2.6 years (49% female). 30.9% had overweight (BAZ \geq 1DE), 1.9% wasting (BAZ \leq -2.00 DE), and 29.8% Stunting (HAZ \leq -2DE). 46.7% of schoolchildren reported a low dietary diversity index, 32.4% medium, and 20.8% high. The most frequent consumption was of cereals 97.3% and meats 71.5%; fish consumption was deficient (14.3%). In the cognitive and behavioral aspects, it was observed that only 20.7% of the students recognized the messages of the food-based dietary guidelines of Panama; 19.73% considered sweets and sugary drinks as food; 39.2% consume sugary drinks instead of water, and 56% indicated that they eat unhealthy foods.

Conclusions: High proportion of overweight observed, as well as poor eating habits before the implementation of Panama's new school food and nutrition policy "Studying without Hunger."

Conflict of Interest: Authors declare no conflict of interest.

Keywords: school feeding / overweight / malnutrition / food / and nutritional education.

P115

BIOCHEMICAL AND ANTHROPOMETRIC ASSESSMENT OF A HOUSEHOLD POPULATION COMPARED TO ITS BODY AND HEALTH PERCEPTION

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Challenges of nutrition and public health in Ibero-America

Introduction: There are data that indicate that obesity is higher among housewives. A central part of the control of the epidemic is the definition of normality and what society perceives as normal or abnormal. It is clear that the appropriate body image receives cultural influences, verbal or not, and it is possible that people do not perceive the problem properly and therefore do not think of preventive / corrective measures.

Objectives: Compare biochemical and anthropometric measurements with the self-perception referred by the participating housewives.

Methods: 81 housewives participated between 30 and 60 years of age. The anthropometric evaluation and the measurement of blood pressure, glucose, cholesterol and triglycerides were performed, in addition the people declared their perception of their body weight and the biochemical parameters mentioned above.

Results: It was obtained that the average BMI was 29.48 ± 5.16 kg / m² and average waist 89.84 ± 11.66 cm. Regarding biochemical parameters, the average glucose was $107.78 + 38.04$ mg / dl, cholesterol $186.91 + 38.61$ mg / dl and triglycerides $192.54 + 75.49$ mg / dl. According to BMI and body perception, only 13.1% were correctly perceived with an ideal weight, 21.7% overweight and 3.5% with obesity, undervaluation of weight in obese people was frequent. According to waist circumference, 55.5% have a substantially increased cardiovascular risk. Women under 40 tend to perceive better when they are overweight. Many participants had high blood sugar levels and high triglyceride levels, but their perception was underestimated. Cholesterol levels and blood pressure measurement were correctly perceived.

Conclusions: Personal perception is a determining factor in lifestyle and has an impact on the acceptance of health problems such as obesity and overweight, since people who perceive themselves wrongly present a greater risk to their health.

Conflict of Interest: The authors declare no conflict of interest.

Keywords: Health perception / household/ health

P116
THE IMPACT OF INTIMATE PARTNERS VIOLENCE ON THE DEVELOPMENT OF EXCESS WEIGHT IN INFANTS

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Challenges of nutrition and public health in Ibero-America

Introduction: Physical intimate partners violence (PIPV) and obesity are significant global health problems. Currently, there is a dearth of research examining the relationship between PIPV and overweight and obesity in early childhood.

Objectives: To explore the relationship between PIPV and the development of excess weight in the first five months of life.

Methods: Cohort study that followed the growth of 599 newborns attended at health units in Rio de Janeiro- Brazil. Excess weight was assessed using the indicator "Body Mass Index (BMI)-for-age", categorized as: absent (\leq score- z +1 SD) and risk of excess weight ($>$ score- z +1SD), combining the "risk of overweight", "overweight" and "obesity" categories. PIPV was investigated using the Portuguese version of Conflict Tactics Scales - Form R. The associations between PIPV and infant's excess weight were assessed at different times in the first five months, using logistic regression models based on relative risks (RR) and their 95% confidence intervals (95% CI).

Results: PIPV doubled the risk of developing excess weight during the first five months of life - incidence in relation to the baseline (RR = 2.01; 95% CI = 1.00–4.04 ; p = 0.051) and in the fifth month of life - incidence in relation to the third month (RR = 2.39; 95% CI = 1.08–5.28; p = 0.031), even after adjusting for maternal age, mother's alcohol misuse and housing conditions.

Conclusions: These findings link PIPV to a risk for excess weight trajectory in infants in the first six months of life, and highlight the importance for identifying and providing support to families experiencing violence in their homes as a way to provide a safe family environment and also ensure the healthy growth and development of children.

Conflict of Interest: The authors declare no conflicts of interest.

Keywords: Intimate partner violence/ infants/ overweight/ cohort study.

P117
CARDIOMETABOLIC RISK AND BARRIERS FOR A HEALTHY LIFESTYLE IN SONORAN ADULT WOMEN

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Challenges of nutrition and public health in Ibero-America

Introduction: Currently, the high prevalence of chronic diseases in women has led to analyze the context and practices linked to lifestyle in stages before the onset of the disease.

Objectives: the objective of this study was to analyze the cardiometabolic risk, through HDL-Cholesterol and triglycerides serum level, blood pressure and waist circumference, and to determine the barriers that prevent adult women from leading a healthy lifestyle.

Methods: A descriptive study was conducted in a sample of 61 pre-menopausal adult women between 25 and 50 years of age, residing in Hermosillo, Sonora, Mexico. A survey was used to know the sociodemographic and economic conditions of women, and to identify the barriers that limit their healthy eating and physical activity. Cardiometabolic risk categorization was based on the presence of at least one of the following factors: waist circumference (CC \geq 88 cm), blood pressure (systolic \geq 130 mm Hg, diastolic \geq 85 mm Hg), hypertriglyceridemia (TG $>$ 150 mg/dL), and reduction in the serum concentration of high density lipoprotein cholesterol (HDL-C $<$ 50 mg/dL).

Results: The participants were mainly mothers (95%), work full time (77%), college graduate and higher (75%), married and living with a spouse (77%), and in nuclear families (66%). The prevalence of cardiometabolic risk factors in women was 64% according to HDL-C, 33% by TG, 64% by CC, and 20% by blood pressure. Among the motivations for eating healthy emphasizes disease prevention (84%), care of body weight (79%), and aesthetics (44%). In general, the main barriers to healthy eating identified by women were the lack of control over the way to eat at social reunions (48%) and the lack of time (46%). Concerning physical activity, the main barriers identified were lack of time (61%) and disgust for exercise (43%).

Conclusions: We found several cardiometabolic risk factors among the studied population, and lack of time was one of the main conditions for adopting a healthy lifestyle in women.

Conflict of Interest: The authors do not manifest any conflict of interest.

Keywords: lifestyle/ cardiometabolic risk/ healthy eating barriers/ physical activity barriers

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CONTEXT ANALYSIS OF MADRID PRIMARY HEALTHCARE PROFESSIONALS FOR A INTERDISCIPLINARY APPROACH WITH NUTRITIONISTS AND SPORTS SCIENTISTS AS PREVENTION AND TREATMENT HUMAN RESOURCE FOR SOME OF THE MOST PREVALENT CHRONIC DISEASES

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Challenges of nutrition and public health in Ibero-America

Introduction: Nowadays, unhealthy physical activity (PA) and dietary patterns are two leading morbi-mortality risks for public health. Different WHO strategies are trying to reduce non-communicable chronic diseases by PA and food action plans (1). Healthy lifestyles provided by the Healthcare (PHC) sector are emerging strategies for public health (2).

Objectives: To assess the self-perception of PHC General Practitioners (GPs) and nurses regarding the inclusion of nutritionists and sports scientists as a multidisciplinary team at Madrid PHC settings.

Methods: Two Google-form questionnaires previously designed and validated (lower-limit Aiken-V coefficient = 0.77) by our research group were sent by email to all GPs and nurses working at PHC centers in the Region of Madrid. Confidentiality was guaranteed. This protocol was approved by the Central Commission for research of the Region of Madrid and the Ethical committee of the Alcorcon Hospital. Differences between PHC respondents were analyzed by Chi-squared test (SPSS, 20.0version).

Results: A total of 319 GPs (76.5% females) and 285 nurses (88.4% females) answered the questionnaire. Almost 100% of PHC respondents admitted the health-related benefits of PA. In spite of that, less than 37% considered it only for some patient's profiles. Besides, only 14.7% of GPs and 75.7% of nurses knew correctly current WHO PA guidelines.

The respondents showed willingness for a collaborative approach of sports scientists (60.09%) and nutritionists (61.58%) with PHC staff. Nurses showed to be 31% more likely to collaborate with sports scientists than GPs (OR 1.31) and GPs 27% more likely to collaborate with nutritionists (OR 1.27); without significant differences between them.

Conclusions: Nurses and GPs working at PHC in the Region of Madrid agree to collaborate with sports scientists and nutritionists as a collaborative approach for implementing active and healthy lifestyle treatments at PHC settings.

Conflicts of interest: None

Keywords: Public Health, Complementary Medicine, Exercise, Diet Therapy.

References: 1. WHO. Global Action Plan for the Prevention and Control of Non-communicable Diseases 2013-20. Switzerland, 2013. 2. WHO. Promoting physical activity in the health sector. Current status and success stories from the European Union Member States of WHO European Region. Denmark, 2018.

P119

TRENDS TO INCREASE OVERWEIGHT AND OBESITY IN MEXICAN URBAN SCHOOL CHILDREN

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Challenges of nutrition and public health in Ibero-America

Introduction: In 2016, overweight and obesity (OW+OB) were declared as an epidemiological emergency in the Mexican population. The development of obesity at an early age increases the risk of developing chronic noncommunicable diseases. In 2010, in the state of Hidalgo it was found that the prevalence of OW+OB was higher in boys (30.5%) than in girls (26.5%), which affected the population residing in urban areas (35.4%) more than in rural (23.2%).

Objective: Evaluate the trends of overweight and obesity in girls and boys in urban areas of Hidalgo, Mexico from 2014 to 2017.

Methods: A cohort study was conducted from 2014 to 2017, in 548 girls and 511 boys aged 6 to 9 years old. The sample was selected randomly, from a list that included all the schools in urban areas that belonged to the municipalities identified with the highest prevalence of OW+OB in the state of Hidalgo. Anthropometric measurements were performed annually to determine the nutritional status of the population. The Chi-squared test was used to evaluate the differences by sex and year.

Results: The increase in OW+OB was greater in boys compared to girls. In 2014, the prevalence of OW+OB was 38.0% in boys and 29.9% in girls ($p < 0.01$), 2015 of 40.5% in

boys and 30.6% girls ($p < 0.01$), 2016 of 45.6% in boys and 36.5% girls ($p < 0.01$) and in 2017 49.3% in boys and 38.1% girls ($p < 0.01$). The greatest increase in BMI/age occurred in the second year in both sexes at the end of the study. The increase in OW+OB was 11.3 percentage points (pp) in boys and 8.2 pp in girls.

Conclusions: The trend of OW+OB for school-age children was high, with the highest prevalence in boys. Interventions are required in the first years of basic education because this research identified the largest increase in OW+OB in the second year of follow-up.

Conflict of Interest: There are no conflicts of interest.

Keywords: trends / overweight / obesity / school-age children

P120

IMPACT IN NUTRITIONAL STATUS AND DIET PROGRESSION OF A NUTRITIONAL CONSULTATION AFTER STOMA CONSTRUCTION

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Challenges of nutrition and public health in Ibero-America

Introduction: In ostomized patients the oral diet reintroduction should be performed progressively. In addition, malnutrition is a longterm complication.

Objectives: Our objective is to evaluate the impact of a nutritional consultation at discharge in these patients.

Methods: A prospective study was performed. At discharge, the patient has two appointments with dieticians for assessment and diagnosis, a review of diet progression and nutritional treatment. The patient's weight was recorded and nutritional profile was requested (albumin, prealbumin) at 7-10 days (visit1) and a month later (visit2). Statistical analysis was performed.

Results: 77 patients were recruited, 65.7±12.5years, 74%men, 54.5% colostomies. Nutritional diagnosis at Visit1 was 37.1% good nutritional status, 16.1% nutritional risk, 19.4% mild malnutrition*, 22.6% moderate* and 4.8% severe*; At Visit2 was 62.9% good nutritional status, 24.2% nutritional risk and 6.4% mild malnutrition*, 4.8% moderate*, 1.6% severe* (*All protein-calorie). Weight's difference between Visit1 and Visit2 was +1.1±3.7kg ($p=0.001$). The mean nutritional parameters measured between Visit1 and Visit2 were respectively: Albumin 3,6g/dL and 4,1g/dL (+0.5±0.4, $p=0.002$), PreAlbumin 21.3mg/dL and 26,4mg/dL (+8.1±7.1, $p=0.003$). At Visit1 5.2% of the patients tolerated soft diet, 50.6% complete, 2.6% astringent and 35.1% low-residues; 42.9% required oral supplementation (mean extra 800kcal/patient). At Visit2

71.2% tolerated complete diet requiring supplementation 33.8% (mean extra 600kcal/patient)

Conclusions: The nutritional consultation for ostomized patients has allowed us to achieve a good nutritional status or maintain the nutritional status in most patients with a correct transition of the diet and an optimization in the use of oral supplements.

Conflict of Interest: There are no conflicts of interest to declare.

Keywords: nutritional status/ stoma / nutritional intervention

P121

ANALYSIS OF THE IMPLEMENTATION POTENTIAL OF AGROECOLOGY ACTIONS AS A PROMOTER MAY OF HEALTH IN RIVERSIDE COMMUNITIES

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Safe, healthful and sustainable food

Background: Seek alternatives that involve the conscious use of natural resources with lower environmental impact aiming at greater availability and quality of feeding can be a viable strategy for health promotion in disadvantaged socioeconomic populations.

Objective: Identify the potencialities and weaknesses for the agroecological development of riverside communities on the Tapajos and Cupari rivers (PA), Brazil.

Methods: Descriptive cross-sectional study conducted with a sample of 104 individuals interviewed in a structured questionnaire, which aimed to know the reality and demand of riverside communities in the Brazilian Amazon, with regard to agricultural practices and community infrastructure. The outcomes used for each variable were potency and fragility. The analysis was descriptive and data was categorical, expressed as a percentage.

Results: The predominant agricultural practice is for subsistence, ratified by average 3.09 family members involved in cultivation activity. Regarding the analysis of the region's agroecological potential, the potentials identified in this study were: cultivation of crops (90.62%), fruits (97.91%), vegetable garden (67.85%), have fruit trees and animals in the vicinity of the residence (94.79%), use plants as medicine (85.41%) and sell cultivated products (70.83%). The weaknesses found were the lack of technical assistance for cultivation (78.12%) and difficulties for the agricultural sector (79.17%). The main problems raised were socio-political order (34.37%), lack of transport (23.95%), lack of agricultural inputs and technical assistance (21.87%) and geographical and climatic issues (8.33%). The most cited socio-political difficulties were the difficulty to sell the products and lack of government incentive.

Conclusions: The agroecological potential of the communities involved in this study is high and promising as

the riverside people are familiar with agricultural management practices, with a large territorial extension. However, it is observed that the lack of technical assistance and government incentives represent difficulties for this potential to be fully achieved. Public policies aimed at encouraging agroecology in this region can significantly contribute to the promotion and quality of life in this population.

Conflict of Interest: None.

Keywords: agroecology / riverside / nutrition / health promotion / sustainability.

P122

COMPARATIVE STUDY TO DETERMINE THE CLASSIFICATION AMONG THE MOST CONSUMED CREAMS IN MEXICO USING PATTERN RECOGNITION

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Safe, healthful and sustainable food

Introduction: Cream is one of the most versatile ingredients in Mexican and international cuisine; however, because of its caloric contents, it is necessary to take care of the amounts ingested. According to the Official Mexican Standard NOM-193-SCFI-2014, cream can be classified by its fat and protein contents into: cream, premium cream, heavy cream, table cream and light cream.

Objective: Determine without bias if there is a significant difference among the most consumed creams in Mexico using pattern recognition techniques and considering only their nutritional contributions.

Methods: Based on the Profeco quality studies conducted in 2014 and 2019, the reported nutritional values in 100 g portions of the most consumed cream brands in Mexico were compared; pattern recognition techniques such as PCA and three unsupervised classification algorithms were used to classify them: *k*-means, Gauss and Spectral.

Results: It was found that with regarding the creams analyzed in 2014, the model distinguishes two classes: table cream and the rest. While in 2019 the distinguished classes are: light vegetable creams and the rest. In both cases the rest indicates that there is no significant difference among the different types of creams in Mexican market. The differences between the two groups in the years analyzed are evident when graphing two of their principal components of PCA, which maintains an average representativity of 88.7%. It was also observed that the average trend of creams from 2014 to

2019 was to decrease the amount of fat by 2.79%, increasing the protein 0.24 g and sodium by 131.4 mg.

Conclusions: According to the Standard NOM-193-SCFI-2014 and the labeling of the products, there should be a significant difference among the distinct types of creams in the market, but the results of the proposed model show that the difference only exists for table creams in 2014 and for light vegetable creams in 2019.

Conflict of Interest: None.

Keywords: Creams / comparative study / pattern recognition

P123

FOOD SECURITY AND PREVALENCE OF ELEVATED GLUCEMIA IN WOMEN OVER 55 YEARS OLD ATTENDING COMMUNITY DEVELOPMENT GROUPS IN A VULNERABLE AREA OF TLAQUEPAQUE, JALISCO

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Safe, healthful and sustainable food

Introduction: During old age, food insecurity (FI), in addition to economic problems, is associated with impaired health and a relationship has been observed between the presence of diabetes and the development of FI as a consequence; on the other hand, FI has also been associated with higher glucose levels, especially in older adults (OA).

Objectives: To know the level of food security (FS) and the prevalence of high blood glucose in women over 55 years.

Methods: Cross-sectional study. 38 women >55 years old, from an area of high marginalization in Tlaquepaque, Jalisco participated. The Latin American and Caribbean Food Security Scale (ELCSA) was applied, which assesses the level of perception of food security. Fasting glucose capillary samples were taken and classified according to the ADA as subjects with normal glucose (NG less 126 mg / dl) or high glucose (HG ≥ 126 mg / dl).

Results: The total sample included 38 women, of which 10.5% perceived having FS and of these 5.3% presented NG and 5.3% HG. On the other hand, 34.2% had mild FI, of which 21.1% showed NG and 13.2% HG, 36.8% reported moderate FI, which represents 18.4% of the total with NG and 18.4% with HG; finally, severe FI was estimated at 18.4% of which corresponds to the total sample 5.8% with NG and 2.6% with HG.

Conclusions: The results of this study show that almost 90% of the sample perceives some level of food insecurity. In addition, of the total sample almost 40% has HG. This is consistent with what has been reported in other studies, where there is a relationship between the level of FI and the presence of diabetes or HG, which is greater than the national prevalence in OA.

Conflict of Interest: The authors declare that there is no conflict of interest.

Keywords: Food Security / Glucose / Older Adults.

P124

FOOD SECURITY LEVEL AND SOCIO-ECONOMIC LEVEL IN ADULTS OVER 55 YEARS OLD FROM A MARGINALIZED COMMUNITY OF TLAQUEPAQUE, JALISCO

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Safe, healthful and sustainable food

Introduction: Food security (FS) is defined when someone has physical and economic access to enough safe and nutritious food in quantity and quality, to meet their needs. Conversely, having limited or no access is known as food insecurity (FI).

Objective: To estimate the food security and socioeconomic levels in adults over 55 years old from a marginalized community in Tlaquepaque, Jalisco.

Methods: A cross-sectional and descriptive study was performed. FI was measured using the Latin American and Caribbean Food Security Scale (ELCSA). Also, the AMAI questionnaire was applied to classify the socioeconomic level of each household.

Results: Data on 46 subjects was collected (85% females). The prevalence of FI was 87.0% on which 34.8% had mild, 30.4% moderate and 21.7% severe. Only 13.0% perceived their situation as FS. According to the AMAI socioeconomic level, no subjects were found at AB, C+ and C. The distribution of the sample was located in the following categories: C- (n=3, 6.5%), D+ (n=3, 6.5%), D (n=28, 60.87%); finally, level E with 12 (26.07%).

Conclusions: Over half the subjects had moderate and severe FI and the majority had a family with a socioeconomic level D or below. This implies that at least half of these families have an educational level maximum of primary education and spend about half of their income on food. These results are consistent with the persistent social vulnerability of older adults in Mexico.

Conflict of Interest: The authors declare no conflicts of interest.

Keywords: Food security /socioeconomic level / food insecurity / poverty

P125

HUAUZONTLE (*Chenopodium nuttalliae* S.) AS A FOOD ALTERNATIVE

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Safe, healthful and sustainable food

Introduction: The huauzontle (*Chenopodium nuttalliae* S.) of the nahuatl: *huautli* bledo and *tzontli* hair, bledo as a hair. Is an edible plant native to Mexico, that dates back to pre-Hispanic times which was one of the main foods of the Aztec civilization and other civilizations in America. Unlike other foods, the huauzontle is used to the fullest because are consumed the seeds, leaves, branches and flowers of the plant. Also, it has high resistance to cold and dry climates including poor soils, its main producers are in central Mexico, despite its flexibility of harvest, currently the huauzontle has lost its value in Mexican culture.

Objectives: The aim of this study was to analyze the nutrient content of huauzontle (*C. nuttalliae* S.) to demonstrate the importance of this Mexican product in the diet.

Methods: The work was carried out in two stages, the first one, in summer 2018 by conventional sampling in the town of Atlixco, Puebla was carried out the collection of samples of the huauzontle. In the second stage, was carried the botanical classification and later the proximal chemical analysis on a dry basis according to the methods of the AOAC, 1995 to quantify humidity, proteins, lipids, inorganic matter, fibre and soluble carbohydrates.

Results: The botanical description of the plant indicates that this *Chenopodiaceae* corresponds to the genus *Chenopodium* and the species *nuttalliae* S. The nutritional content expressed values of humidity 38.6%, dry matter 61.4%, protein 28.36%, lipids 3.87%, inorganic matter 15.56%, fiber 10.33% and soluble carbohydrates 41.89%. Huauzontle has a low percentage of humidity, which provides more macronutrients, in which are highlighted soluble carbohydrates, proteins and minerals.

Conclusions: This plant complies with the basic nutrients of the diet for the human, being accessible by the town, to other than being a plant of easy cultivation, with availability and use from march to september.

Keywords: Food / Huauzontle / Nutrition

P126

CONSUMPTION OF YERBA MATE (*Ilex paraguariensis* A.St.-Hil.) AND AVAILABILITY OF CRITICAL MICRONUTRIENTS IN COLD INFUSION OF TWO COMMERCIAL TYPES

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Safe, healthful and sustainable food

Introduction: Yerba mate is a basic food of the Paraguayan population, considering that it contains several nutrients and some critics such as iron, calcium and vitamin C, its consumption is widely spread in various forms such as tereré (cold infusion), mate (hot infusion) and cooked mate.

Objectives: The main objective of the research was determine the consumer profile and the availability of micronutrients (Fe, Ca and vitamin C) contained in the cold infusion of two commercial types of yerba mate. To concret this: the typical consumer was characterized; consumption habits were determined; The physicochemical and sensory composition of the conventional (M1) and organic (M2) yerba mate samples were determined, and finally the content of the micronutrients available in the cold infusion was quantified.

Methods: To establish the consumer profile, a national survey was carried out, through which demographic and behavioral variables were surveyed; Regarding the availability of nutrients, official analysis methodologies were taken as references based on the physicochemical and sensory quality standards for yerba mate of the type prepared according to the Paraguayan standard NP 35 001 93. Likewise, the amount of micronutrients present in the cold infusion was quantified using instrumental methods.

Results: As a result, the type of yerba mate consumption profile of the present study was defined as: mostly women; between 25 to 34 years. That live in the central region of the country; with tertiary studies; composition of the household of 4 members; daily consumption and weekly amount used between 500 to 1000g per person; the most consumed forms were in order of declaration. Tereré, matte and cooked, from the elaborated compound and conventional type preferably, although there is knowledge of the existence of the organic type, its consumption is even less.

Conclusions: The samples analyzed complied with the reference regulations for the physicochemical and sensory quality parameters. Finally, no significant difference was found between the availability of micronutrients in the cold infusion of M1 and M2.

Conflict of Interest: Does not apply

Keywords: yerba mate / cold infusion / micronutrients / consumer profile

P127

PROMOTION OF TARO CONSUMPTION IN VERACRUZ, MEXICO FOR FOOD SECURITY

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Safe, healthful and sustainable food

Introduction: In the last thirty years, taro (*Colocasia esculenta*) has become a commercial crop in Veracruz, Mexico. Mainly because the internal market is yet undeveloped, almost all production is exported to the USA. However, nutritional properties such as A vitamin content, Calcium and high quality starches, makes taro an important alternative to increase food security in poor tropical areas where the plant is now farmed.

Objectives: To obtain a better understanding of the different processes involved in the diffusion and adoption of taro as part of food security programs.

Methods: A qualitative approach was used. A number strategies were implemented amongst rural communities in taro production areas of Veracruz, Mexico. Study cases analysed included participative workshops, television programs, promotional videos and University interventions.

Results: An increasing awareness of nutritional properties of taro amongst rural families of Veracruz has been noted. Apparently, all strategies have proved to be useful, but participatory workshops with women in the communities seemed to be an effective way to promote the inclusion of taro as part of the family diet in a regular basis.

Conclusions: Taro has the potential to improve food security in tropical areas of Mexico where the plant is produced.

Conflict of Interest: There is no conflict of interests.

Keywords: taro / *Colocasia esculenta* / Veracruz

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FOOD LOSSES OF STRATEGIC ITEMS OF FAMILY FARMING IN PARAGUAY

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Safe, healthful and sustainable food

Introduction: Food systems have direct and indisputable consequences on the health of humans and the planet. However, even though food is the fundamental axis of agriculture, equal attention has not been paid to losses along the agri-food chains, which are considered higher in fresh fruit and vegetable foods. Due to the lack of reliable data, decision-makers have not become aware of the importance of

intervening to minimize these food losses, thus wasting limited resources for vulnerable groups, who in turn depend on their commercialization to access other basic goods.

Objectives: Due to the need to count with accessible information, the quantification of the volume of losses, as well as nutrients and economic resources, was proposed as a general objective. An exploratory descriptive type was delimited, being case studies of three (3) strategic items, tomato (*Solanum lycopersicum* L.) marketed in the main wholesale market; banana (*Musa cavendish*) and strawberry (*Fragaria sp.*) on the farm.

Methods: The Agri-food Chain Evaluation Methodology (MECA) was applied, where the key and applicable components were included within the selected chains.

Results: The main results indicate that the losses for tomato reach 4.72%. On the other hand, in the banana chain, the loss in the production system turned out to be 2%; considered low in both cases, however, the economic quantification represents a value that can be considered important. In the case of the strawberry, on the contrary, the losses reached 26% of the total produced. Regarding the loss of nutrients, they register high fiber values; strategic micronutrients (vitamins A and C mainly) and minerals; which in turn are limiting in the Paraguayan diet.

Conclusions: For the conditions of the investigation, it can be concluded that there are significant losses at the level of volume, nutrients and economic value, with its consequent negative effect on the profitability of the items and family income, so it is necessary and urgent to search solutions that allow the reduction of fruit and vegetable losses.

Conflict of Interest: Does not apply

Keywords: quantification of losses / fruit and vegetables / MECA / postharvest / agri-food systems.

P129

PERCEPTIONS AND BELIEFS AROUND FOOD PRACTICES OF LADINA WOMEN DURING BREASTFEEDING: A QUALITATIVE FROM THE CARIBBEAN OF GUATEMALA

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Safe, healthful and sustainable food

Introduction: Worldwide there are cultural factors that impact on breastfeeding practices. In Guatemala, a culturally diverse country, exists beliefs and food practices during breastfeeding among mothers that may influence infant nutrition, which can vary according to geographical areas or cultural background.

Objective: To explore perceptions, beliefs and food practices of breastfeeding among *Ladino* women (Mestiza) from the Caribbean of Guatemala.

Methods: This study as part of a wider research aimed to explore traditional recipes, beverage consumption and fatty

acid foods sources among breastfeeding women one of the three ethnic groups (ladino) from the Caribbean area (Izabal) of Guatemala. The study was approved by an ethics committee and conducted from June to August 2019. Women participation was voluntary, and the recruitment was held in a public health center. Semi-structured interviews in Spanish were recorded and audios were transcribed *verbatim* for subsequent narrative analysis.

Results: Nine interviews with a mean duration of 8:08 min, were conducted with ladino mothers, who reported had children between 10 months and 21 years. Most of them were housewives (n=5). They perceived that certain types of food consumed during breastfeeding have several effects on breastmilk as well as on their childbirth recovery. Participants reported to avoid beans, milk, fish, coconut and chili, due to the perceived negative effect on breast milk quality that also affect their children's health. The food avoidance practice and diet changes are also derived from previous experiences. The advice of grandmothers, other experienced mothers and health care providers are also valuable for breastfeeding mothers.

Conclusion: In order to provide the best care for their children Lactating Guatemalan mothers change their food consumption; therefore, in future studies, it would be important to determine, the effect from avoiding or adding food items to regular diet may affect their or their child's nutrition during breastfeeding.

Conflict of Interest: The authors declare no conflicts of interest.

Keywords: breastfeeding/ Guatemalan women/ food practices.

P130

UTILIZING A BLENDED APPROACH IN PUBLIC HEALTH NUTRITION INTERVENTIONS, A CASE STUDY IN VITAMIN A SUPPLEMENTATION IN MEXICO AND NICARAGUA

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Challenges for an effective and efficient public-private partnership in food and nutrition

Introduction: Vitamin Angels (VA) helps hard-to-reach populations around the world gain access to essential micronutrients. VA focuses on nutrition interventions in the first 1,000 days and up to five years through a network of more than 1,600 organizations (social, private, and government) in over 70 countries.

Objectives: To describe how Vitamin Angels' blended approach is successful in different country contexts, using Mexico and Nicaragua as case studies focusing on vitamin A supplementation (VAS).

Methods: VA's model integrates a blended approach by targeting its resources to varying organizations (social, private, and government) across multiple levels (local and

national). VA's resources are used to raise awareness to and advocate for evidence-based nutrition interventions, and deliver technical advisory services – to create the enabling environment needed to effect policy change and program implementation, ii) provide technical assistance (i.e., implementation research, learning solutions, and monitoring and evaluation) needed to facilitate launching or strengthening nutrition services, and iii) support partners to integrate evidence-based nutrition services.

Results: Utilizing this approach in Mexico, VA has successfully partnered with 30 local and national social organizations and five local government agencies currently covering ~400,000 children (4%) under five with VAS across 26 states. In Nicaragua, VA has partnered with an international social organization that coordinates directly with the Ministry of Health to provide VAS coverage to 674,000 children (100%) as well as with four local social organizations to reach an additional 10,000 hard-to-reach children (1%).

Conclusions: The implementation of this model shows that partnerships with social, private, and government organizations at the local and national levels in different country contexts is effective in achieving coverage for vitamin A supplementation, particularly among hard-to-reach populations.

Conflict of Interest: None

Keywords: vitamin A supplementation / implementation model / micronutrient deficiencies / Mexico / Nicaragua

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ILSI'S JOURNEY IN SCIENTIFIC INTEGRITY

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ILSI Argentina, Buenos Aires, Argentina, 2ILSI Norte América, Washington, DC, Estados Unidos.

Challenges for an effective and efficient public-private partnership in food and nutrition

Scientific integrity is fundamental to the mission and work of the International Life Sciences Institute (ILSI). Specifically, ILSI North America and its partners throughout the scientific community have been leaders in defining principles, guidelines, and best practices for establishing and maintaining the integrity of the scientific process when diverse stakeholders collaborate - now ILSI and its 16 entities are building on this work. As ILSI is a global organization that is present on the 5 continents, it faces challenges of implementing these findings of ILSI North America in regions of the globe where there are different cultures and ways of working. Nevertheless, ILSI continues to challenge themselves by building on its expertise and strengthening its efforts. This presentation will provide an overview of the expansive range of activities undertaken by ILSI as part of ILSI's journey in scientific integrity.

ILSI's commitment to a culture of scientific integrity is further demonstrated by the work accomplished over the last 18 months with the formation of a global scientific integrity group that has set priorities for ILSI's work on scientific integrity. ILSI's revised Mandatory Policies include ILSI's Principles for Scientific Integrity, which commits all members of the ILSI network to "the highest standards of scientific integrity in all their activities." To

facilitate compliance with these obligations, training will be made mandatory for staff and board members as a condition of continued employment or association with the ILSI entity. ILSI North America began implementation of the Center for Open Science Transparency Openness Promotion (TOP) Guidelines, fully embracing the scientific community's movement to greater transparency through open science.

In 2019, ILSI has made great headway in the development of new training materials that can be used broadly within the scientific community. The poster will include an overview of the training materials, learnings gleaned from implementation of the TOP Guidelines within ILSI North America and plans to adopt them across the ILSI network. It is hoped that new collaborations among sectors will be formed.

P132

KNEE OSTEOARTHRITIS AND METABOLIC SYNDROME: CURRENT STATUS. PERSPECTIVES FOR PREVENTION AND NUTRITIONAL ASSISTANCE

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Nutrition in the prevention and treatment of chronic diseases

Introduction and objectives: Osteoarthritis (OA) is a chronic illness and leading cause of subjective disability worldwide, mainly knee OA. Obesity and metabolic syndrome have been identified as risk factors for knee OA. A narrative review was done on the influence of the diet in the development and progression of OA.

Methods: A systematic review of the literature in Pubmed was conducted using the terms osteoarthritis, metabolic syndrome, antioxidants, diet, nutrition, fat, macronutrients, inflammation, gut microbiome, and Boolean combinations.

Results: Cellular metabolism is altered in OA, with an increase of catabolic processes and inflammation, which are responsible for tissue damage. The oxidative stress may play an important role in the articular homeostasis. Metabolic syndrome has now become an important aspect in some OA patterns, and is mainly related to alterations of lipid metabolism and antioxidant capacity. There is evidence of proinflammatory relation with the intestinal dysbiosis and a possible implication of the gut-brain axis in the pain related processes. The synergy between antioxidants and physical exercise has not been studied in the metabolic OA, and independently in very few studies. There is limited evidence on the positive impact of some micronutrients and diet components, like polyphenols, K and C vitamins, curcumin,

Boswellia Serratia and Avocado and Soy Unsaponificables (ASU). A protective effect has been described for omega-3 fatty acids, high intake of whole grain cereals, fruits and vegetables, and the Mediterranean Diet model.

Conclusions: OA in its different locations is a heterogeneous disease, without established evolutionary biomarkers or known pathogeny. The studies published in the last five years are promising and point out future directions that should be investigated further in this field: Metabolic syndrome, dysbiosis and oxidative stress seem to be closely related to the inflammatory pathogeny of OA. Likewise, new hypotheses have been formulated and encouraging investigations are ongoing, but for now, available evidence is limited for providing nutritional recommendations for prevention or as a therapeutic adjuvant for OA.

Conflict of interest: no conflict of interests to declare.

Keywords: osteoarthritis/ metabolic syndrome/ nutrition/ antioxidants

P133

NUTRITIONAL STATUS AND PERCEPTION OF BODY IMAGE IN ADOLESCENTS OF PUBLIC SECONDARY SCHOOLS IN NUEVO LEÓN, MEXICO

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Challenges for an effective and efficient public-private partnership in food and nutrition

Introduction: Adolescence is a stage of physical, cognitive and psychological changes, body image is important and dissatisfaction can contribute to inappropriate practices and develop eating disorders with negative effects on health.

Objectives: The main objective of this study is to compare the nutritional status, the perception of adequate, overestimated and underestimated body image among men and women of high and low marginalization of public high schools in Nuevo León.

Methods: Quantitative cross-sectional study. A census was carried out on 560 adolescents (360, high income; 200, low income). For data collection, weight and height were evaluated; body image perception was measured by the Collins body silhouettes questionnaire (1991).

Results: The participants were between 12 and 15 years old (54% women; 46% men). 64.3% belong to high-income students, while 35.7% to low-income students.

Higher overweight and obesity were found in high-income men (27.3%), and in low-income women (30.1%). Of the total of high-income women (n = 186), 57.8% are properly perceived, 26.7% are overestimated, 15.5% underestimate their weight. In contrast, low-income women (n = 116), 55.9% are correctly perceived, 27.4% overestimate their weight and 16.7 are underestimated. High-income men (n = 174) 50.6% are properly perceived, 27.6 are overestimated and 21.8 are underestimated. While those with low incomes (n = 84),

45.2% are properly perceived, 40.5% are overestimated, and 14.3% are underestimated. No statistically significant differences were detected regarding the level of income and the perception of body image in women (p = .94) and men (p = .08).

Conclusions: Being a man and living in a low-income sector leads to a higher overestimated and underestimated perception of body image. However, the study did not find a statistically significant relationship between body perception according to the sex of adolescents and their level of marginalization.

Conflict of interest: The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Keywords: body image perception/ adolescents/ obesity

P134

DESCRIPTION OF THE ANTHROPOMETRIC CHARACTERISTICS AND EVALUATION OF RISK OF SUFFERING DISORDERS OF FOOD CONDUCT IN SEMI-PROFESSIONAL DANCERS OF THE VALLARE ACADEMY

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Nutrition in the prevention and treatment of chronic diseases

Introduction: According to previous research, the body requirements for dancers are very strict and sometimes they perform inappropriate practices with the aim of reducing their body weight. The prevalence of an Eating Disorder (ED) is higher among semi-professional dancers than in the general population, and higher among women than men. Semi-professional dancers are subject to a body shaped for their line of work. Therefore, they require a special diet and certain physical characteristics.

Objective: To describe the anthropometric characteristics and assess the risk of suffering from eating disorders in semi-professional dancers from the VALLARE academy.

Method: We evaluated the anthropometric characteristics such as weight, BMI, waist and hip circumferences, and body skinfolds of the dancers of the Vallare Academy. In addition, body image questionnaires, Rosenberg self-esteem scale, and Eating Attitudes Test (EAT) were applied to identify the risk of eating disorders.

Results: Of all the dancers evaluated (n = 15), only 13% presented low weight according to their BMI. When evaluating the body image questionnaire, 27% were at risk of suffering an eating disorder. In terms of the self-esteem scale of Rosenberg, 80% presented low self-esteem. However, when evaluating the EAT questionnaire, no risk of eating disorders were found in any of the subjects.

Conclusions: The results found show various risks of eating disorders, so multidisciplinary work is needed to

strengthen critical points of the population such as: self-esteem, perception of body image and nutritional aspects in this study group, since it is considered a vulnerable population to have these conditions.

Conflict of interest: None.

Keywords: Dancers/ eating disorders (eating disorders)/ anthropometry/ body image/ self-esteem.

P135

PREVALENCES OF OVERWEIGHT, DYSLIPIDEMIA AND INCREASED WAIST CIRCUMFERENCE EXCEED THAT OF PARASITOSIS IN A SUBURBAN COMMUNITY FROM HAVANA

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Irregularities related to Nutrition and the environment justify the study of risk factors for noncommunicable diseases in suburban communities.

Objectives: To evaluate the prevalence of dyslipidemia, overweight, increased waist circumference (WC) and parasitosis in a suburban community of Havana, as well as to describe their interactions.

Methods: Descriptive cross-sectional study in 275 adults (mean age 52.4), evaluated for anthropometric (weight, height, BMI, WC) and metabolic indicators [glucose, triglycerides (TG), and cholesterols: total (TC), HDL, and LDL], by conventional methods, and for the presence of protozoa and helminths using Kato Katz and Willis direct methods.

Results: 61.8% of subjects had dyslipidemia, 58.9% had overweight, 66.5% showed increased WC and 31.6% presented parasitosis. LDL (38.3%) and HDL (33.1%) exhibited the highest frequencies of risk values among metabolic markers. In overweights the pre-obese class predominated (56.8%). 6.9% of individuals were underweight. The WC with substantially increased risk prevailed (48.4%). The parasitosis were dominated by protozoa (94.2%) whereas 4.6% corresponded to helminthiasis and one was mixed. 62.6% of infections positive to protozoa were mono-parasitic, by *Blastocystis hominis*, *Endolimax nana*, *Giardia lamblia*, *Entamoeba coli* and *Entamoeba histolytica*, in decreasing order of frequency. Helminthiasis were positive for *Ascaris lumbricoides*. Overweights showed higher prevalences of elevated glucose (8%) and TG (22.8%) than normoweights (2.1 and 16%) and underweights (0 and 10.5%), respectively; mean concentrations for both metabolites differed more between obese class I individuals (4.37 and 1.61 mmol/L) and subjects with mild thinness (3.39 and 0.87 mmol/L), respectively.

Overweights were more affected by dyslipidemia than underweights. As the risk associated with WC increased, the frequencies of elevated glucose, TC, TG, and LDL and their average concentrations also increased. The parasitized individuals showed less hypoalphalipoproteinemia than the non-parasitized ones. Those with mixed parasitosis due to protozoa had higher frequencies of elevated glucose, TC and LDL compared to those positive to single protozoa.

