

### P20-03

#### INNOVATION OF HEALTHY CHOICES NEEDS INTERDISCIPLINARY COLLABORATION

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**OBJECTIVE:** The aim is to translate nutrition recommendation into healthier choices through networking, communication, research and education where interdisciplinary collaboration is the key factor for innovation of healthier products and meals.

**METHODOLOGY, RESULTS & DISCUSSION:** Ten years of experience have proven that interdisciplinary network with the Government, research, food enterprises, retail and consumer must be formed to create successfully Food for life products. The key success factor is an open and credible dialogue between the different stakeholders. This arena gives an opportunity to understand and manage the relationship between food, nutrition, genomics and health.

The content and quality of nutrients and bioactive compounds in all food commodities are affected by species/varieties, feed quality/cultivation, slaughtering/harvesting, handling, processes (heating, freezing etc), storage (temperature, packaging materials etc) and preparation into meals (cooking, frying, steaming etc) before consumption, which again will influence the absorption of nutrients after the food has been eaten.

**CONCLUSIONS:** Networking, communication, research and education are key success factors between the different actors to create healthy choices. A healthier choice is not necessary a meal which includes all the recommendations, but a meal which is closer to the recommendation and is tasty, convenient and trendy

### P20-04

#### CHANGES IN PECTIN AND STRAND SEPARATION OF SPAGHETTI SQUASH DURING COOKING

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**OBJECTIVES:** Flesh of spaghetti squash separates into strands when cooked. The cause of separation during cooking was investigated.

**METHODS:** 2 cm of squash flesh was dropped into boiling water and cooked for 15 or 30 min or soaked in 0.01N HCl (pH 2.0), 0.035M ammonium oxalate solution (pH 4.0) or 2% sodium hexametaphosphate solution (pH 4.0) for 24 h at 35 °C. Pectin of samples was successively extracted and galacturonic acid was determined. Changes in histological structure were observed.

**RESULTS:** When cooked, pectin degraded by transelimination and dissolved in cooking water; consequently, the middle lamella enlarged. After 30 min, the strands separated completely. When flesh was soaked in HCl solution, separation into strands and extraction of calcium were greater than that soaked in other calcium sequestering agents. High-methoxyl-pectin was extracted by soaking in HCl solution, so, the flesh separated into strands.

**CONCLUSION:** High-methoxyl-pectin glues cells together in spaghetti squash flesh.

### P20-05

#### NUTRITIONAL CONSIDERATIONS ON THE HOMOGENIZATION OF MILK

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Milk is an oil-in-water emulsion, with fat globules dispersed in a continuous skim milk phase. When raw milk is left to stand, the fat particles would rise and form a cream layer on top of the skim milk phase. Homogenization of raw milk is a mechanical treatment by which the milk is passed under high pressure through a tiny orifice, resulting in a decrease in size, and increase in surface area and number of the fat globules. This results in a reduced tendency of the fat globules to cream and form the fat layer on the top.

In previous years it has been hypothesized that unhomogenized, or raw, cow milk is better tolerated than homogenized milk, by hypersensitive, or lactose intolerant consumers. Some studies have also suggested that homogenized milk can be associated with various lifestyle diseases, including atherosclerosis and heart disease. The proposed mechanisms involved will be discussed with reference to current literature on immunological response to homogenize versus unhomogenized milk.

### P20-06

#### REDUCING NUTRIENT LOSSES DURING DEHYDRATION

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The study was designed to estimate loss of nutrients during dehydration of cauliflower leaves using following dehydration techniques: (i) Unblanched sun drying, (ii) Blanched sun drying, (iii) Unblanched shade drying, (iv) Blanched shade drying, (v) Unblanched cabinet drying, (vi) Blanched cabinet drying.

For blanched variations, the temperature and time of blanching was standardized at 90°C for two minutes by peroxidase inactivation test. Standardized techniques were used for sun and shade drying. Cabinet drying was standardized at 65±5°C for 2½ hours.

Carotene losses in blanched dehydrated samples were 18%, 31% and 39% for cabinet, shade and sun dried leaves, while for unblanched dehydrated samples, these were 26%, 44% and 50% respectively. Thus, blanched cabinet drying technique was found to be most suitable for reducing carotene losses.

Iron losses were negligible in unblanched samples, while blanched samples had around 19% iron loss. These losses could be reduced by using the technique of 'serial blanching' and 'air cooling'. Prepared leaf powder provided 56 mg iron and 38,500 µg carotene per 100 g.

### P20-07

#### MICROWAVE TREATMENT OF B-LACTOGLOBULIN ENHANCES ENZYMATIC HYDROLYSIS EFFICIENCY AND FORMATION OF PEPTIDES WITH ACE-INHIBITORY ACTIVITY

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**RATIONALE & OBJECTIVES:** Microwave heating of aqueous solutions of β-lactoglobulin (βLG), the main whey protein in bovine milk, alters thermal unfolding, and thus potentially enzymatic hydrolysis, of the protein by comparison with conventional heating at the same temperature. The aim of this study was to investigate the angiotensin I-converting-enzyme (ACE)-inhibitory activity of proteolytic hydrolysates of microwave-treated βLG.

**MATERIALS & METHODS:** βLG solutions were exposed to microwave and conventional heating for the same amounts of time at 40 and 60°C (non-denaturing conditions) and 90°C.

Following each treatment (performed in triplicate), the protein was digested for 8 h using chymotrypsin, trypsin, or pepsin. Proteolysis was measured with o-phthaldialdehyde and SDS-PAGE, and the ACE-inhibitory activity of the hydrolysates was assayed.

**RESULTS & FINDINGS:** Microwave-treated  $\beta$ LG exhibited more extensive enzymatic hydrolysis than conventionally heated samples, suggesting the exposure of new cleavage sites within the interior of the protein. Under non-denaturing conditions, microwave treatment enhanced the formation of peptides with ACE-inhibitory activity.

**CONCLUSION:** Microwave heating of whey proteins may provide a route to whey protein hydrolysates with altered nutraceutical properties and could become a good option in the treatment of mild and moderate hypertension through the inhibition of ACE.

#### P20-08

##### PROCESSING AND UTILIZATION OF AMARANTH FOR IMPROVING THE NUTRITIONAL QUALITY OF NOODLES

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**RATIONALE & OBJECTIVES:** One of the challenges is to develop inexpensive, nutritionally superior and acceptable food products. The amaranth is a rich source of important nutrients including  $\beta$ -carotene and lysine, thus well suited for blending with products prepared from wheat flour.

**MATERIALS & METHODS:** The process for preparation of amaranth Flour (AF), amaranth protein concentrate (APC) and amaranth leaves powder (ALP) was standardized. Noodles (control) were prepared using flour of wheat variety, WH-283 and by incorporating different levels of AF, APC and ALP and evaluated for nutrient composition, texture, cooking and sensory attributes.

**RESULTS & FINDINGS:** No change or improvement in stickiness, firmness, cooking and sensory characteristics of noodles prepared by incorporating AF (10-20%), APC (5-15%) and ALP (2-4%) was found. Gruel solid losses were minimal in noodles prepared by adding APC. Incorporation of AF and APC in the formulation increased the protein content of the noodles by 16% and 37%, respectively where as incorporation of AF and ALP improved the fiber content of noodles by 4% and 16%, respectively. The incorporation of AF, APC and ALP increased the  $\beta$ -carotene content of noodles several fold.

**CONCLUSION:** The results indicate that amaranth grains and leaves can be processed and utilized for improving the nutritional quality of the noodles.

#### P20-09

##### PROCESSING OF PUMPKIN (CUCURBITA MOSCHATA POIR) TO PREPARE NUTRITIOUS CANDIES

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**RATIONALE & OBJECTIVES:** Pumpkin, one of the important warm season vegetable crops is rich source of  $\beta$ -carotene, minerals and carbohydrates. Pumpkin is consumed as fresh vegetable and only limited part is utilized for preserve and sweet making. Since candies are liked by people of all age groups, hence, an attempt was made to process pumpkin to prepare nutritious candies.

**MATERIALS & METHODS:** The mature pumpkin fruits were purchased from local market and assessed for physico-chemical and nutrient composition. The process for preparation of crystalline and glazed candies was standardized. The candies were wrapped in polyethylene and stored at room temperature. These were evaluated for sensory attributes at 15 days interval.

**RESULTS & FINDINGS:** The pumpkin contained 80-85% edible portion, 10% total soluble solids and 4.75 TSS/Acid ratio.

It contained 1.16 mg  $\beta$ -carotene on fresh weight basis and was found to be good source of pectin, vitamin C and minerals. The candies were 'liked moderately' to 'liked very much'. Except color and texture of crystallized candy no significant change in the other sensory characteristics were observed; candies were 'liked moderately' even after storage for three months at room temperature.

**CONCLUSION:** The results indicate that pumpkin can be processed to prepare nutritious candies which can be a better substitute for sugar candies.

#### P20-10

##### PROCESSING & UTILIZATION OF SOYBEAN TO ACHIEVE FOOD & NUTRITION SECURITY

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**RATIONALE & OBJECTIVES:** Soybean is most economical source of food protein and capable of producing greatest amount of protein per unit land as compared to other plant or animal sources of food used by man. It contains 40% protein, 20 % cholesterol free oil, reasonable amount of important minerals and other minor components such as isoflavones, genestein etc., which are considered to have positive effects on human health. But, it is not a component of our diet due to several constraints including non-availability of indigenous products acceptable to our palate.

**MATERIALS & METHODS:** A number of trials were conducted and soybeans were processed into a variety of products, including indigenous snacks and dairy analogs. All the products were assessed for nutritional and sensory quality.

**RESULTS & FINDINGS:** Soybean can be processed to prepare soy flour free from beany flavor and 10-30% soy flour can be incorporated in various indigenous foods. Improvement in nutritional quality of soy-based products was found. Some of soy-based products are slowly gaining entry into the market.

**CONCLUSION:** There is need to educate masses about adequate processing of soybean for its effective utilization to achieve food and nutrition security.

#### P21: Asian Diet (including spices, condiments and herbs in Asian Diet)

##### P21-01

##### STUDY OF ESTROGENIC ACTIVITY FROM PUERARIA LOBATA, LEONURI HERBA, MILLETTIAE CAULIS, AND ZEDOARIAE RHIZOMA

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Pueraria lobata, Leonuri herba, Millettiae caulis, and Zedoariae rhizoma are gynecological Chinese herbal medicines and have been used to reduce premenstrual syndrome. In this study, a transactivation assay using CHO-K1 cells transiently co-transfected with a (UAS)4-tk-alkaline phosphatase reporter and a chimeric receptor of GAL4-hER  $\alpha$  (or  $\beta$ ) LBD was established for the measurement of estrogen receptor activity. This system we established can use to screen the selective estrogen receptor modulator (SERM). It was found that ethyl acetate extract (EAE) of Pueraria lobata activated both estrogen receptors (ER)  $\alpha$  and  $\beta$ . The maximum relative percentage of 1nM 17 $\beta$ -estradiol (E2) of ER $\alpha$  is 56% (10 $\mu$ g/mL), and of ER $\beta$  is 97% (5 $\mu$ g/mL). Millettiae caulis EAE only activated ER $\beta$ . The maximum induction fold of ER $\beta$  is 4.1 (20 $\mu$ g/mL). The remaining two samples have no estrogenic activity. These results provide basic evidence for the beneficial effect of Pueraria lobata and Millettiae caulis for premenstrual women.