Conclusions: In this suburban community, factors associated with malnutrition, such as dyslipidemia, overweight and increased waist circumference concomitantly show higher prevalences than several parasitosis. The presence and type of parasitosis could modify the risk associated with those factors. Analytical studies are necessary to confirm it.

Conflict of Interest: The authors declare no conflict of interest.

Keywords: Overweight / dyslipidemia / waist circumference / parasitosis / suburban community

P136

ASSOCIATION BETWEEN THE MEDITERRANEAN DIET AND THE STRENGTH OF THE HAND PRESS IN THE LARGEST HOSPITALIZED WOMEN AFTER SUFFERING A FRACTURE DUE TO A FALL

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Nutrition in the prevention and treatment of chronic diseases

Introduction: The Mediterranean Diet (DM) is a dietary pattern associated with multiple health benefits, including the conservation of muscle function and improvement of bone condition. The pressure of the hand can be used as a criterion for the identification of malnutrition in clinical practice and as one of the components that allow the diagnosis of sarcopenia.

Objective: To investigate the association between adherence to DM and hand pressure force in elderly women hospitalized after a fall fracture, participants in a study on osteosarcopenia.

Methods: Observational cross-sectional study. We included women ≥ 65 years, who were admitted into a hospital after suffering a fall fracture. Adherence to DM was determined with a 14-item questionnaire (PREDIMED). The hand grip strength was determined with a manual dynamometer (JAMAR). The values ≤ 16 kg, proposed by EGWSOP 2. The study was approved by the Ethics Committee for Biomedical Research of Granada.

Results: 61 women were evaluated with an average age of 82 ± 7 years and a BMI of 27.0 ± 4.5 kg / m². 62.3% and 37.70% of the women assessed presented high and medium

adherence to DM, respectively and 91.8% had a low hand grip strength.

Conclusions: Although adherence to DM can be considered adequate in the patients evaluated, it had no association with the low mean strength found. We believe that other factors such as acute trauma, advanced age may be the cause of the low force presented.

Conflict of Interest: The authors declare that there is no conflict of interest in the preparation of this article.

Keywords: Mediterranean diet; hospitalized women; sarcopenia; fracture.

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RISK OF SARCOPENIA AND ASSOCIATION WITH NUTRITIONAL STATE AND HANDGRIP STRENGTH IN PATIENTS WITH HEMATOLOGICAL CANCER

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Hematological cancers are due to changes in blood tissue, bone marrow and lymphatic system. These patients are prone to changes in body composition, with reduced muscle compartment and consequent evolution to sarcopenia.

Objectives: To identify the risk of sarcopenia and to verify its association with nutritional status, anthropometric variables and handgrip strength in patients with hematological cancer.

Methods: Hematological cancer patients who attended the outpatient clinic of a university hospital located in Vitória, Espírito Santo, Brazil, participated in the study. Anthropometric measurements were performed (weight, height, arm circumference (CA), tricipital skinfold (TSF) and of adductor pollicis muscle thickness (APMT) of both hands. The handgrip strength (HS) of both hands was also measured, body mass index (BMI), arm muscle circumference (AMC) and corrected arm muscle area (CAMA) were calculated. SARC-CalF was applied to identify the risk of sarcopenia. of 11 indicate the risk of sarcopenia

Results: A study composed of 51 patients, aged 60.4 ± 15.1 years, with a predominance of women (51.0%) and non-white individuals (80.4%). The most prevalent diagnosis was mature B lymphoid cell neoplasm (37.3%). The risk of sarcopenia was observed in 39.2% of patients and the mean SARC-CalF score obtained was 7.8 ± 6.5 There were significant and moderate correlations between the SARC-CalF score with weight current (kg), CA (cm), AMC (cm), CAMA (cm²), BMI (kg / m²), APMT (mm) and handgrip strength (kg) of both hands. After multivariate linear regression, BMI and the handgrip strength dominant remained in the final model, explaining 74.4% of the score.

Conclusions: SARC-CalF showed a significant association with nutritional status, defined by BMI, and with muscle strength, showing that it is a promising tool to identify the risk of sarcopenia in this population.

Conflict of Interest: none.

Keywords: cancer / nutritional status / hand grip strength / sarcopenia.

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EVALUATION OF THE NUTRITIONAL RISK IN AN INSTITUTIONALIZED SPANISH OLDER ADULTS POPULATION

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Malnutrition is a multifactorial condition in elderly population that determines both quality of life and survival.

Objectives: The aim of this study was to evaluate the nutritional status in a convenience cohort of institutionalized older adult population without functional limitations.

Methods: A cross-sectional study was performed in 189 elders (60% women, aged: 87.9 ± 9.2 years, time of institutionalization: 20.1 ± 10.2 months). Demographic, clinical and nutritional indicators were recorded. Nutritional status was evaluated by the Mini-Nutritional Assessment (MNA) questionnaire, anthropometric measurements and laboratory parameters determinations. Body composition and hydration status were examined by bioelectric impedance. Participants were classified into three groups: well-nourished (MNA: ≥ 24 points); at nutritional risk (MNA: 23.5-17 points) and malnourished (MNA:<17 points). Statistical analysis was carried out by means of the SPSS v.24 software.

Results: Nutritional risk and malnutrition accounted for 52.9% and 10.0% of the elders, respectively. MNA score showed significant differences between groups with BMI, mid-arm muscle (MAMC) and calf circumferences, total body water (l), percentage of extracellular water, lean body mass and serum prealbumin (p<0.05). MNA was directly correlated with the percentage of fat mass (r=0.34; p<0.001), MAMC (r=0.28; p=0.003) and the percentage of lymphocytes (r=0.31; p=0.002), whereas inverse correlation with hand-grip strength (right hand) (r=-0.84; p=0.017) was found.

Conclusion: Elderly people without functional limitations showed a high nutritional risk and/or malnutrition. Therefore, nutritional screening and assessment should be considered as a key preventive strategy in order to promote healthy ageing in institutionalized old adults.

Conflicts of interest: None

Keywords: Nutritional Risk / Malnutrition/ Mini-Nutritional Assessment/ Ageing / Geriatric Assessment/ Older adults.

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INTERACTION BETWEEN PHENOLIC COMPOUNDS AND VITAMIN C

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Phenolic compounds are stable molecules that have a high antioxidant capacity due to the property of assigning electrons to free radicals neutralizing their harmful action. These substances are found in fruits, vegetables and drinks.

Objectives: The objective of this research was to evaluate the antioxidant capacity of several phenolic compounds, their mixtures and the effect that vitamin C has on these compounds and their mixtures.

Methods: A 0.5 mM aqueous solution of vitamin C and the standard 0.5 mM solutions of the phenolic compounds were used: ferulic acid, gallic acid, catechin and epicatechin that were prepared in 70% ethanol. The antioxidant capacity of the phenolic compounds, the mixture of these and the mixtures of phenolic compounds with vitamin C were evaluated using the FRAP technique.

Results: The evaluation of the antioxidant capacity of the phenolic compounds and vitamin C showed that gallic acid has the highest antioxidant capacity, the lowest corresponding to ferulic acid. The evaluation of the mixtures of phenolic compounds allowed to observe that the catechin / epicatechin mixture had a slight synergistic effect, the antioxidant capacity having increased by 21.98%, while the gallic acid / ferulic acid mixture decreased the antioxidant capacity by 15.21%. Equimolecular mixtures of each phenolic compound with ascorbic acid showed that gallic acid / ascorbic acid had the highest degree of inhibition with 32.52%. While mixtures of two phenolic compounds with ascorbic acid produced in all mixtures a decrease in antioxidant capacity, the highest observed being gallic acid / catechin / ascorbic acid with 27.95%.

Conclusions: Combinations such as catechin / epicatechin synergistically increased antioxidant capacity, while the presence of ascorbic acid decreased the antioxidant capacity of phenolic compounds; likewise, ascorbic acid decreased the antioxidant capacity of mixtures formed by two phenolic compounds.

Conflict of Interest: The authors declare that they have no conflicts of interest.

Keywords: antioxidant capacity / ascorbic acid / phenolic compounds.

P140

EFFECT OF CONSUMPTION OF FRUCTOSE AND SYMBIOTIC IN EPISODIC MEMORY IN A MURINE MODEL

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Due to the excessive use of high fructose corn syrup, used to sweeten a large number of processed drinks, the consumption of fructose has increased radically; its consumption is related to the generation of obesity, diabetes mellitus, and cognopathy.

It is believed that one mechanism by which fructose consumption is related to memory disturbances is by alterations of the microbiota-intestine-brain axis. A direct relationship between fructose consumption with changes in the microbiota of the gastrointestinal tract and memory disturbances has been demonstrated. Just like the consumption of high fructose drinks can alter the microbiota; consumption of symbiotics can restore a healthier enterotype and improve the mental health of individuals.

Objective: To assess the effect of symbiotic consumption on episodic memory in a group of rats with long-term intake of added drinks with fructose and another with normal diet.

Methods: Forty-eight 48 male Sprague-Dawley rats were assigned to one of the following treatments: water + vehicle; fructose + vehicle; water + symbiotic; and fructose + symbiotic. Fructose was prepared in a 30% w/v and offered to the animals for 12 weeks. The symbiotic group was administered daily at the same time with 4×10^{10} FCU/mL *Lactobacillus casei*. At the end of the treatment, cognitive ability was assessed in the novel object recognition test.

Results: At the end of treatment, a decrease in short- and long-term episodic memory was found in fructose + vehicle-treated rats and maintain a normal recognition rate in symbiotic-treated rats.

Conclusion: The use of symbiotics may be a viable and economical alternative for the treatment of short- and long-term memory disturbances induced by subchronic consumption of fructose. Further studies are needed to establish the mechanism of action of symbiotics.

Conflicts of Interest: The authors declare that there is no conflict of interest.

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Keywords: Fructose / Microbiota-brain axis / Symbiotics / Memory

P141

FOLIC ACID SUPPLEMENTATION IS CAPABLE TO CHANGE SIRT1 EXPRESSION IN FEMALE OFFSPRING

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Recent studies indicate that sirtuin 1 (Sirt1), a protein deacetylase, is a critical regulator of metabolism and has expressive role in innate and adaptive immune response. Sirt1 altered functions are likely involved in autoimmune diseases and its activity and expression are strongly regulated by many factors, including DNA methylation levels and methy-donnors nutrients availability.

Objectives: This study aimed to evaluate Sirt1 gene expression pattern in the offspring of rats according to dietary folic acid level.

Methods: The study involved males and females pups Wistar (n = 40) that were weaned at the same diet their mothers, three treatment groups, control group (2,0 mg/kg of folic acid), deficient group (0,5 mg/kg of folic acid) and the supplemented group (8,0 mg/kg of folic acid) for 13 weeks. At the end of treatment the pups were

ethanized and liver samples were collected from which mRNA was extracted to perform Sirt1 (Rn01428096_m1) gene expression analysis by real-time PCR on the 7500 Fast Thermocycler (Applied Biosystem®) using TaqMan® Array Fast Plates plates (Life Technologies™).

Results: Among the female offspring, Sirt1 gene expression was significantly higher in supplemented group than control (p=0,001) and deficient (p=0,03) group. However, no differences were observed among male offspring

Conclusions: Folic acid supplementation is capable to change Sirt1 gene expression in female pups Wistar. Considering that Sirt1 has been evidenced to sustain normal immune function and delay the onset of autoimmune disease, these results are very important to management of this disease.

Conflict of Interest: All authors declare no conflict of interest.

Keywords: folic acid / sirtuin 1 / autoimmune disease

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RELATION BETWEEN EATING BEHAVIOR WITH THE WEIGHT/AGE INDEX IN SCHOOLCHILDREN

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Mexico is currently experiencing an epidemic of obesity and overweight that affects the general population, causing metabolic problems cardiovascular disease (OMS, 2015); this critical public health problem can be prevented and addressed through educational strategies that treat eating behavior including eating habits, food preferences and knowledge in nutrition; just as it affects the domestic food environment, as they are learned at home from childhood, taking on adulthood, have an impact on lifestyle and therefore in short and long term health, developing c non-transmissible chronic diseases (Vega,2015).

Objectives: relate eating behavior to the weight/age index in schoolchildren ages 5 to 11 with 11 months.

Methods: Descriptive-transverse study with a sample of 108 schoolchildren, the nutritional status was evaluated using the ISAK anthropometric technique, through the pediatric weight/age index (W/A) where: Low Weight (LW) P5, Normal (NL) P50, Overweight (SP) P85, Obese (OB) P95, (OMS, 2007); the questionnaire was applied to assess eating consumption, habits and practices where healthy eating behavior (EB) is: Factor 1. Food practices ≥ 2 hits, Factor 2. Food habits ≥ 4 hits and Factor 3. Food consumption ≥ 2 hits, total score ≥ 14 hits (Estrada, 2019).

Results: female 42%, male 58%, average age 8.3450 years, 32.51kg weight, the questionnaire score F1 1.46, F2 9.50, F3 2.33, EB 11.83 according W/A 30.5% NL, 9.3% LW, 22.9% OW, 17.8% OB, 69.5% being in poor nutrition.

Unhealthy EB is reported in 54.2% for F1, 9.3% F3 and general EB 12.7%; when the nutritional status is related to the unhealthy EB, a combined prevalence of OW and OB of 25% for F1 (p<0.05), 25% F3 and EB 10% is reported. Conclusion: by having knowledge about the consumption, habits and eating practices of schoolchildren, it will allow to design effective nutritional intervention strategies that favor their growth and development avoiding the appearance of non-transmissible chronic degenerative diseases.

Conflict of Interest: the authors declare no conflicts of interest

Keywords: nutritional status/ weight age index/ eating behavior/ schoolchildren

P143

QUALITY OF BREADS MADE WITH WHEAT AND BEAN FLOURS, FORTIFIED WITH CALCIUM AND REDUCED IN SODIUM. CONSUMER ACCEPTABILITY

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Introduction: The World Health Organization recommends the consumption of pulses and considers them good allies to achieve food security and reduce malnutrition worldwide. Breads offers the possibility of incorporating ingredients to improve the diet without changing eating habits.

Objectives: was to investigate texture, colour and organoleptic characteristics of bread nutritionally improved by partial replacement of wheat flour by bean flour, fortified with calcium at the expense of reduced sodium and evaluating acceptability of consumers.

Methods: Breads were made with mixtures of wheat and beans (black and white) flours, with and without the addition of Ca salts, replacing half of the NaCl. Volume, texture and colour were measured in the loaves. They were subjected to an acceptability test with 9-point scale categorized and to determine the organoleptic characteristics, the methodology "Check all that apply" (CATA) was used. The number of untrained participants who carried out the study was 80.

Results: Texture parameters indicated the addition of beans and calcium salts increase the hardness of the crust. Increased calcium salts promoted the light colour in the crumb and crust. Acceptability showed that all the participants liked the samples and obtained an average score of 7.91; 7.89; 7.00 and 6.25 for breads with white beans and common salt, white beans plus Ca salts, black beans with common salt and black beans plus Ca salts, respectively. The 14.8% who consumed breads without added calcium found them more salty while the 4.9% of those who consumed breads with reduced sodium perceived a more bitter taste but without modifying their preference. Besides, 53.8% of consumers would consume these breads. Although all the breads were accepted, the breads with white beans with and without added calcium obtained higher percentages of attributes such as pleasant flavour, nutritious, healthy and novel among others.

Conclusions: Breads produced are inexpensive, of higher quality with a higher content of calcium and reduced sodium and could be incorporated into the daily menu without changing eating habits.

Conflict of Interest: All authors declare no conflict of interest.

Keywords: breads, legumes, added calcium, reduced sodium, acceptability

P144

EFFECT OF A MODIFIED MILK FAT ON OXIDATIVE STRESS AND ANTIOXIDANT CAPACITY IN RATS FED HIGH-FAT DIETS

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Introduction: High-fat (HF) intake, including milk fat (MF), it has been associated with oxidative stress (OS) and elevated non-communicable chronic diseases (NCCD) risk. However, MF can be modified through an increase of poliunsaturated fatty acids in the dairy cow's diet, leading to a modified milk fat (MMF). It is well known that OS biomarkers in liver are essential for the diagnosis and control of NCCD.

Objective: analyze OS biomarkers in rats fed with MF and MMF diets at HF levels.

Methods: Male Wistar Rats were fed for 60 days with S30 (Soybean oil 30%), MF30 (Soybean oil 3% + MF 27%) or MMF30 (Soybean oil 3% + MMF 27%) diets. The following liver determination were performed: Lipoperoxidation (LPO) by TBARS, Reduced Glutathione/Oxidized Glutathione (GSH/GSSG) ratio using capillary electrophoresis, reactive oxygen species (ROS) by fluorescence, mRNA levels of Catalase (CAT), Superoxide Dismutase (SOD) and Nuclear Related Factor-2 (Nrf2) by RT-PCR and enzyme activities of CAT, Glutathione Reductase (GR) and SOD using spectrophotometric methods. In addition, the serum antioxidant capacity (SAC) by measuring levels of uric acid (UA) and the reduction of 1, 1-diphenyl-2-picrylhydrazyl (DPPH) was estimated.

Results: MF30 rats reached similar values to the S30 group in almost all parameters except Nrf2 mRNA levels (decreased 78%) and SAC (increased 30%). Compared with S30 group, MMF30 rats increased the enzyme activity and mRNA levels for SOD (55 and 88% respectively), while decreased LPO (25%), ROS (30%), GSH/GSSG ratio (55%), and the enzyme activities of CAT and GR (25% and 8% respectively) and mRNA levels for CAT (44%), GR (66%) and Nrf2 (81%). On the other hand, UA concentration in serum increased 50% without changes in the estimated SAC by reduction of DPPH.

Conclusions: Liver of rats fed MMF diet improved the SAC and decreased ROS levels induced by HF diets. This effect could be achieved through the modification in the status of OS biomarkers. The intake of MMF characterized by an increase of bioactive fatty acids (rumenic and its precursor vaccenic acid), could contribute to reduce the NCCD risk.

Conflict of interest: there is no conflict of interest.

Keywords: Liver / Oxidative Stress / Modified Milk Fat / Biomarkers.

P145

DIETARY GLYCEMIC INDEX, DIETARY GLYCEMIC LOAD AND FASTING GLUCOSE LEVELS IN ADOLESCENTS FROM TZOTZIL-TZELTAL AND SELVA REGIONS OF CHIAPAS, MÉXICO

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Dietary glycemic index (GI) and glycemic load (GL) are two indices that measure the postprandial glycemic response of carbohydrates. However, evidence on the association between dietary GI, dietary GL and glucose in Mexican adolescents is scarce.

Objectives: To examine the association between dietary GI, dietary GL and fasting serum glucose levels in adolescents from marginalized areas of Chiapas, México.

Methods: This cross-sectional study was framed within a Birth Cohort Study from the Tzotzil-Tzeltal and Selva regions of Chiapas, México. A random sample of 217 adolescents (13-14 years) was assessed. Dietary information was obtained by 24-hour recalls. Dietary GI and GL were estimated using the International Tables of GI and GL values. We collected sociodemographic, anthropometric data and fasting blood samples. Serum glucose was determined by enzymatic photometric tests in an automated analyzer. We fitted quantile regression models to assess the association between dietary GI, dietary GL and glucose levels. To assess the interaction between carbohydrate quality and sex or age, we introduced the product terms of the variables in the models and considered $p < 0.05$ in the likelihood ratio test as statistically significant.

Results: Dietary GI was directly associated with the highest quantiles of fasting serum glucose in male adolescents (p for interaction > 0.05). For boys, one unit increase in dietary GI was associated with a rise in fasting serum glucose of 0.38 mg/dL (95% CI: 0.16 - 0.61) at the 75% quantile. The increase was higher [$\beta = 0.63$ mg/dL (95% CI: 0.04 - 1.21)] for boys with high fasting serum glucose levels (at the 90% quantile). No significant associations were observed for dietary GL in boys. Similarly, no significant associations between the variables of interest were observed in female adolescents.

Conclusions: A direct association was found for dietary GI at the highest percentiles of fasting serum glucose levels in male adolescents from indigenous communities of Chiapas, México.

Conflicts of Interest: Authors declare that they have no conflicts of interest.

Keywords: Glycemic index / glycemic load / serum glucose / adolescents / Chiapas-México.

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Due to a clinical and public health interest of neck circumference (NC), a better understanding of this simple anthropometric measurement, as a valid marker of body composition is necessary.

Objective: To examine the association of neck circumference with indicators of anthropometry and body composition, including total and central body fat as well as lean body mass measured by DXA in young Spanish adults.

Methods: A total of 119 young healthy adults participated in this study. NC was measured over the thyroid cartilage and perpendicular to the longitudinal axis of the neck. Body weight, height, waist circumference (WC), and hip circumference were measured. A Dual X-ray absorptiometry (DXA) scan was used to determine fat mass, lean mass, and visceral adipose tissue (VAT). Additionally, body mass index (BMI) and triponderal mass index (TMI), the waist to hip and waist to height ratios, and the fat mass and lean mass indexes (FMI and LMI, respectively) were calculated.

Results: NC was positively associated in women (W) and men (M), with BMI ($rW = 0.70$ and $rM = 0.84$, respectively), TMI ($rW = 0.63$ and $rM = 0.80$, respectively), WC ($rW = 0.75$ and $rM = 0.86$, respectively), VAT ($rW = 0.74$ and $rM = 0.82$, respectively), Waist/hip ($rW = 0.51$ and $rM = 0.67$, respectively), Waist/height ($rW = 0.68$ and $rM = 0.83$, respectively) and FMI ($rW = 0.61$ and $rM = 0.81$, respectively). The association between NC and indicators of body composition was however weaker than that observed by BMI, TMI, WC and Waist/height in both women and men. It is of note that in women, NC was associated with FMI, VAT and LMI independently of BMI. In men, adding NC to anthropometric variables did not improve the prediction of body composition, while slight improvements were observed in women.

Conclusions: Taken together, the present study provides no indication for NC as a useful proxy of body composition parameters in young adults, yet future studies should explore its usefulness as a measure to use in combination with BMI, especially in women.

Conflicts of interest: The authors declared no conflict of interest.

Keywords: body fat distribution/ cardiovascular risk/ neck adipose tissue/ obesity/ upper body fatness.

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ASSOCIATION OF NECK CIRCUMFERENCE WITH ANTHROPOMETRIC INDICATORS AND BODY COMPOSITION MEASURED BY DXA IN YOUNG SPANISH ADULTS

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ANTHROPOMETRIC INDICATORS OF OBESITY TO SCREEN DIABETES AND HYPERTENSION IN MEXICAN ADULTS

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Nutrition in the prevention and treatment of chronic diseases

Introduction: In recent years, the prevalence of type 2 diabetes mellitus (T2DM) and arterial hypertension (AHT) has consistently increased. The cut-off points of anthropometric indicators body mass index (BMI), waist circumference (WC) and waist-to-height ratio (WHtR)—may vary according to the population groups studied.

Objectives: To establish the optimal cut-off points of BMI, WC and WHtR in the Mexican adult population and to identify the best anthropometric indicator.

Methods: Mexican adults ≥ 20 years old who were evaluated at ENSANUT 2012. Blood samples were obtained from 7,944 adults; those with ≥ 126 mg/dL fasting plasma glucose were considered to have T2DM (ADA 2016). Blood pressure measurements were performed on 9,015 adults; those with ≥ 130 mmHg of systolic blood pressure and/or ≥ 80 mmHg of diastolic blood pressure were considered to have AHT (AHA 2017). The receiver operating characteristic curves of the BMI, WC and WHtR for T2DM and AHT screening were estimated, and the cut-off points were determined using Youden's index.

Results: For the screening of T2DM, the area under the curve (AUC) with the WHtR was 0.690 (95% CI: 0.664-0.715) in women and 0.679 (95% CI: 0.633-0.720) in men. In the AHT screening, the AUC was 0.625 (95% CI: 0.609-0.640) in women with WHtR, while it was 0.645 (95% CI: 0.627-0.662) in men with WC. The optimal cut-off point for WHtR for T2DM screening in women was 0.62 (sensitivity: 74.6%, specificity: 59.4%), in men 0.60 (sensitivity: 62.2%, specificity: 68.2%), in the screening for AHT in women 0.60 (sensitivity: 58.8%, specificity: 60.7%), and in men the optimal cut-off point for WC was 91.4 cm (sensitivity: 65.5%, specificity: 57.6%).

Conclusions: The optimal cut-off points for the screening of T2DM and AHT were identified with anthropometric indicators of abdominal obesity; WHtR and WC.

Conflicts of interest: The authors declare that there is no Conflict of Interest.

Keywords: Obesity / diabetes / hypertension / body mass index / waist circumference / waist-to-height ratio.

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EFFECTS OF PROBIOTIC SUPPLEMENTATION ON METABOLIC SYNDROME: A SYSTEMATIC REVIEW

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Nutrition in the prevention and treatment of chronic diseases

Background: Previous studies evaluating the effects of probiotic supplements in patients with Metabolic Syndrome (MetS) have found contradictory results.

Methods: We performed a qualitative systematic review to analyze if the use of probiotics has any effect on the components of MetS before patients develop type 2 diabetes. Following the Cochrane methodology, we conducted a comprehensive literature search of randomized controlled trials (RCTs) with probiotics in adults with a diagnosis of MetS published until the 4th of July 2019.

Results: According to our inclusion criteria, nine clinical studies were finally evaluated; corresponding to six RCTs. Probiotics intake in patients with MetS resulted in discrete improvements in body mass index, blood pressure, glucose metabolism and lipid profile in some studies. Regarding inflammatory biomarkers, probiotics also positively affected the soluble vascular cell adhesion molecule 1 (sVCAM-1), interleukin-6 (IL-6), tumor necrosis factor α (TNF- α), vascular endothelial growth factor (VEGF) and thrombomodulin.

Conclusions: Despite the diversity of the published studies, the intake of probiotics in patients with MetS may offer a slight improvement in some of the clinical characteristics of the MetS and a decrease in inflammatory biomarkers. However, these beneficial effects seem to be clinically non-relevant and marginal compared to drug therapy and a healthy lifestyle.

Conflict of Interest: None.

Keywords: Metabolic Syndrome / Obesity / Probiotics

P149

EFFECT OF RESVERATROL AND PTEROSTILBENE METABOLITES ON LIPID METABOLISM IN AN *IN VITRO* MODEL OF HEPATIC STEATOSIS

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Steatosis is a condition characterized primarily by excessive triglyceride accumulation in the liver, and it is associated with obesity and insulin resistance. In the last decade, phenolic compounds such as resveratrol and its structural analogue pterostilbene, have emerged as useful tools for the prevention and treatment of this metabolic condition. However, both molecules, and specially resveratrol suffer an intense metabolism in both the liver and the gut, thus decreasing the compound amount that reaches blood and tissues.

Objective: We aimed to investigating whether the main resveratrol and pterostilbene metabolites have beneficial effects on steatosis.

Methods: An *in vitro* model mimicking the fatty liver condition was created by incubating mouse AML-12 hepatocytes with 0.3 mM of palmitic acid (PA) for 18 h. In another set of cells PA, with or without resveratrol (R), pterostilbene (PT), *trans*-resveratrol-4'-O-glucuronide (R-4G), *trans*-resveratrol-3-O-glucuronide (R-3G), *trans*-resveratrol-3-O-sulfate (R-S), dihydroresveratrol (DH-R), pterostilbene-4'-O-glucuronide (PT-G) or pterostilbene-4'-O-sulfate (PT-S) (1 µM) were added to the incubation medium. Protein expression of fatty acid synthase (FAS), carnitine palmitoyl-transferase-1a (CPT-1a) and CD36 were analysed by immunoblot.

Results: Both R and PT metabolites showed a significant delipidating effect. Moreover, R, PT and all their metabolites prevented the increase in FAS induced by PA. In particular, PT-G totally inhibited the previously mentioned increment and restored values to those of the control cells. In the steatotic model (PA group), triglyceride accumulation prompted the CPT-1a activation, a key enzyme implicated in fatty acid oxidation, as a compensatory mechanism. This activation was lower in the PT group, reaching control levels with the rest of the compounds. Regarding free fatty acid transport, CD36 expression decreased with R, R-4G, R-3G y PT-S, which suggests lower fatty acid availability for triglyceride storage.

Conclusions: R and PT metabolites contribute to the delipidating effect of their parent compounds in hepatocytes. This fact minimizes the problem of its poor bioavailability. In general terms, the mechanism of action underlying the effects of the metabolites and the parent compounds seem similar.

Conflict of Interest: the authors declare that there is no conflict of interest.

Keywords: Resveratrol/ Pterostilbene / steatosis/ metabolites/ obesity

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NUTRITION AND FRAGILITY IN ELDERLY ADULTS OF A CARE CENTER. RESULTS OF AN INTEGRAL INTERVENTION

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Instruments have been created and validated that facilitate the periodic evaluation of nutritional status and the fragility phenotype of elderly adults. The Mini Nutritional Assessment (MNA®) questionnaire and the fragility criteria developed by Fried have demonstrated efficacy as valid tools for the timely detection of these conditions.

Objective: The objective was to establish the association between nutritional status and the presence of fragility in a group of women 60 years of age or older, users of an urban health center in Tlalnepantla, state of Mexico.

Methods: The design was analytical observational by repeated survey. The study was nested in a 15-week integral nutritional intervention project, which included actions to promote health, physical activity and supplementation with a snack of rice bran.

With prior consent, anthropometric measurements (weight, height, arm circumference, waist, leg and calf) and body composition by electrical bioimpedance were made; the MNA® checklist was applied, and fragility criteria were evaluated (weight loss, self-report of exhaustion, palmar grip strength, physical activity and walking speed). The study was completed by 22 of 36 adults gathered on visiting days.

Results: The initial prevalence of malnutrition risk was 27% and 9% frailty, showing statistically significant association, Chi2 = 6.8, p = 0.05. At 15 weeks, the prevalence of malnutrition risk was 23%, while the fragility persisted in 9%, with no significant association between the two conditions.

Conclusions: The study showed that it is possible to modify the fragility and risk of malnutrition in older adults in the community with institutional support, although these two conditions persist independently.

It is suggested that rapid clinical tools be used to assess the health and nutrition status of the elderly in order to intervene in a timely manner and improve their life quality.

Conflict of Interest: There is no conflict of interest.

Keywords: Nutrition / Fragility / Elder adults.

P151

EFFECT OF NUTRITIONAL HEALTH DURING PREGNANCY WITH OBSTETRIC RESULTS IN MATERN-FETAL AXIS

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Nutritional needs of macro and micronutrients are increased during pregnancy. Nutritional assessment during this stage is commonly evaluated by anthropometric indicators such as pregestational weight and body mass index (BMI), and gestational weight gain (GWG), which are the reflection of previous nutritional status and during Pregnancy. Fetal development is associated with maternal nutritional factors, both very low GPGs, and very high GPGs, are associated with an increased risk of childhood morbidity, and increased predisposition to chronic diseases in adult life.

Objectives: To link obstetric outcomes in the mother-child binomial, with the nutritional indicators identified during pregnancy.

Methods: Cross-sectional, observational study in pregnant women aged 18 to 35 in public hospitals in Culiacán, Sinaloa. obstetrician-gynecologists, anthropometric and maternal dietary data were analyzed, the maternal diet was evaluated qualitatively and quantitatively through questionnaires, and neonates were clinically examined to detect fetal malnutrition. To assess the impact of nutritional health with obstetric results, one-way ANOVA and logistic regression were performed in Stata intercooled v.13.1, $p < 0.05$ values were taken as statistically significant.

Results: 68 pregnant women were included, of whom only 31 (45.5%) had a healthy gestation, 5 (7.4%) developed preeclampsia, 5 (7.4%) developed gestational diabetes and 27 (39.7%) started their pregnancy with excess body weight (EBW). 68% of patients had a higher GWG than recommended for their BMI; high consumption of hypercaloric foods and low consumption of fiber and water were identified in all patients. 50% of births were via caesarean section. 57% of neonates were found below the 50th percentile according to the weight for size, and 20% of the newborn was exposed to fetal malnutrition during third trimester of gestation.

Conclusions: Dietary habits are key for the development of a healthy gestation, so it is necessary to implement strategies that improve nutritional health during this stage to optimize the results in the fetal maternal axis.

Conflict of Interest: The authors declare that there is no conflict of interest regarding the publication of this article

Keywords: Pregnancy / Newborn / Gestational disorders

P152

FOOD ACCESSIBILITY REFERRED BY BRAZILIAN INDIVIDUALS WITH HYPERTENSION AND TYPE-2 DIABETES MELLITUS

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Food choices of the individuals are guided by different factors, such availability and cost.

Objectives: Our objective was to evaluate food accessibility referred by Brazilian individuals with hypertension and type-2 diabetes mellitus.

Methods: A cross-sectional analysis of the baseline data of two randomized multicenter clinical trials ongoing in Brazil. Individuals of both sexes, over 21 years old, with previous diagnosis of hypertension and type-2 diabetes mellitus were included. Socioeconomic, biochemical and food accessibility data were collected from standardized and validated questionnaires. Data were expressed in absolute numbers and percentages, means and standard deviations.

Results: 414 patients were evaluated, aged 53.7 ± 11.9 years and 40.6% men; 54.8% were white, 53.4% completed the high school/had incomplete undergraduate, and 61.1% were married. Mean BMI was 30.8 ± 4.5 kg/m², and mean cardiometabolic features were: fasting glucose: 128.3 ± 56.3 mg/dL; glycated hemoglobin: $6.9 \pm 1.8\%$; systolic blood pressure: 138 ± 19.8 mmHg, and diastolic blood pressure: 87.2 ± 12.7 mmHg. In total, 65.5% of the participants buy food themselves and 60.4% prepared their own meals/foods. Regarding main meals, 86%, 78.5% and 95.2% of the individuals referred that their breakfast, lunch and dinner are made at home, respectively. 78.2% of the patients referred that fresh fruits and vegetables are available near home, and 63.5% agree that they have higher quality. However, 64.5% buy fresh fruits and vegetables once a week and 29.2% related they are expensive. In addition, 80.4% related that near their home there are significant number of snack bars, pizzeria and fast food stores available.

Conclusions: A variety of foods is accessible to the assessed population, and this should be taking into account for counseling individuals in primary cardiovascular prevention.

Conflict of interest: The authors declare no conflict of interest.

Keywords: Hypertension / Diabetes Mellitus, Type 2 / Social Environment / Diet, Food, and Nutrition.

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SOME CAUSES THAT INFLUENCE FOOD CONSUMPTION IN PATIENTS WITH CANCER RECURRENCE

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Nutrition in the prevention and treatment of chronic diseases

Introduction: up to 30% of causes of cancer are attributed to food. Those who suffer from the disease make changes in consumption, but survivors are expected to have a healthier food consumption, which is part of self-care.

Objectives: describe dietary changes made by cancer survivors with cancer recurrence and the reasons for those changes.

Methods: the statistical method of multiple correspondence factor with supplementary variable, cluster analysis and frequency distribution were used, in order to establish the percentage associated with each modality. SAS UNIVERSITY and R Studio version 3.4.3 statistical packages were used.

Results: the main reason that led to changes in food consumption was health, followed by the components associated with cancer treatment, while the economic factor was the one that less affected the variations in food intake. Frequency in the decrease in the consumption in meat with fat, fried foods, alcohol, snacks, sausages and dairy products from 63% to 35% was reported, while the ingestion of fruits with or without peel and vegetables ranged between 26% and 40%. Dairy was the group of foods with the highest frequency of daily consumption, followed by fruits without peel, baked goods, vegetables, and broths. More than half of respondents reported never consuming popcorn after the first diagnosis and about half reported the same for pre-cooked foods, carbonated and processed beverages, and alcohol.

Conclusions: cancer survivors, who suffer a recurrence or a new diagnosis of this disease, make changes in food intake, following the recommendations issued by international organizations, in terms of health promotion and disease prevention.

Conflict of Interest: the authors declare there's no conflict of interest regarding the publication of this article.

Keywords: food consumption/ cancer/ recurrence/ risk factors.

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RELATIONSHIP BETWEEN NUTRITIONAL STATUS, MEAL TIMING AND PLACES OF FOOD CONSUMPTION IN URBAN POPULATION OF ECUADOR

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Nutrition in the prevention and treatment of chronic diseases

Background: Nowadays, eating patterns are varied and difficult to identify. The consumption of snacks, skipping meal times and the adoption of different diets are more prevalent and are associated with the increment of body weight. It has been observed that meals outside the home are more frequent and these provide greater amount of calories, total fat, saturated fatty acids and a lower fiber intake, micronutrients and vitamins, so they promote weight gain and affects health.

Objective: Identify meal timing and places of food consumption in urban population of Ecuador and its relationship with the nutritional status.

Methods: The sample consists of 400 subjects living in urban areas of Ecuador, between the ages of 15 and 65. The nutritional status was evaluated through the Body Mass Index (weight and height²) and two 24-hour reminders were applied on non-consecutive days, following the multi-step methodology.

Results: The nutritional status and caloric intake had an inverse linear relationship ($r = -0,120$). 4% of the population is underweight, 39% normal weight, 30.5% overweight, 24% obese and 2.5% morbidly obese. 85% of the population eats 3 main meals per day (breakfast, lunch and dinner) and 88.8% eats inside the home. The consumption of food inside or outside the home is not related to nutritional status ($\chi^2 = 0.4$) as well as the number of main meals eaten per day ($\chi^2 = 0.7$).

Conclusions: The amount of calories ingested the consumption of food inside or outside the home and the number of main meals that are eaten daily are not related to the nutritional status, so it is recommended to analyze the quality of the diet consumed.

Conflict of interest: The study was supported by a scientific grant from AIBE and support from Universidad San Francisco de Quito. The funders had no role in study design, data collection and analysis, the decision to publish, or the preparation of this manuscript.

Keywords: Nutritional status / meal timing / places of food consumption

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ASSOCIATION BETWEEN NUTRITIONAL STATUS AND QUALITY OF LIFE OF THE ELDERLY

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Nutrition in the prevention and treatment of chronic diseases

Nutrition in the prevention and treatment of chronic diseases

Introduction: Adequate food and nutritional status represent essential conditions for human beings and are directly linked to health and the prevention and rehabilitation of diseases, being fundamental to quality of life and the well-being of the elderly population.

Objectives: To evaluate the association between nutritional status and quality of life (QL) of the elderly population assisted by the Steps of Longevity Project of the Food Bank of Rio Grande do Sul.

Methods: Cross-sectional and retrospective study that used secondary data, collected between March and December 2017, of 185 non-institutionalized elderly aged 60 and over. Sociodemographic information was obtained from a questionnaire with simple and direct questions. Anthropometric data collected were weight, height and Body Mass Index and scores related to QL were measured using the Short Form Health Survey 36 (SF-36).

Results: The mean BMI was 29.7 kg/m², but when individuals were stratified by BMI range, a higher prevalence of obesity was observed. Analyzing the association of QL scores related to the eight domains of the SF36 questionnaire, in general, obese individuals had worse QL in practically all domains, except for social and mental health aspects. Functional capacity and limitation by physical aspects showed a positive association ($p < 0.001$ and $p = 0.042$, respectively) with obesity.

Conclusions: Obese individuals had worse QL in practically all domains, except for social and mental health aspects. In addition, those who were obese presented worse functional capacity and greater physical limitations compared to all the other weight ranges and greater physical limitations in relation to those who were overweight.

Conflict of Interest: There are no conflicts of interest.

Keywords: Elderly / Quality of Life / Nutritional Status

P157

FOOD SECURITY LEVEL AND CONSUMPTION OF SUGARY DRINKS IN OLDER ADULTS OF A MARGINALIZED COMMUNITY OF TLAQUEPAQUE, JALISCO

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Nutrition in the prevention and treatment of chronic diseases

Introduction: The globalized food system promotes greater accessibility and availability of energy-dense foods, including sugary drinks (SD). Mexicans are the largest consumers of SD worldwide, with 163 liters per year per person.

Objectives: To know the level of food security (FS) and the frequency of consumption of SD in older adults in a marginalized area of Tlaquepaque, Jalisco.

Methods: Cross-sectional study. 46 older adults (39 women and 7 men) from a marginalized community in Tlaquepaque, Jalisco were interviewed. To measure the FS, the Latin American and Caribbean Food Security Scale (ELCSA) was used. A food frequency (FF) questionnaire was applied to measure the number of days per week and daily portions (DP) of SD according to the Mexican System of Equivalent Foods (SMAE).

Results: Of the total sample ($n = 46$), 13.0% had FS, 100% indicated a daily consumption of SD with an average of 3.9 DP; 34.8% of the population was classified with mild food insecurity (FI), of which 93.3% consumed 5-7 days with an average of 3.3 DP; moderate FI was found in 30.4% and of these, 57.1% had a FF of 5-7 days and an average of 2.9 DP; finally, it was estimated that 21.7% of the population had severe FI of which 50% had a consumption of 2.6 DP on 5-7 days per week.