**P21-02**  
**FORMULATION OF OCIMUM CANUM EXTRACT DRINK AS THE POTENTIAL FUNCTIONAL DRINK IN INDONESIA**

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Basil in the species of *Ocimum canum* is one of the popular traditional herbs in Indonesia. It sold as a fresh-cut product. Extract of the plant are use in traditional medicine and have been shown to contain biological active constituent that have several benefit in human health. One of the recent researches shows that *Ocimum canum* is high in flavonoid and has special aroma that suitable as functional drink in Indonesia. By this reason, the main objective of this research is to find the best formulation of extract drink from *Ocimum canum* with addition of basil seeds as the new innovation of functional drink in Indonesia. The best formulation that we choose is that use dry oven of leaf *Ocimum canum* as the main ingredient. Proximate analysis shows that protein content of 0.18%, carbohydrate 5.33%, fat 0.33%. Total phenol content of this product is 2.8mg/ml.

**P21-03**  
**CONSUMPTION OF HERBS AND SPICES AND CARDIOVASCULAR DISEASE RISK AMONGST THE MINANGKABAU IN WEST SUMATERA, INDONESIA**

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Indonesian traditional diet is a good source of antioxidant food such as herbs and spices.

This study was conducted to investigate the relationship between antioxidants food from traditional diet to cardiovascular disease risks.

This was a cross sectional study conducted in 2 cities and two municipalities. 437 respondents were chosen from a list of adults (>30 years old). Data of demography and food consumption were compiled by interview and FFQ. Anthropometry assessments and blood samples were taken. Data was analyzed by using computer.

The study was conducted mostly to women (68%), more than 40 years old (73%) and respondents in the cities (69%). Obesity was found in 51% of the respondents. There were significant differences in hypertension prevalence, consumption of fruit and vegetables between respondents in the two locations of the study. No difference was found in herbs and spices consumption. A significant relationship was found between spices consumption and weight and body mass index. Significant difference was found between spices consumption and systolic pressure. No significant relationship was found between fruit and vegetable consumption and cardiovascular disease risk factors.

This study showed that consumption of herbs and spices may have protective effects to cardiovascular disease risks.

**P21-4**  
**PROMOTING QUICHUA FOODS TO IMPROVE CHILDREN'S NUTRITION IN THE ECUADORIAN ANDES**

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**RATIONALE & OBJECTIVES:** Indigenous food systems have been recognized and promoted for their cultural and nutritional benefits. The Corazon en Familia Project used the positive deviance methodology to identify key local foods to improve the diet and nutritional status of children under 5 years of age, in the context of increased availability of less nutritious market foods.

**METHODS:** A baseline nutrition survey was conducted with

109 participating children. As part of the positive deviance methodology, local best practices and key foods were identified. Mothers learned to prepare local foods and new recipes in 12-day community home-based cooking and education sessions.

**FINDINGS:** Twenty key foods were identified and promoted in community kitchens. For the Quichua children whose mothers were participating in the community kitchens, underweight was reduced from mean WAZ -1.12 to -0.54WAZ ( $p < 0.01$ ) by 2 months and -0.44WAZ ( $p < 0.01$ ) at 1 year.

**CONCLUSIONS:** Promoting consumption and production of indigenous quichua foods through positive deviance methodology and community home kitchens, improved children's nutrition; offering a culturally appropriate methodology for indigenous communities.

**P21-05**  
**ANTIOXIDANT CAPACITY, TOTAL PHENOLIC CONTENT AND NUTRITIONAL COMPOSITION OF ASIAN FOODS AFTER THERMAL PROCESSING**

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Asian foods were studied for antioxidant capacity, total phenolics, and nutritional value. Varieties of commonly consumed foods were selected for the present study. They are chicken curry, spicy stir-fried pork, spicy sausage, curry dip, sate sauce (peanut sauce), and a dessert from black glutinous rice. The foods were packed in retort pouch and treated to achieve sterilized products to understand an effect of heat on natural antioxidants to scavenge DPPH radicals. One hundred grams of examined foods exhibited antioxidant capacity and total phenolic content ranging from 7.46-40.16 mg vitamin C equivalent (VCE), 14.53-145.93 mg gallic acid equivalent, respectively. The top three foods high in antioxidant capacity were Mu phat phrikkhing (40.16mgVCE/100g), Khua kling mu (31.38mgVCE/100g) and phrik ong (23.54mgVCE/100g), respectively. The results showed that natural antioxidants remained their activity after thermal processing. Total phenolic content have a positive high correlation ( $r^2 = 0.91$ ) with antioxidant capacity. The determined content of protein, fat, total dietary fiber and energy ranged from 1.97-22.74, 2.28-24.97, 1.72-6.77 g/100 g and 125-342 Kcal/100 g, respectively.

**P21-06**  
**SUPEROXIDE ANION SCAVENGING AND XANTHINE OXIDASE INHIBITION BY THAI CULINARY HERBS**

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Herbs used in Thai culinary were previously reported on their potency as natural antioxidants. Those examined free radicals were various. In present study, superoxide anion, a byproduct of mitochondrial respiration, is a free radical of interest. Superoxide anion can be produced through conversion of xanthine to uric acid by xanthine oxidase. Objective of this study is to reveal double functions on superoxide anion radical scavenging and uric acid inhibition of selected herbs. Ten common herbs in Thai culinary: hairy basil, holy basil, sweet basil, lemongrass, young pepper, chili, kaffir lime leaves, garlic turmeric and fingerroot, were extracted with methanol, except garlic which was extracted with water. Scavenging superoxide anion and reducing uric acid content were analyzed by NADH/PMS and xanthine/xanthine oxidase system. The result on superoxide anion scavenging ability demonstrated that young pepper possessed highest ability by 80% at the concentration of 1 mg extract per ml, compared to lemongrass, hairy basil, holy basil, sweet basil, kaffir lime leaf and bird chilli which be able to scavenge in a range of 8 – 32% at 1 mg extract per ml. Fingerroot and garlic showed no ability to scavenge superoxide anion. Meanwhile, all

tested herbs exhibited an effect on uric acid reducing through enzyme xanthine oxidase inhibition. Hairy basil, sweet basil and (possibly) turmeric illustrated greatly inhibited uric acid generating up to 70% at 1 mg extract per ml. The other herbs showed less ability on uric acid reduction. In conclusion, most of examined herbs possessed dual functions as superoxide anion scavenger and xanthine oxidase inhibitor.

**P21-07**  
**ANTI-INFLAMMATORY ACTIVITY OF ETHANOL EXTRACT OF RED CURRY WITH CHICKEN (KANG KAD)-A CELL CULTURE STUDY**

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Bioactive compounds in spices/herbs have been demonstrated to suppress pro-inflammatory mediator productions. Pro-inflammatory mediators have been proven to play roles on pathogenesis of several chronic inflammatory diseases. Although individual spice/herb has been shown to inhibit pro-inflammatory mediator productions, the biological activities of mix spices/herb in usual consumption diets have never been studied. Therefore, this study examined the anti-inflammatory activity of extract from a popular Thai dish "red curry with chicken or Kang kai" consisting of red curry paste, chicken, sweet basil, kaffer lime leaves, pea eggplant, red chili and coconut milk as ingredients. The anti-inflammatory activity of extract from this recipe was evaluated by measuring its inhibitory effect on TNF- $\alpha$  and IL-6 production from LPS-activated murine macrophages. Pre-treated cells with 55, 110 and 220  $\mu\text{g/ml}$  of the extract significantly suppressed TNF- $\alpha$  and IL-6 production from LPS-induced macrophages by a dose dependent manner without cytotoxicity. Furthermore it inhibited phosphorylation of p38, Erk1/2 and SAPK/JNK MAPK of LPS-induced macrophages in a dose response character. The IC50 of the extracts on TNF- $\alpha$  and IL-6 production were  $114 \pm 7.1$  and  $70 \pm 2.1$   $\mu\text{g/ml}$ , respectively. These results suggested that phytochemicals from Kang kai suppressed the LPS-induced secretion of TNF- $\alpha$  and IL-6 by blocking phosphorylation of MAPK. The health benefit of this recipe warrants further investigations in humans. Mahidol University)

**P21-08**  
**NUTRITIONAL AND ANTI-DIARRHEAL PROPERTIES OF AN INDIGENOUS FOOD CONSUMED BY AYTAS**

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Malnutrition may predispose children to diarrhea and aggravate malnutrition. Traditionally, ethnic communities, like Kanawan Aytas of Morong, Bataan, Philippines use the shoot of limuran rattan (*Calamus ornatus* BLUME var. *philippinensis*) as food and natural treatment for diarrhea. This study is on the efficacy of limuran shoot as antimotility agent. The analyses revealed 1.40 g% protein, 8.62 g% carbohydrate, 1.37% fat, 0.82% ash, 38.59 mg% Ca, 65.91 mg% P, 0.79 mg% Fe, 54.48 mg% K, and 10.10 mg% Vitamin C. Dried shoot was extracted with solvent and the methanol extract yielded fractions rich in spirostanol saponins. Evaluation of antimotility activity using the charcoal tracing method in 60 Swiss mice revealed high potency against castor oil-induced diarrhea at doses of 0.6 g/kbw, 0.95 g/kbw and 1.5 g/kbw ( $P > 0.004$ ,  $P > 0.002$  and  $P > 0.001$ , respectively). The LD50 was 2.46 g/kbw. This is the first report on the nutrient composition and antimotility activity of *Calamus ornatus* shoot.

**P21-09**  
**COMPARATIVE STUDY ON DIETARY HABITS AMONG MALAY FARMERS AND INDONESIAN WORKERS IN JENGA REGION, STATE OF PAHANG, MALAYSIA**

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Although Malay farmers and Indonesian workers share similar cultural and religious backgrounds, due to economic disparity between them, their dietary habits differ from each other to some extent. In order to elucidate the difference, members from each group were interviewed. Malay farmers preferred to cook at home among themselves and take food at home together with their family members. Majority of households ate sufficiently all types of foods except seaweeds. In terms of category of food taken by both groups there found some differences. Malay farmers and their family members tend to eat more fruits, meat, fish, egg, whereas Indonesian workers were more likely to take oily food than the Malay counterpart. Indonesian workers are more likely to take so-called junk foods than Malay counterpart. According to the findings of the Jengka Region survey, Malay farmers and their family members have comparatively better dietary habits than Indonesian workers partly due to economic disparity between both groups.

**P21-10**  
**THE STUDY ON ACTIVE OXYGEN SCAVENGING ACTIVITY OF JAPANESE TRADITIONAL SEASONING - DRIED BONITO STOCK (KATSUODASHI)**

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Dried Bonito Stock (Katsuo-dashi) is the Japanese traditional seasoning and is used as the main ingredient that forms the basis in many Japanese cuisines. It is prepared by extracting essence from Katsuo-bushi, which is made of bonito's meat by boiling and smoking. They have been reported that Katsuo-dashi does not only add good taste and flavor to some cuisines but also has DPPH radical scavenging activity. In this study, dried bonito stock was evaluated for four types of the active oxygen scavenging activity. Superoxide anion which was generated by the reaction xanthine oxidase with hypoxanthine, hydroxyl radical which was generated by the Fenton reaction, and singlet oxygen which was generated by the irradiation of UV to riboflavin were measured of their intensities of the spin adduct by the spin-trapping ESR. Peroxyl radical was measured by chemiluminescence method using AAPH under alkaline condition.