Conclusions: It was identified that at least 50% of the subjects have a consumption of 5-7 days per week of SD regardless of the level of FI in which the population was classified; which is alarming due to its relationship with the development of overweight and obesity, in addition to chronic noncommunicable diseases and their poor nutritional value.

Conflict of Interest: The authors declare that there is no conflict of interest.

Keywords: food insecurity / sugary drinks / Jalisco / older adults.

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PLASMA LEVELS OF ADIPOCYTOKINES ARE ASSOCIATED WITH INSULIN RESISTANCE INDEXES IN MEXICAN ADULT WOMEN WITH OBESITY AND TYPE 2 DIABETES MELLITUS

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Obesity and diabetes are two of the biggest emerging health problems worldwide. Obesity is associated with a chronic low-grade inflammatory state in adipose tissue and peripheral tissues that increases insulin resistance.

Objective: To compare the plasma levels of adiponectin and IL-1 β in Mexican adult women with obesity and type 2 diabetes mellitus.

Methods: Comparative cross-sectional study, which included 95 adult women divided into 3 study groups [group 1: normal weight (NW); group 2: obese (OB); group 3: obese + T2DM (OB + T2DM)]. Anthropometric, biochemical and clinical data were obtained. Plasma adipocytokines were determined by enzyme-linked immunosorbent assay (ELISA) using commercial kits (Invitrogen®).

Results: The NW group had significantly lower BMI and central adiposity (WC, HC, W/H ratio and W/S ratio) markers compared to women in the OB and OB + T2DM groups. Fasting plasma glucose levels were significantly lower in NW [82.00 (12.75) mg/dL] and OB [96.50 (17.75) mg/dL] groups compared to OB + T2DM group 145.00 (62.00) mg/dL; $p < 0.001$]. On the other hand, plasma insulin levels were significantly lower in NW group [6.85 (5.18) μ U/mL] compared to OB and OB + T2DM groups [17.20 (13.08) μ U/mL and 20.80 (14.10) μ U/mL, respectively; $p < 0.001$]. OB and OB + T2DM groups presented similar levels of adiponectin and significantly lower compared to NW group. Meanwhile, plasma IL-1 β levels were significantly higher in OB + T2DM compared to NW and OB groups. Finally, the OB and OB + T2DM groups had higher insulin resistance (HOMA2-IR y HOMA-AD) than NW group ($p < 0.001$). Significant correlations were observed between plasma adipocytokines (adiponectin and IL-1 β) and insulin resistance indexes (HOMA2-IR, QUICKI).

Conclusions: OB and OB + T2DM groups had higher insulin resistance than NW group. In this study, hypoadiponectinemia is associated with insulin resistance in women with OB and OB + T2DM.

Conflict of Interest: The authors declare no conflict of interest.

Keywords: obesity / diabetes / inflammation / insulin resistance / adipose tissue

P159

PERCEIVED HEALTH STATUS AND CONSUMPTION OF ULTRA-PROCESSED FOODS ARE ASSOCIATED WITH METABOLIC PHENOTYPE OF BRAZILIAN GRADUATES (CUME PROJECT)

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Nutrition in the prevention and treatment of chronic diseases

Background: Obesity is a public health issue, and has personal behavior as one of its causes. Evidence suggests that health status influences healthy behavior.

Objective: To evaluate association between perceived health status and consumption of ultra-processed foods (UPF) and metabolic phenotype of Brazilian graduates.

Methods: Cross-sectional analysis conducted with baseline population of the CUME project. Data was collected through a self-answered online questionnaire. The phenotype was determined by calculating Body Mass Index and information on medical diagnosis, results of biochemical tests or use of medications to control blood glucose, blood pressure and/or dyslipidemia. The consumption of UPF was measured by food frequency questionnaire composed of 144 food items that were classified according to NOVA classification. Participants also reported their perceived health status, which was categorized into positive and negative health perception. Multinomial logistic regression analyses were conducted in STATA® software (version 13.0) to examine the odds ratio (OR) associated with the metabolic phenotype at a 95% confidence interval (CI) using the healthy nonobese phenotype as reference. The analyses were adjusted by sex, age, family obesity history, and physical activity.

Results: Were included 4311 participants (2916 woman), and age mean was 35 ± 0.14 . The prevalence of healthy nonobese phenotype was 60.45%, unhealthy nonobese 28.04%, healthy obese 4.66% and unhealthy obese 6.84%. Negative health perception increased 2.10 (95% CI 1.65 - 2.67) times the chance of unhealthy nonobese phenotype 4.04 (95% CI 2.79 - 5.86) times the chance of healthy obese phenotype, and 8.96 (95% CI 6.60 - 12.18) times the chance of unhealthy obese phenotype. The highest quartile of UPF consumption increased 2.76 (95% CI 1.84 - 4.14) times the chance of healthy obese phenotype. Regarding unhealthy obese phenotype, the third quartile of UPF consumption increased 2.34 (95% CI 1.54 - 3.55) times the chance of this

phenotype, while the highest quartile increased 3.77 (95% CI 2.54 - 5.61) times the chance of the phenotype.

Conclusion: Our findings suggest that the metabolic phenotype is related to the perceived health status of Brazilian graduates, which may reflect in their dietary intake, an important individual behavior related to obesity.

Conflicts of interest: The authors declare that there is no conflict of interest.

Keywords: obesity / healthy lifestyle / dietary intake / NOVA classification / healthy obese phenotype

Conclusions: Sociodemographic factors significantly impact food security in lactating women's homes, which contributes to the limited access and availability of food in the home and prevents healthy eating adjusted to nutritional requirements during this stage. Lactating women's nutrition should be prioritized because of its role in the reproductive cycle and in the health of children under two years of age.

Conflicts of interest: The authors declare that they have no conflict of interest.

Keywords: lactating/ breastfeeding/ postpartum period/ women.

P160

SOCIODEMOGRAPHIC FACTORS ASSOCIATED WITH FOOD INSECURITY OF A GROUP OF LACTATING WOMEN, ANTIOQUIA COLOMBIA 2019

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Challenges of nutrition and public health in Ibero-America

Background: The scientific evidence is compelling in demonstrating the importance of breastfeeding on children's health, but for this process to be best achieved, the mother requires an adequate nutritional status, which is conditioned by the household's level of food security. In our context, research on the food and nutritional conditions of breastfeeding mothers is limited, which reflects the invisibility of this problem and the need to document it in order to strengthen public policies and nutritional care for this group.

Objective: To assess the sociodemographic factors associated with food insecurity in a group of lactating women.

Methods: Descriptive observational study of secondary sources, conducted from on the database of the Food and Nutrition Profile of the Department of Antioquia 2018-2019. The sociodemographic variables evaluated were area, socioeconomic level, age, educational level, occupation, household members, type of household, access to drinking water, health regime, household income and duration of breastfeeding. For the association between sociodemographic aspects and food security, the chi-square test of independence was applied.

Results: Food insecurity was found in 78.6% of the lactating mothers, of which 36% presented moderate and severe insecurity with similar proportions. A significant association was found between food security and these sociodemographic variables: household members ($p = 0.0011$), socioeconomic level ($p < 0.001$) with greater affectation at the lowest level. The mother's educational level ($p = 0.008$), household income ($p = 0.006$), the type of health affiliation ($p = 0.011$) and the type of family ($p = 0.004$) also presented significant association.

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ASSESSMENT OF THE EFFECT OF OAT AND POTATO FIBRE ON THE SURVIVAL OF LACTOBACILLUS CASEI IN A NUTRACEUTIC FERMENTED PRODUCT

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Challenges of nutrition and public health in Ibero-America

Introduction: Obesity is the biggest public enemy of health, is the basis for the development of diseases that occupy the world's top mortality causes like cardiovascular diseases, type 2 diabetes mellitus, and cancer.

Obesity is a multifactorial disease; its main cause is an imbalance between caloric intake and expenditure, promoted by the obesogenic environment with easy access to processed foods high in carbohydrates and lipids.

The use of symbiotic foods has been shown to be a significant aid in the treatment of obesity. The formulation and development of new foods with probiotics added with prebiotics easily accessible to the public on the market could be a viable alternative.

Objectives: The research aim was to evaluate the effect of two prebiotic fibers on the survival *Lactobacillus casei* subsp. *casei* and physicochemical changes in dairy drinks, during their shelf life, for the subsequent development of new nutraceutical foods.

Methods: It was determined for 4 weeks at 4° Celsius changes in acidity, pH and survival of lactic acid bacteria in CFU/mL of 2 different fermented dairy drinks added with prebiotic fibers of oats and potato.

Results: Fermented dairy drinks show changes over time in physicochemical properties and the survival of *L. casei*, however, the fibers evaluated do not decrease the survival to lose the probiotic activity of dairy drinks (1×10^8 CFU/mL).

Conclusions: The formulation and development of new fermented nutraceutical foods added with probiotics and prebiotics could be an excellent alternative in the control of incidence and prevalence of obesity, however, it must be

assured that the combination not lead to undesirable changes in the foods in order to achieve acceptance by consumers.

Conflicts of Interest: The authors declare that there is no conflict of interest.

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Keywords: *Lactobacillus casei* / Oats fibers / Potato fibers / Nutraceutical Foods

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ASSOCIATION BETWEEN MAGNESIUM LEVEL AND DEPRESSIVE SYMPTOMATOLOGY IN WOMEN IN PERIPARTUM PERIOD IN CUENCA-ECUADOR

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Challenges of nutrition and public health in Ibero-America

Introduction: Depression during peripartum (pregnancy and postpartum) is common in women from developing countries. Social, biological and environmental variables have been identified as risk factors. Studies suggest that adequate levels of magnesium intake could be beneficial in depression cases. There's little research in this regard in Latin America.

Objectives: To evaluate the relationship of magnesium (Mg) intake with depressive symptomatology in women during peripartum.

Methods: A case-control study was accomplished in 2018 with peripartum women (18-35 years old) who attended a non-profit clinic in Cuenca-Ecuador. Depressive symptomatology was determined when participants got a score above 9 on the Edinburgh Scale (EPDS). Mg intake was determined by 24-hour urine. Questionnaires were applied to assess the presence of other factors (i.e. anxiety) previously associated with peripartum depression. A multiple linear regression analysis was performed to identify the main risk factors associated with depressive symptomatology.

Results: 112 women in the peripartum period participated (56 cases with depressive symptoms and 56 controls) with an average age of 26.4±5.1 years (45% from a low and medium-low social stratum). For each 15mg increase in Mg urinary excretion, the EPDS score decreased one unit (95%CI: -0.66-1.49). When pregnancy was desired, the EPDS decreased two units (95%CI: 2.94-0.55, p<0.01), and when mothers completed their basic education, the EPDS reduced four units (95%CI: 1.20-6.96, p<0.01). Additionally, the anxiety scale increased three units when the EPDS increased

one (95%CI: 0.69-1.23, p<0.01). Other analyzed variables didn't show significance associations.

Conclusions: A higher Mg intake is related to a lower score on the EPDS. This strong association was presented independently to the relationship found with the other adjusted variables (domestic violence, history of depression or anxiety, educational level, lack of social support, pregnancy unwanted). Magnesium intake levels could represent a risk factor associated with peripartum depression. Women may have low Mg levels during peripartum due to the absorption of nutrients from the fetus, placenta, and lactation. Hypomagnesemia is associated with a depletion of neurotransmitters, which may lead to depression.

Conflict of Interest: The authors declare no conflicts of interest related to this work.

Keywords: depression / magnesium / peripartum / postpartum / pregnancy

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FOOD AND BEVERAGES MARKETING TECHNIQUES IN BRAND ON SOCIAL NETWORKS IN ARGENTINA

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Challenges of nutrition and public health in Ibero-America

Introduction: The food and beverages (F&B) industry uses different communication channels to spread its brands. In recent years, the Internet has allowed expanding the advertising boundary to all digital media using different marketing techniques (MT).

Objectives: To identify MT of the commercial brands of F&B most consumed in schoolchildren present in the official accounts of the main social networks.

Methods: The consumption of F&B by more than 5% of the schoolchildren of Buenos Aires City was taken according to the Nutritional Food Survey (2011). Up to 20 brands were selected for each F&B category with greater presence in the main retail. From June to July 2019, the MT used in the posts on the main social media, namely Facebook, Twitter and Instagram, were identified on the brands' official accounts.

Results: Of a total of 198 identified brands, 58% (114) have Facebook, 45% (89) Instagram and 33% (65) Twitter accounts. At the same time, 54% of Facebook accounts had posts, while Instagram had 66% and Twitter had 29%. The MT most used was the presence of the product packaging, present in more than 90% of the accounts. Posts with interaction or activities with consumers were found on 67% of Instagram accounts, 62% on Facebook and 53% on Twitter. Promotional strategies were mostly used on Facebook accounts (46%), on Twitter (37%), and to a lesser extent on Instagram (7%). The presence of advertising characters was 26% on Facebook, 20% on Instagram and 16% on Twitter. The offers were observed in 10% of Twitter and in the rest it was less than 7%.

Conclusions: Facebook was the most used social network to promote F&B. The product image was the main MT in all active accounts, followed by publications with interactions with consumers. It is essential that there are public policies that regulate advertising in digital media, specifically policies that focus on children.

Conflict of Interest: The authors declare that they have no competing interests.

Keywords: food/ beverages/ marketing/ social network/ schoolchildren.

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SATIETY RESPONSE TO THREE DIFFERENT TYPES OF HONEY (*APIS MELLIFERA*) OF MEXICAN ORIGIN

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Challenges of nutrition and public health in Ibero-America

Introduction: Honey is a natural sweetener produced by different species of honeybees, besides, is composed mainly by sugars (60-85%). The satiety index (SI) is described by the subjective sensation of fullness after the ingestion of food. Knowing the impact of foods in the satiety index could be guide to select certain foods and accomplish a more balanced diet. Regarding to above, the honey satiety index has not been fully studied.

Objectives: To evaluate the satiety response of three different honey (*Apis mellifera*) from Mexican origin.

Methods: Three types of raw honey were used in the study (Hermes Honey, Aguascalientes, Mexico). Men and women (N=26) 20-33 years old participate in this study. Subjects after 8 hours of fasting consumed 70 gr of honey, subsequently, they were asked: "How full do you feel?", using a visual analog scale (Jimenez-Cruz *et al.*, 2006) indicating their response at minute 0, 15, 30, 45, 90 and 120. The differences were evaluated through a two-way ANOVA and a Tukey test for the significance level $\alpha = 0.05$, using the statistic software Graph Pad Prism.

Results: Honeys M2 MF and M3 AG showed maximum satiety values at min 15, meanwhile honey M1 AP had the maximum satiety value at min 30; both cases had a significant difference from minute 0. Honey M1 AP showed different values of: "Satisfy without hunger" from minute 15 until minute 45. The Honey M2 AF and M3 AG only indicated values of "Low Hunger". All the honeys showed better results than glucose control.

Conclusions: M1AP and M2AF honeys showed the classification "Satisfied without hunger" and "Low Hunger" though a prolonged range of time in comparison to glucose.

Conflicts of Interest: The authors declare no conflict of interest.

Keywords: satiety index / raw honey

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APPROACHING GENDER GAPS IN FOOD CONSUMPTION AND NUTRITIONAL STATUS IN CHILDREN, YOUNG PEOPLE AND ADULTS IN SORACÁ, BOYACÁ

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Challenges of nutrition and public health in Ibero-America

Introduction: Gender gaps in health analyze the differences between men and women in terms of health outcomes. These are based on the identification of economic, historical, social, political and cultural areas (1) (2). Nutrition represents one kind of health gap, which proposes a new field of research from a gender perspective.

Objectives: to analyze gender gaps in the nutritional status and food intake in children, young people and adults in Soracá, Boyacá (Colombia) in 2016.

Methods: Cross-sectional study conducted in two a groups of age (children/young people and adults) during 2016. The study collected information regarding food consumption, nutritional status and social determinants.

Results: In terms of food consumption, in both groups the intake of protein and alcohol in men is more frequent, while women consume more dairy products, fruits, vegetables and sugars. In terms of nutritional status, a greater prevalence of overweight in women was reported. In children and young people, overweight represented 19% vs 4.0%, while in adult's obesity represented 13% vs 6%. On the other hand, by including intermediate social determinants in the analysis, the differences between fruit and vegetable intake in adults were reduced from daily intake frequency: 0.64 (CI: 95%: 0.33-0.95) to daily intake frequency: 0.45 (CI: 95%: 0.01-0.89). In terms of nutritional status of children and young people when including intermediate determinants, overweight differences decrease from OR: 4.33 (CI: 95%: 1.67 - 11.22) to OR: 3.80 (CI: 95%: 1.41 - 10.27)).

Conclusions: Our results are consistent with the data reported by the (Colombian Nutritional Status Survey (ENSIN)). The ENSIN reports in teen women in Colombia higher intake of sugars (1.1 times/day vs. 0.9 times/day). Adult women report higher intake of vegetables and milk (0.4 times/day vs. 0.3 times/day) and (0.8 times/day vs. 0.7 times/day). Although men reported a higher intake of protein in foods such as eggs (0.7 times/day vs. 0.4 times/day).

Similarly, adult women were more overweight than men (59.6% vs. 52.8%) (3).

Conflict of Interest: no conflicts of interest

Keywords: gender, food consumption, nutritional status

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SOCIODEMOGRAPHIC PROFILE AND ANTHROPOMETRIC ASSESSMENT OF SCHOOLCHILDREN OF MÉRIDA, YUCATÁN

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Challenges of nutrition and public health in Ibero-America

Introduction: In Mexico, height and weight problems are increasing in minors. Yucatan is the second state with the most prevalence of overweight and obese schoolchildren (43.1%), according to the School Nutrition Surveillance System (SIVNE). Several studies indicate that diet and lack of physical activity are triggers of excess of weight in schoolchildren, minimizing the sociodemographic conditions of the population and causing the problem to continue.

Objective: To relate sociodemographic characteristics with an anthropometric evaluation of schoolchildren from fourth to sixth grade in public elementary schools in Mérida, Yucatán.

Methods: A descriptive, retrospective and cross-sectional study. Anthropometric (weight and height) and sociodemographic (age, sex, school grade and geographic location of the school) data from randomly selected students in fourth to sixth grade has been obtained by staff qualified in nutrition; in a convenience sample of the schools. The BMI/age was determined and classified using the WHO-Anthro-Plus software. The schools were grouped into eight geographical

areas, delimited in the urban development plans of Mérida. SPSS®version 23 was used for descriptive statistics.

Results: The study included 1113 schoolchildren (47% girls, 53% boys). 93% had adequate height/age and 7% faltering growth. Regarding BMI/age, 49% showed normality and 48% an excess of weight (25% overweight and 23% obese). When the anthropometric variables were related to sociodemographic variables, it was observed that girls had a higher prevalence of severe faltering growth than boys. The BMI/age indicated that 14% of boys were overweight and 14% obese; in girls, the prevalence was 11.5% and 9.2%, respectively. Schoolchildren who go to school in the north of Mérida (zone I) had a higher prevalence of excess of weight, while in the east (zone III) schoolchildren had a higher prevalence of faltering growth and underweight.

Conclusions: In Mérida, nutrition problems behave differently in each of the eight geographic areas. The overweight is concentrated in the north of the city whilst underweight and faltering growth prevail in the east. It is important to implement increasingly focused health programs.

Conflicts of interest: None of the authors have conflicts of interest.

Keywords: Excess of weight / underweight / faltering growth / schoolchildren / Yucatán.

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COMORBIDITIES IN BRAZILIAN COMMUNITY HEALTH AGENTS AND THEIR ASSOCIATION WITH RENAL FUNCTION. CACEA STUDY

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Challenges of nutrition and public health in Ibero-America

Introduction: The Brazilian community health agents (CHA) are the professionals responsible for being the gateway to the community health system 1 that group is formed from health training and does not have formal education in the area, its main function is to support the services for the patient in primary care 2. being this way this is a population little studied for being very specific, in addition to intuiting that for their daily work they are people who maintain healthier lifestyles, however in the state of Bahia Brazil it was observed that this population was dissatisfied with their health and they presented physical domain compromise (pain, discomfort, dependence on medications or treatment, energy) 3.

Objective: The of this work is to analyze associations of sociodemographic factors and lifestyles of CHA in relation to renal function.

Methods: It is a study developed in 25 health units of Vitoria-ES Brazil, the research participants are community health agents totaling 247 participants, performing

anthropometric, biochemical and hemodynamic examinations. The data analysis was performed in the SPSS 21.0 software, the variables were presented in means, standard deviations and proportions, for the association analysis the Poisson regression was performed with robust variability.

Results: The sample was composed of 263 participants, with a mean age of 46.44 SD \pm 9.25 years and 100% of the female sex, when categorized by the glomerular filtration rate (Altered and normal), it is observed that 28.1% of diabetics, 51.1% of hypertensives, 66.7% of whites, 35.6% of smokers, 35.6% of poor health perception, 44.4% who use antihypertensives and 28.9% who use antidiabetics, present the altered glomerular filtration rate. When the regression model was carried out to evaluate the associations, it was found that the participants with diabetes (OR = 1.31), Hypertensive (OR = 1.10), who use hypoglycemic agents (OR = 1,3) and who were already smokers (OR: 1,16), are more likely to have altered glomerular filtration rates

Conclusions: Community health agents who have comorbidities and use medications are more likely to have renal involvement.

Conflict of Interest: we do not declare conflict of interest

Keywords: community health agents, renal function

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NECK PERIMETER AS AN ANTHROPOMETRIC INDICATOR FOR THE DIAGNOSIS OF OVERWEIGHT AND OBESITY IN CHILDREN AND ADOLESCENT

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Challenges of nutrition and public health in Ibero-America

Introduction: In latin America, approximately 42.5 million of children and adolescent between 0 and 19 years of age who are overweight and obese (OMS, 2016); those that have a negative effect on their health, which trigger diseases such as hypertension, diabetes and metabolic syndrome. Currently, it is determined that the neck perimeter has a high correlation to diagnose overweight and obesity.

Objective: Evaluate the neck perimeter as an anthropometric indicator for the diagnosis of overweight and obesity in children and adolescent aged 5 to 15 years.

Methods: Cross-sectional descriptive study, shows the convenience of children and adolescent who attend a sports complex. The nutritional status was evaluated using the ISAK anthropometric technique, using the neck perimeter according to Valencia (2018) where obesity: 29.4 women, 30.5 men and overweight: 25.2 women, 26.5 men.

Results: Sample of 116 subjects, minimum age 5 maximum 15 years, average age 8.22 years DO 1.94, 41.2% female, 58% male, average neck perimeter 27.97 cm, DO 2.23, range 24 to 36 cm. It was found 18.5% of normal nutritional status. 62.2% overweight and 16.81% obesity, the analysis according to sex, the values found are very similar, the female being the one with the highest percentage both overweight (64.6% 63.2%) and obesity (18.8% vs 16.2%), meanwhile for the age group, the older age was found to be more overweight and obese ($p < 0.05$)

Conclusions: The problem of overweight and obesity requires a non-invasive and easy-to-use evaluation that allows to determine an accurate nutritional diagnosis such as the neck perimeter, it is easy to measure, does not change during the day it is not visible influenced by the time of measurement, abdominal inflammation, the amount of clothing that is worn, this is especially useful in those people who are stigmatized by their body weight, have a phobia of weighing themselves, and in circumstances in which to remove clothing to measure waist circumference or weighing is not viable.

Conflict of Interest: the authors declare no conflicts of interest

Keywords: neck perimeter/ overweight/ obesity/ nutritional status

P170

REDUCING STUNTING BY A PUBLIC HEALTH INTERVENTION IN CAREGIVERS OF UNDER ONE YEAR OLD INFANTS IN BOGOTÁ, COLOMBIA

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Challenges of nutrition and public health in Ibero-America

Introduction: Bogotá is one of the cities with the highest prevalence of chronic malnutrition with 13%, which exceeds the 10.8% of the national prevalence. Therefore, a strategic alliance among different private and public institutions was established (Fundación Santa Fe de Bogotá, Secretaría Distrital de Salud, Secretaría de Integración Social and Fundación Éxito) to develop and implement a public health to address the reduction of stunting in the most prevalent localities of Bogotá.

Objectives: To assess the effectiveness of an inter-sectoral public health intervention to reduce stunting in children under one year of age. Stunting has been classified as at risk of chronic malnutrition through anthropometry in three priority areas in the Capital District.

Methods: A before-after quasiexperimental study was design to determine the magnitude of the change in nutritional status.

Results: A total of 1,126 children from three localities of Bogotá (Kennedy, San Cristóbal and Engativá) were part of the intervention. Forty three percent of children were stunted and 56.7% were at risk of stunting. Ten months after the intervention 17% (n = 686) of the children passed from chronic malnutrition to low-height risk and 4.5% (n =31) passed to adequate height.

Conclusions: Scientific evidence on health and nutrition interventions aimed at reducing stunting in children under 5 years of age showed that the most effective interventions in reducing the prevalence of stunting are those that obtained at least a 3% change over 12 months. In our intervention evidenced, 4.5% of change over 10 months.

Conflict of Interest: no conflicts of interest

Keywords: inter-sectoral, stunting, malnutrition.

References: Muttaquina H, Nuzhat C, Khaleda B, Prasenjit M, Alan J et al. Evidence-based approaches to childhood stunting in low and middle income countries: a systematic review. *Archives of Disease in Childhood*. 2017; 102 (10): 903-909.

Community Child Assistance Center (CAIC) of the municipality of San Miguel Xoxtla, Mexico, and compare the contribution of nutrients with the IDR for this population.

Methods: Descriptive and analytical cross-sectional study. One hundred children between 3 and 5 years of age who participate in the DIF hot breakfast program, who were weighed, measured and took personal data such as age, disease, previous medical treatments and data participated with informed consent of the parents socioeconomic The breakfast evaluation was carried out through the precise weighing method, the statistical analysis of the data obtained was finally performed and compared with the official Mexican standard for school breakfasts.

Results: The energy contribution of the hot breakfast was $22.53 \pm 3.3\%$, which does not cover the 25-30% indicated in NOM-169-SSA-1-1998 (official Mexican standard for school breakfast), the most consumed foods it was fruits and legumes, a group that is almost not consumed is that of meat and fish (consumption is mostly chicken and rarely tuna). The caloric profile of breakfast was 13.3% protein, 16.14% lipids and 62.19% carbohydrates.

Conclusions: The hot school breakfast of the DIF provided in the CAIC is varied and almost sufficient and most micronutrients cover between 25-30% of the Recommended Daily Intakes. The improvable characteristics of breakfast are a greater contribution of energy through a greater consumption of healthy fats, such as those from milk and derivatives such as cheese and yogurt.

Conflict of Interest: The authors declare no conflict of interest.

Keywords: School breakfast / preschoolers / eating of food

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EVALUATION OF THE HOT SCHOOL BREAKFASTS OF THE DIF, IN THE PRESCHOOL CAIC, OF THE MUNICIPALITY OF SAN MIGUEL XOXTLA, MEXICO

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Challenges of nutrition and public health in Ibero-America

Introduction: The DIF (Integral Family Development) Food Rations program provides hot breakfasts, thus contributing to nutritional improvement through a daily ration of hot breakfasts, a food aid program by the government. However, they lack systematic evaluations that allow attributing a change or benefit due to its implementation.

Objectives: Evaluate the energy and nutrient contribution of the hot breakfast offered to preschoolers attending the

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EVALUATION OF EATING HABITS IN A UNIVERSITY POPULATION IN THE CITY OF PUEBLA, MEXICO

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Challenges of nutrition and public health in Ibero-America

Introduction: Eating is a voluntary and conscious process, so it is able to be educated. Proper nutrition is the basis of good health and this justifies that in more developed societies there is a growing concern for food in young people. The majority of young people do not have enough dietary information that allows them to have a balanced diet, their decisions are influenced by the type of family feeding, the behavior of other young people, advertising messages about

fast food, snacks and other consumption variables that often disagree with the regulated and harmonious dietary guidelines.

Objectives: Evaluate the eating habits of a university population.

Methods: 100 university-level students between 18 and 25 years old participated. A questionnaire was applied to know their eating habits, in addition to asking about their weight and size.

Results: BMI was 23.48 ± 3.35 . Some relevant eating habits and lifestyles were: 45% of the students live with both parents, mostly women (28%), in 44% of the population at least one of the parents was overweight and / or obese. The most consumed foods for breakfast were milk (54%), cereals (43%), fruit (32%) and yogurt (26%). 9% combine milk, cereal and fruit, followed by 27% mixing only cereal with milk, 59% of the population said to have breakfast always or almost always. The most consumed snack was sandwich (34%), followed by fruit (18%).

Conclusions: The eating habits of university students are good in general, however, these could be improved if more hours are devoted to physical activities that are sacrificed for class schedules. The population says that it is good to have breakfast, however, they do not do it in the right way because they consume mainly a single group of foods, without compensate this throughout the day since the consumption of junk food is high.

Conflict of Interest: The authors declare no conflict of interest.

Keywords: Eating habits / breakfast / physical activity / food

P173

CHARACTERIZATION OF FOOD SALE ESTABLISHMENTS IN THE UNIVERSITY CENTERS OF THE UNIVERSIDAD DE GUADALAJARA

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Safe, healthful and sustainable food

Introduction: University is a critical period for health, students need to adapt to a new environment that can influence their lifestyle and eating behavior. Food environments that stimulate opportunities for the consumption of energy-dense foods may contribute the increase of obesity prevalence. Little is known about food environments at universities.

Objectives: Characterize food stores in university environments.

Methods: Multi-center cross sectional design. All establishments whose main line of business was food and gave their consent to participate were evaluated, located inside and outside (within a radius of 800 meters taking each entrance door as a measurement point) at each university campus (UC) of the *Universidad de Guadalajara* in the metropolitan area. Maps with each radio were obtained with ArcGIS. The instrument previously structured in SurveyMonkey evaluated the classification of food stores, as well as some characteristics. For twelve months, the six thematic UC were evaluated. Food stores were classified as a restaurant with waiter (RWW), a restaurant without waiter (RWOW), mobile food vending (stalls established on the street or on sidewalks), convenience stores and others, and Facebook®. A descriptive analysis of the data was performed.

Results: Out of 500 food stores (75% located outside the UC), mobile food vending had the highest frequency (28%), followed by RWOW (23%), Facebook® (19%), RWW (16%) and convenience stores and others (14%). Regarding the characteristics, no food stores offers the nutritional value of its dishes. The characteristics with the greatest presence were: option of dishes without frying (69%), offer drinks without sugar (52%) and serve their dishes with vegetables (46%); food stores were considered clean (31%) and had clean personnel (13%) (clean hands, use of caps and face masks). Convenience stores and others have the highest frequency of visible advertising of ultra-processed foods (64%).

Conclusions: Mobile food vending is the type of establishment with the highest presence in all the UC analyzed. None offer nutritional information about the dishes and they don't follow recommendations in hygienic conditions.

Conflict of Interest: None.

Keywords: Food environment/ food availability/ universities.

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ADEQUACY OF HEALTHY LUNCH BOXES TO THE DAILY ENERGY AND NUTRIENTS DISTRIBUTION FROM THE SPANISH STANDARD DIET

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Safe, healthful and sustainable food

Background and aim: The lifestyle of our society has increased the demand and use of lunch boxes being used in dishes at work for adults (Lucan, 2016). These users want to find healthy meals in these containers (Webb, 2006). The aim of this study is to evaluate the lunch boxes prepared for adults in a cooking workshops focussed to healthy lifestyle and

compared with the Spanish standard diet (Moreno Rojas et al., 2015).

Methods: Several elaborated lunch boxes were separated after cooking workshops and weighed (Utility electronic scale; made in China for Propert Australia Ltd) each ingredient at least twice, to the nearest 1 g, by dietitians. In order to estimate energy and nutrient composition of each lunch box was used the DIAL program, version 1.02 for Windows 10 (Alceingeniería, Madrid, Spain) (Ortega et al., 2016). Obtained values from energy and nutrients were compared with the percentage distribution in the lunch of the Spanish standard diet for adults (Moreno Rojas et al., 2015).

Results: The mean of the percentage distribution of energy, proteins, lipids and carbohydrates between meals from the elaborated lunch box in the cooking workshops was of 46, 50, 46 and 42%, respectively versus of 46, 50, 46 and 42% from Spanish standard diet. Furthermore, the micronutrients calculated in the lunch boxes is adequate to this standard diet being the reflection of a good healthy tool.

Conclusions: The adequacy of the lunch box in healthy recipes is very important to improvement the nutrition and quality of life on the employee-working environment.

Keywords

Healthy lunch box, workers, energy, nutrients

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PATTERN RECOGNITION TO DETERMINE THE QUALITY OF THE MOST CONSUMED BREAKFAST CEREALS IN MEXICO

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Safe, healthful and sustainable food

Introduction: According to experts, an ideal breakfast is one that provides between 20 and 25% of the daily caloric requirements; moreover, it should include an appropriate nutrient intake (vitamins, minerals, proteins, carbohydrates and fats). Although it is shown that breakfast cereals do not represent the best option for breakfast due to the industrialization process they go through, even among them we can distinguish those which are healthier for human consumption.

Objective: Determine without bias which are the healthiest breakfast cereals using pattern recognition techniques and considering only their nutritional contributions.

Methods: Based on Profeco quality studies conducted in 2011 and 2019, the reported nutritional values were compared in 30 g portions of the most consumed breakfast cereal brands in Mexico; pattern recognition techniques such as PCA and three unsupervised classification algorithms were used to classify them: *k*-means, Gauss and Spectral.

Results: It was found that cereals in 2019 and 2011 can be classified in two groups: healthy and less healthy. The difference between the two groups is evident even when graphing the first two principal components of PCA, which maintain an average representativity of 82.8%. The average trend in cereals from 2011 to 2019 was to decrease the amount of sugar by 2.43 g and the energy intake by 55 kcal, as well as increase protein 0.24 g, fiber 0.34 g and fat by 0.05 g. It was identified that American brands and Nestle brands became less healthy, while Maizoro and Kellogg's improved their quality over time.

Conclusions: Trends in nutrition indicate that cereals should decrease their energy intake, sugar, and fat, increasing protein and fiber. The three unsupervised algorithms show that Nestlé and the American brands have kept the same values from 2011; instead, Maizoro and Kellogg's have improved their formulations to the new standards.

Conflict of Interest: None.

Keywords: Breakfast cereals / comparative study / pattern recognition

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NUTRITIONAL VALUE OF WATERCRESS (*Nasturtium officinale*)

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Safe, healthful and sustainable food

Introduction: The watercress (*N. officinale*) is a plant native to Europe, its consumption has extended to America

where it was integrated to the ecosystems of the continent, at present it is found in adjacent areas of rivers and lakes, looking like a wild plant. It is also valued as a source of food for its easy propagation and reproduction in different environments in addition to the diversity of uses in the culinary gastronomy of the world. However are still unknown the nutritional contributions that this plant can contribute to the diet.

Objectives: The aim of this research was to analyze the macronutrient content in watercress (*N. officinale*), and to promote the benefits that this plant can bring to human nutrition.

Methods: The work was carried out in two phases, the first in the summer of 2017 in the municipality of Rayón, State of Mexico. The samples of complete plants of fresh watercress were collected under a targeted sampling and with safety and hygiene measures. In the second stage, the botanical classification and the proximal chemical analysis on a dry basis according to the methods of the AOAC, 1995.

Results: The botanical description of the plant indicates that this Brassicaceae corresponds to the genus *Nasturtium*, species *officinale*. The percentages obtained expressed values of humidity 87.7%, dry matter 12.3%, protein 27.2%, inorganic matter 3.37%, lipids 2.65%, fiber 13.9% and soluble carbohydrates 52.88%. Watercress contains high percentage of humidity, however, the macronutrient content is still relevant.

Conclusions: The Watercress is a wild plant that is available most of the year and is a product accessible to the population that by being included in the daily diet combined with other nutrient-rich foods can improve the nutrition of different social groups.

Keywords: food / watercress / nutrition

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CONTENT OF FOOD ADITIVES ACCORDING NOVA FOOD CLASSIFICATION IN EDIBLE PRODUCTS ADVERTISED ON COLOMBIAN TELEVISION IN 2018

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Safe, healthful and sustainable food

Introduction: The use of additives is increasingly common in the food industry. In turn, multiple studies show that a large amount of ultra-processed edible products are advertised on television. There is a lack of evidence in Colombia about the content of additives present in these products.

Objectives: This paper aims: 1) describe the percentage of edible products according NOVA food classification [I) natural or minimally processed foods, II) culinary ingredients, III) processed foods and IV) ultra-processed products], 2) comparing the amount of additives present in non-ultra-processed foods (NUPF) vs ultra-processed edible products (UPF), and 3) compare the content of food additives in NUPF vs UPF.

Methods: Information regarding ingredients and food additives were recorded according to Codex STAN 192-1995 v. 2019, as early as the collection of available labels of edible products (n=55) scheduled on Colombian television in August 2018. For the analysis was performed: 1) the percentage of edible products according NOVA food classification, 2) the amount of additives present in NUPF vs UPF was compared, and 3) the content of food additives (total additives/total ingredients) in NUPF vs UPF was compared. Nonparametric statistics were used for comparison between two groups (Mann-Whitney) using STATA: 15.1.

Results: It was identified 55 edible products. According to the NOVA food classification, 21.8% (n=12) were natural or minimally processed foods, 0.0% (n=0) culinary ingredients, 1.8% (n=1) processed foods and 76.4% (n=42) ultra-processed products. It was found that NUPF (n=13) had a median of 0 additives, while UPF (n=42) a median of 6 additives (IR: 4-9), p<0.001. In the case of the comparison of the content of additives, the NUPF group presented a median of 0 additives per ingredient, while for the UPF it was 0.392 additives per ingredient (IR:0.258-0.579), p<0.001.

Conclusions: From edible products advertised on Colombian television in 2018, 76.4% are NUPF, characterized by having a higher content of food additives vs UPEF. Additional studies are required to evaluate the possible public health effect of the consumption of additives in the Colombian population, given the increasing availability of UPF.

Conflict of Interest: The authors declare no conflict of interest.

Keywords: food additives / NOVA / ultra-processed edible products / television advertising

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ANALYSIS OF FOOD ACCESS AND CONSUMPTION OF VENEZUELAN CITIZENS UNDER HUMAN MOBILITY STATUS

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Safe, healthful and sustainable food

Introduction: Venezuela is a country that has maintained political, economic and social conflicts for more than a decade. These conflicts have put Venezuela in crisis, generating a direct impact on migration patterns at the international level. By the end of 2019, the number of Venezuelans in human mobility was close to 4.5 million and the UN Refugee Agency (UNHCR) predicted that by 2020 the number would increase to 6.5 million. Food security occurs when people have stable access to safe, nutritious and sufficient food. However, this balance breaks down and becomes food insecurity for different reasons. People in human mobility become a vulnerable group who, because of limitations, are at high risk of food insecurity.

Objective: The aim of the study was to evaluate the food security pillars of access and consumption of Venezuelans in a situation of human mobility that attended a health center in Quito, Ecuador.

Methods: A cross-sectional, observational and analytical study was conducted with Venezuelan adults in a situation of human mobility. A short questionnaire adapted from the Emergency Food Security Assessment from the World Food Program (WFP) was applied in order to evaluate food consumption.

In addition, the weekly expenditure on food was consulted, which made it possible to estimate access to food. Food insecurity was determined by linking food consumption and access (WFP, 2010).

Results: The total sample of the study was 247 adults, with an average age of 36.8 years (CI 95% 35.26-38.34), 168 (68%) individuals were female and 9.9% of participants are in an alarming situation of serious food insecurity. Likewise, 75.6% of Venezuelan individuals in a situation of moderate food insecurity, of whom 10% have unacceptable food consumption and 76.9% are in the category of inadequate access.

Conclusions: Venezuelan individuals with a human mobility situation in Ecuador (with a maximum of 1 years stay) have a high percentage of food insecurity. The lack of access plus food consumption problems is the main cause of this problem, which shows a serious situation of economic constraint due to lack of resources.

Conflict of Interest: No conflicts

Keywords: Food security/ human mobility/ Venezuela/ food insecurity/ migration.

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DIFFERENCES IN THE LIPID CONTENT BETWEEN ORANGE JUICE AND BLOOD ORANGE JUICE

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Safe, healthful and sustainable food

Introduction: Brazil is one of the biggest orange producers in the world and this includes different varieties of

fruit, since a great part of its production is intended for juice production, which is exported to several countries around the world. To supply the demands of commerce, the producers perform blends of different varieties, trying to achieve the taste and smell desired by consumers. Despite being little known in Brazil, the blood orange juice stands out for its high sugar contents, flavor, smell, and color, that are different from the traditional (Hamlin). Moreover, as a beneficial effect to the organism, studies shown that the blood orange juice consumption increases the resistance to oxidative stress, that is why this species has been studied for the functional potential of its compounds, mainly the anthocyanins.

Objectives: Seeking to know the nutritional profile of the orange juice this study had as its aim to quantify the fat content in traditional orange juice and blood orange, coming from the interior of São Paulo - SP, and correlate its results.