The scavenging activities of Katsuo-dashi were confirmed for four active oxygen species. Some efficient components in dried bonito stock, which were Creatinine, Anserine and Histidine, were evaluated of their activities, and were considered of their contributions to the activity of Katsuo-dashi. It may be possible to contribute in maintaining the health of Japanese.

### **P21-11 DIET PATTERN AND CHRONIC DISEASES AMONG THREE COMMUNITIES IN MUMBAI**

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**RATIONALE & OBJECTIVES:** A shift from diverse traditional food patterns to energy-dense, processed foods and fast foods are apparent especially in urban communities, leading to increased risk of chronic diseases. The indicators currently used for detecting risk of chronic diseases reflect clinical, biochemical and anthropometric alterations, which occur after a considerable lag period following changes in diet and lifestyle. Alternately, an approach, which incorporates use of a dietary screening tool, would be useful for identifying risk early.

The primary objective was to assess the dietary consumption pattern and assess its association with Non-communicable Chronic Diseases (NCDs) among three communities in Mumbai, using a specially developed dietary screening tool.

**MATERIALS & METHODS:** The food consumption pattern and food behavior were studied using a specially developed tool, which was used to assess diet consumption among fifty families each of Gujarati Vaishnav, Konkanastra Brahmin and Maratha Maharashtrian communities in Mumbai.

**RESULTS & FINDINGS:** A positive significant correlation was observed for NCDs with scores for fat intake, salt and sugar consumption. The scores for positive food behaviors were higher among families without disease whereas scores for negative behavior were higher among families who had one or more members with NCDs.

**CONCLUSION:** Dietary consumption pattern and food behavior were associated with NCDs despite the differences in the diet observed among the three communities studied. These preliminary findings indicate the feasibility and potential for the use of a suitable dietary tool to assess risk of NCDs.

### **P21-12 WOUND HEALING PROPERTIES OF ETHANOLIC AND AQUEOUS EXTRACTS OF EUCHEUMA COTTONII IN NORMAL RATS**

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Chronic wounds and their treatment are a big burden on the healthcare system, both in terms of cost, time and energy of care required. The lost in productivity and decreased quality of life is immeasurable. This study reports on the potential wound healing accelerating effects of oral consumption of the ethanolic and aqueous extracts of *Eucheuma cottonii* that is one of the major edible seaweeds in Malaysia. A 2 cm diameter excision wound model was used, with honey (100mg/kg body weight) as positive control and untreated normal rats as negative control groups. Both extracts significantly increased the rate of wound contraction, better than honey. The extracts decreased lipid peroxidation in the plasma and increased erythrocyte antioxidant enzyme activities (superoxide dismutase, catalase and reduced glutathione) compared to both the positive and negative control groups. The ethanolic extract was more effective than the aqueous extract by 20%. Histopathological wound tissue observations showed both extracts significantly reduced scars, enhanced epithelization, hair follicle growth and tissue granulation compared to both control groups. HPLC results suggest that *E.cottonii* possesses several antioxidant compounds, which may be responsible for the wound healing acceleration. This is the first report showing that oral consumption of tropical seaweed extracts could enhance wound healing even better than honey.

### **P22: Food Cultures, Cuisines, & Traditional Diets**

#### **P22-01 BODY COMPOSITION AND NUTRIENT INTAKE IN ADULTS DURING AND AFTER RAMADHAN**

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Muslims do not eat or drink anything from dawn until sunset during in the month of Ramadhan. The purpose of this study was to assess body composition, dietary intake and physical activity patterns during and after Ramadhan. Body weight, fat percentage and waist circumference were measured, and body mass index (BMI) was calculated. Dietary intake was estimated using a 3-day food diary and physical activity patterns were determined using a 3-day physical activity diary during and after Ramadhan month. BMI, fluid intake reduced significantly during Ramadhan for both genders. No significant difference in body fat percentage, energy expenditure, protein, carbohydrate and fat intake for both genders but waist circumference reduced significantly only in women. This study indicates that fasting in the month of Ramadhan led to weight loss despite unchanged energy intakes.

#### **P22-02 DIETARY INTAKES AND IRON STATUS OF VEGAN AND NON-VEGETARIAN GHANAIAN CHILDREN**

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**RATIONALE & OBJECTIVES:** Information on the diets of vegan children in Ghana is lacking. We compared the diets and iron status of vegan children (9-60 mo and >5-11 y; n=26) with matched non-vegetarian children (n=26).

**MATERIALS & METHODS:** Dietary intake was assessed using 24-hr food recall. Hemoglobin and plasma ferritin were determined. Results & findings: Vegan diet compared to diets of non-vegetarian children was devoid of vitamin B12 (0.1 ± 0.2 mg vs. 1.5 ± 1.8 mg, p= 0.000). Vegan children had higher intakes of dietary fiber (17.1 ± 11.9 g vs. 8.4 ± 6.2 g, p= 0.002), thiamine (1.1 ± 0.8 mg vs. 0.5 ± 0.3 mg, p= 0.001) and vitamin A (1702.1 ± 1887.1 RE vs. 671.2 ± 690.9 RE, p= 0.01). Plasma ferritin was significantly higher for non-vegetarian children compared to the vegans (59.15± 48.18 ng/mL vs. 34.05± 25.88 ng/mL, p= 0.012). Anemia prevalence (Hb< 11.0) was about 25% in both groups.

**CONCLUSION:** The addition of animal source foods to the diet is likely to improve diet quality and iron stores.

#### **P22-03 NUTRITIONAL STUDY ON VEGETARIAN DIET AND LAB RESULTS AMONG JAPANESE NURSE STUDENTS**

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<sup>1</sup>Showa Women's University, JPN; <sup>2</sup>Tokyo Adventist Hospital,  
Tokyo, JPN Abstract

**RATIONALE & OBJECTIVES:** The purpose of this study was to analyze the relation to dietary intakes and lab results among nurse students in Japan.

**METHODS:** Participants were 7 male and 62 female who had vegetarian lunch at hospital during practicum. Dietary intakes were collected with FFQW82; Lab data were collected from health check up. Participants are divided into high animal protein intake group (HAPG) and low animal protein intake group (LAPG). Bone density were measured with Ultrasound (AOS100) on calcaneus.

**RESULTS & FINDINGS:** Animal protein ratio in female was

32%. Corellation showed between HAPG and LAPG were intake of (1) energy ( $p < 0.05$ ), (2) protein ( $p < 0.05$ ), (3) iron ( $p < 0.10$ ), (4) calcium ( $p < 0.10$ ). HAPG showed significantly high correlation in bone density ( $p < 0.05$ ), AST, and TG (both  $p < 0.05$ ).

**CONCLUSION:** Data showed the strong relation between bone density and HAPG. This study also indicated that female students are nutritionally deficient. Author concluded that nutritional education is needed among young vegetarian.

#### **P22-04 IRON STATUS AMONG URBAN VEGETARIAN POPULATIN IN JAKARTA INDONESIA**

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**RATIONALE & OBJECTIVES:** Vegetarians may have inadequate iron status because of low or no heme-iron intakes. The objectives of the study were to assess the iron status and investigate the dietary intake related to.

**MATERIALS & METHODS:** The design of the study was cross-sectional with 91 adult vegetarians both women and men who living in Jakarta. Iron status was assessed by measuring hemoglobin. The dietary intake related to iron status was measured by Food Frequency Questionnaire.

**RESULTS & FINDINGS:** There was 16.8% of the vegetarian who has hemoglobin less than normal value, with mean of hemoglobin for women and men was  $12.5 \pm 0.8$  g/dl and  $14.7 \pm 1.8$  g/dl respectively. The factors that related to iron status were iron-rich food consumption, protein consumption, iron-enhancer food consumption, and iron-inhibit food consumption.

**CONCLUSION:** Although the mean of hemoglobin more than normal value, there were still vegetarians who suffered from iron deficiency, therefore we recommended that the vegetarians supposed to consider their diet in term of food related to iron status.

#### **P22-05 CULTURAL, SOCIAL, AND ECONOMIC PERCEPTION OF OBESITY IN SOUTHEAST ASIA**

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Once associated exclusively with rich industrialized countries, obesity is now a serious problem throughout the developing world, including Southeast Asia. The objective of this project is to assess perceptions about obesity in relation to globalization and changing lifestyles in Southeast Asia. A survey was carried out in Indonesia, the Philippines and Thailand to solicit the perception regarding obesity and quality of life.

A total of 350 respondents from both urban and rural population participated in the study.

Results of the survey revealed that self-perception regarding obesity among Southeast Asian show common similarities, particularly in self reporting on health, dietary habit and also the concept of beauty and a beautiful body. Character and behavior are highly regarded in evaluating a person's self-worth in society. The findings also show that Filipinos frequented fast food outlets more than respondents from Indonesia and Thailand. Results of ORWELL 97 showed that Thailand has better quality of life as compared to the Philippines and Indonesia.

#### **P22-06 FOOD CULTURE AND DIETARY INTAKE AMONG IRANIAN STUDENTS IN MALAYSIA**

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**RATIONALE & OBJECTIVE:** Iranian students in Malaysia face the problem of food choice, as Malaysian and Iranian food cultures are totally different. High price of Iranian foods and inaccessibility of its ingredients, discourage the practice of Iranian food habits among them.

The objective of this study is to investigate the changes in the food habits of the subjects in relation to the practice of healthy eating.

**METHOD:** The research design includes an explorative study through focus groups followed by a self-administered questionnaire. The study was carried out among Iranian students in University Putra Malaysia.

**RESULTS & FINDINGS:** Preliminary results showed that the majority of the 218 subjects who participated in the study (63%) chose fast food restaurants when eating out. The minority (7.5%) consumed Malaysian foods daily, and 73% did not like the smell of Malaysian foods. A significant decrease was noted in the consumption of dairy products, fruits and vegetables.

**CONCLUSION:** An increase of fast foods consumption, along with a decrease in vegetables and dairy products' intakes suggested an inclination to unhealthy dietary practices among subjects. The study suggests the subjects to get accustomed to local food ingredients to gain a more balanced and healthy diet.

#### **P22-07 KNOWLEDGE ABOUT TRADITIONAL AND REGIONAL FOODS, AND EUROPEAN CERTIFICATES AMONG POLISH PEOPLE**

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In European Union, there exists a system which helps to protect and promote the traditional and regional foods. The cultural identity is one of the values appended to the food, as the unquestionable good of the concrete region worth for rescue for coming generation. Poland, which entered the European Union in year 2004, began efforts for the acknowledgement some from her food-products as worth for the legal protection.

The aim of the study was to recognize Poles knowledge about Polish traditional and regional food products (TRFP) and existing law regulations.

**MATERIAL AND METHODS:** The questionnaire study was conducted in 2007 among 153 persons (70 men, 83 women) aged 14-81 years. Persons were questioned about availability of TRFP at the market, frequency consumption, knowledge about European Union certificates given food products and information sources about them, and about price for such type of the food. Results were analyzed with statistical package SPSS, and differences were found significant at  $\alpha=0.05$ .