Methods: The "Bligh and Dyer" described by Folch and based in a blend of chloroform-methanol, was used for the determination of the amount of the total lipids in samples. The analyzes were performed in the bromatology laboratory of the University of São Paulo/Ribeirão Preto - SP in triplicate.

Results: The results have shown differences in the content of lipids between the juice samples, in which the blood orange juice presented higher fat contents (0,048±0,001 mg/mL) comparing to the traditional orange juice (0,018±0,020 mg/mL).

Conclusions: It is not common that different varieties of the same fruit present differences in their nutritional content, mainly majority components as carbohydrates, proteins, and lipids. Despite of the differences already presented in the literature among the phenolic compounds, anthocyanins, vitamin C, flavanones, and Hydroxycinnamic acid of the blood orange, the fat quantity had not yet been determined. As a way to continue this work, we suggest the determination of the profile of fatty acids in this juice for a detailed study of its composition and correlation with the studies that were already realized.

Conflicts of interest: nothing do declare.

Keywords: citrus / fruit juice / lipids / determination / quantification.

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EVALUATION OF WEIGHT GAIN IN PREGNANT WOMEN OF A FIRST LEVEL PUBLIC HEALTH CENTER OF THE CITY OF PUEBLA, MEXICO: A PILOT STUDY

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Challenges for an effective and efficient public-private partnership in food and nutrition

Introduction: During pregnancy, there is an accumulation of maternal body fat that will be used for milk production and maintenance of breastfeeding.

Objective: Evaluate weight gain in pregnant women according to their gestational trimester.

Methods: It is a pilot study conducted on December 2019 on 20 pregnant women in a Health Center in the city of Puebla, as part of a larger project called "Sociodemographic factors of pregnant women and their relationship with weight". Nursing students collected self-reported anthropometric data (height, pregestational weight and current weight), age and gestational weeks. Weight gain was evaluated according to WHO recommendations. A descriptive analysis was performed to present the results.

Results: The average age was 23.0 ± 5.3 years, being the minimum 16 and the maximum 35 years. According to the trimesters, 10% ($n = 2$) were in the first trimester, in the second and third trimesters they had 45% ($n = 9$) each according to the pre-gestational nutritional status (PGNS), 25% ($n = 5$) were underweight, 45% ($n = 9$) adequate weight, 25% ($n = 5$) overweight and 5% ($n = 1$) obese. The average weight gain in women in the first trimester was 3.5kg for those who were in adequate PGNS and 4kg for those who were in overweight PGNS. Those in the second trimester gained 4 ± 5.2 kg those who had low weight PGNS ($n = 5$), 2.5 ± 3.5 kg those who were with adequate PGNS ($n = 2$) and 8 ± 5.7 kg those who were overweight ($n = 2$). In relation to those in the third quarter, the average weight gain was 7.5 ± 4.7 kg those with adequate PGNS ($n = 6$), 2 ± 2.8 kg those who were overweight PGNS ($n = 2$) and the one who was obese had a weight loss of 7 kg.

Conclusions: It was found that during the second trimester the participants presented a lower weight gain than recommended, while in the third trimester they had an adequate weight gain.

Conflicts of interest: none.

Keywords: Pregnant woman / pregestational weight / gestational weight gain

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NUTRITIONAL EDUCATION PROGRAM FOR OVERWEIGHT AND OBESE STAFF OF CIE, CELAYA GTO

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Obesity is a chronic degenerative disease, the main characteristic of which is the increase in adipose tissue, one of the most important causes is the excessive intake of sedentary lifestyle, triggering consequences such as chronic degenerative diseases. This is why it is of utmost importance

to carry out interventions focused on improving nutrition and health in people who are overweight or obese.

Objectives: Improve feeding habits and body composition of overweight or obese staff at CIE Celaya, Guanajuato

Methods: A diagnostic evaluation was carried out using food frequency and anthropometric measurements such as: weight, size, tricipital and bicipital skin fold and abdominal circumference. Subsequently, all staff were invited to participate with an BMI greater than 24.9 and with an unfavourable food frequency. Individualized nutritional plans and nutritional talks of personal interest were implemented along with workshops for the improvement of eating habits. Anthropometric and food frequency measurements were completed, initial and final data after intervention were compared with the SPSS statistical package and Student's statistical test T

Results: The average age was 33 years, the improvement of anthropometric markers was achieved: weight (78.3 ± 19.4 a 76.63 ± 18.3 ; $p=0.028$), BMI (29.98 ± 4.99 a 29.30 ± 4.79 ; $p=0.023$) PCT (21.25 ± 8.81 a 19.70 ± 7.46 ; $p=0.02$), (92.36 ± 13.91 a 91.99 ± 13.95 ; $p=0.09$); P; and increased consumption of foods such as: vegetables (3.91 ± 1.62 a 5.25 ± 1.28 ; $p=0.018$), natural water (1.79 ± 0.72 a 2.25 ± 0.45 ; $p=0.043$), and food reduction such as: pork (2.75 ± 1.86 a 1.83 ± 1.74 ; $p=0.013$), industrialized juices (1.58 ± 1.62 a 0.91 ± 1.08 ; $p=0.012$) and soft drinks (3.58 ± 2.27 a 2.58 ± 2.06 ; $p=0.05$)

Conclusions: It was concluded that nutritional intervention in a correct way to prevent to the people a have not diseases with: Obesity, over weight and DM and make a improve in your health and more production in the companies

Conflict of Interest: We have not conflict to interest

Keywords: Obesity/Nutrition /Intervention/

P182

NUTRITIONAL STATUS AND ORAL HEALTH: AN INTERDISCIPLINARY CHALLENGE OF HEALTH EDUCATION IN STUDENTS OF AN EDUCATIONAL INSTITUTION FROM MEDELLIN - COLOMBIA

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¹Dentist graduated from the University of Antioquia. Colombia; ²Graduated dentist University of Antioquia. Colombia; ³Dentist, Mg in Social and Human Sciences, Professor University of Antioquia. Colombia; ⁴Nutritionist. Doctor of Education. Professor University of Antioquia. Colombia; ⁵Professional in Health Information Systems Management.

Nutrition in the prevention and treatment of chronic diseases

Introduction: "There is a two-way relationship between health, diet and nutrition" J Acad Nutr Diet. 2013 May; 113 (5): 693-701. doi: 10.1016 / j.jand. 2013.03.001.). The oral health situation compromises an individual's ability to consume food,

consequently, the nutritional status; likewise, diet and nutrition affect the development and integrity of oral structures and their functioning. Some studies have shown that in populations with low sugar consumption, tooth-decay levels are also lower.

As a result, a multidisciplinary articulation between nutrition and oral health to develop comprehensive research and education actions in health is necessary.

Objective: To identify the relation between nutritional state and oral hygiene in schoolchildren of a public institution in Medellin-Colombia.

Methodology: Dental and nutritional assessments were done on 372 schoolchildren between 8 and 12 years of age, as well as the Simplified Oral Hygiene Index (SOHI), obtaining good, fair, and bad hygiene. For the Nutritional Status, an anthropometric evaluation (weight, height, age, and gender) was performed based on the BMI / E, using the WHO's AnthroPlus, obtaining the classification of: Thinness, Risk of thinness, Adequate weight, Overweight and Obesity. The "SOHI" variables were matched against the "Nutritional Status" numbers.

Results: The overweight index was 26.07%, the obesity index was 10.75%, the proper weight was found in 53.22% of the children, 8.60% were at risk of thinness, and 1.34% were thin. Of the 62.4% that showed good oral-hygiene, 53.4% had adequate weight, 27.6% were overweight and 11.2% were obese. Similarly, of the 37.4% that indicated fair oral-hygiene, 53.2% had adequate weight, 23% were overweight and 10.1% were obese. Finally, 0.3% showed poor oral hygiene, of which 100% were overweight. According to ENSAB IV, 92.06% of Colombian school children show signs of tooth-decay; in our case, the overweight problem deserves special attention when compared to the oral-hygiene issue.

Conclusions: Among the factors that lead to the development of dental decay, is the consumption of a cariogenic diet coupled with unhealthy habits such as poor oral hygiene. This calls for a joined effort between nutrition and dentistry professionals in the planning and execution of educational activities for health.

Keywords: nutrition/ diet/ oral health/ health education/ schoolchildren.

This work is part of the Colon Cancer Prevention (ECNT) project. Educational perspective against obesity, in food, nutrition and physical activity, in schoolchildren in Antioquia and Quindío, within the Scientific Academic Alliance for the strengthening of IES, focusing on nanobioengineering for the prevention, diagnosis and treatment of colon-cancer-Nanobio-cancer. Scientific Colombia. 2017

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Obesity in an early stage of adult life has as consequence the risk of developing cardiovascular and chronic diseases. University age, between 17 and 24 years old (young adults), suggests that during this period of life, unhealthy habits could be acquired, resulting in deterioration in health indicators.

Objectives: Evaluate the nutritional status of new students from a private university in the state of Puebla, Mexico.

Methods: Data were collected with university students belonging to a common core discipline. Anthropometric measurements of weight, height, hip, and waist were made. The Body Mass Index (BMI) were obtained and the nutritional status was classified, with the parameters of the World Health Organization (WHO). Cardiovascular risk was also estimated with waist circumference. In addition, surveys were conducted with questions to obtain information on age, physical activity practices and the degree they are studying, among others.

Results: 247 students with an average age of 18.7 ± 1.5 years were evaluated, 65.9% (n = 162) women; 43.3% (n = 107) mentioned living alone. Of the total sample evaluated, 56.7% belonged to the health sciences department, followed by 15% that belonged to engineering and the rest corresponded to the other careers offered at the university. On the other hand, 64.4% (n = 159) said to practice physical activity, so 44.5% (n = 110) are classified as active according to the WHO criteria. The average waist circumference of the 247 students was 78.9 ± 10.5 cm; Average hip circumference was 97.1 ± 8.4 cm. The BMI results were 23.8 ± 4 kg / m². According to the evaluation of the nutritional status, 63.6% (n = 157) are eutrophic; 24.7% (n = 61) are overweight; 6.9% (n = 17) present some type of obesity; 4.9 (n = 12) have low weight. Of the total of the students evaluated, 22.8% (n = 55) have estimated cardiovascular risk through waist circumference according to sex.

Conclusions: Obesity and cardiovascular risk diagnosed in youth should be of concern, because of the predisposition of these people to suffer from chronic degenerative diseases at earlier ages.

Conflict of Interest: None

Keywords: Nutritional status, cardiovascular risk, young adults.

P183

ASSESSMENT OF THE NUTRITIONAL STATUS OF FRESHMEN STUDENTS FROM A PRIVATE UNIVERSITY IN THE STATE OF PUEBLA

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P184

NUTRITIONAL PREOPERATIVE EVALUATION IN PATIENTS WITH DIGESTIVE NEOPLASSIC PATHOLOGIES INTERNETS IN THE CENTRAL HOSPITAL OF THE INSTITUTE OF SOCIAL FORECAST. 2019

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Nutrition in the prevention and treatment of chronic diseases

Background: Hospital malnutrition (DNH) continues to be the most frequent cause of increased morbidity and mortality and one of the main health problems worldwide. It is important to identify undernourished or at-risk patients in order to establish adequate nutritional support as soon as possible. Preoperative nutrition is essential in the care of surgical patients. Objective: Analyze the pre-operative nutritional status of patients with digestive neoplastic pathology admitted to the General Surgery service of HC-IPS.

Methods: Cross-sectional, observational and descriptive study carried out in patients with digestive neoplasia who entered the Department of General and Digestive Surgery of the IPS Central Hospital to undergo surgery in the May-June period of 2019. For each patient a file was prepared that included information on personal data, history of previous pathologies, medication, elements of clinical judgment, anthropometric data, general laboratory data, preoperative diagnosis, surgical procedure performed, hospitalization time.

Results: Preoperative nutritional assessment was performed in 20 patients who attended the General and Digestive Surgery Service of the IPS Central Hospital. 55% corresponded to the female sex. The mean age was 65 ± 13 years. As for the preoperative nutritional assessment, 20% had mild malnutrition, 20% moderate malnutrition, 5% severe malnutrition and 25% risk of malnutrition. The nutritional biochemical parameters were a bit low with an average of 3 ± 0.6 g / dl for albumin and an average of 5.8 ± 0.8 g / dl for total proteins. 70% of patients had no difficulty eating food. A high percentage of patients reported weight loss in the last three months.

Conclusion: All patients with oncological pathology who are going to be taken to a surgical procedure require assessment by the nutrition service to know the current status, and in case of presenting some degree of malnutrition, offer the necessary support for their compensation in the pre and postoperative.

Conflict of Interest: The authors declare no conflicts of interest.

Keywords: nutritional evaluation/ digestive neoplasia/ nutritional intervention/ preoperative nutrition.

P185
FOOD CONSUMPTION HABITS IN PATIENTS WITH RISK FACTORS OF METABOLIC SYNDROME, FROM THE MARGINAL URBAN AREA OF QUITO-ECUADOR, 2017

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Introduction: In patients with Metabolic Syndrome, it is essential to understand how is the food pattern. In several studies it has been seen that people with this disease do meet the dietary recommendations, for simple carbohydrates, saturated and total fats, and sodium. In addition, the consumption of vegetables, fruits, whole grains and low-fat dairy is low.

Objective: Evaluate the dietary consumption in relation to different risk factors of metabolic syndrome.

Methods: 135 individuals with one or more metabolic syndrome risk factors defined by IDF (International Diabetes Federation) between 18 and 65 years old, treated at the Health Centers of El Quinche and Cumbayá in Ecuador were studied. Anthropometric measurements were taken; as weight, length and waist circumference and lipid profile. Food consumption was related to metabolic syndrome factors using the Spearman test and the difference between the descriptive variables was used by the Mann-Whitney U test.

Results: Dairy products ($p=0.049$; $\rho=-0.170$) had a mean negative correlation with triglycerides as did fruits ($p=0.039$; $\rho = -0.178$), the group of breads, cereals and tubers ($p=0.018$; $\rho=-0.204$) and the meat, eggs and shellfish group ($p=0.008$; $\rho=-0.229$). Whereas, vegetables ($p= 0.029$; $\rho=0.188$) had a mean positive correlation with HDL cholesterol and the group of breads, cereals and tubers ($p=0.024$; $\rho=0.195$) had a positive average correlation with diastolic pressure.

Conclusion: Therefore, eating a balanced diet in terms of portions is correlated with better triglyceride parameters, HDL cholesterol and diastolic pressure, which are components of the metabolic syndrome.

Conflict of Interest: The funders had no role in study design, data collection and analysis, the decision to publish, or the preparation of this paper.

Keywords: metabolic syndrome - consumption habits - adults - risk factors.

P186
CHANGES IN THE DIETARY INTAKE IN NUTRITIONAL SCIENCES STUDENTS

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Overweight and obesity are a public health problem due their high prevalence in Mexico; it has been demonstrated that an adequate dietary intake has a major clinical impact controlling and preventing them. Furthermore,

the educational and work environment play an important role to implement nutritional interventions.

Objective: To evaluate the dietary intake changes in Nutritional Sciences students.

Methods: A cohort study of Nutritional Sciences second year students from Facultad de Estudios Superiores Zaragoza of the Universidad Nacional Autónoma de México. 20 students were evaluated. Anthropometric and diet data were collected at baseline and in the sixth month. The food processor nutrition and fitness software and the statistical program SPSS 21th version were used to evaluate diet and statistical analysis respectively.

Results: In general, after 6 months: energy intake decreased by 300 kcal (p 0.03), as well as sugar 32 g (p 0.03), and total fat 11 g (p 0.04), saturated fat 5 g (p 0.05) and Sodium 822 mg (p 0.02), showed decreased intake versus the baseline.

Conclusions: Educational environment exposure makes students aware of preventing and treating diseases by means of nutrition which involves an improvement in the dietary intake. Reduction was observed for total energy, sugar, Sodium and saturated fat intake. However, evaluation of another variables such as body composition and lifestyles are required for further analyses of the impact of educational environment exposure.

Conflict of Interest: No conflict of interest is declared.

Keywords: Educational environment/ dietary intake/ nutritional sciences.

Methods: Five VAS were adapted to assess hunger, appetite and satiety. Scales were translated and adapted to Spanish language through a group of experts. Then the pilot study was realized in a group of 12 participants (6 men and 6 women). VAS were applied in two different occasions with an interval of 4 weeks (test and re-test). Participants were dating with 8 hours of fasting, and each subject answer the five VAS before and after eating a breakfast. The breakfast provided a total of 267 kcal (41.7% carbohydrates, 22.9% proteins and 35,5% fat). This procedure was repeated in the same manner in the second session. For the statistical analysis Student-T, Wilcoxon, and the intraclass correlation coefficient (CCI) test were used. Statistical analyses were performed using SPSS v.20.0 (SPSS, Chicago, IL, U.S.A.) and a p value $<$ 0.05 was considered statistically significant.

Results: In the test as well as in the re-test, a significant difference was found in all scales when comparing basal and post-ingestion application. When comparing the values between the test and re-test, no differences were found between applications, except for the scale "desire to eat". When evaluating the CCI between the basal and post-ingestion scales a r value of 0.60-0.70 was obtained in all VAS, except for scale "desire to eat" ($r=0.42$).

Conclusions: In this sample the five VAS showed to be a useful tool to assess hunger, appetite and satiety. All VAS were reproducible, except for the scale "desire to eat".

Conflict of Interest: The authors declared no conflict of interest.

Keywords: VAS/ hunger/ satiety /reproducibility

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ADAPTATION AND REPRODUCIBILITY OF VISUAL ANALOGUE SCALES FOR THE EVALUATION OF HUNGER, APPETITE AND SATIETY IN A POPULATION OF WESTERN MEXICO. A PILOT STUDY

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Nutrition in the prevention and treatment of chronic diseases

Introduction: In the study of hunger, appetite and satiety, visual analogue scales (VAS) are used as a tool to assess these somatic sensations. However, these scales are not adapted for their use in Mexican population. Thus, the aim of this study was to adapt and reproduce five VAS to assess hunger, appetite and satiety in Western Mexican population.

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ASSOCIATION BETWEEN NUTRITIONAL STATUS AND HYPERPHOSPHATEMIA IN PATIENTS WITH RENAL REPLACEMENT THERAPY

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Chronic Renal Disease affects kidney function severely and if not detected and treated on time, it will progress to an irreversible stage where Renal Replacement Therapy (RRT) such as Hemodialysis (HD) will be inevitable. Once patients enter HD, there is a complete dependence on health care services, which represents a high cost to the Health Care Systems. One of the main complications for patients under HD is hyperphosphatemia, which is defined as blood phosphate levels above 4.5 mg/dl and is recognized as an independent risk factor for mortality. Nutritional evaluations represent a low-cost and effective approach to

prevent, identify and positively influence chronic diseases, we believe that a deep analysis of basic nutritional parameters in patients under HD will reveal associations to disease-related biochemical factors that could be improved through nutritional interventions in order to avoid fatal outcomes.

Objectives: We aim to evaluate the association between Body Mass Index (BMI) and blood phosphate levels in patients attending to a public/private HD clinic.

Methods: Weight and height measurements, as well as biochemical data were obtained from files of patients attending to the clinic. BMI was classified in two categories: weight excess with BMI $>25\text{kg/m}^2$ and eutrophic with $18.5\text{kg/m}^2 < \text{BMI} < 25\text{kg/m}^2$. Descriptive and analytical statistical analysis was performed in Excel.

Results: Twelve patients were included in the first analysis, from which 33.3% were women, mean age was 61.8 ± 16.5 years, mean weight was 65.7 ± 1.7 kg, mean height was 1.59 ± 0.11 m, mean BMI was 25.8 ± 5.06 kg/m^2 , mean blood phosphate level was 5.2 ± 2.01 mg/dL . We observed 58.3% eutrophic patients and 41.7% with weight excess. The latter showed a mean blood phosphate level of 6.7 ± 1.58 mg/dL , compared to 4.11 ± 1.59 mg/dL from the eutrophic group ($p=0.019$).

Conclusions: This first approach has shown a positive correlation between BMI and hyperphosphatemia in patients under HD. Usually obesity is considered a protective factor for HD patients; we aim to increase the n of the study and differentiate between fat body distribution in order to increase the strength.

Keywords: body mass index, hemodialysis, hyperphosphatemia

Objective: To analyze the association between *FTO* gene polymorphism rs9939609 and anthropometric, biochemical and dietetic parameters in Mexican adults with different metabolic phenotypes.

Methods: 250 Mexican adults with normal weight (NW) or obesity (OB) were included (OMS criteria). Anthropometric, biochemical and dietary parameters were determined, and the subjects were classified into metabolic phenotypes: healthy (MHP) and unhealthy (MUHP) if they presented none or one, or two or more criteria related to blood pressure, triglycerides, HDL-Cholesterol or insulin resistance measured by HOMA-IR. The presence of the polymorphism was identified by allelic discrimination with TaqMan® probes using the Roche LightCycler 96 system. Variables were compared according to genotypes and metabolic phenotypes, by analysis of variance or Student's t-test, respectively.

Results: The 78.2% of the participants were women with a mean age of 36.9 ± 11.5 years. The 31% of the subjects with NW ($n=28$) had the MUHP compared to 86% ($n=69$) of the subjects with OB. The 54.7% ($n=93$) presented the TT genotype, 40% AT ($n=68$) and 5.3% AA ($n=9$). In subjects with MHP and AT/AA genotype, BMI was higher (TT: 22.1 ± 2.7 kg/m^2 vs AT/AA: 24.6 ± 5.3 kg/m^2 , $p=0.01$). In subjects with MUHP and AT/AA genotype, waist circumference (WC) values (TT: 97.8 ± 15.4 cm vs AT/AA: 104.7 ± 17.4 cm, $p=0.04$), insulin (TT: 13.4 ± 7.7 $\mu\text{U/ml}$ vs AT/AA: 20.0 ± 10.3 $\mu\text{U/ml}$, $p<0.01$) and HOMA were higher (TT: 3.2 ± 2.0 vs AT/AA: 4.8 ± 2.4 , $p<0.01$). Dietary intake variables were not statistically different between phenotypes and genotypes.

Conclusions: AT and AA genotypes were associated with higher BMI, WC, insulin, HOMA and body fat in subjects with MHP or MUHP.

Conflict of Interest: The authors declare that they have no conflict of interest.

Keywords: *FTO* / rs9939609 / polymorphism / metabolic phenotypes

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THE ASSOCIATION BETWEEN *FTO* GENE POLYMORPHISM RS9939609 AND ANTHROPOMETRIC, BIOCHEMICAL AND DIETETIC PARAMETERS IN SUBJECTS WITH DIFFERENT METABOLIC PHENOTYPES

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Fat mass and obesity-associated (*FTO*) variant rs9939609 had been associated with obesity-related phenotypes. *FTO* is highly expressed in the hypothalamus and may have a role in energy balance, food intake regulation, and adipogenesis. The obesity predisposing risk A-allele is considered one of the strongest risk factors for polygenetic obesity.

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OBESITY PHENOTYPES AS PREDICTORS OF ARTERIAL HYPERTENSION IN MEN

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Abdominal fat (subcutaneous and visceral adipose tissue) is a risk factor for hypertension and type 2 diabetes. There are several anthropometric measurements detect adiposity phenotypes such as visceral adiposity (BAI) and intra-abdominal fatty area (AGAI).

Objective: To evaluate the obesity phenotypes and their association with arterial hypertension in men.

Methods: Cross-sectional study in open population. Men aged 30 to 50 years were included, with BMI >18.6kg/m², clinically healthy or with the presence of hypertension, without changes in weight in the last 6 months ($\pm 10\%$), sedentary, non-smokers, non-alcoholic, without consumption of medications, or nutritional supplements. Weight, height, waist circumference, hip circumference, % body fat, systolic blood pressure (SBP), diastolic (DBP) were measured, and glucose concentrations, and lipid profile were quantified. The following indices were calculated: body mass, waist/hip, waist/height index; BAI= Hip/(Height*1.5)-18); and AGAI=(2.125*age) + (2.843*waist)-225.39.

Results: 302 subjects were studied, with an average age of 37 \pm 4.6 years and mean body mass index was 30.2 \pm 8 kg/m². The prevalence of hypertension was 23.4%. The correlation analysis shows a positive association of AGAI with the SBP levels (r=0.37, p=0.02), DBP (r=0.30, p=0.01) and glucose (r=0.35, p=0.02). With the waist/height index correlated with SBP levels (r=0.23, p=0.02), DBP (r=0.27, p=0.02) and glucose (r=0.29, p=0.01), positive correlation of glucose levels with the BAI (r=0.30, p=0.03). The area under the curve for the presence of hypertension with the AGAI is 0.73(0.69-0.77), sensitivity of 0.76 and specificity of 0.61, for waist/height index it is 0.69 (0.65-0.73), a sensitivity of 0.70 and specificity of 0.60.

Conclusions: The AGAI can be used as a screening test to rule out the presence of hypertension in men aged 30-50 years.

Conflict of Interest: None of the authors have a conflict of interest

Keywords: Adiposity/ hypertension/ anthropometry/ adults.

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INFLUENCE OF THE VEGETARIAN DIET ON THE MICROBIOTA-INTESTINE-BRAIN AXIS

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Nutrition in the prevention and treatment of chronic diseases

Introduction: A plant-based diet appears to be beneficial for human health, promoting the development of more diverse and stable microbial systems. In view of the direct influence of the vegetarian diet on the intestinal microbiota and the apparent role of the intestinal microbiota in the development of the neurotransmitter system, in the modulation of affective disorders, stress-related disorders and in the perception of pain, vegetarian diets have gained recognition as a dietary standard healthy and therapeutic for a number of chronic diseases.

Objective: The objective of this work was to assess food consumption in the last 12 months of vegetarians and to identify the relationship between diet and risk for the development of chronic non-communicable diseases.

Methods: Cross-sectional study, conducted through the online survey hosting platform "Survey Monkey", with convenience sampling (n = 14).

Results: The average age of the participants was 25 years old (n = 14), all female, with a level of education ranging from complete high school to complete graduate school, claiming to be lacto-vegetarian (64%), lacto-vegetarian (7%), ovovegetarian (7%), strict vegetarians (14%) and vegan (7%), (Mo) 2 to 5 years practicing the diet. The intestinal function data identified were stool type 4 (64%) and type 3 (36%) using the Bristol Stool Consistency Scale; evacuation frequency of 2x / day (57%); with no evacuation effort in most participants (64%); evacuation time of less than 5 minutes (57%); and allegation that they did not need digital mechanical action to eliminate feces (71%).

Conclusion: Food intake seems to be the most direct factor that influences not only the composition of the intestinal microbiome, but also altered symptoms of intestinal function, with dietary fibers being key modulators. The analysis of bowel habits and the type of stool describes a more adequate pattern of intestinal functioning, since by altering intestinal transit, the state of the individual's intestinal physiology can be assessed, such as motility, increased intestinal permeability, enteric neural function and even the release of hormones.

Conflict of interest: The authors have no conflict of interest related to this research.

Keywords: vegetarian diet - microbitota - food consumption.

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BODY COMPOSITION STUDIES AMONG GUATEMALAN ADULTS USING THE BIOELECTRIC IMPEDANCE ANALYSER SECA mBCA® 525

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Body size height and weight are common measurements in health diagnosis but they are not enough to estimate values for muscle, fat and skeletal mass let alone give any information on the individual's hydration status, which are significant indicatives of body health diagnosis. The simplest way to obtain such information is using bioelectrical impedance analysis (BIA) which is a technique that promises to be not only a more refined assessment of body composition but also a useful analytical approach to explore both the emerging and existing questions concerning body components among the Guatemalan population.

Objectives: To explore and construct a body composition and anthropometric profile from different populations in Guatemala using BIA.

Methods: All individuals were recruited in different sites of Guatemala; their height, weight, waist and wrist circumference were measured according to the ISAAC standards. Participants provided basic data on age, sex and habitual physical activity, BIA measurements were taken with the analyzer SECA mBCA 525. Descriptive statistics were applied to the results.

Results: From a total of 296 individuals evaluated (women=231; men=65), the following distribution of BMI was constructed: Underweight=2.04%, Normal=43.9%, Overweight=33.8%, Obese=20.6%. Analyses where lactating and non-lactating women were taken into account showed an average value of adipose tissue% (FAT %) =37.0±8.5, the same variable for men had a mean value of 26.5±8.6. For Hydration status as Hydration% lactating women, non-lactating women and men had the following mean values, 76.9±6.7, 75.0±6.7 and 67.3±8.3.

Conclusions: BIA represents a practical tool that allows researchers to explore different variables related to body composition with only one measurement, it also facilitates measurements done *in situ* that require just a couple of minutes to prepare and provides a quick diagnostic of health.

Conflict of Interest: No conflict of interest.

Keywords: body composition / bioelectric impedance analysis / BMI / Guatemala.

participated in the research, respecting the following inclusion criteria: both sexes, age 18-60 years, formal bond with the Institution, who have a cell phone with QR-Code reader, and who agreed to participate through the electronic informed consent form. An electronic QR-Code questionnaire was applied to qualitatively assess the health and food habits of the sample. Data were collected during the period from September to December/2019. This study is approved by the Ethics and Research Committee.

Results: The total sample was 710 volunteers. The average age was 26.7±9.2 years, considering 87.2% women, and 85.5% category students. The average BMI was 24.2±4.5 kg/m² (34.5% overweight). The average score was 39.4±10.9 points. The distribution of the food standard showed 41.4% "Excellent Food", 36.8% "Intermediate Food" and 21.8% "Deficient Food". When considering the formal bond, the employee's eating pattern is lower than student, teacher and coordinator (p≤0.001). In the total sample, the eutrophic students had a better dietary pattern. BMI showed correlation with food pattern score (r=-0.224; p≤0.001) and age (r=0.319; p≤0.001), and confirmed by linear regression of BMI with food pattern score (β=-0.283; p≤0.001) and with age (β=0.343; p≤0.001).

Conclusions: Most of the sample reports excellent food quality, however, 1 out of 3 members of the sample is overweight. And, dietary pattern and age influence the BMI value.

Conflict of Interest: We have no conflict of interest.

Keywords: Food Guide / Intake / Adult / Chronic Non-communicable Diseases

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QR HEALTHY FOOD - INVESTIGATION OF THE FOOD STANDARD OF THE ACADEMIC COMMUNITY OF THE UNIVERSITY CENTER SÃO CAMILO (SP-BRAZIL)

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Nutrition in the prevention and treatment of chronic diseases

Introduction: The eating habits of Brazilian adults have been characterized by low consumption of fruits and vegetables, and high intake of foods rich in fats, sodium and sugars. Thus, according to the classification of the Food Guide for the Brazilian Population, fresh and minimally processed foods are progressively being replaced by ultra-processed foods. These new eating habits have increased the risk of the Brazilian population to develop chronic non-communicable diseases.

Objectives: The present study aims to investigate the dietary pattern of the community of University Center São Camilo.

Methods: An analytical observational study was carried out, with a cross-sectional design. University students, employees and academic teachers and coordinators

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EFFECT OF MATERNAL HIGH SWEETENERS INTAKE OF LEARNING AND MEMORY IN ADULT FEMALE OFFSPRING

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Maternal exposure to hypercaloric diets during perinatal period has been associated with an increased development of metabolic and cognitive disorders in the offspring.

Objectives: Determine the effect of maternal high sweeteners intake during gestacion and lactation on body

weight, food intake, learning and memory in adult female offspring rats.

Methods: Twenty-eight female pups from dams feed estandar diet (C-C group, n=10), high sucrose diet (1:1.5) (Caf-Az group, n=6) and high honey-diet (1:1.5)(Caf-M group, n=12) were feed a standard diet from the third week of age. Body weight and food intake were recorded once a week. Learning and memory test were performed at 14 age week(Y maze) and 18 (Barnes test). At week 19 the pups were sacrificed to obtain tissues for further analysis.

Results: The birth weight of the Caf-M group was significantly lower than C-C group ($p < 0.001$). In addition, in the weight gain from week 3 to week 19 of life, the Caf-Az group gained less weight compared to C-C ($p < 0.001$) and Caf-M ($p < 0.05$) groups. Regarding the food intake (g/day) we found a significant difference when comparing C-C with Caf-Az and Caf-M ($p < 0.001$). On the other hand, regarding glucose levels, we found significant differences between C-C and Caf-M with respect to Caf-Az ($p < 0.001$). In relation to the learning and memory test, in Y maze we found difference in the percentage (%) of alternation when comparing C-C with Caf-Az and Caf-M ($p < 0.01$), while in Barnes test we found difference in latency in the long-term test between Caf-Az with C-C and Caf-M ($p < 0.05$).

Conclusions: Maternal high sucrose diet during gestation and lactation causes hyperglycemia and possible long-term memory loss in adult female offspring, suggesting that diets with glycemic index (GI) (such as sucrose) may be damaged to health.

Conflict of Interest: The authors declare no conflict of interest.

Keywords: metabolic programming / sucrose / honey / food intake / memory loss

P195

GLUCEMIC INDEX AND GLUCEMIC LOAD OF "PICADITA" ISSUED IN ELEMENTARY SCHOOLS OF THE STATE OF MORELOS

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Nutrition in the prevention and treatment of chronic diseases

Introduction: The glycemic index (GI) is a characteristic of foods rich in carbohydrates (CHO), it allows estimating the impact on glucose levels that they cause when consumed; they are classified as low, medium and high GI foods. The glycemic load (GL), in addition to considering the effect on glucose levels, also takes into account their carbohydrate content by classifying them in low, medium and high GL foods. Low GI and GL foods are recommended in the treatment of diseases such

as diabetes, overweight, cardiovascular diseases, some types of cancer, among others.

Objective: To determine the GI and GL of a "picadita" in elementary schools of Morelos.

Methods: Food preparation was standardized with samples from 5 schools in the state of Morelos to develop a "picadita" model to which its nutritional composition was determined to know its CHO content. A clinical trial was carried out following the methodology proposed by Brouns et al., 2005 with the prior approval of the Research Ethics Committee of CeProBi and the signing of an informed consent letter from volunteers.

Results: The "picadita" model was made up of nixtamalized corn tortilla (42 g), green sauce (28 g), whole cream (17 g), cotija cheese (10 g) and vegetable oil (4 g), its CHO content was 49.8 g/100g. The clinical trial involved 10 subjects, 4 women and 6 men with an average age of 26.5 years, a BMI of 23.0 kg/m², fasting glucose of 72.5 mg/dL, cholesterol 5.4 mg/dL, HDL 62.6 mg/dL and triglycerides 109.5 mg / dL. The "picadita" had a high GI (78.43 ± 12.78) and average GL (16.79).

Conclusions: It is suggested to limit the consumption of "picadita" in children and adults to prevent the development of overweight and chronic noncommunicable diseases and avoid their consumption in those who present these diseases.

Conflict of Interest: There is no conflict of interest.

Keywords: Glycemic index / Glycemic load / Prepared foods / "picadita".

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ASSOCIATION BETWEEN DIETARY IRON INTAKE AND LEVELS OF SERUM FERRITIN AND HEMOGLOBIN IN ADULT YOUNG WOMEN LIVING IN HIGHLANDS

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Anemia is a public health problem, especially in women. One of the causes is iron deficiency and its bioavailability determines the timing, which depends on the type of iron ingested and its absorption. An indicator to evaluate iron stores is serum ferritin.

Objectives: We set out to quantify the dietary intake of iron in young adult women to associate it with ferritin and hemoglobin.

Methods: 222 female university students of medium-medium high economic level were invited, between 18 and 30 years old, residents at 2700 meters above sea level. Iron intake, enhancers and inhibitors of its absorption were analyzed by means of a qualitative food consumption frequency questionnaire, calculating Hem iron and NoHem iron by the method Monsen et al. Hemoglobin and ferritin were measured using a venous blood sample. Anemia with hemoglobin less than 12g/dl, iron deficiency with ferritin less than 15ng/dl, and iron deficiency anemia with both altered values were considered.

Results: 178 (80.2%) completed the study. The mean age was 20.5y (SD 2.1), hemoglobin corrected for altitude was 13.43g/dL (95% CI 13.30-13.57), serum ferritin 46.03ug/L (95% CI 40.8-51.2), total iron consumption 10.9 mg/dL (95% CI 9.96-11.91), Hem iron 0.56 (95% CI 0.46-0.65) and NoHem iron 10.41 (95% CI 9.38-11.33). 87.7% (95% CI 81.1-94.3) had low iron consumption. 15.3% (95% CI 2.97-27.6) presented some alteration related to iron deficiency (2.3% anemia, 11.7% iron deficiency without anemia and 1.4% anemia with iron deficiency). The association between low iron consumption and some alteration due to this micronutrient deficiency had a LR = 3.89 p = 0.049.

Conclusions. The low consumption of iron in women of childbearing age of medium to high economic resources is critical. The narrowly association between the consumption under the daily recommendation and the pathologies that occur with some type of anemia suggest the comprehensive approach to this chronic problem.

Conflict of Interest: No conflicts

Keywords: ferritin/ iron/ iron intake / young women

Methods: The study included 400 subjects aged between 15 and 65, stratified by gender, age, region of residence, educational and socioeconomically level. The caloric intake was collected by applying two 24-hour reminders (multi-step technique); the level of physical activity was assessed using the International Physical Activity Questionnaire (IPAQ). The nutritional status was evaluated taking anthropometric measurements (weight and height), and its classification was carried out according to the WHO criteria.

Results: The energy intake is higher in men (2367.4 kcal/d) than in women (1978.3 kcal/d), adults aged between 20 and 49 years and subjects with a higher educational level had a higher energy consumption. The energy expenditure was higher in men, adolescents, who belongs to higher socioeconomically and educational level. The studied population is 31.3% overweight and 26.5% obese, being higher in women than in men. A low energy balance (59.1) was observed in the general population, men showed a significantly greater difference (-128.9) than women (225.8), no significant differences were found in relation to age, region of residence, educational and socioeconomically level.

Conclusions: There are difference between genders, socioeconomically and educational levels on energy intake, energy expenditure and energy balance. According to the nutritional status, differences were found by gender and age. It is recommended to analyze the metabolic adaptations that may occur in response to the low energy balance.

Conflict of interest: The study was supported by a scientific grant from AIBE and support from Universidad San Francisco de Quito. The funders had no role in study design, data collection and analysis, the decision to publish, or the preparation of this manuscript.

Keywords: Energy balance / caloric intake / physical activity / IPAQ / nutritional status

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ENERGY BALANCE IN THE URBAN POPULATION OF ECUADOR 2019

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Nutrition in the prevention and treatment of chronic diseases

Background: The study of the balance between energy intake and energy expenditure in the Latin American and Ecuadorian population has been poorly developed. The increase in the overweight and obesity prevalence, responds to changes in lifestyle habits and socioeconomic conditions. The aim of the study is to analyze the energy balance and its relationship with nutritional status, according to sociodemographic parameters in the population living in urban areas of the coastal region and the highlands of Ecuador.

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VALUATION OF CALCIUM INTAKE ACCORDING TO THE NUTRITIONAL STATE OF A SAMPLE OF 702 ECUADORIAN SUBJECTS FROM 19 TO 65 YEARS OLD

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Overweight and obesity have become a public health problem worldwide. According to WHO, in 2016 around the world, more than 1.9 billion adults suffered from overweight and 650 million obesity. Currently, there are studies that support the relationship between low calcium intake and overweight or obesity, showing that a higher calcium or dairy intake is associated with a lower weight gain.

Objective: To evaluate the calcium consumption according to the nutritional status in the Ecuadorian population to establish a possible relationship between them.

Methods: A sample of 800 Ecuadorian participants between 15 and 65 years old, resident in the urban area of different cities of the coast and Sierra, was studied. Weight, height and body mass index were measured. Two 24h dietary recall were conducted according to the multi-step methodology on non-consecutive days, the ratio of average calcium intake and total daily caloric intake was determined. Calcium consumption was analyzed according to nutritional status and sociodemographic characteristics (sex, age, region of residence and socioeconomic level). The Komogorov-Smirnov test was applied to see the normality of the variables. To compare the means ANOVA with Bonferroni was used of calcium intake and nutritional status. Finally, a correlation test was applied to analyze the possible relationship between the variables.

Results: From the sample of 800 subjects, those older than 18 years were taken, leaving a total of 702 Ecuadorians, of which 48.9% were men (n=343) and 51.1% women (n=359). The same ones that belong to the regions of coast 54.7% and Sierra 45.3%. The prevalence of overweight and obesity was 65.67% and predominates in the female sex with 37.46%. The average daily calcium intake is 688, 95 ± 202,78 milligrams. No significance was found between the nutritional status and calcium intake variables.

Conclusion: Calcium intake was lower than the recommendations proven in recent studies that compared the calcium intake and the nutritional condition, as well as other variables like habits and body mass percentage

Conflict of Interest: The funders had no role in study design, data collection and analysis, the decision to publish, or the preparation of this paper.

Keywords: Calcium - Obesity - overweight - sociodemographic.