**RESULTS:** TRFP were known by 78% people and almost similar percentage 74.5 heard about European Union certificates. The TRFP were bought occasionally, mostly before traditional holidays. TV was the significantly more often declared as the source of information by women (63.8%;  $p=0.0169$ ) than men (44.0%). Poles did not know about latest products registered at EU, because of the lack a proper information at the official website of Ministry of Agriculture. 71.2% persons confirmed willingness to buy food products with certificates. However, this decision depended on the differences between prices for product with and without certificate. Only 13.7% person preferred traditional product independently of the price.

**CONCLUSIONS:** Polish traditional and regional foods are attractive products for consumers. The better information about

Polish foods should be presented at official websites of Polish local and national authorities.

#### P22-08

##### QUALITY OF THE DIET IN A COLLEGE POPULATION COMPARISON WITH MODELS HEALTHY DIET

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**RATIONALE & OBJECTIVES:** Atlantic diet is a balanced diet and, unlike the Mediterranean diet with a higher consumption of seafoods, as well as bread, potatoes, vegetables, pork and beef. This model has been used to examine the quality of the diet of a group of 50 university students, and study their eating habits.

**MATERIALS & METHODS:** Anthropometric assessment. Life Habits Questionnaire. Recorded the weight of the midday meal and 7-day dietary record.

**RESULTS & FINDINGS:** The dietary pattern of the studied population does not follow the recommendations of what constitutes a healthy diet, representing a food pattern that could almost be the "Atlantic diet Pyramid" inverted. Also their calorie intake does not meet the energy needs and energy distribution throughout the day is incorrect.

**CONCLUSION:** It is necessary to encourage healthy eating habits from an early age.

#### P22-09

##### PERCEPTION OF DIETARY CHANGE AND ATTITUDES TOWARDS THE IRISH DIET AMONG NON-NATIONALS IN IRELAND

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**RATIONALE & OBJECTIVES:** Cross-cultural attitudes to diet differ significantly. This study examined attitudes towards the Irish diet and their perceived dietary change among a random sample of non-nationals living.

**MATERIALS & METHODS:** A self-administered cross-sectional survey was distributed to a randomly selected sample of English language students in Dublin.

**RESULTS & FINDINGS:** 473 students from four geographical regions (Asia, Africa, South & Central American, and Europe) (response rate: 84%) completed the survey. Marked cultural differences between geographical regions were found with South & Central Americans being the most likely to indicate a decrease in fruit and vegetable intakes (31%) since living in Ireland while Asians (10.2%) was the least likely subgroup to pay attention to their intake of fruit and vegetables. Africans (26%) were more likely to consider no difference in terms of health between their diet in Ireland and Africa while Europeans (74%) were the most likely to perceive that their diets were now less healthy in Ireland.

**CONCLUSION:** Cultural perspectives of what constitutes a healthy diet differ significantly between geographical regions.

#### P22-10

##### SUPPRESSIVE INFLAMMATORY ACTIVITIES OF RED CURRY PASTE EXTRACT IN LPS-ACTIVATED RAW264.7 MOUSE MACROPHAGES

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Red curry paste is composed of various kinds of spices and herbs, which are rich in several phytochemicals, especially

flavonoids and carotenoids. These phytochemicals are also quoted in anti-inflammatory activities. This study examined the anti-inflammatory activities of red curry paste extracted by measuring NO production, iNOS, COX-2, p-p38, p-JNK and p-ERK proteins expression from the LPS-stimulated RAW264.7 mouse macrophage cell line. Cells were pre-treated with 57.5, 115 and 230 µg/ml of red curry paste extract for 1 hr prior to activate with 5 ng/ml LPS for 24 h. Culture medium from treated cells was collected to measure NO and cell lysates were used to measure proteins expression by Western blot. The red curry paste extract significantly suppressed NO production and inhibited iNOS, COX-2, p-p38, p-JNK and p-ERK protein expression in a dose-dependent manner. These data demonstrated that phytochemicals from mixed spices and herbs in red curry paste extracts can attenuate inflammatory activities by inhibiting NO production, iNOS, COX-2 expression by inhibiting phosphorylation of MAPkinase family: p38, JNK and ERK proteins. The health benefit effect of red curry paste should be further investigated in animals and humans.

Supported by University.

#### P22-11

##### NUTRITIONAL STATUS AND PLASMA LIPID PROFILE OF VEGETARIAN AND NON-VEGETARIAN FEMALE ADOLESCENTS AT ILE-IFE, NIGERIA

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The nutritional status of vegetarian and non-vegetarian female adolescents was investigated using anthropometric measurements and 3-day direct weighing record. The plasma lipid profiles of the subjects were also determined. There was significant reduction ( $p < 0.05$ ) in the mean weight and BMI of vegetarians but no significant difference ( $p > 0.05$ ) in their mean height and MUAC. The mean energy intakes of both vegetarians and non-vegetarians were significantly lower ( $p < 0.05$ ) than the daily recommended value of 2,550kcal. The mean intakes of protein, calcium, iron and sodium were adequate for both groups while the mean intake of zinc and vitamin B12 by vegetarians were below the recommended intakes. Total cholesterol and LDL cholesterol of vegetarians were significantly lower ( $p < 0.05$ ) than those of non-vegetarians. Vegetarian diets can provide adequate nutrients and health benefits to adolescents.

#### P22-12

##### HANDLING PRACTICES AND SAFETY OF STREET VENDED FOODS IN UGANDA

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**RATIONALE & OBJECTIVE:** Street foods are becoming a permanent entity in Uganda yet; their safety and effect on consumers have not been adequately investigated. The study was aimed to investigate the microbial quality of foods sold on streets in Uganda and the factors predisposing to their contamination.