P199

EVALUATION OF THE NUTRITIONAL STATE AND LIFESTYLE OF ADULT VEGETARIAN PATIENTS FROM THE CITY OF SÃO PAULO

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Epidemiological studies have been showing important benefits of vegetarianism and other diets based on plant foods in reducing chronic non-communicable diseases (NCDs) such as diabetes, obesity, hypertension and cancer, including the influence of total mortality. The rise in chronic diseases has been attributed in part to the virtually global shift to a diet where animal and processed foods predominate.

Objective: The objective of this study was to assess the nutritional status and lifestyle of vegetarian individuals in a Brazilian city.

Methods: This is a cross-sectional study, conducted at a private Brazilian university.

Results: A total of 23 adults participated in the survey. Among them, the greater predominance of females 78.3% (18/23). When comparing nutritional status with the type of vegetarian diet adopted, it can be seen that patients who adhered to a vegan, strict vegetarian or lactovegetarian diet had a higher prevalence of overweight. The opposite was observed in ovolactovegetarian patients, who had a higher prevalence of eutrophic people. Regarding the lifestyle habits assessed, 56.5% (13/23) of the participants reported being sedentary, 56.5% (13/23) reported consuming alcoholic beverages, 82.6% (19/23) reported sleeping up to 8 hours a day, 17.4% (4/23) reported smoking and 43.5% reported exchanging a main meal for a snack.

Conclusion: In this sense, it is extremely important not only to encourage a plant-based diet, but also to understand how health is for vegetarians in a city like São Paulo

Conflict of interest: The authors have no conflict of interest related to this research.

Keywords: vegetarian diet - lifestyle - nutritional status.

P200

FOOD PURCHASING AND NUTRITIONAL STATUS IN NUTRITION AND DIETETICS STUDENTS IN MEXICO AND COLOMBIA. MULTICENTER STUDY

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Nutrition in the prevention and treatment of chronic diseases

Introduction: university entrance, food purchase decisions, and money invested, amongst other multiple aspects, determine the nutritional status of university students.

Objectives: describe the relationship between aspects related to the purchase of food, body mass index and waist circumference, in university students of nutrition and dietetics in Colombia and Mexico.

Methods: descriptive, multidimensional, longitudinal study with 583 female students, whose nutritional status was assessed and who were questioned about food purchasing, through a previously validated survey.

Results: there was a statistically significant difference (p <0.05) in the money invested in the purchase of food in

households, which was higher in students in Mexico; in the factors that determine the purchase of food, such as nutritional value, aspect of the food, ingredients and quality; in conditions: underweight, normal weight and overweight by country, as well as in waist circumference and fat percentage. There was no significant difference ($p > 0.05$) in the money invested in the individual purchase of food, nor in the money to buy food, as a determining factor for its purchase, nor for obesity.

It should be noted that the money destined for the purchase of food at home is significantly related to the BMI of students in Colombia, but not with those of Mexico; noting also that, in both countries, the supermarket is the place where the purchase of food is most frequently reported.

Conclusions: the money destined to the purchase of food, as well as the place and aspects taken into account for food purchasing (nutritional value, aspect of the food, ingredients, quality and prices) determine the nutritional status and require more research to establish how they influence food purchase decisions and therefore the risk of developing noncommunicable diseases in the future.

Conflict of Interest: the authors declare there's no conflict of interest regarding the publication of this article.

Keywords: nutritional status/ university students/ food purchasing/ body mass index.

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HEALTH COMPLICATIONS ASSOCIATED WITH BEING OVERWEIGHT OR OBESE, DURING PREGNANCY, CHILDBIRTH AND PUERPERIUM, IN WOMEN FROM YAXCABA, YUCATAN

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Nutrition in the prevention and treatment of chronic diseases

Introduction: In the last 40 years, Mexico has undergone an epidemiological transition due, mainly, to nutritional changes in the population, now being chronic diseases, such as obesity, the main causes of morbidity and mortality. According to ENSANUT 2012, more than 80% of Yucatecan women are overweight or obese, a condition that has been related to maternal / fetal complications, such as abortion, preeclampsia, gestational diabetes, infections, threat of premature delivery, macrosomia or congenital diseases in the son.

Objectives: To relate the health complications associated with overweight or obesity, during pregnancy, childbirth and puerperium, in women from Yaxcabá, Yucatán.

Methods: Quantitative study: descriptive, observational, cross-sectional and retrospective. Fifty-seven women who were overweight or obese participated in the Yaxcabá SSSY Health Center, who were enrolled in the prenatal control program (2016-2018). The association of the variables nutritional status and complications was through the Ji^2 test.

Results: 57 women participated, 18 were overweight and 39 were obese. Obese women had 14 abortions and overweight women had two. The difference was significant when calculating Ji^2 with a $p = 0.053$, at 90% confidence. In the threat of premature delivery a statistically significant difference was found with a $p = 0.028$ at 95% confidence. Among the most frequent complications during the last pregnancy were: urinary infection 49%, abdomen pain 37%, headache 33%.

Conclusions: Overweight and obesity in women participating in this study was related to the threat of premature delivery and abortion. There were no differences in other complications among women who were overweight or obese. The importance of these findings is that overweight or obesity conditions constitute a similar risk for most complications. Events that imply risk of loss or complications of the newborn are important. These findings should be considered in terms of programs and public policies.

Conflict of Interest: No conflict of interest.

Keywords: Health complications, overweight/obesity, abortion, premature delivery.

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NUTRITIONAL STATUS AND PHYSICAL ACTIVITY OF STUDENTS FROM NORTHEAST BRAZIL

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Obesity is considered a worldwide epidemic that is related to the food and physical activity profile. In Brazil, overweight affects about a third of children aged five to nine years and 25% of adolescents.

Objecives: The objective of the present study was to trace the anthropometric profile of students from a capital city in the Northeast of Brazil.

Methods: It was a cross-sectional and descriptive study conducted in public schools. The work was approved by the research ethics committee of the State University. Data on weight, height, waist circumference and fat percentage were collected using bioelectrical impedance, and BMI was calculated for the age of 327 participants (100 children and 227 adolescents) from public schools in the city of Fortaleza/ Ceará, Brazil. The level of physical activity was also assessed using the international physical activity questionnaire (IPAQ).

Results: Just over half (50.46%) of participants were female. Most children and adolescents were eutrophic (57.49%) and high values of overweight were found in both sexes: 37.04% of boys and 40% of girls. Waist circumference was adequate in all participants. The percentage of fat was moderately high (25.99%) for female adolescents. As for the

level of physical activity, 41.40% of the participants were active and 49.50% were irregularly active and sedentary. Sedentary lifestyle predominated in female.

Conclusions: Thus, the study observed mostly eutrophic of participants. However, an increased frequency of overweight, without deposition of abdominal fat but with high total fat was observed. Lifestyle sedentary in female adolescents.

Conflict of interest: The authors declare no conflict of interest

Keywords: Obesity/Nutritional status/ Physical activity

P203

RISK FACTORS OF SCHOOLCHILDREN WITH OBESITY FOR CHRONIC NON COMMUNICABLE DISEASES IN MORELOS, MEXICO

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Obesity is a multifactorial disease of high prevalence in the child population in Mexico.

Objectives: The association of obesity with risk markers for chronic noncommunicable diseases in school children in Morelos was analyzed.

Methods: It is a cross-sectional analytical design, a history of obesity, eating habits, diet and alterations of glycemia, triglycerides, total cholesterol, high density lipoproteins and blood pressure were studied, with statistical tests of Chi² and t of Student (value of p > 0.05).

Results: 41 schoolchildren with obesity (BMI ≥ 97) with ages of 8.6 ± 1.7 years, from 6 elementary schools in eastern Morelos, participated. The Body Mass Index of boys was higher than that of girls (+1.9 kg / m²), p < 0.05; one of the parents (63.3%) or both (34.2%) were obese, without differences by age and sex. 78% had breakfast at home, 31.7% brought food to school, 75.6% brought money to buy food and 12% added salt to food, without differences by age and sex. Energy consumption was lower than the recommendation (87% of the DRI), without differences by age and sex, and children who skipped breakfast described lower protein energy consumption (-4.3%) compared to those who ate breakfast, p < 0.05. The averages of some blood values: blood glucose, 77.2 ± 19.3 mg / dl; total cholesterol, 131.9 ± 21.2 mg / dl; triglycerides, 119.5 ± 74.2 mg / dl, high density lipoproteins, 32.4 ± 6.8 mg / dl, systolic blood pressure, 97.0 ± 8.6 mmHg and diastolic blood pressure, 67.0 ± 6.5 mmHg without differences by sex. Children under 10 years had total cholesterol values higher than those of 10 years or more (+17.3 mg / dl), p < 0.05, while blood pressure was higher than in those older (p < 0.05), they are not significant when

standardized in reference percentiles; Children who did not eat breakfast had higher blood glucose levels (+ 17.2 mg / dl).

Conclusions: The most important risk factor in this group was the omission of breakfast; It is recommended to promote the habit of breakfast at home and with adequate food, which should be accompanied by other healthy behaviors.

Conflict of Interest: There is no conflict of interest.

Keywords: School children / obesity / risk factors / breakfast omission

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EATING AND PHYSICAL ACTIVITY PATTERNS OF THE POPULATION WORKING IN THE URUGUAYAN STATE ELECTRICAL COMPANY: DESIGN AND METODOLOGY

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Nutrition in the prevention and treatment of chronic diseases

Background and Justification: Noncommunicable diseases (NCD) are the main cause of death in the whole world and most are potentially preventable; they last a long time and generally develop slowly.

In Uruguay 64,9% of the population between 25 and 64 years of age are overweight or obese.

The scientific evidence available suggests that the workplace provides an opportunity to develop nutritional interventions to improve health.

Objective: The objective is to study the eating and physical activity patterns of the workers in the Uruguayan State Electrical Company working in the whole country and their associations with overweight and obesity in order to establish institutional strategies to improve the situation.

Methodology: This is a cross-sectional, randomized, representative study of the population of workers of Uruguayan State Electrical Company (UTE) with a precision of 3% and a confidence level of 95%. To achieve this a sample of 1964 workers who started working there between the 1st January 2010 and 31st December 2017 will be selected.

The study is financed by the University of the Oriental Republic of Uruguay and is carried out together with the Department of Occupational Health of UTE, and the scientific coordination of the University of Granada (Spain).

To achieve the objective the participants will answer an online questionnaire on frequency of food consumption (QFFC) and an international questionnaire on physical activity (IPAQ) both previously validated. The Company will also provide the study with personal data of the participants.

A more detailed analysis of nutrient ingestion and physical activity will be carried out in a finite sample of 200 workers through a personal interview, a double dietary 24 hour recall (R24h), use of accelerometry and recording of anthropometric and body composition measurements.

Conclusion: This is the first study carried out in Uruguay with workers from the public sector and from the public to get to know their eating and physical activity habits in order to be able to establish healthy lifestyle policies in the future.

Conflict of Interest: There is no conflict of interest.

Keywords: eating habits/physical activity/food intake/nutritional status in workers.

P205

HYDROLYZED PROTEINS OF PEA (*PISUM SATIVUM*) AND RICE (*ORYZA SATIVA*) AND ITS EFFECT ON ADIPOGENESIS IN THE 3T3-L1 CELL LINE

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Nutrition in the prevention and treatment of chronic diseases

Introduction: At least 50% of the population has an excess of fat mass, which is closely related to the development of chronic degenerative diseases. Recently, scientific information put proteins, mainly plant proteins, as bioactive compounds. Pea (*Pisum sativum*) and rice (*Oryza sativa*) proteins have technological and nutritional functions; however, there is little information about its impact on adipose tissue.

Objectives: Evaluate the effect of pea protein (*Pisum sativum*) and rice (*Oryza sativa*) hydrolysates on adipogenesis on the 3T3-L1 cell line.

Methods: Protein isolates a)pea and b)rice were hydrolyzed by an *in vitro* digestion (Guangliang et al., 2017), taking the intestinal phase by study its effect in 3T3-L1 cell line. The 3T3-L1 cell line differentiation process was according by the ATCC. For the evaluation of adipogenesis, the Oil Red O stain kit (Lipid Stain) was used (Oseguera Toledo et al., 2016) (n = 3).

Results: The protein percentual was a) 81.55±0.16 % and b) 82.32±0.77%. The *in vitro* digestibility of protein isolates was a) 93±0.09% and b) 94±0.23%. The 3T3-L1 cell line cultivated with a) and b) obtaining a significant difference (p<0.05) respect to control.

Conclusions: Protein values and *in vitro* digestibility reported were similar to those obtained by other authors (Horneffer et al., 2007; Kalman, 2014; Pietrysiak, Smith et al., 2018). The results about the 3T3-L1 cell line are similar to other vegetal proteins, lowering the lipid droplets

concentration, but to elucidate the possible mechanism in which these proteins work in the 3T3-L1 cell line is important.

Conflict of Interest: This scientific group does not present any conflict of interest.

Keywords: obesity/ plant protein / in vitro / pea / rice

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DOWN SYNDROME (DS) WITH OVERWEIGHT AND OBESITY: DIET AND PHYSICAL EXERCISE VS. BODY COMPOSITION

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Nutrition in the prevention and treatment of chronic diseases

Introduction: DS (OMIM#190685) is the most common genetic cause of intellectual disability and individuals who manifest it face unhealthy and premature aging. The consumption of unhealthy foods and low levels of physical activity potentiate obesity and overweight in these patients; the study of variations in anthropometric parameters allows to observe the improvement in metabolic alterations in subjects with obesity and DS.

Objectives: to analyze the correlation between dietary intervention, physical exercise and body composition variation, in SD with overweight and obesity.

Methods: this review is based on the guidelines recommended by PRISMA (Preferred Report Elements for Systematic Review and Meta-analysis) and the quality of included clinical trials was evaluated by the CONSORT methods. The selection criteria were articles published between January 1997 and December 2019; studies on patients with DS, overweight and obesity, clinical trials using dietary intervention and physical exercise paying special attention to changes in body composition through any anthropometric parameter and unit of measurement.

Results: only 1% of the clinical trials analyzed were included. They were focused on an intervention based on physical exercise and the anthropometric measures analyzed were body fat (in kg or %), BMI (in kg/m²), waist circumference (in cm) body weight (in kg) and fat-free mass (in kg or %).

Conclusions: once the lack of data and knowledge in this thematic area has been identified, further research is recommended. The development of future works on this topic base on guidelines that we highlighted in this review will allow the following (i) to identify dietary and physical exercise

techniques leading to greater variations in body composition; ii) to reduce the side effects of overweight and obesity by allowing a reduction in healthcare costs.

Conflict of Interest: the authors declare no conflicts of interest.

Keywords: Down's syndrome / obesity / overweight / diet / exercise / body composition.

P207

FOOD EDUCATION PROGRAM - INTEGRATING SCIENCE, SCHOOL AND HEALTH (SP-BRAZIL)

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Nutrition in the prevention and treatment of chronic diseases

Introduction: The prevalence of overweight in children and adolescents has been progressively increasing in recent years, being considered a current public health problem. This fact provides a greater risk for cardiovascular diseases in adulthood. The approval of Brazilian Law nº 13.666/2018, which includes food and nutrition education (FNE) as a transversal theme in the curriculum from early childhood education to high school, favors health promotion and disease prevention.

Objectives: Develop a training program for educators and nutritionists linked to the Brazilian School Food Program on how to approach the topic of healthy eating at school in a transversal way.

Methods: Through the partnership with universities, medical society and State Secretariat of Education (SP-Brazil), it was possible to develop a distance course to assist educators from public schools, in addition to nutritionists, in compliance with Law 13.666/2018, through a virtual environment platform learning. The selection of the topics covered and the materials used took into account references with a high scientific impact.

Results: The program was divided into 3 stages. Step-1: will be applied Online Characterization Questionnaire for diagnostic evaluation of participants. Stage-2: 40-hour training course will be offered, divided into 4 axes. Axis-I: Understanding and reflective analysis of the participants' food (stimulating reflection on their own food history); Axis-II: Understanding of the student (discussion on food production, nutrition, marketing, food and nutritional security, and public policies involving school meals); Axis-III: Educator/Nutritionist and the Program (discussion of the importance of the school as a health promoter in the prevention of obesity, high blood pressure, diabetes and

cardiovascular disease); Axis-IV: Food education in school practice (production of material about FNE applied to school). Throughout Step-2, reflective activities will take place, using active methodologies, to encourage the inclusion of the theme healthy eating at school. Step-3: Program Evaluation.

Conclusions: It is expected that with the training of educators they will have more effective pedagogical actions on promoting healthy eating habits at school. Thus, in the long-term, a decrease in obesity indicators and their complications among schoolchildren, with the systematic incorporation of fundamentals about healthy eating into the schools' pedagogical plan.

Conflict of Interest: We have no conflict of interest.

Keywords: Food and Nutrition Education / Health / School

P208

NUTRIMETRY: QUALITY MODEL IN THE PREVENTION OF SHORT HEIGHT SECONDARY TO MALNUTRITION

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Nutrition in the prevention and treatment of chronic diseases

Introduction: In global framework of surveillance in nutrition, global goal 1, reduce 40% by 2025 the number of children under 5 years of age who are stunted, action framework of the second international nutrition conference CIN2, recommendation 36.

Objective: Present Nutrimey as novel methodology been applied in Tenabo, Campeche for a decade.

Methods: 593 children from a Tenabo, Campeche clinic monitored with Nutrimey participated from 2010 to 2017. The data collected was divided into two groups, G1=1000-day children (24 to 36 months, n=443) and G2=6 years (72 to 84 months, n=150). Nutrimey was used to cross Z-BMI in three diagnoses (low, normal and overweight/obesity) with Z-height in three diagnoses (low, normal and high) according to WHO, calculating per year the conditional prevalence of the crossing in a grid of 3x3 cells and averages of z scores.

Results: Of the total of 1000-day and 6-year-old children respectively, 19.41% and 8.00% were low-height, with same groups order, with Nutrimey percentage was divided into 3.39% and 1.33% with low weight, 12.64% and 6.67% normal weight and 3.39% and 0.00% overweight/obesity. For normal height (G1=80.14% and G2=92%) with low weight G1=7.67% and G2=6%, Normal weight G1=51.24% and G2=54.67% and Overweight / Obesity G1=21.22% and G2=31.33%. For high height (G1=0.45% and G2=0%) there was a prevalence of 0.23% in G1 both in normal weight and in

Overweight/Obesity, in others the prevalence was 0%. A trend of change in the prevalences for short height is not observed per year, although in G1 there is an increase of .36 in the average of the z-height from 2011 to 2017.

Conclusions: Nutrimetry allows to detect and attend timely the proportion of children who have been short height and overweight/obese at the same time since 1000 days of born. If this is done early in children under 59 months, the possibility of improving the short height and avoid overweight or obesity increases.

Conflict of Interest: None of the authors have any conflicts of interest or financial ties to disclose.

Keywords: Nutrition / Short-height / one thousand days children/ overweight / Obesity

P209

RELATIONSHIP BETWEEN LIFESTYLE AND NUTRITIONAL STATUS OF ADOLESCENTES BETWEEN 12 AND 18 YEARS OLD, COMPARING TWO PRIVATE AND TWO PUBLIC EDUCATIONAL CENTERS OF GUATEMALA

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Since the end of the 20th Century, behaviors that predispose to obesity have increased. The probability that childhood obesity persists into adulthood is 20% at age 4 and 80% in adolescence, which is when physical, psychosocial, and cognitive changes occur. Habits are defined, and some negative harmful ones can be promoted. Growth and development are affected by diet, style and living conditions.

Objective: The main objective was to evaluate the role of lifestyle in nutritional status, according to demographic, familiar, nutritional and sociocultural characteristics.

Methods: With the approval of the National Ethics Committee, the nutritional status of adolescents - BMI, fat percentage and abdominal circumference was determined: performing clinical, anthropometric evaluation; to later determine the statistical association with eating habits (24-hour reminder and consumption frequency) and lifestyle (Fantastic test) - affective aspects, leisure activities, consumption of tobacco, alcohol and other drugs, time in contact with screens or electronic devices and physical activity.

Results: 601 adolescents participated, of which 56.5% had a normal BMI; 64.8% were women from public institutions and 50.7% from private institutions (p 0.0176); and men where 60.4% and 55.5% respectively (p 0.4217). The prevalence of overweight was 27.6% and 14.97% of obesity: with higher prevalence of overweight in women (32.4% women; 22.6% men, p 0.0073) and a higher prevalence of obesity in men (11.9% women; 18.2% men, p. 0.037).

Conclusions: The data obtained confirmed the hypothesis that there is an association between the lifestyle and nutritional status of adolescents from public and private institutions in this study. The variables that are associated with BMI were those related to eating and physical activity habits, ethnic group and fat percentage.

Keywords: Lifestyle, nutritional status, public schools, private schools, food, physical activity, technology, adolescence.

P210

ANEMIA IN PREGNANT WOMEN AND WEIGHT OF THE NEWBORN IN THE NATIONAL PERINATAL INSTITUTE OF LIMA PERU

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Challenges of nutrition and public health in Ibero-America

Introduction: Anemia in pregnancy continues to be a health problem in various countries of the world, affecting both the health of the mother and that of her newborn. Several researchers around the world have searched for some association between these two variables. However, the studies carried out on this topic have not been conclusive, varying results and methodologies.

Objective: To determine the association between Anemia of pregnant woman and the newborn weight of National Maternal Perinatal Institute of Lima

Methods: Quantitative approach study, correlational, cross-sectional and retrospective observational design. It worked with 1715 Clinical Histories of the patients attended in the Maternal Perinatal Institute, during the period September - October 2015, of which 530 met the eligibility criteria. To verify the association between the two study variables, the Spearman correlation test was performed.

Results: The pregnant woman's anemia and the weight of her newborn did not show any association (Spearman's Rho = 0.003). The mean of the hemoglobin of the pregnant woman was 11.8 ± 1.2 gr / dl, and 21.3% presented anemia. The average weight of the newborns was 3363.1 ± 447.3 g, of which 5.3% was observed with low weight. In addition, it was found that 56.3% of pregnant women presented normal weight, and 39.7% had excess weight, according to pre-pregnancy BMI.

Conclusions: There is no significant association between the Anemia of the pregnant woman and the weight of her newborn in the patients treated at the National Maternal and Perinatal Institute in Lima.

Conflict of Interest: None to declare.

Keywords: Hemoglobin /Pregnant women / Birth Weight

P211

RATIONS AND RECOMMENDED DAILY INTAKE OF MICRONUTRIENTS LOST IN THE MERMA OF FRUITS AND VEGETABLES OF A SELF-SERVICE STORE

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Challenges of nutrition and public health in Ibero-America

Introduction: Annually one third of all food produced in the world for human consumption is lost or wasted; estimating that half of the group that is lost are fruits and vegetables.

Objective: To determine the amount of rations and the number of Mexican adults that would cover the daily portion recommendation of micronutrients from the waste of fruits and vegetables from a self-service store.

Methods: Case study was determined by the wasted of fruit and vegetables in a self-service store in southeastern Mexico, for a period of 10 months; The nutritional information was obtained using the nutritional value tables of the food and the database of the United States Department of Agriculture (USDA); The recommendations of the main vitamins and minerals for Mexican adults and the micronutrient rations were calculated.

Results: The total decrease of fruits and vegetables for 10 months was 150,250.8 kg. Of which 72% corresponds to the net weight (107,692.31 kg) and the remaining 28% to the inedible parts (42,558.49 kg). Vegetable's wasting is higher (59%) than fruit (41%); 48% of the losses are made up of tomato, mango, pineapple, carrot, lemon, apple and chayote. The total waste of vegetables would cover IDR of 1,385 people in 10 months, and the fruits of 733; the vitamins may have covered the RDI of retinol, ascorbic acid, thiamine, riboflavin, niacin, pyridoxine and folic acid. The minerals may have covered the RDI of calcium, phosphorus, iron, magnesium, sodium, potassium and zinc.

Conclusion: The waste in these foods could have benefited the population by covering their recommended daily intake (RDI) of vitamins and minerals with a total of 643,695 rations in 10 months.

Conflict of Interest: no conflict of interest

Keywords: waste, fruits, vegetables, portions, IDR, vitamins, minerals.

P212

AN INTERVENTION OF FOOD AND NUTRITION EDUCATION TO PREVENT OBESITY IN SCHOOLCHILDREN IN PANAMA

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Challenges of nutrition and public health in Ibero-America

Introduction: Obesity is a public health problem in Panama.

Objectives: To develop a food and nutrition education (FNE) methodological alternative for the prevention of overweight in schoolchildren (8-12 years) from Panama

Methods: Quasi-experimental pretest-posttest study, prospective and without a control group, carried out from July-December 2018 in 248 schoolchildren of both sexes from five elementary schools in Panama West. Sociodemographic data, dietary diversity information, and anthropometric markers were obtained. Overweight was defined when the BAZ was ≥ 1 , according to WHO 2007. Knowledge, attitude, perception, and behaviors regarding eating habits and lifestyles were evaluated. Results were compared by type of school (healthy school program-HSP and regular schools-RS) and by evaluation period (baseline-BL and final period-FP) after six weeks of FNE intervention with different teaching strategies.

Results: mean \pm SD for age was 9.8 ± 1.3 years (54.8% female and 62.5% HSP). The excess weight in BL and FP was 46.2% and 46.0%. Mean \pm SD for waist in BL and FP was 66.1 ± 10.4 and 65.6 ± 10.3 cm ($p = 0.000$); for BAZ was 0.876 ± 1.331 and 0.885 ± 1.310 DE ($p = 0.4206$). No significant differences were observed in anthropometric markers according to type of school. The diet was characterized by including cereals (96.8%), meat/chicken (91.1%), sugar (77.6%), oils and fats (75.7%); and deficient in fish (17.8%) and eggs (37.7%). In HSP, higher consumption of cereals, meats, milk, but also of sugars and fats was observed (test proportions, $p < 0.05$). The median and (RIQ) of knowledge score was in BL and PF of 6 (3) and 11 (4) points, respectively (Wilcoxon Mann-Whitney test, $p < 0.05$). The positive attitude index in BL and FP was significantly increased (Wilcoxon Mann-Whitney test, $p < 0.05$) from 70 (11.5) and 73.5 (8) points. The median and RIQ of the BL and FP performance index was 39 (6) pts and 40 (6) pts (Wilcoxon Mann-Whitney test, $p < 0.05$).

Conclusions: High prevalence of overweight. FNE improves the cognitive-behavioral dimension. Multisectoral policy for the prevention of obesity is required from schools to meet the goals of the 2030 Agenda.

Conflict of Interest: Authors declare no conflict of interest.

Keywords: Obesity / Education / Panama / Malnutrition / Policies / Nutrition

P213

STUDENTS' DIET ASSESSMENT OF A PRIVATE EDUCATION INSTITUTION IN PUEBLA, MEXICO

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Challenges of nutrition and public health in Ibero-America

Introduction: Lifestyle and eating habits are a direct influence on health through life. When students are attending universities, nutrition may influence habits that in some cases will be maintained until adulthood. Young people of this academic stage are vulnerable to suffer alternations on their eating behaviors.

Objective: This inquiry was to assess the students' diet ingesting of a private higher education institution in the state of Puebla, Mexico.

Methods: Data were collected from freshmen students from education institution in the state of Puebla. Anthropometric measurements (height, hip circumference, waist circumference, and weight,) were collected, the body mass index (BMI) was classified according to the criteria of the World Health Organization (2017). Questionnaires and 24-hour reminders (R-24h) were sent to the participants electronically using Google form. The R-24h were evaluated using the Mexican System of Equivalent Foods (SMAE) and accounted for by the amount of energy, carbohydrates (HCO), proteins (PTN) and lipids (LIP). The consumption was adequate when HCO 50-60%, PTN 15-20% and LIP of 25-30%.

Results: The 287 participants, 154 answered the R-24h. 76% (n = 117) were women and 24% (n = 37) men. The average age was 18.7 ± 0.9 years, and the BMI was 23.7 ± 4.0 kg / m². The average energy consumption was 1579 ± 545 kcal (minimum 750, maximum 3600 kcal). The percentage (%) of HCO was 49.2 ± 10.9 , PTN 24.9 ± 13.5 and LIP of 23.7 ± 9.1 . In the case of men, it was observed an energy consumption of 1679 ± 493 kcal (minimum 907, maximum 3115 kcal) and the % of HCO was 45.1 ± 10.5 , PTN 27.0 ± 13.4 and LIP of 20.2 ± 8.9 . For women, the energy consumption was 1548 ± 558 kcal (minimum 750, maximum 3600 kcal) and the % of HCO was 50.4 ± 10.7 , PTN 24.2 ± 13.5 and LIP of 24.8 ± 8.9 . The 29 (%) Presentation a BMI > 25kg / m²

Conclusions: It was distinguished that students have a diet rich in PTN regardless of their sex and tendency to suffer from overweight.

Keywords: anthropometry / diet / eating habits / macronutrients / nutritional status / overweight

P214

SENSITIVITY AND SPECIFICITY OF ACCESSIBLE, LOW COST BUT LITTLE USE ANTHROPOMETRIC PREDICTORS TO IDENTIFY CARDIOVASCULAR RISK IN INDIGENOUS WOMEN IN SOCIAL-FOOD VULNERABILITY

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Challenges of nutrition and public health in Ibero-America

Introduction: By 2030 it is estimated that more than 23 million people will die from Cardiovascular Disease (CVD). CVD impacts public-health by raising costs on family and health systems. In Mexico, CVD is the fourth cause of premature mortality in adults 34-44 years, the third in 45-54 years and the first from 65. Framingham-Risk-Scale (FRS), is widely used by linking biochemical and clinical data to calculate CVD risk (CVDr), however the difficulty of having biochemical data, leads to the need to develop anthropometric tools with high-sensitivity and specificity to predict it, especially in vulnerable groups with restricted access to health services. Anthropometric indicators (AI) such as waist-circumference (WC), waist-height-index (WHI) and conicity-index (CoI) are proposed as accessible predictors to estimate CVDr. Receiver-Operating-Characteristics (ROC) curves, compare the predictive skill of diagnostic methods using graphical representation under the focus of balancing sensitivity and specificity as well as obtaining cut-off points that support the diagnosis.

Objective: to assess predictive-capacity of three AI for the identification of CVDr in Matlatzinca women, who have high levels of poverty and social inequality, hindering their access to CVD biomarkers.

Methods: Population-based cross-sectional study in 93 indigenous women. CVDr was estimated using FRS as reference method, comparing it with WC, CoI and WHI. ROC-curves were obtained identifying cut-off points, area under the curve, sensitivity and specificity for each anthropometric indicator.

Results: Breakpoints and AUC for each AI were: WHI-0.63 (0.763), CoI-1.29 (0.756) and WC-91 (0.663).

Conclusions: In this population, WHI presented greater power of discrimination, considering it the best predictor of CVD risk because of its high sensitivity.

Keywords: Indigenous-women / anthropometric-index-, central-obesity, cardiovascular-risk, sensitivity, ROC-curves.

Conflict of interest: Neither author reported a conflict of interest related to this study.

P215

FACTORS RELATED TO THE LEVEL OF FOOD SAFETY IN STUDENTS OF A HEALTH SCIENCES PROGRAM OF A COLOMBIAN CARIBBEAN UNIVERSITY IN THE 2018-2019 PERIOD

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Challenges of nutrition and public health in Ibero-America

Introduction: Enjoying food security, according to FAO, implies that all people have permanent physical, social and economic access to safe, nutritious food, in sufficient quantities to meet their nutritional requirements, food preferences and lead an active and healthy life. According to the National Survey of nutrition (2015), the 45.8% of the Colombian population is in food security and 54.2% in food insecurity: 31.9% mild, 13.8% moderate and 8.5% severe, similar to South America (8.3%). The students of health sciences, from the Metropolitan University - Barranquilla, Colombia- come from households in various geographical areas of the Caribbean (68%), including vulnerable areas. Previous studies show that their social, economic conditions and changes in university life jeopardize their ability to access and consume food in adequate quality and quantity and there are situations of malnutrition (40%).

Objectives: Determine the factors related to the level of food safety in students a health sciences program of a Colombian Caribbean University in the period 2018-2019.

Methods: Descriptive cross-sectional study, conducted between April 2018 and October 2019, conducted on 279 students aged 18 to 28, selected by probabilistic sampling, under informed consent a questionnaire was applied to know sociodemographic data, lifestyles, food consumption and measure Food Safety according to the Latin American and Caribbean Food Security Scale (LACFS), used in the National Survey of nutrition. The data were analyzed in SPSS.

Results: The 43.4% of the sample was found in food safety; while 56.3% presented food insecurity: mild 35.71%, moderate 15.00% and 6.07% severe; similar to the Colombian population. 68.3% of the population with food insecurity did not consume a variety of foods, 64.3% ate healthy foods and 56.8% did not have enough food to eat, due to lack of money; Strength of association of these variables was demonstrated using ODDS RATIO and confidence intervals, which coincides with $p < 0.000$ values according to chi-square test.

Conclusions: Food limitation was identified in the students, inequality is reflected in access to healthy and nutritious food, loss of diversity, quality and reduction in the amount of food consumed. Keywords: Food safety, students, food insecurity

Conflict of Interest: The authors belong to the Metropolitan University

Keywords: food safety / students / health science program

P216

LIFESTYLE AND NUTRITIONAL STATUS IN CHILDREN OF A PUBLIC ELEMENTARY SCHOOL OF CIUDAD GUZMÁN, MEXICO

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Challenges of nutrition and public health in Ibero-America

Introduction: During the last decades, Mexico has experienced a nutritional transition characterized by the displacement of the consumption of healthy foods for others with high amounts of energy, sugars, saturated and trans fatty acids, that accompanied by sedentary lifestyle, increase the risk of chronic non-communicable diseases in earlier stages of life and their comorbidities.

Objectives: Identify the possible association between the lifestyle of schoolchildren with their nutritional status and the risk of developing NCD's.

Methods: Children who had the consent signature by their parents and the consent signed by them were included. Weight and height were measured and the body mass index (BMI) was obtained. Their nutritional status was classified by z-score. A questionnaire validated in Mexican children was applied to identify the lifestyle habits of food and physical activity. The statistical analysis was done with SPSS-v.25.

Results: 346 children were evaluated, 181 female and 165 male. Of the total, 1.45% were underweight; 58.09%, normal; 36.70%, overweight and 3.76%, obesity. Compared with the 2018 National Health and Nutrition Survey (ENSANUT), in the sample evaluated, there was more than double the prevalence of overweight than the national average (16.1%). No statistically significant association was found between lifestyle and nutritional status, according to sex. When evaluating lifestyle by sex, a higher proportion of girls maintained ($p = 0.002$) healthier lifestyles (7.32%) and sufficient lifestyles (24.53%) than compared to boys, (3.30% and 13.55%, respectively).

Conclusions: Apparently, programs and public policies at all levels are not enough. The organization of families and communities is necessary to articulate efforts to advance in solving this serious problem.

Conflict of Interest: The authors declare that they have no financial or personal conflicts of interest that may inappropriately influence the development of this research.

Keywords: school-age children/ nutritional status/ lifestyle.

P217

ASSESSMENT OF FOOD AVAILABILITY AND FOOD ENVIRONMENT MONITORING AS QUALITY INDICATORS OF THE ENVIRONMENTS IN MEXICAN SCHOOLS

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Challenges of nutrition and public health in Ibero-America

Introduction: Children stay long and important time on the school site. The school's food environment has been identified in the causal line of childhood obesity. In Mexico, the monitoring of the food environment must be implemented by the school authorities and the school councils for social participation (CEPS); however, surveillance and compliance of the rules is fail. M-health could be useful tools to evaluate school food environments more efficiently.

Objectives: Describe food availability of public elementary schools and their association with surveillance by CEPS.

Methods: Descriptive study done through a mobile application (Applan-e) developed based on the framework of food environments in Latin America. Information was collected on the availability of food and surveillance actions by the CEPS of 56 public elementary schools in Hidalgo, Mexico, randomly selected. Food availability was categorized as high, medium and low when in schools there were > 2, 1 or 0 places of food sales per day respectively.

Results: 68.4% of the schools were urban and 31.6% rural; 37.5% of the schools were in high availability and 26.7% in medium food availability. An association was found between the high availability of food and the non-existence of surveillance by CEPS (χ^2 , $p = 0.028$).

Conclusions: Non-surveillance by CEPS of food outlets is associated with exposure to increased food availability in schoolchildren in the schools evaluated. It is necessary to study and address the causes that generate unhealthy food environments.

Conflict of Interest: without any conflict of interest.

Keywords: schools/ food environment/ food availability/ monitoring.

P218

EFFECTS ON SPORTS PERFORMANCE AND BODY COMPOSITION WITH VEGAN DIET IN CROSSFIT PRACTITIONERS

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Challenges of nutrition and public health in Ibero-America

Introduction: The positive health effects of vegan diets are already known, however, there is little information in terms of sports nutrition and nutritional demands that athletes have, even more so in a discipline of strength and endurance such as Crossfit.

Objectives: To compare sports performance and body composition in crossfit practitioners with vegan diet and conventional diet.

Methods: Two groups of crossfit practitioners were compared to whom they were assigned a vegan and conventional feeding plan respectively for one month. An assessment of body composition was carried out through the bioimpedance method and taking body circumferences, sports performance was evaluated by means of a strength test (clean & jerk, push press and front squat), endurance (burpees) and speed (short and long), before and after the meal plan.

Results: Eleven subjects were evaluated (vegan diet $n = 6$, conventional diet $n = 5$). When analyzing the determinants of strength, it was found that subjects with a vegan diet significantly improved this condition compared to subjects with a conventional diet; clean & jerk (35.0 ± 4.1 kg vs 28.8 ± 4.6 kg, $p = 0.043$), push press (35.0 ± 3.5 kg vs 27.6 ± 4.3 kg, $p = 0.012$) and front squat (44.6 ± 3.5 kg vs 34.8 ± 7.0 kg, $p = 0.014$). However, no differences were found in the evaluation of endurance, speed and body composition.

Conclusions: Vegan diet showed effects to improve strength in crossfit practitioners, however, they did not improve conditions of resistance, speed and body composition, it is important to mention that the intervention time and the number of participants was small, so more studies that contemplate these conditions are suggested.

Conflict of Interest: no conflict of interest.

Keywords: Crossfit/vegan diet/body composition/strength.

P219

THE EFFECT OF SCHOOL BREAKFAST PROGRAM ON CHILDREN NUTRITIONAL STATUS IN HERMOSILLO CITY, ESTATE OF SONORA, MEXICO

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Challenges of nutrition and public health in Ibero-America

Introduction: The main desnutrition problem present in Mexico are anemia, iron and vitamin A deficiency. These are related to higher susceptibility to the infections disease and cognoscitive deterioration.

Objectives: The main objective of this study was to evaluate the effect of the School breakfast program (SBP) on the nutritional status in Hermosillo city, Sonora.

Methods: This was a quasi-experimental study, 266 children of 2nd and 3rd grade participated and were evaluated according to de intake frequency of the school breakfast. Divided into the following groups according to consumption: regularly, irregularly and a reference group that didn't had any consumption. Z-scores for Height/age, Weight/age and BMI/age were estimated. Also, biochemical indicators were determined for hemoglobin, ferritin, zinc and serum retinol. The 24-hour recall and a food security poll were used as the dietary evaluation methods.

Results: At the end of school academic year the prevalence of anemia were decreased 2% in irregular group and 2.4% in regular group, Regarding to the iron deficiency, irregular group showed a decrease of 6%, and, both regular and irregular group showed similar results with a decrease 8% and 7%, respectively on the prevalence of vitamin A deficiency. The dietary evaluation showed that the regular group meets the recommended daily intake of macro and micronutrients. the 71% and 78% of the participants in regular and irregular groups respectively had a food insecurity problem. However, there is a negative association between the food insecurity levels and the daily recommended intake of nutrients.

Conclusions: The school breakfast program (SBP) has a positive impact on the reduction of iron and vitamin A deficiency problem on the beneficiaries.

Conflict of Interest: The authors declare no conflicts of interest that pertain to this work.

Keywords: Children, School breakfast, nutritional status, SBP

P220

MATERNAL FACTORS RELATED TO BIRTH WEIGHT IN MEXICAN CHILDREN

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Challenges of nutrition and public health in Ibero-America

Introduction: Birth weight is an indicator of intrauterine growth and development, which is determined by maternal factors.

Objective. The objective of this work was to associate maternal sociodemographic variables with the birth weight of their newborn children (NB).

Methods: Weight indicators were evaluated in NB of the year 2017 from the state of Hidalgo, Mexico. Data on weight, length, gestational age and maternal variables (age, marital status, schooling and entitlement to a health care institution) were taken from the Birth Information Subsystem (SINAC). Using the Intergrowth-21st Newborn Size platform, weight percentiles were obtained, to diagnose NB as small for gestational age (SGA) and large for gestational age (LGA). The low weight (LW) was determined with a weight <2500 g. The diagnoses of SGA and LGA were associated with socioeconomic variables of their mothers, using a logistic regression.

Results: 43 174 NB (51.4% male) were evaluated. The prevalence of NB with LW, SGA and LGA was 5.9%, 8.3% and 6.8%, respectively; with differences by sex in the SGA (10.2% in males, $p < 0.05$). Age ≤ 19 years old, concubinage as marital status and not being entitled to a health service of mothers, were associated with a higher risk of being born SGA ($\beta = 1.4, 1.2$ and $5.1, p < 0.01$, respectively); in contrast, mothers aged ≥ 35 years old, married and entitled to the Mexican Social Security Institute (IMSS) or the Institute of Social Security and Services for the State Workers (ISSSTE), had a higher risk of having LGA NB ($\beta = 2.2, 1.4$ and $2.1, p < 0.01$, respectively).

Conclusions: The main nutritional problem detected in Mexican NB is the low weight for gestational age, especially in boys. In mothers, aged ≤ 19 years old and not being entitled to a health care institution of the National Health System, were associated with a higher risk of having SGA newborns.

Conflict of Interest: The authors declare no conflicts of interest.

Keywords: Low birthweight / Mexico / maternal conditions

P221

NUTRITIONAL DIAGNOSIS OF RIVERSIDE RESIDENTS CHILDREN AND ADOLESCENTS ACCORDING TO FOOD STANDARD

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Challenges of nutrition and public health in Ibero-America

Background: The assessment of the nutritional status of children and adolescents is a fundamental tool for the control of morbidity and mortality in this age group.

Objective: To evaluate the prevalence of nutritional diagnosis of children and adolescents from the riverside under the perspective of different dietary patterns.

Methods: Retrospective cross-sectional study composed of a sample of 405 patients aged between 0 and 17 years attended during voluntary health expeditions carried out in the years 2018 and 2019 in riverside communities on the Cupari and Tapajos rivers (PA), Brazil. Anthropometric measurements were converted into a BMI Z-score for age. The nutritional diagnosis was established through the cutoff points of the Z-score and recommended by the WHO. The sample was allocated according to nutritional diagnosis in groups with different dietary patterns: exclusive breastfeeding (A), breastfeeding associated with complementary feeding (B) and individuals who have already stopped breastfeeding (C). The statistical analysis was descriptive and the variables expressed in simple frequencies.

Results: There was a predominance of patients in group C (77.53%) in the studied sample. The nutritional diagnosis most observed in all groups analyzed was eutrophy (A-10, B-44, C-262). In group A, the most frequent nutritional deviation was obesity (6), in group B the risk of overweight (18) and in group C, thinness (19) and overweight (20) stood out with similar rates.

Conclusion: In the nutritional assessment, most children and adolescents from the riverside region presented eutrophy. However, we observed that the introduction of food and the interruption of breastfeeding significantly impacts the nutritional status of riverside dwellers. The rates of thinness and overweight demonstrate, respectively, the reflection of the limited livelihoods and inadequate infrastructure characteristic of the region and the recent dietary transition with the introduction of industrialized foods observed in the last decades. Such findings suggest the need for public health policies to accommodate this demand.

Conflict of Interest: None.

Keywords: pediatrics / nutritional diagnosis / riverside / child development.

P222

SOCIAL REPRESENTATIONS IN STUDENTS OF THE HEALTH AREA ABOUT BREASTFEEDING

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Challenges of nutrition and public health in Ibero-America

Introduction: Breastfeeding (BF) is the ideal method of feeding. However, only 29% of Mexican infants have exclusive BF practice. The absence of BF is a Public Health problem, maybe because health professionals do not support mothers enough. Health professionals have unfavorable beliefs about BF. Knowing the social representations (SR) of BF for health students, will allow to understand their beliefs and to develop strategies to improve them.

Objective: To explore the structure of the SR of BF (BFSR) in Mexican students of CUCS-UDG (Jalisco, Mexico).

Methods: Qualitative study based on SR Theory. Sampling was at convenience. It included undergraduate students (nursing, nutrition and medicine) from CUCS-UDG. The information was collected with free listings, using the inductive word "breastfeeding." Three analyzes were performed (similarity through the co-occurrence index applied to the word matrix and the set of meanings, and prototypical analysis).

Results: We included 124 students (94 women) with 20±3 years of average age. The majority were students of medicine (n = 49). We obtained 608 words out of 620: from these, 235 were different, reaching a cultural consensus of 62%. According to the three types of analysis, "baby" is the central and organizing element of the structure of the BFSR. In the analysis of co-occurrence of words, "mom", "milk" and "nutrition" stand out as the organizing elements. By its meaning, "mom" stands out for being an affective element and "maternal" associates the words "milk" and "breastfeeding" (social-normative elements). The central nucleus of the prototypical analysis includes words associated with people and acts that participate in the BF process (instrumentalist thematic elements), and in the peripheral areas there are affective and biological thematic elements.

Conclusion: The core of the BFSR is related to instrumentalist elements instead the peripheral areas are associated with emotional, biological and social dimensions of

BF. These last elements are expected to be in the central nucleus (corresponding to the basic information that students must acquire during their formation). It is essential to strengthen the educational strategies on BF during their academic programs so that, eventually, biological, affective and social elements will be included into the central nucleus of their BFSR.

Conflict of Interest: The authors declare no potential conflicts of interest.

Keywords: Social representations / Breastfeeding / University students.

P223

NUTRITIONAL STATUS AND ASSOCIATED FACTORS WITHIN A GROUP OF PRESCHOOLERS AT AN EDUCATIONAL INSTITUTION IN CALI, COLOMBIA

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Challenges of nutrition and public health in Ibero-America

Introduction: WHO defines nutrition as food intake in terms of an organism's dietary requirements (1). Proper nutrition is essential for good physical and mental development (2); however, risk factors, such as poverty, violence, and inequality, impact the availability, consumption, and use of food (3), (4). These factors increase the probability of changes in the nutritional status (5).

Worldwide, 52 million children less than 5 years of age suffer from emaciation. Further, 155 million have stunted growth, while 41 million are overweight or obese. These cases mostly occur in low- and middle-income countries (2).

Bearing all this in mind, this investigation was undertaken within a group of preschoolers with the purpose of analyzing their nutritional status and its relationship with the associated factors.

Objective: Analyze the nutritional status and associated factors of a group of preschoolers from an educational institution in Cali, for 2019-2020.

Method: This was a quantitative, cross-sectional descriptive study conducted on 92 preschoolers, teachers, and parents at an educational institution. Three instruments were applied: parent survey, teacher survey, and a record for nutritional screening.

Results: Within the study group, 14% girls had short stature and 2.4% of boys had growth restriction. Among the girls, 6.8% were at risk of malnutrition versus 8.8% of boys, and 10% of boys and 6% of girls presented with low weight, whereas 10% of girls and 19% of boys were at a risk of being overweight.

A total of 76% of participants declared to have knowledge of eating habits. However, 43% of preschoolers received only

4 meals a day. All participating teachers said they had knowledge of eating habits.

Conclusions: The percentage of participants at a risk of being overweight is greater than that of children at a risk of malnutrition or already malnourished. Poverty level is a risk factor that increases the probability of malnutrition. The knowledge reported by teachers about eating habits and the supervision they conduct on students during the school day is a protective factor.

Conflict of Interest: The authors declare no conflict of interest.

Keywords: Nutritional Status / Preschoolers / Teachers / Parents / Protective Factors / Risk Factors.

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P224

OBESITY, OVERWEIGHT AND EATING HABITS IN BOGOTÁ, COLOMBIA: CONTRIBUTIONS OF ETHNOGRAPHY FOR COMPREHENSION OF THE PHENOMENON IN BOGOTÁ, COLOMBIA

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Challenges of nutrition and public health in Ibero-America

Introduction: One of the main challenges facing the global public health is the understanding of the phenomenon of obesity and overweight in contemporary societies. Today, more than 1900 million people are overweight, from which over 650 million are obese. A significant number of chronic

diseases are associated with being overweight or obese (WHO, 2016). In Colombia, 56.4% of the population is overweight; in the capital Bogotá, the prevalence is 56.6% (ENSIN, 2019). Qualitative approaches have approximated to the phenomenon (Kremers et al, 2009). Ethnographic analysis is proposed here to gain a better understanding of the phenomenon in a neighborhood of Bogotá, Colombia.

Objectives: Develop specific contributions of ethnography as research method to understand the eating habits associated with overweight and obesity in adults living in Usaquén, a neighborhood in the northeast of Bogotá, Colombia.

Methods: An ethnographic approach was made through case studies of five overweight and obese (measured by body mass index) adults. The techniques employed during the ethnography included field work in the locality, observation, measurement taking, home visits, and interviews.

Results: Through ethnography, it is evident that eating habits related to obesity and overweight in all five cases relate to access of hypercaloric foods and to food consumption patterns established in the family nucleus. Factors such as location of the residence and access to both public equipment, goods, and services in the area influenced a sedentary lifestyle.

Conclusions: Ethnography offers an interesting potential to the qualitative approach to understanding eating habits related to obesity and overweight. The method requires real-time focus to build trust and to observe emic dynamics. This approach is based on complementary approaches and methodologies (Brown and Gould, 2013) capable of offering novel strategies for addressing the problem.

Keywords: Obesity and overweight / eating habits / anthropology / ethnography / public health

P225

CHARACTERIZATION OF FOOD ADDITIVES PRESENT IN DAIRY BEVERAGES AND NON-DAIRY BEVERAGES ADVERTISED ON COLOMBIAN TELEVISION IN 2018

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Safe, healthful and sustainable food

Introduction: The use of food additives is increasing by the food industry.

Objective: This article aims to compare food additives present in dairy beverages (DB) and non-dairy beverages (NDB) advertised on Colombian television in 2018, according to frequency and technological function.

Methods: The ingredients and food additives presented in the products were registered according to Codex STAN 192-1995 v.2019, from advertising guidelines of labels in beverages on Colombian television. These were classified in DB and NDB according to the resolution 02310 of 1986 and decree 616 of 2006 of the Ministry of Social care of Colombia. For analysis of the DB and NDB was performed: the frequency of additives and technological function; classification of beverages according to NOVA processing and the production company was identified. The analysis included measures of central tendency and dispersion, as well as student's t-test. P value <0.05 was considered significant.

Results: It was found 15 types of DB and 31 NDB advertised. According to NOVA, 85% were ultraprocessed products (NDB=25 and DB=14), and 15% natural foods (NDB=6 and DB=1). In BD, it was found higher content of additives with the increase in the degree of processing of products ($p < 0.05$). Regarding the content of additives, DBs had an average 6.0 ± 3.0 (min 1, max 10), vs NDB 6.0 ± 4.0 (min 0, max 14); $p > 0.05$. About technological functions, it was evidenced that additives in DBs have a higher frequency of use such as: stabilizers (23%), flavorings (19%) and colouring (17%); and NDBs: flavorings (19%), colouring (18%), acidity regulators (18%) and sweeteners (10%). As for the production company of the DB the highest frequency was Alpina Productos Alimenticios S.A 73.3%, followed by Lácteos Gloria 20%. For NDB, Postobón presented the highest frequency 51.6%. The 35.9% of all ultraprocessed beverages were from Postobón S.A and 25.6% from Alpina.

Conclusions: There is a wide use of additives in DB and NDB advertised on Colombian television, especially those classified as ultraprocessed. Is required to assess the public health impact of these findings.

Conflict of Interest: The authors declare no conflict of interest.

Keywords: food additives, dairy beverages and non-dairy beverages

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VITAMIN E INTAKE AND BLOOD PRESSURE IN ADOLESCENTS OF SANTIAGO DE CHILE

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Nutrition in the prevention and treatment of chronic diseases

Introduction: The antioxidant effect of vitamin E could be associated with a decrease in blood pressure.

Objectives: Associate the intake of vitamin E with blood pressure in adolescents from Santiago de Chile.

Methods: Descriptive association study in which 21 14-year-old male students from a school in Santiago de Chile participated. The vitamin E intake of adolescents was determined through a consumption trend survey that included 50 foods. Blood pressure was taken three times, after five minutes of rest in each blood pressure measurement. This

study was approved by the Ethics Committee of the Faculty of Health from Bernardo O'Higgins University. The statistical analysis was with the SPSS program.

Results: The minimum intake of vitamin E was 2 mg and the maximum was 108 mg with a median of 55.5 mg; the 25th percentile was 51 mg and the 75th percentile was 65.5 mg. Only 14.3% of adolescents do not meet the recommended daily intake of vitamin E. Regarding the blood pressure ranges, 61.9% had normal Systolic Arterial Pressure, 23.8% showed pre-systolic arterial hypertension and 14.3% manifested stage 1 systolic hypertension. In Diastolic Arterial Pressure, 85.7% were normal, 9.5% had pre-diastolic arterial hypertension and 4.6% with stage 1 diastolic hypertension. The Pearson value between the association of vitamin E intake and systolic blood pressure was 0.178. In the case of diastolic blood pressure, the Pearson value was 0.192.

Conclusions: Despite the fact that there is no association between vitamin E intake and blood pressure in the adolescents studied, a trend is evident.

Conflict of Interest: The researchers do not present a conflict of interest.

Keywords: Vitamin E / blood pressure / adolescents.

P228

COMPOSITION OF BREAST MILK AS A REFLECTION OF AMARANTH CONSUMPTION

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Safe, healthful and sustainable food

Introduction: The high nutritional value of amaranth contributes to the treatment of anemia and malnutrition. According to the WHO, breast milk is the best way to provide young children with the nutrients they need to promote proper growth and development.

Objectives: The objective of this research is to evaluate the effect of the consumption of *A. hypochondriac* as part of the mother's diet in the lactation period, on the changes in the chemical composition of breast milk.

Methods: From the fifth week, the quality of milk provided by a group of breastfeeding women, who were under a controlled feeding plan, was evaluated. The protein and fat content of breast milk were evaluated for 20 days and samples were taken for biochemical analysis (blood count, triglyceride level, cholesterol, calcium and phosphorus) and an anthropometric study (height, weight, height, age, sex, body mass index, muscle component, fat component, body water, muscle perimeters, bone diameters, skin folds) to determine their nutritional status. A routine survey was conducted to keep track of the foods consumed daily, as well as the portions and schedules. Inclusion criteria: With premature children, fifth week of the lactation period or those who do not breastfeed. Exclusion criteria: With infections / lesions on the

nipples, under drug / natural treatment. Informed consent letter The determination of the fat content of breast milk was carried out following the hematocryte method, while the protein determination was carried out by the Biuret method.

Results: An increase in the protein and fat content of breast milk was observed in the samples provided at the time of investigation.

Conclusions: The composition of human milk varies according to purchasing power and eating habits. By integrating amaranth into the daily diet of mothers during lactation as a snack, an increase in milk quality is obtained.

Conflict of Interest:

Keywords: Amaranth/protein/ fat

P229

NUTRITIONAL VALUE OF THE MISTLETOE TRUE (*Cladocolea loniceroides* and *Struthanthus interruptus*) IN FOREST PARKS AND GARDENS OF MEXICO CITY

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Safe, healthful and sustainable food

Introduction: In Mexico, by tradition, medicinal plants are consumed to control diseases in humans. The plants mistletoe true, of the Loranthaceae family, are used in the prevention of gastritis, cardiovascular diseases, nervous disorders and dermatitis. Also, it contains antioxidants and antimicrobial, antihypertensive and anticancer activity. However, the nutritional quality of the parasitic plant that inhabits each region is unknown.

Objective: The objective of this research was to know the nutritional value of *Cladocolea loniceroides* and *Struthanthus interruptus* in forest parks and gardens of Mexico City (CDMX).

Methods: The research was carried out in four sites Alameda Sur, Jardín Lecumberri, Ex-Convento de Churubusco and Ramón López-Valarde of the CDMX. By site, 15 mistletoe samples of the species ash (*Fraxinus* sp.), Poplar (*Populus* sp.) and thunder (*Ligustrum* sp.) were randomly taken. The nutritional content was determined in triplicate based on the AOAC, 1995. The results were analyzed with the JMP V8 program, through a randomized experimental design. To test the differences between the means, an analysis of variance (ANOVA) and the comparison of means with the Tukey test were performed, with a significance level of $P \leq 0.05$.

Results: By species of parasitic plant significant statistical differences were observed ($P \leq 0.0001$). *S. interruptus* presented average percentages of humidity of 55 %, dry matter 45 %, organic matter 91.4 %, lipids 5.2 %, minerals 8.5 % and fiber 18.2 %. Unlike *C. loniceroides*, which presented low values of humidity 51.2%, organic matter 89.9%, lipids

3.8% and fiber 17.1%. In addition, the curve of the percentage of minerals was superior (9.3 %).

Conclusions: The mistletoe true *S. interruptus* had higher nutritional quality than *C. loniceroides*. The percentage of macronutrients presented by both parasitic plants opens a food option for mistletoe consumers, as well as an economic income for the inhabitants of CDMX.

Keywords: Mistletoe true / nutritional content / *Cladoclea loniceroides* / *Struthanthus interruptus*.

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PHYSICAL, NUTRITIONAL AND BODY IMAGE CHARACTERISTICS OF A HIGH LEVEL WOMEN'S VOLLEYBALL TEAM

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Nutrition in the prevention and treatment of chronic diseases

Introductions: Nowadays the anthropometric data of sportsmen and women are of great importance, due to the professionalization of sport and the higher performance from early ages. Physical, psychological and social benefits can be obtained from their practice. Volleyball is an attractive discipline for the female sector.

Objectives: To know the anthropometric characteristics of a university volleyball team, to study their adherence to the Mediterranean diet and to evaluate their body image.

Methods: Transversal descriptive observational study conducted by a multidisciplinary team, with female students >18 years old who accepted to participate. Variables: age, sex, smoking habits, physical activity, height, weight, body mass index and questionnaires: adherence to the Mediterranean diet (Predimed) and Body Image Test or B.S.Q. (Body Shape Questionnaire).

Results: Eleven players were studied. Average age was 21.2 years (SD 5.2). Average height 1.74 m, average weight 69.8 kg, BMI 23.3, of which 18.8% were overweight. 18.8% smoked more than 15 cig/day. 100% carried out more than 120 minutes of daily physical activity. 18.18% had very low adherence to the Mediterranean diet, 36.36% low and 45.45% medium adherence. Four players (36.36%) had greater distortion of their body image. The lowest and most unanimous result was question 32: Have you taken laxative to feel thinner, and the highest result, an average of 2.59, question 12: When looking at other girls' figures, have you compared them unfavourably?).

Conclusions: It was noted that no player had a high adherence to the Mediterranean diet, only 18.8% were overweight but the percentage of distortion of their body image was high. In spite of the fact that they all did a lot of physical activity, it should be noted that there is a high

percentage of smoking in the sport. It is important to establish guidelines for nutritional education and to intervene in adolescents. The concept of body image is very complex, involving perceptive elements, emotions, personality reactions to their bodies, attitudes influenced by society. It is therefore important to reconstruct their ideas about the meaning of food and thus avoid eating disorders.

Conflict of interest: None.

Keywords: Mediterranean diet, body mass index.

P231

HEALTH, NUTRITION, AND FOOD LITERACY IN ADOLESCENTS: A SYSTEMATIC REVIEW

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Background and purpose Health, nutrition, and food literacy are recent concepts in health promotion, which suggest mastery over a set of knowledge and abilities that can benefit health.

Objectives: This study explored and analyzed interventions and studies that involved health literacy, nutrition literacy, and food literacy in adolescents between 10 and 19 years of age.

Methods: A systematic search was performed in PubMed, Scielo, and BVS of articles published in English, Spanish and Portuguese between 2013 and 2018. The inclusion criteria were based on the PICOS strategy (Participants, Interventions, Comparisons, Outcomes and Study Design) The articles were aimed at adolescents (10 to 19 years). Interventions: studies that addressed health literacy, nutrition literacy, and/or food literacy strategies were included. Outcomes: articles that dealt with non-communicable chronic diseases (NCCDs) or that mentioned aspects related to maintaining or improving health status, and that emphasized the development of a specific skill or competency in the area of health, nutrition, or food literacy. Study designs included: cross-sectional, community trials, qualitative studies, and participatory research. In all, 1,491 studies on adolescent literacy were found, 28 of which were selected, and 5 of those met the inclusion criteria.

Results: The findings from this review suggest the existence of large differences in methodological approaches. Knowledge was found to be associated with different interactive and critical health skills. Significant improvements were found in attitudes about sugary drinks, media literacy, public health, and slight improvements were found in attitudes about vegetables and physical activity. Knowledge about food and nutrition was identified as important for food literacy and improving eating behavior, and a need to

strengthen confidence in preparing and consuming food was identified. Sociocultural knowledge and development of skills related to eating and nutrition practices were identified as key to food and nutrition decisions.

Conclusions: The adolescents represented in the articles included in this review were found to have acceptable levels of knowledge about food and nutrition literacy, but impact on practices was limited. **Keywords:** health literacy, nutrition literacy, food literacy, interventions for adolescents

Conflict of Interest: The Authors declare that there is no conflict of interest

Keywords: Health literacy / nutrition literacy / food literacy / interventions for adolescents

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NUTRITIONAL STATUS AND FRAILTY IN OUTPATIENTS WITH CARDIOVASCULAR DISEASE

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Malnutrition in patients with cardiovascular disease is highly prevalent and increases hospitalizations, complications during hospitalizations and mortality. In the other hand, malnutrition is associated with frailty in ageing. However, this association in outpatient elderly with cardiovascular disease has not been studied.

Objectives: To examine the possible relation between malnutrition and frailty in outpatient elderly with cardiovascular disease.

Methods: Cross-sectional study in 40 outpatient elderly (>60 years) with cardiovascular disease, who signed consent forms and assisted to a rehabilitation cardiac clinic from Barranquilla, Colombia during June and July 2018. Nutritional status was evaluated by means of the Mini Nutritional Assessment and frailty by the Fried frailty phenotype. Data were presented as median (percentiles 25-75%) and frequencies (%). Comparison was made by Pearson's J-square test.

Results: Median age was 67 (63-71) years, 27 (67.5%) were male, 29 (72.5%) had a partner, 17 (42.5%) were currently employed, the median body mass index was 26 (23-30) and the most common diagnosis was ischemic cardiopathy in 23 (57.5%) subjects. Related to the nutritional status, 27 (67.5%) had normal nutritional status and 13 (32.5%) were at risk of malnutrition. Equally important, 17 (42.5%) were robust, 19 (47.5%) were prefrail and 4 (10%) were frail. A better nutritional status was associated with a better frailty status ($p=0.008$).

Conclusions: This study suggests normal nutritional status is associated with a robust status in outpatient elderly

with cardiovascular disease. In this sample, none outpatient elderly with cardiovascular disease has malnutrition.

Conflict of Interest: Authors declare no conflicts of interest.

Keywords: Cardiovascular disease / Frail elderly / Frailty / Malnutrition / Nutritional status

P233

FOLIC ACID, AN ANTIOXIDANT AGAINST THE RENAL DAMAGE GENERATED BY BINGE DRINKING CONSUMPTION DURING ADOLESCENCE IN RATS

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Binge Drinking is the pattern of alcohol consumption of greatest concern among teenagers. It generates short-term, but also long-term problems related to renal and cardiovascular functions, which increase the risk of cardiovascular disease (CVD) in adulthood. Alcohol ingested in acute form leads to oxidative stress in tissues, altering their functions. Folic acid (FA) is an antioxidant ingested with food, which is deeply decreased in chronic alcoholic patients.

Objective: to analyze if FA supplementation in adolescent rats exposed to Binge Drinking improves their renal oxidative balance.

Methods: 4 groups of adolescent male wistar rats were used: control (base diet: 2ppm AF), control with folic acid (8ppm FA in diet), alcohol (base diet and alcohol 20% ip) and alcohol with FA (supplemented diet and alcohol 20% ip). After 3 weeks of treatment, the activities of the antioxidant enzymes superoxide dismutase, glutathione reductase and glutathione peroxidase (GPx) were determined spectrophotometrically; and also lipid oxidation in the kidneys. Blood pressure was measured by the tail occlusion technique.

Results: Alcohol rats presented an oxidative imbalance with a significant decrease in GPx activity and an increase in lipid oxidation, consistent with an increase in blood pressure. FA supplementation increased the activity of this enzyme and decreased lipid oxidation, it lowered blood pressure values.

Conclusions: the use of FA is a cheap, safe and effective therapy to decrease the renal oxidative effects that occur during alcohol consumption in adolescence, improving blood pressure control, and helping to avoid the appearance of future chronic CVD.

Conflict of interest: There is no conflict of interest.

Keywords: Binge Drinking/ folic acid/ oxidative stress/ kidney/ cardiovascular disease

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SELENIUM IN THE KIDNEY OF LACTATING DAMS WITH METABOLIC SYNDROME

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Nutrition in the prevention and treatment of chronic diseases

Introduction: maternal Metabolic Syndrome (MS) during lactation causes cardiometabolic changes related to Se homeostasis and its antioxidant selenoproteins such as Glutathione Peroxidase (GPx) in the heart.

Objective: to analyze renal Se deposits and GPx activity, as well as renal oxidation in lactating mothers with MS, analyzing its repercussion on renal functionality.

Methods: two groups of lactating mother wistar rats were used: control (base diet: 0.1 ppm Se) and SM (diet rich in fructose (65%) and 0.1 ppm Se). At the end of lactation (21 d postpartum) Se levels in urine, blood and kidney were measured by graphite furnace atomic spectrophotometry. Renal GPx activity and lipid oxidation were determined by spectrophotometry. To calculate creatinine clearance (Cl), and the relative Cl of Se, serum and urine creatinine were determined by ELISA. Blood pressure was measured by the tail occlusion technique.

Results: MS dams ingested less Se in diet and clarified it more by urine, presenting less Se in serum. Renal deposits of Se were increased along with GPx activity; however, lipid peroxidation appeared. Creatinine Cl was increased, indicating an increase in filtration, accompanied by increased blood pressure.

Conclusions: MS in mothers during lactation causes profound changes in the body redistribution of Se; increasing it in kidney, probably to avoid oxidative stress. However, this deviation of Se is not enough because there is lipid oxidation, an increase in filtration and in blood pressure. Due to this Se deficiency, we propose its supplementation to avoid renal oxidative damage in lactating mothers with MS, since it could improve renal function and avoid future maternal cardiovascular diseases.

Conflict of interest: there is no conflict of interest.

Keywords: metabolic syndrome/ selenium/ glutathione peroxidase/ kidney/ lactation.

P235

QUANTIFICATION OF CAROTENOIDS IN TROPICAL FOREST FLOWERS BY RRLC

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Safe, healthful and sustainable food

Introduction: Humid tropical forests are adapted to the warm climate of the tropics and to the influence of high humidity. These factors are the reason for development of abundant biodiversity and richness in plant species. However, they are in danger due to deforestation, indiscriminate felling, climate change and little transfer of ancestral knowledge about the health benefits that certain species provide. Furthermore, almost nothing is known about the carotenoid content in tropical flowers.

Objectives: The objective of the study was to physical-chemical analysis of the flowers of five different native species from tropical forests in South America.

Methods: This research was carried out under the framework contract MAE-DNB-CM-2017-0080-UTE and project MAE-DNB-2019-0911-O. The study was carried out on flowers' petals with orange to red colorations of the following tropical species from Ecuador: *Renalmia thyrsoides* (Ruiz & Pav.) Poepp. & Endl., *Drymonia affinis* (Mansf.) Wiehler, *Renalmia alpinia* (Rottb.) Maas, *Warszewiczia coccinea* (Vahl) Klotzsch, and *Stromanthe stromanthoides* (J.F. Macbr.) L. Andersson. The plants were grown in the botanical garden "Las Orquídeas" located in the Pastaza province in Ecuador and botanically identified in the Herbarium of the Catholic University of Ecuador. For the characterization were measured weight, diameter, soluble solids, titratable acidity, humidity, ash, color and carotenoid profile by liquid chromatography (RRLC).

Results: The values of the soluble solids content were between 1.1 (*D. affinis*) and 30.0 °Brix (*R. thyrsoides*), percent titratable acidity (expressed as oleic acid) between 0.01 (*D. affinis*) and 0.05% (*W. coccinea*), the ash content between 4.5 (*W. coccinea*) and 58.8% (*D. affinis*) and the average of humidity of 88.2%. In addition, the carotenoids 9-cis-violaxanthin, violaxanthin, lutein, zeinoxanthin, β-carotene and α-carotene were identified in the species under study. The *R. alpinia* species had the highest carotenoid content with 535.3 µg / g of α-carotene, 563.3 µg / g of β-carotene and 48.6 µg / g of zeinoxanthin.

Conclusions: In conclusion, *R. alpinia* presents nutritional potential and medical benefits due to the high content of carotenoids and provitamins such as β and α-carotene.

Conflicts of interest: The authors declare no competing financial interest

Keywords: Tropical flowers - comercial quality - bioactive compounds - carotenoids

P236

NUTRITIONAL CONTENT OF SCHOOL LUNCH IN CHILDREN OF ACATLÁN DE JUÁREZ AND VILLA CORONA, JALISCO

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Nutrition in the prevention and treatment of chronic diseases

Introduction: The diet of children and adolescents has consequences in the risk of being overweight, obese, or acquiring chronic-degenerative diseases. Children spend one-third to one-half of the day at school where exposure to healthy foods is crucial for optimal growth and development.

Objective: To compare the nutritional content of school lunch whether brought from home or obtained at school (purchase / gift).

Methods: These results are a baseline analysis of a macro project. Schoolchildren between 6-12 years of age from six primary schools in Acatlán de Juárez and Villa Corona, Jalisco were included. The recording of food and drink ingestion during recess was made through direct observation. Nutrient content was analyzed using the ENSANUT food database.

Results: Data from 316 schoolchildren were included (50.6% male). The median age was 7.9 years (IQR 2.0). The median z-score of BMI for age was 0.67 (IQR 2.2), and it was higher in children who brought their lunch from home (0.83, IQR 2.0 vs. 0.51, IQR 2.1, $p=0.029$). The median of energy in the school lunch was 300.9 kcal (IQR 397.3), no differences observed by sex. More than half (51%) brought their school lunch from home. This group had higher values in total energy, carbohydrates, fiber, protein, calcium, iron, folate, vitamin A, saturated, monounsaturated, and polyunsaturated fatty acids.

Conclusions: Nutritional differences were observed in school lunch of children who brought it from home and those who obtained it at school. These results showed the necessity of population-based nutrition strategies to reduce the risk of acquiring chronic-degenerative diseases at early ages.

Conflict of Interest: The authors declare no conflicts of interest.

Keywords: School food environment / school meals / childhood obesity / food parenting / snacks.

P237

POSTPRANDIAL TRIGLYCERIDE-RICH LIPOPROTEINS MODULATE HUMAN MONOCYTE-DERIVED DENDRITIC CELL MATURATION AND ACTIVATION IN A FATTY-ACID-DEPENDENT MANNER

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Dietary fatty acids have demonstrated to modulate systemic inflammation and induce the postprandial inflammatory response of circulating immune cells.

Objectives: This project aims to study the effect of postprandial triglyceride-rich lipoproteins (TRLs) on immunometabolic homeostasis by modulating dendritic cells (DCs), sentinels of the immunity that link innate and adaptive immune systems.

Methods: Healthy subjects were given ≈ 15 calorie per kilogram of body weight meals containing either SFAs, MUFAs, MUFAs plus omega-3 LCPUFAs or not fat. Blood samples were collected at baseline and hourly over 6 h for TG, GM-CSF, IL-12p70, and IL-10 analysis. TRLs were isolated at the postprandial hypertriglyceridemic peak and autologous monocytes were isolated at fasting and induced to differentiate into moDCs with GM-CSF + IL-4 in the absence or presence of the different postprandial TRLs for 6 days. To analyze the effects of TRLs on DC maturation and activation RT-qPCR and ELISA technologies were used.

Results: In healthy volunteers, SFA-enriched meal raised serum levels of GM-CSF (SFAs > MUFAs = PUFAs) in the postprandial period. Autologous TRL-SFAs up-regulated the gene expression of DC maturation (*CD123* and *CCR7*) and DC pro-inflammatory activation (*CD80* and *CD86*) genes while downregulated tolerogenic genes (*PD-L1* and *PD-L2*) in human monocyte-derived DCs (moDCs). These effects were reversed with oleic acid-enriched TRLs. Moreover, postprandial SFAs raised IL-12p70 levels meanwhile TRL-MUFAs and TRL-PUFAs increased IL-10 levels in serum of healthy volunteers and in the medium of TRL-treated moDCs.

Conclusions: Postprandial TRLs are metabolic entities with DC-related tolerogenic activity and that this function is linked to the type of dietary fat in the meal. This study shows that the intake of meals enriched in MUFAs from olive oil, when compared with meals enriched in SFAs, prevents the postprandial production and priming of circulating pro-

inflammatory DCs, and promotes tolerogenic response in healthy subjects.

Conflict of Interest: The authors state no conflict of interest.

Keywords: postprandial state / fatty acids / olive oil / dendritic cells / triglyceride-rich lipoprotein

P238

PREVALENCE OF DIABETES MELLITUS IN THE POPULATION AGED 10 - 19 IN THE CITY OF BOGOTÁ, PERIOD 2015 – 2019

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Type 2 Diabetes Mellitus is a chronic disease that predominates in adults, but its incidence has been increasing in children and adolescents in recent years according to WHO figures. Currently there are few studies on the prevalence of DM2 in children and adolescents, however, the annual incidence of DM2 between 2011 and 2012 was 5,300 cases among the population aged 10 to 19 years according to the National Statistics Report Diabetes Report of the United States of 2017. Currently in Colombia there is no specific data on DM2 in this population group.

Objective: Characterize the prevalence of DM2 in the population aged 10 to 19 years of the city of Bogotá in the period between 2015-2019 and the risk factors

Methods: A descriptive, cross-sectional study was carried out without population intervention, using national statistical sources (DANE and SISPRO) and digital tools for the calculation and graphic analysis of the collected information.

Results: In Bogotá, Colombia, the highest prevalence of DM2 is in the age range of 15 to 19 years in females regardless of the year during the period 2015-2019.

Conclusions: The incidence of childhood and juvenile DM2 tends to increase despite fluctuations over time. In Accordance with the literature, it is affirmed that the increase in obesity, metabolic syndrome, new lifestyles and family inheritance are the most relevant risk factors for developing DM2, which represents a challenge for public health in terms of its prevention and monitoring worldwide

Conflict of interest: None

Keywords: Type 2 diabetes mellitus / Prevalence / Risk factors / Adolescent / Child

P239

THE USE OF WEB TECHNOLOGY DOES NOT INCREASE WEIGHT LOSS

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Web-based or web-supported programs are increasingly being used as support to improve habit change or weight loss success. The results published so far have a success rate of about 50%, so it is a tool to consider that should be evaluated further.

Objectives: To compare the change in weight at 3 months between patients from two study cohorts in which support was provided through the use of a diary or a web page.

Methods: Cohort study with 165 adult patients who required a dietary intervention for excess weight, three months with biweekly motivational interview-type visits, in which weight was measured and who had been randomly assigned to an intensive intervention through a web-based (WG) or a daily food registry (DG). A total of 81 patients in the WG group were analyzed, with a mean age of 48.6 ± 13.9 , a mean BMI of 30.3 ± 4.2 and a total of 64 (79.0%) women. In the DG group the mean age was 49.5 ± 13.0 , the mean BMI was 31.1 ± 4.6 and the number of women was 66 (78.6%)

Results: The average weight loss was similar between the WG and DG groups (5.0 ± 3.7 Kg vs 4.7 ± 3.1 Kg; $p=0.876$), as well as the percentage weight loss $\geq 1\%$, (62 (98.4%) in WG vs 61 (96.8%) in DG; $p=1,000$). The percentage of subjects with loss greater than 5 and 10% was also similar.

Conclusions: The use of a web-based support does not provide advantages from the point of view of weight loss compared to the use of a food record diary during an intensive intervention with motivational interviewing in adults.

Conflict of Interest: no conflict of Interest.

Keywords: obesity/ weight loss/ technology/ web tools/ dietary intervention

P240

CHANGES IN RISK FACTORS FOR NONCOMMUNICABLE DISEASES IN URUGUAYAN WOMEN DURING COVID-19 VOLUNTARY CONFINEMENT

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Confinement as a social distancing measure to reduce the spread of the virus SARS-CoV-2 can affect dietary habits, physical activity and healthcare, amplifying risk factors (RF) for noncommunicable diseases (NCD).

Objectives: To determine the presence of RF for NCD before and during COVID-19 confinement in a sample of Uruguayan adult women.

Methods: Cross-sectional study through an online anonymous questionnaire available for a period of two weeks. Women ≥ 25 living in Uruguay during voluntary confinement who were internet users and gave voluntary consent to participate were included. We assessed for dietary RF (fruits and vegetables, processed foods, sugary drinks, over use of salt defined as salt added during cooking and during consumption), physical activity, body weight and alcohol consumption, before and during confinement. Results were shown in percentage frequency.

Results: Overall, 631 women (68.8% from the capital, 56.9% university-level education, 25.5% health workers, 61.3% living in houses, 61.8% keeping 2 months confinement) answered the questionnaire. During confinement 44.2% increased food consumption and particularly RF: processed foods ≥ 3 times/week (43.9% vs. 37.9% before), sugary drinks ≥ 3 times/week (37.4% vs. 32.9%), over use of salt (17.3% vs. 16.3%), salty foods (17% vs. 15.2%) and daily alcohol consumption (5.4% vs. 2.3%). Low fruit and vegetable intake increased (75.1% vs. 73.2%). During confinement 59.6% did not achieve sufficient physical activity (43.9% before) and 62.3% had sedentary behaviour (44.2% before). Overall, 21.9% declared hypertension, 14.9% dysglycemia and 32.8% dyslipidemia. A total of 47.6% were overweight/obese and 36.5% perceived an increase in body weight during confinement.

Conclusions: In this sample of highly educated women with presence of risk factors, COVID-19 confinement may affect lifestyle habits with impact over NCD.

Conflict of Interest: The authors declare that there is no conflict of interest.

Keywords: COVID-19 / SARS-CoV-2 / risk factors / noncommunicable diseases / diet / confinement

P241

FREQUENCY OF SOFT DRINK CONSUMPTION AND NUTRITION STATUS IN UNIVERSITY STUDENTS

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Challenges of nutrition and public health in Ibero-America

Introduction: Mexico is one of the countries with the highest consumption of soft drinks in the world, with an epidemic of obesity. Taxes on soft drinks are a strategy for obesity prevention, given the significant contribution that soft drinks make to excess intake of added sugars.

Objectives: This study aimed to determine the association of the frequency of soft drink consumption and the nutrition status in university students.

Methods: This cross-sectional study included 180 adolescent students (88 females, 92 males) of the University of Colima, with an age range of 15 to 17 years old. The nutrition status classified according to the body mass index (BMI) Z-score. An estimation of the soft drink consumption, as well as the survey AMAI, used to identify the socioeconomic level, were obtained.

Results: About 99.5% of the students had a certain level of soft drink consumption: 14.4% rarely, 40.5% occasionally, 25% most days of the week, everyday 19.4%, and 0.5% denied any consumption. 52% of the students said that these taxes implemented did not reduce their soft drinks intake. Regarding BMI in the studied population, 83.9% were adequate nutritional status, 13.9% are at risk of nutrition (5% emaciated and 8.8% overweight), and 2.2% presented inadequate nutrition (0.5% severely emaciated and 1.6% were obese). Bivariate analysis with the soft drink consumption revealed a significant association only with nutrition status ($X^2 = 19.113$; $p = 0.004$). But not statistically significant relationship found with the soft drink tax ($X^2 = 2.524$; $p = 0.471$), health risks knowledge ($X^2 = 4.219$; $p = 0.239$), and socioeconomic level ($X^2 = 19.246$; $p = 0.203$).

Conclusions: The consumption frequency of soft drink was found not to be a risk factor of inadequate nutrition in this population of teenagers. The soft drink tax and knowing the adverse effects of health did not affect habitual consumption; thus, it is crucial to search for strategies and methods of intervention that reduce the consumption frequency of soft drink to reduce the risk of obesity in adulthood.

Conflict of Interest: None.

Keywords: Soft drink / nutrition status / obesity

P242

ASSESSMENT OF NUTRIENT INTAKE OF A GROUP OF IBERO-AMERICAN STUDENTS OF POSTGRADUATES IN NUTRITION

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Challenges of nutrition and public health in Ibero-America

Introduction: The role of diet as a protective factor against chronic noncommunicable diseases is well established, and this makes it a fundamental component of prevention activities.

Objectives: The objective of this study was to analyse the eating habits of the population of students studied and establish whether their consumption pattern corresponds to the recommended intakes.

Methods: Descriptive cross-sectional study with the collaboration of Ibero-American postgraduate students from the Health area of the Ibero-American University Foundation. The participants were selected by accidental non-probability sampling, sending the information of the study and the surveys through the Virtual Campus. Statistical data were analysed with the SPSS v.22 program.

Results: The sample was grouped into 5 subgroups according to the geographical area of origin: Central America and the Caribbean (ACC) (n = 64), Spain (E) (n = 113), Mexico (M) (n = 110), South Cone (CS) (n = 57), Andean Countries (PA) (n = 125). The men from ACC did not cover the IRs for fiber, iodine, vitamins B9 or D, while the women did not cover those for fiber, calcium, iodine, or vitamin E. Men in Spain did not cover the IRs for fiber, iodine, vitamins B8 or E, while women did not cover the IRs for fiber, iodine, vitamins B8, B9, and E. Men in Mexico did not cover the IRs for fiber, iodine, vitamins B5, B9, or E, women did not cover those of fiber, iodine, vitamins B5, A and E. CS men did not cover the IRs for fiber calcium, iodine, vitamins B9 and D, while women did not cover IRs for fiber, iron, iodine, vitamins B9 and E. For the PA men, they did not cover the IRs for fiber, iodine or vitamin B9, the women, on the other hand, did not cover those for fiber, calcium, iron, iodine, vitamins B9 and E.

Conclusions: Neither group covers the IRs for fiber, iodine, or vitamin B9. Promoting the consumption of foods rich in these nutrients and promoting the fortification of these nutrients in foods commonly consumed by the entire population should be considered a top priority issue.

Conflict of Interest: There is not conflict of interest.

Keywords: nutritional status, diet surveys, energy and nutrients intake and ibero-american.

email. The final sample was 168 subjects. SPSS 20 statistical support was used for the statistical analysis.

Results: The younger men and women lost an average of 630 g and 400 g respectively, while the older participants gained 1 kg in both sexes. Regarding the consumption of fruits and vegetables, this increased during confinement (57.5% of the younger subjects increased their consumption); this figure decreases as age increases. The consumption of vegetables followed the same line. Only 21.5% increased the consumption of pastries, candies, and salty snacks. Furthermore, half of the younger participants did more physical exercise during confinement; in contrast, more than half of the older respondents reduced it.

Conclusions: We can affirm that in general the UNEATLANTICO community improved their eating habits and physical exercise during confinement, especially the youngest, who increased or maintained the consumption of fruits and vegetables, limited the consumption of pastries, sweets, salty snacks and drinks alcoholic, and performed physical exercise on a regular basis. This has resulted in a reduction or maintenance of weight in most subjects in the community.

Conflict of Interest: There is not conflict of interest.

Keywords: coronavirus, food, confinement, university population.

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CHANGES IN LIFESTYLE IN A UNIVERSITY POPULATION DURING CONFINEMENT BY COVID-19

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Safe, healthful and sustainable food

Introduction: The pandemic caused by COVID-19 has forced the declaration of a confinement of the population in most of the affected countries. This confinement has affected the habits of life, physical exercise, food, and shopping of the affected population.

Objectives: The objective of this study was to examine how confinement has influenced the eating habits and lifestyle of the university community of the European University of the Atlantic (UNEATLANTICO) (Spain).

Methods: The participants were selected by accidental non-probabilistic sampling, sending the study information and surveys through the Virtual Campus and the University

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MEDITERRANEAN DIET AND FOOD INTAKE IN PRESCHOOL CHILDREN. MELIPOP STUDY

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Introduction: Mediterranean diet is considered a prevention tool against different chronic diseases highly related to diet and lifestyle.

Objectives: The aim was to evaluate the relationship of the adherence to Mediterranean dietary pattern of parents with the dietary pattern of their children.

Methods: 72 Spanish children (3-6 years old) from the MELIPOP study and their parents, who completed some questionnaires were included. The results have been studied through multiple linear regressions using food intake as independent variable.

Results: There is an association between adherence to the Mediterranean diet by parents and children ($\rho=0.490$; $p<0.001$). The main results from the study indicate that 50.0% of the variability of fish consumption in girls is due to adherence to the Mediterranean diet once adjusted for the child's age, energy intake and mother's education ($p<0.001$).

Conclusion: Therefore, educate parents in Mediterranean diet as a healthy dietary pattern and promote their adherence would improve their children's lifestyles.

Conflicts of interest

The authors declare no conflict of interest.

Keywords: Mediterranean diet/ obesity/ adherence/ pre-scholar/ food intake.

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EFFECT OF "IN VITRO" DIGESTION ON THE ANTIOXIDANT CAPACITY AND CELLULAR PROLIFERATION OF SPANISH CIDERS

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Safe, healthful and sustainable food

Introduction: Several studies show the antioxidant capacity of cider determined by different chemical methods. The studies are mostly carried out using undigested cider and/or chemical extraction methods.

Objectives: The aim of the work was to know the influence of two "in vitro" digestion protocols on the antioxidant capacity of cider and its effects on cell proliferation.

Methods: Two digestion procedures: one that simulates gastrointestinal digestion (GID) and another that also includes digestion in the mouth by amylase action (AD) were applied to nine Spanish ciders. Different assays were performed with undigested ciders (UD) and soluble fractions (SF) of the digestion.

Polyphenol content and antioxidant capacity were determined by FRAP, ABTS, DPPH and ORAC methods. The effect on cell proliferation was measured by MTT assay in SW480 cells with 72h of incubation.

Results: Both digestion procedures reduced, with respect to undigested cider, the polyphenol content and the antioxidant capacity determined by any of the employed methods (between 65 and 85% of UD), except for ABTS which resulted in 125% UD. No significant differences in the antioxidant capacity were observed between the two used digestion protocols (GID and AD).

Cell proliferation inhibition was higher for both digested fractions than for undigested cider independently of the digestion type (GID or AD).

Conclusions: 1. "In vitro" digestion reduces the polyphenol content and the antioxidant capacity of ciders according to most of used methods. 2. The inhibitory effect of cider on cell proliferation increases with "in vitro" digestion processes.

Keywords: Cider / digestion / antioxidant

P246

EFFECT OF PROCESSING ON THE NUTRITIONAL VALUE AND ANTIOXIDANT CAPACITY OF CRICKET FLOUR

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Safe, healthful and sustainable food

Introduction: Culture is one of the factors that modify the choice of food. Insect consumption is traditional in some parts of the world such as Mexico or China, but it is not accepted in Europe.

Objectives: The aim of this paper is to know the nutritional quality of cricket flour obtained by different procedures.

Methods: We worked with five samples: fresh cricket (F), dehydrated cricket at 50°C (D50) and 100°C (D100), toasted cricket at 180°C (T180) and lyophilized cricket (L). The chemical composition and protein profiles were determined in undigested samples. Their antioxidant capacity was also evaluated after "in vitro" digestion.

Results: The different employed treatments reduce the ash, protein, fiber and sodium contents in a significant way respecting the fresh sample. The D50 treatment is the best one to maintain ash and sodium values in relation to the control sample, whereas for proteins the best one is the D100 treatment. PAGE electrophoresis experiments show a band at 200 kDa corresponding to myosin in all processed samples that is absent in case of F sample.

The antioxidant capacity determined by FRAP and ABTS methods is higher in the insoluble fraction (IF) than in the soluble fraction (SF), while the opposite occurs with ORAC method. The highest antioxidant capacity is for D100 according to FRAP, or for T180 according to ABTS and ORAC methods. The sample with the lowest antioxidant capacity by FRAP and ABTS methods corresponds to D50 and by the ORAC method to the L sample.

Conclusions: 1. D100 treatment produces the greatest losses of minerals and sodium and the L treatment the greatest losses of protein. The treatment also affects the protein profile of the samples. 2. The antioxidant capacity determined by ABTS and ORAC methods is increased in T180, while it is the D100 that produces the greatest increase by FRAP.

Keywords: Crickets / composition / antioxidant

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Nutrition in the prevention and treatment of chronic diseases

Introduction: A positive parent-child relationship is associated with a healthier weight, diet and higher levels of physical activity in children. IDEFICS study was a behavioral intervention to prevent obesity in children aged 2.0-9.9 years old from eight European countries.

Objective: The objective of this study is to evaluate the association between social vulnerability and the strength of the parent-child relationship at follow-up.

Methods: Data from 4,160 children was included in the analysis. We computed the vulnerability score (independent variable) by adding the number of social vulnerabilities a child/family experienced at baseline (minimal parental social network, non-traditional family structure, at least one non-native parent, at least one parent unemployed, low parental educational level and low household income). Parents were asked "To what extent would the following items describe your family" with the items: "we often go on trips together", and "I am often too busy to talk to my child" (reverse coded). Parents answered each item with a 4-point scale from 0-point ("not true") to 3-points ("exactly true"). We added the points of both items to obtain a parent-child relationship strength score and classified families as "doing more together than average" if their score fell above the mean (≥ 5 points). Analysis was conducted separately by the relationship strength categorization at baseline. We used multilevel logistic regression mixed models to evaluate the association between social vulnerability score and the relationship strength at follow-up (outcome).

Results: Families with relationship strength ≥ 5 and with vulnerability score ≥ 3 at baseline are less likely to do more things together at follow-up in comparison with families with vulnerability score = 0 (OR = 0.64; 95%CI: 0.44-0.95). Families with relationship strength < 5 and with vulnerability score = 2 at baseline are less likely to do more things together at follow-up when compared to families with vulnerability score = 0 (OR = 0.73; 95%CI: 0.54-0.98).

Conclusions: Despite the parent-child relationship strength score at baseline, families with vulnerabilities are less likely to engage in behaviors than tend to strengthen their parent-child relationship (trips and communication). Results are consistent with the behavioral change theory that indicates that interventions favor subgroups without vulnerabilities as they have more resources to achieve behavioral change.

Conflict of Interest: The authors of this communication declare that they have no conflicts of interest. IDEFICS Study was funded by European Commission within the Sixth RTD Framework Programme Contract No.016181 (FOOD). Ayala-Marín was financially supported by the Institute of Health Carlos III, Spain (grant#IF118/00016).

Keywords: social vulnerabilities/ parent-child relationship/ obesity/ community interventions

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ASSOCIATION BETWEEN SOCIAL VULNERABILITY AND THE STRENGTHENING OF THE PARENT-CHILD RELATIONSHIP IN A CHILDHOOD OBESITY PREVENTION PROGRAM: RESULTS FROM THE IDEFICS STUDY

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RAPID WEIGHT GAIN, INFANT FEEDING PRACTICES AND SUBSEQUENT BODY MASS INDEX TRAJECTORIES. THE CALINA STUDY

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Previous research has examined the role of rapid weight gain (RWG) during the first year of life and the onset of overweight and adiposity.

Objetives: We aimed to study growth patterns according to RWG and infant feeding practices during the first 120 days.

Methods: 862 children from the CALINA study were examined. Repeated measures ANOVA analyses were conducted. The first model included RWG as the main effect and yearly BMI, weight and height for age z scores (BAz, WAZ and HAZ at birth, 6 months, 1, 2, 3, 4, 5 and 6 years as the repeated measures variable and the second model included infant feeding practice as the main effect.

Results: Participants in the RWG-group presented significantly higher BAz and WAZ from birth to 72 months ($p=0.006$ and $p=0.043$, respectively). HAZ trajectories did not differ across groups ($p=0.828$). Trajectories of growth indicators according to infant feeding practice in the first 120 days of life showed that formula-fed infants had higher BAz and WAZ compared to infants fed with mixed-feeding or breast milk ($p=0.000$ and $p=0.005$, respectively). HAZ trajectories did not differ across categories ($p=0.560$)

Conclusions: BAz and WAZ trajectories were significantly higher in the RWG group and in the formula-fed group. No significant differences were found regarding height. Infant feeding practices and RWG, determine different growth trajectories of BMI and weight during childhood.

Conflict of interest: None declared

Keywords: Rapid weight gain / Infant feeding / Breastfeeding / Body mass index z-Score.

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HEALTHY UNIVERSITIES: ASSESSMENT OF UNIVERSITY MENUS

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Safe, healthful and sustainable food

Introduction: The University of Burgos is part of the "Spanish Network of Healthy Universities" and carries out activities for a healthier campus, within which this work is included.

Objectives: To determine the quality of the menus offered in a university canteen as well as their antioxidant capacity.

Methods: Four menus were collected from a university canteen (1: Zucchini puree and trout "Navarra"; 2: Pasta salad and roast chicken; 3: Green beans with ham and veal with pepper; 4: Red beans with chorizo and cuttlefish burger with salad). The dishes were ground and frozen at -30°C until analysis. Moisture, ashes, lipids, proteins, dietary fiber and sodium were analyzed. The amount of carbohydrates and energy were calculated. Furthermore, the antioxidant capacity was determined by the FRAP assay after in vitro digestion.

Results: Taking into account that the central daily meal should represent approximately 35% of the total daily energy intake, only menu 3, with 47%, would have a high contribution. The energy contribution of proteins and fats were very high. Fiber intake was adequate, with menu 3 presenting the highest contribution. Salt intake was variable: between 23% (menu 1) and 53% (menu 4) of the recommendations. Menu 4 presented the highest antioxidant capacity values, covering 56% of the estimated value for the Spanish diet per day, while menu 1 only covered 23%.

Conclusions: 1. All menus provide a high amount of protein and fat, although the final energy contribution is adequate. 2. The contribution to the total antioxidant capacity of the Spanish diet depends on the menu, being high the contribution made by the menu with legumes.

Conflict of Interest: The authors have declared that they have no conflict of interest.

Keywords: Collective catering / Menus / Healthy universities

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NUTRITIONAL ASSESSMENT IN A CHILD POPULATION AT RISK OF MALNUTRITION. PRONUSA PROJECT

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Challenges of nutrition and public health in Ibero-America

Introduction: Honduras is one of the countries in Central America with the highest poverty rates and prevalence of child malnutrition.

Objectives: To evaluate the nutritional status of children 0-5 years old in the communities that belong to the PRONUSA project (San Juan Pueblo, Department of Atlantida).

Methods: Weight, height, triceps and subscapular folds, cranial, brachial, and waist perimeters were measured. Data of weight, height, BMI and "weight to height" have been interpreted according to the WHO child growth standards (2007) and CDC (Kuczmarski et al., 2002). The WHO child growth standards (2007) were used for cranial and brachial folds and perimeters. The Orbegozo standards were used for the waist perimeter (Fernández et al., 2011).

Results: There is a high percentage of boys and girls in a normal situation concerning their weight and height, according to the WHO and CDC standards, although a high percentage stands out in "relative short stature". According to weight, the prevalence of malnutrition is higher when CDC standards are used, in comparison to WHO standards, a trend that is reversed for height. For BMI, the values obtained using the WHO standards show a greater trend towards excess weight, while those of CDC standards tend towards underweight. However, according to "weight to height" we found greater extreme malnutrition in boys and greater thinness in girls, comparing CDC with WHO. For both the folds and the perimeters measured, normality is the predominant nutritional status. There are more boys than girls in extreme situations, both for low and high values.

Conclusions: 1. According to most of the parameters, normality predominates, with more boys than girls in extreme situations. 2. The prevalence of nutritional risk situations varies depending on the standards used.

Conflict of Interest: The authors have declared that they have no conflict of interest.

Keywords: Risk of malnutrition / growth standards / child malnutrition

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QUANTIFICATION OF NUTRITIONAL INDICES (AI, TI, N-6/N-3) IN LAMB PRODUCED IN SOUTHERN CHILE BY NEAR-INFRARED REFLECTANCE SPECTROSCOPY (NIRS)

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Safe, healthful and sustainable food

Introduction: The knowledge of nutritional indices in food, such as Atherogenic Index (AI), Thrombogenic Index (TI) and n-6/n-3 ratio; are of utmost importance for human nutrition and for the control of cardiovascular diseases. For obtaining these nutritional indices it is necessary to calculate

the content of Fatty Acids (FA) existing in food. For the quantification of FA, a Gas chromatography is used as a technique of proven specificity and robustness, nevertheless, the high cost of this analysis is a disadvantage. In the last decades, methods as robust as the conventional have been developed, such as Near-Infrared Reflectance Spectroscopy, a multiparameter technique of rapid response which does not require a high intervention of the sample.

Objective: Evaluate the fast quantification of nutritional indices (AI; TI; n-6/n-3) in sheep meat by NIRS.

Methods: 106 samples of sheep meat from the muscle *longissimus thoracis et lumborum* were analysed. All samples were produced from La Araucanía to Magallanes regions in Southern Chile. FA were determined by Gas Chromatography. The recording of the spectrum was performed in reflectance mode with a BRUKER FT-NIRS MPA equipment. The mathematical model was created using partial least squares regression (PLS) and the predictive power of the model was assessed as of RPD parameter (relationship between standard deviation of the chemical data method of reference and the prediction error) found in the NIRS model.

Results: The calibration descriptors obtained from the mathematical model (R^2 and RPD) were the following: AI (0.90 y 3.2); TI (0.84 y 2.5) and the n-6/n-3 ratio (0.81 y 2.3) respectively.

Conclusions: The results obtained indicate that the model calibration can be used for predicting nutritional quality indices in sheep meat produced in southern Chile.

Conflict of Interest: Does not Apply

Keywords: NIRS / Fatty Acids / Nutritional index / sheep meat / lamb

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MINERAL CONTENT OF NUTRITIONAL RELEVANCE IN FRUITING BODIES OF MORCHELLA SPP. COLLECTED IN SOUTHERN CHILE

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Safe, healthful and sustainable food

Introductions: *Morchella* spp. is an edible mushroom that reaches high prices in the market because of its high nutritional and gastronomic value worldwide. In Chile, it can be found in the wild from the central area to the extreme south of the country. Currently, there is no information on the mineral content of this product in food composition tables locally. Because of that, the access of this product to formal market is limited, and opportunities of value aggregation are reduced.

Objectives: The goal of this work was to characterize the content of minerals of nutritional importance of fruiting bodies of *Morchella* spp. collected in different areas of the Territorio Patagonia Verde (TPV). These samples were compared with specimens collected in different regions of Chile to determine the variation produced because of the territory of origin.

Methods: From September to November 2019, 81 samples of *Morchella* spp. were collected. 53 samples belonging to TPV; 18 samples belonging to territories located north of TPV (between Angol, Los Ángeles and Quilleco) and 10 samples collected south of TPV (between Coyhaique and Cochrane). Minerals were determined in the Laboratory of Nutrition and Environment of INIA Remehue, Osorno.

Results: The average concentration obtained in TPV were the following: 93.4% humidity; 0.96 ashes; 122 mg P; 3.96 mg Ca; 9.24 mg Mg; 3.3 mg Na; 309.54 mg K; 0.55 mg Zn; 0.19 mg Cu, 1.89 mg Fe; 0.34 mg Mn and 2.20 mg Al. The TPV presented significant differences in the content of P, Ca, Mg, K y Cu ($p < 0.05$) regarding the other territories sampled.

Conclusions: Therefore, this differentiating pattern can be used in the characterization of the mushrooms from this territory or for obtaining a certification of origin.

Conflict of Interest: Does not Apply

Keywords: *Morchella* / mineral content / Territorio Patagonia Verde (TPV)

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THE INFLUENCE OF PARENTAL STYLES IN THE FORMATION OF FOOD BEHAVIORS IN CHILDREN AND ADOLESCENTS: A NARRATIVE REVIEW

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Challenges of nutrition and public health in Ibero-America

Introduction: Parenting styles are the set of practices used by parents to educate their children through educational standards. The styles most defined as Authoritarian, Authoritative, Permissive and Neglectful. Eating behavior can directly interfere with an individual's health, and that parents can influence eating behavior in various ways.

Objectives: This review aims to discuss scientific evidence on how parenting styles interfere and shape eating behavior in childhood.

Methods: Bibliography review carried out during January 2020. The search was performed in the Medline, Scielo and Capes databases. Studies from the last ten years in languages, English, Spanish and Portuguese were included.

Results: 24 studies were selected. 95.8% of the studies took place in western countries ($n = 22$), the majority of studies were cross-sectional (58.3% $n = 14$). The average sample size of the participants was 966 (range: 22-10645). In this scenario of parenting styles and eating behavior, the authoritative style seems to be the best for the development of desirable behaviors. This result is supported by the findings of three longitudinal studies that show that the authoritative parenting style has been shown to be effective in controlling children's weight. Another very recent study also found a positive relationship with improving the quality of food consumption by children, in addition to increasing the number of family meals. In cross-sectional studies, the authoritative style is also desirable and showed improvement in the control of food and healthy eating styles in the perception of 1005 parents. A study with 450 children showed an improvement in emotional nutrition and a reduced risk of overweight. And in 2013, Zahara with a cohort of 10645 adolescents showed healthier behaviors in the variable food consumption when related to authoritative parenting styles.

Conclusion: This review provided evidence that there are studies considering the influence of parenting styles on eating behavior. Based on the findings of this study, the authoritative parenting style proved to be more effective in the formation of healthier eating behaviors. However, further research is needed to better understand the relationship between parents and children.

Conflict of Interest: There is no conflict.

Keywords: "parenting styles", "eating Behavior" and "children".

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ADHERENCE OF FEMALE PATIENTS WITH BREAST OR COLORECTAL CANCER TO VEGETABLE INTAKE RECOMMENDATIONS

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Nutrition in the prevention and treatment of chronic diseases

Background and Objective: Female breast (BC) and colorectal (CC) cancer are some of the top cancer types, in terms of prevalence (24.2 % and 9.5% respectively).

The American Institute for Cancer Research (AICR) recommends covering at least two-thirds of the plate with vegetables, fruits, whole grains, and beans.

The objective was to analyze the adherence to that recommendation in a sample of women with BC or CC, at diagnosis, and at 6 and 12 months.

Method: A cohort study was conducted in newly diagnosed female patients who attended the Oncology Unit of the Medical Center and the Surgery Unit of the Central University Hospital of Asturias (Spain). Standardized 24-hour recall questionnaires were done in triplicate at diagnosis, and after 6- and 12-months follow-up studies.

Results: 90 women (BC, n = 76; CC, n = 14) aged 56.1 ± 9.7 were included. At diagnosis, the vegetable intake, expressed as thirds of the plate, was 1.64 ± 0.13 (BC) and 1.35 ± 0.15 (CC). The adherence of BC patients was reduced (not significantly) at 6 months (1.58 ± 0.12) and at 12 months (1.59 ± 0.12). The adherence of CC patients was increased (not significantly) at 6 months (1.50 ± 0.11) and at 12 months (1.43 ± 0.07).

Conclusions: The cancer female patients did not fully adhere to the recommendations, although all of them covered 80% of them as an average throughout the study.

Keywords: Breast cancer; Colorectal cancer; Women; Diet; Vegetable food

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INTERACTION BETWEEN MEDITERRANEAN DIET AND AN OBESITY GENETIC RISK SCORE ON METABOLIC SYNDROME: THE HELENA STUDY

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Few studies have observed whether the adherence to the Mediterranean dietary (MD) pattern is influenced by the genetic risk to obesity in the development of metabolic syndrome (MS).

Objectives: To assess whether the genetic predisposition to obesity interferes on the effect of MD adherence on MS in European adolescents.

Methods: 605 adolescents (51.6% females) aged 11–19 from the Healthy Lifestyle in Europe by Nutrition in Adolescence (HELENA) multicentric, cross-sectional study with valid data, were included. MS was assessed by calculating a risk score from waist circumference, HDL-Cholesterol, triglycerides, HOMA and mean arterial blood pressure. Two 24h/recalls were used to collect dietary information and a MD Score was calculated. An unweighted genetic risk score (uGRS) to obesity was obtained, by summing the number of risk alleles.

Results: The interaction between the uGRS and MD was significantly associated with the MS score in both males ($p=0.001$) and females ($p=0.005$). In 9.9% of boys, when the genetic risk score was ≤ 19 risk alleles and adolescents were meeting the MD recommendations, lower levels of the MS score were observed. In 95.2% of girls, when the genetic risk score was ≤ 26 risk alleles and adolescents were meeting the MD recommendations, lower levels of MS score were also observed.

Conclusions: The GRS modulate the relationship between MD and MS. For adolescents with high adherence to MD there is lower values of MS but in those with low or medium predisposition to obesity. The influence of the genetic predisposition to obesity on MS was higher in females than in males.

Conflict of Interest: Authors declare no conflict of interest.

Keywords: Metabolic syndrome/ Mediterranean Diet/ Genetic Risk Score/ HELENA/ Adolescents/ Gender.

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ENERGY INTAKE OF GERIATRIC PATIENTS IN A SECOND LEVEL HOSPITAL IN MÉXICO CITY

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Nutrition in the prevention and treatment of chronic diseases

Objective: To evaluate the energy intake in geriatric patients during hospitalization

Subjects and methods: A sample of 39 senior patients was studied; 26 participants between 65 to 74 years of age were classified as early elderly (EE), and 13 older than 74 as late elderly (LE). A diet providing 100% of the daily requirements was offered to both groups. The amount of food consumed during hospitalization was measured and its caloric content was estimated. Student's t-test for unrelated samples was used for statistical analysis; an alpha value <0.05 was considered as significant.

Results: Daily energy intake was in the complete sample was 894 ± 375 kcal. Nevertheless, only three patients consumed at least 80% of their daily requirements, nineteen (49%) less than 50%, and 18 (46%) consumed between 50 and 79% of their requirements. In the EE group, the energy intake was 754 ± 460 kcal in men and 920 ± 428 kcal in women, these values in LE group were 904 ± 331 kcal and 945 ± 331 kcal respectively ($p=NS$). The percentage energy intake of women was closer to daily requirements than that in men ($p < 0.05$).

Conclusion. The geriatric patient reduces their energy intake and men are more susceptible to this problem

Conflict of interest None

Keywords: elderly/ energy intake/ hospitalization

Each one was evaluated anthropometrically, body composition by DEXA, lipid profile and fasting glucose, and clinical evaluation. The cut-off points of the NCEP-ATPIII and IDF were used for identifying metabolic alterations.

Results: All the population was normal weight according to BMI (22.4 ± 1.8 kg / m²), but 85% had excess body fat. There were two cases of metabolic syndrome, and just over 13% had two or more metabolic abnormalities according to the IDF criteria. Waist circumference significantly ($P < 0.05$) correlated with insulin concentration (+0.362), HDL-C (-0.469), triglycerides (+0.543), and atherogenic index (+0.445). Android fat was correlated with BMI (+0.382), metabolic syndrome alterations (+0.397), and LDL-C (+0.349), while gynecoid fat did not correlate with the variables studied.

Conclusion: There is a high prevalence of metabolically unhealthy normal weight subjects, with a high percentage of adipose tissue. The android or visceral distribution could indicate an increased risk of comorbidities, even in normal-weight subjects. It is essential to monitor the waist and body composition in order to recognize this obesity phenotype.

Conflict of Interest: The Authors declare that there is no conflict of interest.

Keywords: metabolically unhealthy normal weight / obesity / adipose tissue / body composition / metabolic syndrome.

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CHARACTERIZATION OF INDIVIDUALS WITH METABOLICALLY UNHEALTHY NORMAL WEIGHT PHENOTYPE

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Challenges of nutrition and public health in Ibero-America

Introduction: Obesity is a complex disease that can deteriorate the quality of life by increasing the risk of cardiovascular and metabolic diseases and some types of cancer. For its development, adipose tissue has a preponderant pathophysiological role. That has led to the characterization of new obesity phenotypes unrelated to body weight or BMI, but the percentage and distribution of adipose tissue, as metabolically unhealthy normal weight subjects. These are of interest to public health due to the risk of not being detected and treated promptly.

Objective: To identify and characterize metabolically unhealthy normal weight subjects, in order to contribute to the explanation of the mechanisms associated with this phenotype and to create detection strategies.

Methods: Thirty-seven normal weight subjects were studied, who agreed to participate voluntarily in the study.

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TYPE OF DIET IN FAMILIES AT RISK OF DEVELOPING DIABETES TYPE 2

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Nutrition in the prevention and treatment of chronic diseases

Background: DT2 represents 95% of all types of diabetes. The worldwide prevalence of DT2 in adults is 8.8% according to data from the International Diabetes Federation. Mexico has a prevalence of 9.4% and it is estimated that by 2050 it will be 22.5%. The diet within families and especially those who are at risk of developing DT2 is extremely important to know to develop strategies and counseling and prevent or delay the development of the disease.

Objective: To know the type and frequency of food consumption of family members at risk of developing DT2.

Methods Prospective descriptive study. 15 families with at least one member with DT2 participated. The sample was made up of 90 relatives who lived under the same roof as the

proband, who were of legal age and who reported not having been diagnosed with DT2. A questionnaire of type and frequency of food was used, BMI was calculated, and I took casual capillary glucose.

Results: 70% were female. The average age was 45 years. 20% of the participants were relatives by political relationship, the remaining 80% were consanguineous relatives. 80% of the participants had a capillary glucose of 120 mg / dL, 60% obesity, 30% overweight and 10% normal weight. 100% consume sugary sodas, foods high in carbohydrates and sugary every seven days a week. The consumption of 15 corn tortillas and flour a day. The consumption of red meat is at least four times a week. The consumption of seasonal vegetables and fruits is 5 times a week. Consumption of natural water is seldom a week.

Conclusions: The consumption of hyper-caloric foods and highly sugary drinks is a pattern in the participating families, this is associated with the BMI and glucose levels presented even if they are diagnosed by a doctor with DT2.

Keywords: Type 2 diabetes, family, diet, risk.

P260 DRY POZOLE OF MANZANILLO: NUTRITIOUS AND SUSTAINABLE CONSUMPTION

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Safe, healthful and sustainable food

Introduction: The food and nutritional transition, but above all, the acculturation in the last decades in Mexico, has led us to changes in diet patterns, with the insertion of ultra-processed foods partial or total in the diet. They are leaving traditional food as a craving or something exotic. Consequently, obesity has increased, and diseases associated with said pathology.

Objectives: This study aimed to revalue the dry pozole of Manzanillo; as a dish of sustainable and nutritious consumption.

Methods: A cross-sectional study carried out in eight cenadurías (night-time eating establishments) of Manzanillo, Colima, one of the most traditional-regional dishes consumed was selected (dry pozole) of the 23 meals offered in these establishments. We, therefore, valued sustainable consumption and production. The nutritional evaluation of dry pozole was calculated per 100 g, as well as the ratio of recommended to restricted food components (RRR). The RRR is based on six nutrients to encourage (protein; fiber; calcium; iron; vitamins A, and C) and five nutrients to limit (calories, added sugar, cholesterol, saturated fat, and sodium).

Results: Dry pozole had a high nutrient density score (RRR=1.1) because they were nutrient-rich. Thus, the recommendation of regular consumption. This dish has corn as the main ingredient, a symbol of Mexican identity; besides, the region is the producer of the corn. In 100 g of pozole, it has ≤10% saturated fat, it does not contain added sugar and has ≤300 mg of sodium. Some consider this dish as a whim that is

thought to lead straight to obesity but is it healthy food and rich in nutrients.

Conclusions: Dry pozole, with 40 centuries of culinary heritage, is a traditional and regional dish. The evaluation nutritional allows us to revalue this dish for the consumers.

Conflict of Interest: None.

Keywords: Sustainable consumption / evaluation nutritional / dry pozole

P261 EFFECTS OF PITAHAYA (*HYLOCEREUS UNDATUS*) PEEL SUPPLEMENTATION ON BODY WEIGHT, GLUCOSE LEVELS AND FOOD INTAKE IN RATS FED A CAFETERIA DIET

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Obesity is currently recognized as a public health problem, increasing the risk of multiple diseases such as type II diabetes mellitus, cardiovascular disease, among others. The strategies to prevent obesity are based mainly on lifestyle modification, which includes dietary habits. Thus, in recent years there has been an increase in the study of different dietary components present in food as key factors involved in the prevention and control of pathological processes.

Objective: The aim of the present study was to evaluate the effects of pitahaya peel supplementation on body weight, glucose levels and food intake in diet-induced obese rats.

Methods: Fifteen male Wistar rats weighing approximately 240 g were randomly distributed into 3 groups: a standard chow diet group (3.35 kcal/g) (control); a cafeteria diet group (3.72 kcal/g) (cafeteria) and a cafeteria diet group supplemented with pitahaya peel (300 mg/kg body weight) (pitahaya). Body weight was recorded once a week and food intake three times per week for 15 weeks. Finally, fasting blood glucose levels were obtained, the rats were sacrificed, blood was collected to obtain serum samples, and tissues were extracted for further analysis.

Results: A significant difference in body weight gain was found ($p < 0.01$) between the control (269.98 ± 14.99) and cafeteria group (408.32 ± 65.72). Regarding the food intake (g/day), we found a significant increase in the cafeteria group intake compared to the control group ($p < 0.05$). Similarly, blood glucose levels were significantly higher in the cafeteria group compared to the control group ($p < 0.01$).

Conclusions: The cafeteria diet causes an increase in food intake and consequently higher body weight gain, as well as

higher blood glucose levels. Pitahaya peel supplementation induces lower weight gain compared to the cafeteria group but without finding statistically significant differences.

Conflict of Interest: The authors declare no conflict of interest.

Keywords: obesity / pitahaya / food intake / glucose / cafeteria diet

P262 EATING HABITS AND LIFESTYLE DURING COVID-19 QUARANTINE IN PARAGUAY

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Challenges of nutrition and public health in Ibero-America

Introduction: Social distancing and isolation during quarantine due to coronavirus (COVID-19) has definitely affected people's eating behavior, situation which must be evaluated in public health.

Objective: description of food and nutritional context among the Paraguayan population and changes caused during the COVID-19 quarantine.

Methods: an observational, exploratory, cross-sectional study was conducted among adults from 18 years old, both sexes, through a self reported digital survey which contained multiple choice questions on sociodemographic aspects, anthropometric data, presence of diseases, usual eating behaviors and perception about changes in food intake and physical activity during mandatory quarantine. The data was collected from May 22 to June 12, 2020 (second phase of quarantine). The results are presented in frequencies and percentages.

Results: 2,178 people participated; 54,2% were overweight (21,5% obese); 29,2% referred to have at least one chronic disease; hypertension and hypercholesterolemia were the most frequent; 62% consumed less than 2 servings of fruits and vegetables per day, and during quarantine their consumption decreased by 21% and 12% respectively. Only 12% consumed at least 3 servings of dairy products per day; 60% felt that the quality of their diet was affected by the anxiety generated during the pandemic and 43% faced reduction in income which affected food purchasing capacity. Foods most frequently consumed during quarantine were rice, noodles, pasta and bread (41%), fried foods (31%), sugary foods (44%), sugary drinks (26%) and alcoholic beverages (21%); 64% practiced physical activity less frequently.

Conclusions: The COVID-19 pandemic has had a strong impact on society, affecting among other aspects, food quality. It is important to rethink strategies focused on improving food and nutritional status considering the new health and social context.

Conflict of Interest: no conflict of interest.

Keywords: coronavirus/ food habits /physical activity

P263 QUALITY OF SCHOOL BREAKFAST AND KNOWLEDGE ABOUT HEALTHY EATING OF SCHOOL CHILDREN AFTER EDUCATIONAL INTERVENTIONS AT DIFFERENT LEVELS

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Nutrition in the prevention and treatment of chronic diseases

Background: Different educational and food intake interventions have been implemented in the school environment as a strategy against childhood obesity, however, little is known about the results obtained by involving parents and teachers in addition to schoolchildren in the interventions.

Objectives: To compare the school breakfast quality score and the knowledge about healthy eating of schoolchildren after the application of an educational intervention in three groups between August and October 2019.

Methods: A quasi-experimental exploratory study was carried out in first grade children. An educational intervention was applied using didactic materials in three groups (A: 17 schoolchildren, B: 8 schoolchildren and their parents, C: 10 schoolchildren, their parents and a teacher). Data were collected before and after the intervention. The school breakfast quality was identified by direct observation of the food eaten and a score based on the KIDMED questionnaire was applied, positive values indicated consumption of healthy foods and negative values, the opposite. Knowledge was determined using a questionnaire validated through the Delphi method. A higher score indicated greater knowledge. The study protocol was approved by the Research Ethics Committee FCQ-UNA N°461/19.

Results: Average age of the schoolchildren was 6±0.4 years, 64% were female. Only group A showed significant improvements in the school breakfast quality score when comparing before and after the intervention (-1.3 vs 0.5 points; p<0.05). When comparing between groups, it was observed that A had a significantly better breakfast quality score than C (0.5 vs -1.2 points; p<0.05). The nutritional knowledge score showed a significant increase in the three groups after the intervention (p<0.01) and when comparing between groups, the C had a higher score than B (32.8 vs 31.4; p<0.05).

Conclusions: Group A (only schoolchildren) showed improvement in the school breakfast quality score, both within and between groups. However, the knowledge score improved significantly in group C, that is, by involving parents and the teacher, in addition to schoolchildren. The study needs to be replicated on a larger scale.

Conflict of Interest: The authors declare no conflict of interest.

Keywords: Education/ nutritional/ children/ knowledge.

P264

NUTRITIONAL SERVICE ROUTINE FROM THE INSERTION OF CHILDREN AND GUARDIAN PARTICIPATION DURING THE FOOD INTRODUCTION PERIOD

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Safe, healthful and sustainable food

Introduction: The food introduction phase, is a period of learning and transition, which brings an impact on the formation of eating habits. During nutritional care, some strategies should be implemented where guardians are encouraged to trust the baby's innate ability to feed themselves.

Objectives: Within this perspective, this work describes the elaboration of an orientation and incentive protocol for the participatory food introduction, stimulating the execution of healthy behaviors and habits for babies.

Methods: The protocol was developed by members of the Academic League of Maternal and Child Nutrition; with themes that promote learning and exchange between parents and their babies when offering new foods, so that babies become protagonists of their own feeding. The practices were organized to happen in weekly meetings, for families with babies of both sexes, in the age group of 04 to 24 months; addressing topics from the construction of a nutritionally complete diet, the maintenance of breastfeeding, as well as selectivity, intolerances and food allergies.

Results: The themes that involve the practices lead to the understanding of participatory introduction; food cuts suitable for the different stages of the baby; how to prepare and assemble a healthy meal and the role of food groups; awareness about controlling expectations of the children's guardians as well as identifying the signs of satiety and selectivity. Food-related issues that families face were also incorporated into the protocol, with activities to facilitate a positive meal time environment, family's palate, everyone's relationship with food; in addition, the concepts involving processed, ultra-processed foods, labeling, plate sizes for perception of quantities, with encouragement to the proposal of making a mini vegetable garden. The participatory approach through integrated practices during the Food Introduction process, should be guided by the nutritionist due to the formation of healthy habits in the first 1,000 days of life.

Conclusion: the validation of nutritional care protocols is important for the practice, including and encouraging actions that actively integrate the participation of babies and their guardians, as precursors for the development of child health in the long term.

Conflicts of interest: none.

Keywords: Introducing food / Infant Feeding / Participatory Food.

P265

EVOLUTION OF IODINE LEVELS IN SALT OF THE MONITORING SYSTEM OF THE NATIONAL PROGRAM FOR CONTROL AND PREVENTION OF IODINE DEFICIENCY DISORDERS (I.D.D.) IN PARAGUAY, 2015- 2019

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Nutrition in the prevention and treatment of chronic diseases

Introduction: The main strategy to reduce iodine deficiency disorders (I.D.D.) in Paraguay is the enrichment of salt with iodine.

Objective: description of the evolution of iodine levels in salt according to the results obtained during the period of 2015 to 2019 from the Monitoring System of the National Program of Control and Prevention of Iodine Deficiency Disorders (I.D.D) implemented by the National Institute of Food and Nutrition of the Ministry of Public Health and Social Welfare of Paraguay.

Methods: descriptive cross-sectional study with secondary data. Results of iodine levels (mg/kg) of salt samples from household surveys were included, as well as salt samples from stores and salt processing plants from around the country during the 2015-2019 period.

Results: adequate levels of iodine in salt improved significantly ($p < 0,05$) from 2015 to 2019 in store salt samples (62.2% vs 88.7%), in household survey samples (58.8% vs 73, 5%) and in salt processing plants samples (53.7% vs 71.5%). Likewise, a significant decrease in the excessive (> 40 mg /Kg) and insufficient levels of iodine (< 20 mg / Kg) was observed in all salt samples throughout this period ($p < 0.05$).

Conclusions: improvement in the iodine levels in salt during the last five years indicates the effectiveness of the implementation of the Surveillance System of the National Program of Control and Prevention of IDD, confirming a greater compliance of the actual legal regulations by most of the iodized salt processing plants.

Conflict of Interest: no conflict of interest.

Keywords: salt /iodine / iodine deficiency

P266

PROVIDING TOOLS TO COPE MORE EFFECTIVELY WITH NEGATIVE BELIEFS AND MOODS MAY INCREASE THE EFFICACY OF WEIGHT LOSS AND MAINTENANCE PROGRAMS

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Safe, healthful and sustainable food

Objective: Mexico is a developing country with one of the highest obesity rates (3), with 47% of the population being overweight and 30% obese. Understanding the processes that may influence the onset or maintenance of unhealthy eating behaviors could be useful for development of holistic intervention and prevention efforts to tackle obesity. Our study seeks to understand the relationship between mood, attitudes and eating behaviors among women living in the north of Mexico.

Methods: 152 not pregnant or lactating women between 18 and 70 years old, volunteered for a study on "the effects of mood and attitudes on eating behavior." Eating attitudes and mood were measured on entry to the study. Anthropometric data (weight and height) were taken and the body mass index (BMI) was calculated. 44.7% had a normal weight, 33.6% had overweight and 21.7 % had obesity.

Results: Correlation analyzes indicated a statistically significant relationship between BMI and post-traumatic stress ($r = .18, p = .027$) (4.5), self-indulgence ($r = .37, p < .001$) (6) and negative self cognition ($r = .21, p = .022$) (7-10). A comparison analysis indicated that there is a significant difference in the attitude of self-indulgence between the group of people with normal weight ($M = 1.68, DT = .65$) and the group of people with overweight / obesity [$M = 2.11, DT = .85$], $t(149) = -3.45, p < .001$. Finally, an analysis of the possible moderating effects of the study variables on BMI was performed with self-indulgence (X) as the focal predictor, negative self-cognition [CNY] (M) as the first moderator of nutritional status [EN] (W) and BMI (Y) as the outcome variable, controlling for the age range (C). The resulting double moderation model is robust [$R^2 = .71, F(8,158) = 61.37, p < .001$]. The direct effect of self-indulgence on BMI [$\beta = 3.43, t(157) = 2.15, p = .033$ (CI 95% = 6.58, .28)] increases with the double interaction (CNY * EN: $F(2, 157) = 3.68, p = .027$) when the EN in overweight / obese and the CNY increases [EN = 3, CNY > 2.81, $\beta = 1.38, t(157) = 3.18, p = .002$ (CI 95% = 5.22, 2.24)].

Conclusions: Our findings suggest that detecting and providing tools to cope more effectively with negative beliefs and moods may increase the efficacy of weight loss and maintenance programs.

Conflicts of interest: No potential conflict of interest was reported by the authors.

Keywords: obesity/ depression/ anxiety/ negative beliefs/ weight loss

P267

NUTRITIONAL STATUS OF PATIENTS WITH CONGENITAL HEART DISEASE FROM "FRANCISCO ICAZA BUSTAMANTE" CHILDREN'S HOSPITAL. JANUARY TO DECEMBER 2016

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Congenital heart disease (CHD) are the most frequent congenital anomalies, they constitute the fourth cause of infant mortality in children under 5, nutritional status plays an important role in the evolution and prognosis of the disease.

Objectives: To assess the nutritional status of patients under 15 with congenital heart disease of the hospital of the child "Francisco de Icaza Bustamante". January 2016 - December 2016.

Methods: Cross-sectional, analytical study was carried out in a sample for the convenience of 51 children with CHD, patients of the "Francisco De Icaza Bustamante" Hospital

Results: 40% of the sample is 1 to 11 months old, 26% show a lesion of the ductus arteriosus, 46% are underweight and 13% are overweight, 45% have pneumonia, 6% gastroenteritis and 4% sepsis, 50% have low weight during the first year, 100% of low weight sample manifested gastroenteritis and sepsis, 50% had diarrhea, 9% gastroenteritis, 88% presented anemia, 29% hypoalbuminemia, 50% normoweight had moderate anemia, 50 % of the sample underweight has mild anemia and 50% moderate anemia, 33% of normal weight shows hypoalbuminemia and 60% of low weight. In addition, malnutrition impacted 4.3% of GDP in Ecuador, causing loss of productivity due to malnutrition.

Conclusions: The nutritional status of children with congenital heart disease is affected with a high presence of low weight according to BMI for age. These data served as the basis for developing a menu program aimed at those responsible for the nutritional care of children with CHD.

Conflict of Interest: The author express that there are no conflicts of interest when writing the article

Keywords: Congenital heart disease/ under 15 years/ nutritional status/ BMI/age / anemia

P268

EFFECT OF MICROENCAPSULATION ON THE STABILITY AND BIOACCESSIBILITY OF THE ANTHOCYANINS EXTRACTED FROM BLACK-CARROT (*DAUCUS CAROTA* L.)

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Safe, healthful and sustainable food

Introduction: The food industry works to replace synthetic dyes with natural colorants, the Black-carrot (*Daucus carota* L.) represents an alternative to obtain anthocyanins. The anthocyanins are soluble pigments with colorant and antioxidant capacity. The anthocyanins are present in Black-carrot are classified into cyanidin and derivatives groups, those pigments are unstable in different environmental conditions. The microencapsulation is a technology to improve protection in storage and in the gastrointestinal tract.

Objectives: The aim of this work was to evaluate the effect of microencapsulation on the stability and bioaccessibility of the anthocyanins extracted from Black-carrot.

Methods: Black carrot crop 2019 (INIA-La Platina) was used. The spray-dried was used as an encapsulation technique, applying experimental design optimized by Response Surface Methodology, maximizing the encapsulation efficiency of anthocyanins. The characterization of microparticles was realized according: moisture (%), water activity, total anthocyanins, antioxidant activity (FRAP) and external morphology (SEM). The accelerated stability was evaluated at 60°C and the bioaccessibility with *in-vitro* digestion model.

Results: The encapsulation efficiency of anthocyanins was above 70%. The characterization of microparticles was 5.3% moisture, 0.25 water activity, 2.1 mg ECG/g total anthocyanins and 15 mg Trolox/g to antioxidant capacity (FRAP). The external morphology was spherical in shape with indented surfaces and fused particles. The bioaccessibility of anthocyanins reached 67%.

Conclusions: The microencapsulation was an effective technique to protect anthocyanins from Black-carrot. These anthocyanins encapsulated could be an alternative of colorant with healthy properties for use in the food industry.

Conflict of Interest: no conflict of interest.

Keywords: Microencapsulation / anthocyanins / Black-carrot

P269

CONSUMPTION OF CRITICAL NUTRIENTS AND NUTRITIONAL STATUS IN OFFICIALS OF A PUBLIC INSTITUTION

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Nutrition in the prevention and treatment of chronic diseases

Introduction: The Pan American Health Organization (PAHO) has developed a nutrient profile. Consuming foods high in critical nutrients is a risk factor for overweight / obesity. Employees with better nutritional status are healthier, have a better disposition to handle stress, lower risk of accidents, lower absenteeism and lower staff turnover.

Objectives: To estimate the consumption of critical nutrients for non-communicable diseases and evaluate the nutritional status of teaching and non-teaching officials of a public university.

Methods: cross-sectional study with primary data. In 72 officials we measure anthropometric data: weight, height waist circumference (WC), Body Mass Index (BMI), Lean Mass (LM), Fat Mass (FM), Visceral Fat (VF) and we collected three days food record in non-consecutive days to estimate the critical nutrients consumption, based on the standard diet of 2000kcal/d. We determined whether or not it meets the PAHO profile according to: sodium (Na) consumption ($\leq 1\text{mg} / 1\text{kcal}$), consumption of simple carbohydrates (SCH) ($\leq 30\%$ TCV); Total Fat Consumption (TF) ($\leq 30\%$ TCV); Consumption of Saturated Fat (SF) ($\leq 10\%$ TCV). The research was approved by the Ethics Committee of FCQ-UNA 393/18.

Results: 58% of the total sample was overweight according to BMI. The 86.1% had high or very high FM and 55.6% had low LM. Regarding WC, about 45% were at risk. High VF was present in 59.7% of the participants. The nutrient consumption was as follows: 0.4mg of Na/1gKcal; 4.9% SCH above TCV, 7.3% more TF, 3.2% more SF and 9% more energy. The consumption of the majority of those surveyed exceeded the established daily consumption values. The excess was greater for Na (66.7%), SCH (69.4%) and SF (79.2%).

Conclusions: A high percentage of officials habitually consume food that exceeds the limits established in the PAHO nutrient profile for SF, TF, SCH and Na. Excess weight was highly prevalent in the study group.

Conflict of Interest: The authors declare without conflict of interest.

Keywords: obesity/ critical nutrients/ nutritional status/ work environment.

P270

CARDIOVASCULAR RISK AND INSULIN RESISTANCE IN OFFICIALS OF A PUBLIC INSTITUTION

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Routine activities in the workplace that make it difficult to carry out physical activity and the consumption of foods with an inadequate nutrient profile are risk factors that increase the probability of non-communicable diseases (NCDs) in the economically active population. This represents damages for the official and the institution.

Objectives: To characterize the cardiovascular risk and insulin resistance in officials who attend the nutritional office of the Faculty of Chemical Sciences during the month of August 2018.

Methods: We conducted a cross-sectional study with primary data on 28 officials. We evaluated anthropometric data such as weight, height and waist circumference (WC). To determine cardiovascular risk we used the Castelli Index (CI). We also made use of the WHO / PAHO and ACC / AHA risk calculator. we estimated insulin resistance (IR) through HOMA. The research was approved by the Ethics Committee of the Faculty of Medical Sciences-UNA.

Results: The mean age was 43±12 years; 57.1% were women. The average BMI in women was overweight (27kg/m²), and obesity in men (31.8 kg/m²). The averages WC show an increased risk (80.3cm) in women and greatly increased risk in men (99.3cm). Women and men presented risk according to the Castelli atherogenic indices, as well as dense particles according to the size of LDL; TC/HDL-c ratio 4.0 and 4.9; LDL-c /HDL-c ratio 2.5 and 3.1 and TG/HDL-c ratio 2.6 and 4.3; respectively. Men had a higher frequency of risk than women. Most of the participants (67.9%) did not have insulin resistance. The average HOMA in women was 1.1 and in men it was 1.8. The risk of heart disease or stroke in the next 10 years was present in 17.8% and 10.7% of officials according to ACC / AHA and WHO / PAHO, respectively.

Conclusions: The findings show that officials have anthropometric risk parameters (increased WC and excess weight) and altered atherogenic risk indices (CI). However, most do not have IR or risk of heart disease or stroke in the next 10 years according to ACC / AHA and WHO / PAHO.

Conflict of Interest: The authors declare without conflict of interest.

Keywords: anthropometry/ Castelli index/ cardiovascular risk/ HOMA insulin resistance.

P271

CONSEQUENCE OF INTERMITTENT FASTING ALTERNATED WITH A HIGH-FAT DIET IN RATS: LIPIDIC, GLYCEMIC AND HEPATIC ENZYME EVALUATION AND HISTOLOGY OF RETROPERITONEAL ADIPOSE TISSUE

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Nutrition in the prevention and treatment of chronic diseases

Introduction: In the obesity epidemic it is necessary to create strategies to induce caloric deficit, for aesthetic reasons and due to comorbidities. Currently the strategy that gained evidence was intermittent fasting (IF) for weight loss and to improve the lipid and glycemic profile, however the scientific evidence of the effects is still controversial

Objectives: To evaluate the effect of IF on body mass, food intake, serum markers and histology of retroperitoneal (RET) adipocytes in rats

Methods: Two types of diets and 4 groups were used: Control (CP), Palatable (CPL), Standard Restricted (RP) and Palatable Restricted (RPL). The IF was 50% of the CP consumption, being 2 days of IF and 3 ad libitum, alternating with a palatable diet and 20% sucrose solution. In the first and last periods of 15 days of treatment, the groups consumed control ou PL diet in according to treatment. IF was performed within 30 days after the first 15 days of treatment. The data were presented with mean and standard error of the mean and considering normal distribution were submitted to one-way ANOVA followed by the Bonferroni test, using the GraphPad Prism v.6.01 software.

Results: The RP group showed hyperphagia and increase in the ALT enzyme, but there was no difference in body mass between the groups. Greater glucose tolerance was observed in the restricted groups, however there was no difference in the serum glucose and lipid contents. The adipose tissue RET showed hypertrophy of adipocytes from the restricted groups, however, tissue hyperplasia was not observed

Conclusions: The IF improved glucose tolerance, but increased the ALT enzyme, characterizing possible liver damage. Higher adipocyte capacity to store fat is suggested, which can lead to cellular dysfunction.

Conflict of Interest: No

Keywords: Intermittent fasting, high-fat diet, hyperphagia, glucose tolerance.

P272

EVALUATION OF BINGE EATING AND FOOD ADDICTION IN SEVERE OBESE WOMEN FOLLOWED IN THE OBESITY AMBULATORY – MACAÉ-RJ/BRAZIL

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Challenges of nutrition and public health in Ibero-America

Introduction: In the treatment of obesity, the change in lifestyle is considered of great importance for care, it is the first step for its monitoring, especially in severe obesity. The changes involve nutritional planning and physical activity, but it is necessary for the patient to develop cognitive skills to improve self-control, suggesting an assessment of psychic disorder. The effectiveness of body mass control strategies depends on the identification of behavioral disorders.

Objective: To evaluate the prevalence of binge eating and addiction in severe obese women.

Methodology: Medical record data were collected during Psychology and Nutrition sessions. Anthropometric data and patient identification were recorded. For the assessment of behavioral disorders, instruments validated in the Brazilian population were used. The study included women, between 18 and 60 years old, being followed up at the obesity clinic and without a history of serious illnesses.

Results: 10.26% and 20% prevalence for binge eating (CAP) and food addiction were observed respectively. There was an average loss of 4.5 kg of participants during treatment, but a highlight is a gain of 2.9 kg in women with CAP and 2.4 kg in cases of food addiction. We observed women without a diagnosis of CAP among the participants, but with a high risk of developing CAP because they were classified in the slope range of the scale. The age groups with the highest concentration of disorders were between 18 and 36 years for food addiction and 37 and 50 years for CAP, with a higher prevalence of both disorders in the BMI range of 40 - 50 kg / m². **Conclusion:** The severely obese women evaluated had a low prevalence of CAP and food addiction compared to other studies, probably because they were under specialized monitoring at the outpatient clinic, contributing to better psycho-emotional control and self-control of intake.

Conflict of Interest: There is no conflict of interest.

Keywords: Severe obesity/ binge eating/ Food addiction

P273

CORRELATION OF THE BODY MASS INDEX AND WAIST CIRCUMFERENCE OF GIRLS WITH THEIR ANCESTRY UP TO THE THIRD GENERATION

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Nutrition in the prevention and treatment of chronic diseases

Introduction: Nutritional intergenerationality corresponds to the burden of nutritional status that is transferred to the future generation and is recognized as one of the factors that influences the increase in obesity, mainly through maternal lineage.

Objectives: Evaluate the correlation of the body mass index (BMI) and waist circumference (WC) of girls with their ancestry up to the third generation of selected cities in Paraguay.

Methods: An analytical study was carried out in 98 trios (girls, mothers and maternal grandmothers) between July and September 2019. Demographic and anthropometric data such as weight, height and WC of the girls and their mothers were collected. Data of grandmothers were obtained by self-report. Inferential statistics were used to determine the correlation between the mother's and grandmother's BMI with the girl's BMI z-scores. Furthermore, the correlation between the mother's and the girl's WC was determined. The Pearson correlation coefficient was calculated and the research protocol was evaluated by the Research Ethics Committee of FCQ-UNA N°460/19.

Results: The average age of the girls was 10±1.1 years, 77.6% were between the 4th and 6th grade. The BMI z-score was 0.8±1.6 SD and the WC 69.5±9.7cm. The mothers had an average of 37±6.8 years and schooling of 12.8±4.1 years. The maternal BMI was 28.8±7.3 kg/m² and the average WC 92.1±13.4 cm. The grandmothers had an average of 64.9±10.8 years, 6.9±4.2 years of schooling and BMI 28.7±6.9 kg/m². The results suggest a statistically significant correlations between: the mother's BMI and the girl's BAZ (r: 0.2937; p<0.05) and the mother's and girl's WC (r: 0.264, p < 0.05). However, the correlation between the grandmother's BMI and the girl's BMI z-score was not significant (r: 0.018; p>0.05).

Conclusions: In the study sample, the BMI z-scores and the WC of the girls are correlated with the maternal values of BMI and WC, but not with the BMI of the grandmother. Systematic efforts based on public health initiatives applied to the prevention of obesity in mothers and offspring should be the primary goal.

Conflict of Interest: The authors declare without conflict of interest.

Keywords: Women/ girls/ obesity/ BMI/ waist circumference.

P274

IDENTIFICATION OF MOTIVATIONS IN PARTICIPATING MOTHERS OF THE HEALTHY CHILD, HEALTHY ADULT PROGRAM WHO PROMOTED CHANGES IN EATING HABITS

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Nutrition in the prevention and treatment of chronic diseases

Background: Culturally, In Mexico, mothers are the responsible ones to raise children, provisioning of food, and establishing nutritional practices. In a country with a high prevalence of overweight (OW) and obesity (OB) in infants (33.2%) there is a need to implement educational interventions focused on providing knowledge, skills and tools that encourage mothers to change their children habits, an example of this is the program Niño sano, adulto sano (Healthy Child, Healthy Adult). The objective of the study was to identify the motivations that allow mothers to make changes in eating habits in their children.

Methods: From January to June 2018, Niño sano, adulto sano program was implemented in a low-setting community in Querétaro, Mexico. Once the program was concluded, three semi-structured group interviews were carried out (July 2018). They were audio recorded, verbatim transcribed, categorized and analyzed by narrative.

Results: The interviews (63:03; Min 55: 53- Max 67:30 minutes) were developed with ten women (37 ± 5 y). Two categories were obtained from the analysis: El aliciente de mamá (Mom's incentive), related to self-motivation, and Mamá en acción (Mom in action), related to their implemented activities.

Mothers identify the well-being of their children as an objective and stimulus to learn strategies to improve their eating habits, for example: due to difficulties in vegetable consumption, their attention was focused on the preparation and inclusion of cooking recipes with a greater amount of fruits and vegetables in the usual menu. In addition, due to their family role, they consider themselves responsible for changes in children, and they implemented actions to encourage the consumption, for example, of simple water with customizable bottles or to eat rejected vegetables through creative songs.

Conclusion: The identification of the motivators, as well as the participant's actions implemented to change the eating habits of their children, allows to focus actions for achieving mothers' main objective.

Conflict of Interest: None

Keywords: Nutrition education/ prevention obesity/motivators/mothers

P275

DEVELOPMENT OF CALCIUM RICH SOLUTION FROM EGG SHELL

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Safe, healthful and sustainable food

Introduction: Egg is considered of great nutritional value due to its macro and micronutrients composition. Eggshell represents about 11% of the egg's weight. It is usually discarded regardless of its high calcium content, which could be considered a valid resource to enrich human's diet. Calcium can be extracted to elaborate functional foods and contribute to a better population health and wellness.

Objective: To develop a calcium rich solution from eggshell and lemon juice, to be applied in gluten and lactose free cookies, and evaluating its organoleptic and nutritional quality.

Materials and methods: The calcium rich solution was extracted from eggshells by maceration with lemon juice during different times: 20 and 120 minutes. Calcium concentrations were determined in both solutions using SMEWW - APHA 3111-B technique. Cookies were prepared with gluten free flour, adding the 120 min solution. Consumer acceptance in appearance, color, flavor, odor, and texture of cookies were evaluated amongst 116 untrained participants, using a 9 points hedonic scale. Two types of cookies were tested, with and without the calcium solution. Data were analyzed by ANOVA and LSD Fisher Test, $\alpha=0.05$.

Results: The solution extracted during 120 min from eggshells had the highest calcium content (348mg per 100mL). Enriched cookies were preferred by most of the consumers (84%) and significant differences were found in texture and flavor attributes. Most of the participants indicated they would include these cookies in their daily diet, even the ones with celiac disease and lactose intolerance.

Conclusion: It is possible to obtain a calcium rich solution from eggshells by selecting, sanitizing, separating, crushing and resting them in lemon juice, in order to enrich food products. Enriched cookies are a good alternative for the general population's nourishment.

Keywords: Eggshell/ calcium/ acceptability/ cookies
The authors report having no conflict of interest.

P276

ROSEHIP SHELL FLOUR: OBTAINING, COMPOSITION, ANTIOXIDANT CAPACITY AND USE IN COOKIES

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Safe, healthful and sustainable food

Introduction: The rosehip (*R. rubiginosa* L) is the rounded part of the rose flower. The fruit grows at the bottom of the petals. The shell of this fruit, in Argentina, is mainly used as an infusion replacing tea.

Purpose: The aim of the work was to obtain flour from rosehip shell, determine its chemical composition and antioxidant capacity, to be used in the preparation of cookies, and evaluating its acceptance by consumers.

Methods: The chemical composition and antioxidant capacity (DPPH) of rosehip shell flour, from the province of Neuquén, Argentina, were determined. Sweet cookies were prepared, analyzing the acceptance for appearance, color, taste, smell and texture, in a 9-points hedonic scale, by 103 untrained judges (consumers). Averages, standard deviations and frequencies were calculated.

Results: The chemical composition of the rosehip shell flour (100 g) was: moisture 6.28±0.06 g, lipids 6.1±0.60 g, protein 2.73±0.13 g, total ashes 6.91±0.37 g, carbohydrates 83.75±0.63 g, iron 4.07±0.55 mg, and calcium 543±23.43 mg. The radical scavenging activity (DPPH) of the rosehip flour extract expressed as IC50 was 117.09±5.84 µg/mL. The average acceptance by consumers of the cookies were: Appearance 7.14±1.23, Color 7.19±1.31, Texture 7.17±1.5, Smell 6.53±1.65 and Taste 7.15±1.57. The product was accepted by more than 91% of the participants, 81.55% would include the cookie in their nutrition and 65.05% knew the rosehip.

Conclusion: It is possible to obtain flour from the rosehip shell, source of carbohydrates, calcium and iron, of moderate antioxidant activity and good acceptance, to be included in different preparations, which will allow to optimize local resources, improving the regional market.

Keywords: Flour / Rosehip / Antioxidant capacity
The authors report having no conflict of interest.

P277

ZATZ LARVA (*Arsenura armida* C.) AS NATURAL FOOD

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Safe, healthful and sustainable food

Introduction: Zatz larva is known to be an early phase from the metamorphic growth process Zatz butterfly experiences. This larva is usually found living in the rubber trees of the eastern regions of Mexico, mainly in Chiapas State where it is consumed by some sectors of this population. Its name derives from the native Tzotzil language which translation means “worm”. As addition, summer is the most feasible season to find it.

Objectives: To investigate the nutritional value of the larval state of *Arsenura armida* C. in order to consider it as another source of food within the diet.

Methods: Zatz larvae were collected from cork trees in the municipality of Yajalón, Chiapas in the summer of 2017 through convenience sampling. Subsequently, taxonomy was identified, and proximal chemical analysis was carried out on a dry basis of the worm by the AOAC (1995) methods to quantify macronutrients.

Results: The results of the proximal analysis on a dry basis were: humidity 79.63%, dry matter 20.36%; protein 34.70%, inorganic matter 2.10%, lipids 5.16%, fiber 7.82% and soluble carbohydrates 50.22%.

Conclusions: This larva can be used as another source of food to improve the nutrition of the population due to its content of macronutrients, mainly protein, being complementary to the consumption of animal origin food. In addition, it can be considered as an exotic dish of great cultural value

Conflict of Interest: The authors have no conflicts to declare.

Keywords: nutritional value / edible insect

P278

NUTRITIONAL VALUE OF STICK WORM (*Aplagiognathus Spinosus* N.)

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Safe, healthful and sustainable food

Introduction: Currently there are thousands of insect species that have been described, but only a few are used by man, these being an important source of nutrients especially due to their high protein content.

Objectives: To investigate the nutritional value of the larval state stick-worm (*Aplagiognathus Sinosus N.*) in order to consider it as another source of food within the diet.

Methods: The work was carried out in two phases, the first, convenience sampling in the delegation of Tlalpan, Mexico City in the summer of 2017. In the second, taxonomy identification and proximal chemical analysis on dry basis of the worm by the AOAC 1995 methods for quantifying macronutrients.

Results: The data obtained for the taxonomy: genus *Aplagiognathus* species *Spinosus N* and for proximal analysis on dry basis were: humidity 74.43%, dry matter 25.57%; protein 36.98%, inorganic matter 5.32%, lipids 50.41%, fiber 3.94% and soluble carbohydrates 3.35%.

Conclusions: This larva can be used as another source of food to improve the nutrition of the local population due to its macronutrient content, mainly protein, and its availability throughout the years in the fallen oak trunks.

Conflict of Interest: The authors have no conflicts to declare.

Keywords: Stick worm / nutritional value / edible insect.

P279

NUTRITIONAL RISKS DURING COVID 19: AN OPPORTUNITY FOR NUTRITION SCHOOLS TO PROMOTE HEALTHY EATING AND PREVENT MALNUTRITION AND NON-COMMUNICABLE DISEASES (NCD)

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Challenges of nutrition and public health in Ibero-America

Introduction: As part of the undergraduate Nutrition program of Mariano Galvez University of Guatemala, the professional practice at community level is developed in the last year for a period of four months. In 2020 this was oriented towards the search for interventions for the promotion of health and prevention of malnutrition in the framework of COVID 19 pandemic, considering that the presence of malnutrition both due to excess and deficiency as well as presenting chronic non-communicable diseases and obesity increase the risks of a patient infected by SARS-CoV-2 in addition to the post-pandemic effects on nutritional food security in communities.

Objectives: Identification of strategies and interventions for health promotion and prevention of malnutrition and Non Communicable Disease in the context of the COVID 19 pandemic.

Methods: A review of scientific literature and health and nutrition data from Guatemala was carried out to analyze the information published about the nutritional and food situation in the framework of the COVID 19 pandemic, which included technical documents and protocols from CEPAL, INCAP, CieNut, FAO, WHO, Spanish Academy of Nutrition and

Dietetics and OXFAM. With the analyzed information and data, proposals were prepared and strategies designed to promote nutritional food security and healthy eating habits and hygiene and sanitation, as well as prevention of malnutrition, with emphasis on the maternal and infant group and other vulnerable groups at rural and urban areas as part of the Nutrition professional practice in Guatemala, Amatitlan and Chimaltenango during the months of March to June 2020.

Results: With the analyzed information, intervention proposals and instruments were developed oriented to food and nutritional consequences after the COVID 19 pandemic, as well as education and communication materials for the promotion of healthy lifestyles and the prevention of malnutrition and NCD, including breastfeeding as one of the most important protective factors during the first 2 years of life. Among the proposals are a manual for home gardens for post-COVID 19 food production, a project for the prevention of acute respiratory infections (ARIs), a proposal for the evaluation of monetary transfers from the government during COVID emergency, a proposal for the collection of food (REKKO-lecta), response plan to mitigate Food and Nutritional Insecurity, project for post-COVID 19 consumption assessment, proposal to evaluate the use of donated food as part of a food assistance programs.

Conclusions: Nutrition schools have a great opportunity to identify and support local and institutional actions for the prevention and promotion of health, nutrition and food and nutritional security (SAN) at community level for the prevention of malnutrition and NCD in the framework of the COVID 19 pandemic through the different supervised practice programs.

Conflict of Interest: No conflict of interest

Keywords: Nutrition/ COVID 19/ Food Security/ Nutrition schools/ NCD prevention

P280

OBESITY PREVENTION IN RURAL COMMUNITIES OF GUATEMALA. EXPERIENCES OF THE UNDERGRADUATE NUTRITION PROGRAM OF MARIANO GALVEZ UNIVERSITY OF GUATEMALA

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Nutrition in the prevention and treatment of chronic diseases

Introduction: From 2017 to 2020, strategic actions for obesity prevention have been developed at community level such as: assessment of nutritional status and level of food and nutritional insecurity. These strategies have been modified based on the new challenges that have emerged mainly derived from emergencies that have occurred in the last two years, such as the eruption of Volcan de Fuego and the current COVID 19 pandemic. The prevention of obesity represents an

important challenge for the country, institutions, families and individuals due to the risk of associated comorbidities and treatment costs.

Objectives: Describe nutritional status and food insecurity level to guide obesity strategies and programs in rural communities in Guatemala.

Methods: The data obtained from the field work carried out by students and professors in communities of the departments of Chimaltenango, Escuintla, Sacatepéquez and Guatemala was analyzed. Anthropometric indicators BMI /age and Height/age for children under 5 and BMI for adults were used to determine nutritional status and ELCSA scale was applied to assess the level of nutritional food insecurity (INSAN).

Results: In 2017, 360 children under 5 in the community of San José El Yalú were diagnosed with 32% stunting, 16% overweight and 80% of households in food insecurity level. In 2019, the nutritional status of 370 scholars in the same community was evaluated, a 51% stunting, 25% overweight, 5% obesity and 95% of homes in food insecurity level were identified showing that stunting and food insecurity worsen in school children and their families, therefore it is necessary to strengthen early interventions in the course of life in these groups. In 2020, the evaluation was carried out on 470 scholars of Jocotenango, Sacatepéquez identifying 40% stunting, 25% overweight and 9% obesity, very similar to the groups evaluated in prior years in other communities. Based on these results, audiovisual educational material and interventions were designed focused on scholars which included school gardens, cookbooks, infographics on processed and ultra-processed foods, a tool to assess emotional hunger, education on breastfeeding and a handbook of nutrition education for teachers.

Conclusions: Stunting along with overweight and obesity are increasing in children and require continuous assessment and interventions adapted to the socioeconomic and cultural community context. The undergraduate Nutrition program of Universidad Mariano Galvez of Guatemala contributes with basic data to institutions and decision makers at community level for the design of prevention strategies. The systematization of nutritional interventions at community level makes it possible to influence behavior change, mainly if it includes risk assessment and the education and communication component.

Conflict of interest: We have no conflict of interest

Keywords: obesity/ community interventions/ nutritional assessment/ nutrition education

P281

PARENTAL HEALTHY FOODS INTAKE MEDIATES THE ASSOCIATION BETWEEN SOCIOECONOMIC STATUS AND CHILDREN'S HEALTHY FOODS INTAKE – THE FEEL4DIABETES STUDY

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Safe, healthful and sustainable food

Introduction: Higher socioeconomic status (SES) has been associated with better diet quality; however, food parenting practices are important in shaping children's dietary behaviors and are therefore recognized as the most proximal level of influence.

Objectives: To explore the process in which socioeconomic status might influence children's fruit, vegetable and whole grain cereals intake, addressing potential mediating effect of parental intake of the corresponding foods.

Methods: Data were collected from 10184 school-age children (5-12 years) from 6 European countries participating in the Feel4Diabetes study, in 2016. Parents socioeconomic variables and dietary intake were obtained through self-administered questionnaires. SES was defined by years of maximum educational level attained by parents (>13 or ≤12 years). Dietary intake for each food group was reported in categories that ranged from less than 1 portion per week to more than 6 portions per day and were analyzed as continuous variables. Single mediation analyses were performed using Macro Process in SPSS.

Results: SES was positively associated with children's dietary intake of fruits, vegetables and whole grain cereals after adjusting for mediators ($p < 0.01$ in all cases). Parental intake of fruits, vegetables and whole grain was positively associated with SES and with corresponding intake of their children. Parental intake of fruits, vegetables and whole grain cereals mediated the associations between SES and children's dietary intake by 84.3%, 81.6% and 88.4%, respectively.

Conclusions: Parents are on the front line of shaping children's eating habits, therefore it is important to take their intake into account when designing interventions that aim to improve dietary intake in children and their families. Thus, motivating parents in low socioeconomic status populations to improve their own dietary intake may be beneficial in order to indirectly improve the one of their children

Conflict of interest: None declared.

Keywords: Fruit intake / Vegetable intake / Whole grain intake / Children's dietary intake / Parental role modeling.

P282

CONSUMPTION PATTERNS AND FORMS OF PREPARATION OF FISH AND SEAFOOD BETWEEN WOMEN IN THE MULTIETHNIC COMMUNITY OF LIVINGSTON, IZABAL, GUATEMALA

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Challenges of nutrition and public health in Ibero-America

Background and objective: For the residents of the Atlantic Coast of Guatemala, fishing is the main source of food and income. The knowledge of dietary intake is a fundamental tool to know food patterns and to explore their association with the risk of diseases, habits, beliefs and customs. The objective of this study was to determine the consumption of fish and shellfish from the Garifuna, Maya-Q'eqchi and Ladina women residing in that region.

Methods: The information was collected within 43 women: Garífunas (n = 10), Maya-Q'eqchi '(n = 23) and Ladinas (n = 10). The women participated voluntarily through semi-structured interviews, recorded on mobile devices with prior verbal consent. The interviews were conducted in different places (health center, private clinic and homes), during the months of May to September 2019. The questions were based on their eating habits, fluid intake, fruits, vegetables, seeds and fats, frequency of consumption of fish and shellfish, with their respective methods of preparation.

Results: Of the total sample obtained, only one woman stated not eating fish or shellfish. The most preferred species were: jurel (*Trachurus trachurus*), mojarra (*Lepomis macrochirus*), palometa (*Eugerres plumieri*) and shrimp (*Litopenaeus vannamei*). As for its frequency of consumption, three times a week prevails within the three ethnic groups. Soup is the most common preparation, followed by simple frying and a variation of garlic-seasoned frying.

Conclusions: The women of the Maya-Q'eqchi 'ethnic group are the main consumers of fish and shellfish species, with greater diversity in their intake and frequency of consumption. Food preparation methods differ slightly by cultural patterns.

Keywords: Patterns of consumption, alimentation, fish, shellfish, women, Atlantic Coast Guatemala.

P283

FEEDING PRACTICES AND MATERNAL CARE DURING BREASTFEEDING: A QUALITATIVE APPROACH TO EXAMINE GARÍFUNAS AND MAYAS-Q'EQCHI' PRACTICES IN LIVINGSTON, GUATEMALA

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Challenges of nutrition and public health in Ibero-America

Background and objective: The breastfeeding period is important during the life cycle given the increment in mother-infant nutritional needs. The mother's diet can impact the breastmilk quality. The purpose of the study was to learn about mother's feeding practices during breastfeeding to broaden the understanding of food systems, beliefs and practices during this period.

Methods: The study was part of a broader research conducted in the Guatemalan Caribbean, where 2 of the 4 Guatemalan ethnic groups converge: *Garífunas* and *Mayas*. Participation was informed, voluntary and approved by Ethics Committee. Trained nutritionists conducted semi-structured interviews in public clinics and homes between May-September 2019. The women interviewed were *Garífunas* (n=6) and *Mayas-Q'eqchi'* (n=18). Questions included aspects about feeding practices, sources of information and advice during breastfeeding.

Results: Both groups avoid certain foods during breastfeeding, however these varies by ethnic group. Grandmothers were reported as source of feeding practices advice and had the greatest influence on mother's practices. During this period *Garífuna* women avoided foods such as coconut, avocado and rice, while *Mayas-Q'eqchi'* did not consume eggs, dairy, coconut milk, fats and fish. In the latter, the type of childbirth method, especially Caesarean section, influences the type of restricted foods. Is also believed that not limiting specific foods during breastfeeding period may change the breastmilk quality/quantity, produce complications in the recovery for childbirth and cause infant discomfort (diarrhea, colic, navel infection, etc.).

Conclusions: The advice received from figures such as grandmothers, the type of childbirth method and the perceived impact of food on health, influence the type of food selected for maternal consumption during breastfeeding, especially among the *Maya-Q'eqchi'* group.

Keywords: Breastfeeding, Maternal feeding, Maya, Garífuna, Guatemala

P284

NUTRITIONAL SUPPLEMENT WITH NUTRACEUTICAL POTENTIAL

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Safe, healthful and sustainable food

Introduction: Malanga is a stem with a high content of available nutrients such as carbohydrates and protein, as well as being highly digestible; probiotic foods are taking off because of their health benefits.

Objectives: The objective of this work was to develop a food supplement with functional characteristics, adding lactic acid bacteria (*Lactobacillus casei*) (BAL), using malanga starch (*Xanthosoma sagittifolium*) as an encapsulating agent.

Methods: The amount of malanga starch used was 1 and 2 %; for every 100 ml of liquid supplement a proportion of 80 % of sweet whey was used (pH 6.0), 1% malanga starch, 2% active BAL, 17 % cooked fruit pulp (mango and apple), which were mixed in constant agitation at a temperature $\leq 40^{\circ}\text{C}$ until the desired consistency was achieved; it was then dehydrated at 150°C at an airflow of 20 ml/min, using a spray dryer (SD 18A, LABFREEZ®, China).

Results: The yield was 12%, with a viability after seven days of vacuum storage of more than 1×10^6 UFC/g, according to NOM 181 SCFI/SAGARPA- 2018. It is an innocuous product, since microbiological tests were performed according to NOM -112- SSA1- 1994 and NOM 114-SSA1-1994, finding negative results. The nutritional composition of the supplement is 2.03 g of carbohydrates, 7.65 g of proteins and 0.61 g of lipids.

Conclusions: A 12% yield was achieved, indicating its potential for processing. The food supplement presented a high nutritional content, and the viability of the LAB present was maintained, allowing it to be considered as a functional food, which can be used in different age groups. Drying (spraying) conditions allowed encapsulation and maintenance of viability of LAB strains.

Conflict of Interest: The authors indicate no conflict of interest.

Keywords: supplement, malanga, nutritional

P285

THE CONSUMPTION OF ULTRA-PROCESSED FOODS, ANTHROPOMORPHIC MEASUREMENTS AND BLOOD CHEMISTRY IN MEXICAN SCHOOL-AGE CHILDREN

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Nutrition in the prevention and treatment of chronic diseases

Introduction: The ultra-processed foods consumption is involved with chronic diseases and could be determinant in incidence of metabolic syndrome in school-age children.

Objectives: To evaluate the effect of the ultra-processed foods consumption and components of the metabolic syndrome in children from Celaya, Mexico.

Methods: Clinical, quantitative, correlational, and transversal study in a sample of 30 children aged 6-12 years, from seven randomly selected primary schools in Celaya, Mexico; frequency of consumption of ultra-processed foods, anthropometry, glucose and lipid profile were measured.

Results: Positive correlations were found between consumption of instant soups with waist circumference ($R=0.36$), abdominal contour ($R=0.40$), bicipital fold ($R=0.38$) and abdominal fold ($R=0.46$); ultra-processed food consumption was positively associated with abdominal fold ($R=0.40$). Consumption of soft and carbonated drinks was positively associated with hip circumference ($R=0.39$). Physical activity was positively associated with arm muscle area percentile ($R=0.73$). Concerning biochemical markers, there is correlation between glucose levels with consumption of fiber cereal ($R=0.44$), ice cream, snow and popsicles ($R=0.46$), hazelnut cream ($R=0.40$), margarine ($R=0.40$); cholesterol levels were directly associated with pastries and doughnuts ($R=0.43$), cereal bars ($R=0.46$), sweetened flake cereal ($R=0.38$), hazelnut cream ($R=0.42$), margarine ($R=0.42$), corn syrup ($R=0.37$); triglyceride levels were associated with nuggets and fish sticks ($R=0.39$), chocolate ($R=0.38$), candy, and marshmallow sticks ($R=0.38$). Blood pressure was affected by consumption of soft and carbonated beverages ($R=0.48$).

Conclusions: The consumption of ultra-processed foods is significantly associated with anthropometric measurements of fat mass and biochemicals; while physical activity may be regulating the consumption of these foods.

Conflict of Interest: Authors have no conflict of interest to declare

Keywords: ultra-processed foods/ anthropometric measurements/ blood chemistry

P286

FOOD HABITS AND NUTRITIONAL PROFILE OF ALCOHOL USERS IN AN ADDICTION HOSPITAL UNIT

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Nutrition in the prevention and treatment of chronic diseases

Introduction: The use of psychoactive substances, especially alcohol, causes social, psychological, clinical and nutritional damage. Weight loss can occur in alcoholics, however, in periods of abstinence, rapid weight gain is possible, which can trigger obesity.

Objective: The aim of this study was to describe the eating habits of alcoholics (in hospital for detoxification) and their patterns of alcohol consumption, and to verify their nutritional status at hospital discharge and 15 days after hospital discharge.

Methods: This was a longitudinal, quantitative study with data collection at hospital discharge and 15 days after hospital discharge. A food frequency questionnaire was applied within 48 hours of admission, and anthropometric measurements were taken at admission and 15 days after the first assessment.

Results: The study included 26 alcoholic men with a mean age of 49.3 ± 7.3 years. Average weight gain was significant (2.7 ± 2.1 kg; $P < 0.001$) after 15 days of hospitalization. There was also a significant increase in mean body mass index (BMI) and waist circumference ($P < 0.05$). Distilled alcoholic beverages were the most commonly consumed (88.5%), with 92.3% of the individuals consuming them. This intake pattern ranged from 1,000 to 2,000 ml / day, corresponding to an average consumption of ethanol of 421 ± 261 g / day. Regarding food frequency, the consumption of simple carbohydrates was high while the intake of protein food groups was reduced, with daily consumption being: milk (46.2%), cheese (30.8%), eggs (19.2%) and meat (7.6%). Half of the individuals consumed sausages and similar meats almost daily. The consumption of fats was high, with 73.1% of the sample consuming margarine daily. Daily intake of vegetables and fruit was below recommendations, 30.7% and 42.3% respectively.

Conclusions: A significant increase in weight, BMI and waist circumference was identified during the hospital stay. Eating habits, concerning the frequency of ingestion of certain food groups, were inadequate according to the Food Guide for the Brazilian Population. There was a frequent consumption of simple carbohydrates and low consumption of proteins, vegetables and fruits, demonstrating poor quality of macro and micronutrient intake, which may contribute to the development of chronic diseases.

Conflicts of Interest: there are no conflict of interest.

Keywords: Alcoholism/ body composition/ nutritional status/ food habits.

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