**MATERIALS AND METHODOLOGY:** Structured Questionnaires were used to collect data from 225 street food vendors on their vital statistics, personal hygiene and food hygiene. Standard methods were used for the enumeration, isolation and identification of bacteria from various street food samples.

**RESULTS & FINDINGS:** TPC indicated high microbes in chapatti snack ( $6.97 \pm 0.28 \log_{10} \text{ cfu/g}$ ), steamed sweet potatoes ( $6.84 \pm 0.21 \log_{10} \text{ cfu/g}$ ) and beef stew ( $5.35 \pm 0.33 \log_{10} \text{ cfu/g}$ ). Occurrence of microorganisms was as follows: fecal coliforms ( $2.25 \pm 0 \log_{10} \text{ cfu/g (ml)}$ ), E. coli ( $1.42 \pm 0.17 \log_{10} \text{ cfu/g (ml)}$ ) in wash water. S.aureus prevalence in final dish-rinse was ( $4.22 \pm 1.81 \log_{10} \text{ cfu/}$ ), serving surface ( $3.08 \pm 0.12 \log_{10} \text{ cfu/}$ ), utensils ( $2.68 \pm 0.08 \log_{10} \text{ cfu/}$ ) and hands of vendors ( $2.28 \pm 3.22$

log<sub>10</sub> cfu).

**CONCLUSION:** Street foods can be a source of potential food borne illnesses. Training of street food vendors in techniques to improve street food safety is essential to gain consumer confidence; increase volumes sold and advance the food security status of vendors.

#### P22-13

##### A MODEL OF PROMOTING LOCAL FOOD TO ENHANCE ECONOMIC HOUSEHOLD SECURITY

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**OBJECTIVE:** To share a process model on how promoting nutritional value of local food through scientific research and evidence-based data could be an important factor in enhancing economic household security.

**METHODS:** An exhaustive survey of existing literature on Argan oil (AO) and initiatives to promote the production and use of AO.

**RESULTS:** 1- Traditional extraction of AO was slow, of low quality and sold in local markets at low prices. 2- Chemical studies showed that AO is high in UFA, tocopherols, polyphenols and stenols. Research studies suggest that AO could play a beneficial role in cardiovascular disease prevention through lowering hypertension and LDL, enhancing HDL serum levels, and preventing atherosclerosis. AO has also been suggested to exert protection against cancer and diabetes, empowering the antioxidant and anti-aging skin effects. 3- Based on that, national and international initiatives were carried aiming to protect the Argan tree; setting up a systematic mechanical press to produce good quality AO and by-products; structure the AO market and creating and strengthen women cooperatives.

**CONCLUSION:** Scientific based data are essential in promoting the nutritional value of local foods. Comprehensive and sustainable development projects are essential in ensuring economic household security for rural women.

#### P22-14

##### EFFECTS OF FAST FOODS CONSUMPTION ON QUALITY OF DIETS AMONG NIGERIAN POPULATION

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Fast food industry is increasing daily in most urban areas of Nigeria. This will no doubt alter the food intake pattern of people in favor of refined food usually with low fiber content but high caloric value. This paper investigated the fast food consumption, diet quality and anthropometric parameters of 254 Nigerians subjects (112 male and 142 female). The analysis of chemical composition of the foods consumed revealed average energy intake of 12 MJ. Carbohydrate, fat and protein contributed 50, 38 and 12% of the total energy, respectively. The energy consumption pattern showed that over 60% of subjects consumed more than 100% of daily energy requirement. This was reflected in their high Body Mass Index (BMI) with over 60% of the subjects recorded values above normal. Positive correlation ( $r=0.754$  and  $0.925$  at  $p\leq 0.05$  for male and female, respectively) was observed between energy intake and weight. Iron, zinc and protein intake were within the recommended dietary allowance (RDA) while the intake of calcium, potassium and fiber were low. This study showed that fast foods have greatly reduced the consumption of nutrition foods which could negatively affect the health of the fast foods consumers.

#### P22-15 - 3439

##### QUALITY PROTEIN MAIZE BASED VERMICELLI

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**RATIONALE & OBJECTIVES:** The present investigation was carried out to study the organoleptic acceptability and nutrient composition of vermicelli developed from white QPM and normal maize.

**MATERIALS & METHODS:** Vermicelli was developed using maize flour with refined flour in the proportion of 40:60 and 60:40 respectively from both types of maize varieties. Vermicelli with 100 per cent refined wheat flour served as control. The developed vermicelli were subjected to sensory analysis and analysis of proximate and mineral composition.

**RESULTS & FINDINGS:** Results of organoleptic evaluation showed that overall acceptability of control and maize based vermicelli was "liked moderately" by the judges. Nutritional composition of the maize based vermicelli indicated that content of crude protein, fat, ash, crude fiber was higher in all maize based vermicelli as against control. Maize based vermicelli were higher in phosphorus and magnesium content as compared to control. Iron content was highest in QPM vermicelli.

**CONCLUSION:** QPM can be used for development of value added products and hence will help in diversification and popularization of maize in urban as well as rural households.

#### P23: Nutrition & HIV/AIDS I

##### P23-01

##### THE IMPACT OF DIFFERENT DIETARY PATTERNS ON NUTRITIONAL STATUS IN ASYMPTOMATIC PEOPLE LIVING WITH HIV INFECTION

Annan, Reginald A.<sup>1</sup>; Aryee, Paul A.<sup>1</sup>; Jackson, Alan A.<sup>1</sup>; Margetts, Barrie M.<sup>1</sup>; Vorster, Este<sup>2</sup>

<sup>1</sup>University of Southampton, Southampton, GBR; <sup>2</sup>North-West University, Potchefstroom, ZAF

This cross-sectional secondary data analysis examined the impact of different dietary patterns on nutritional status in asymptomatic PLWH in North West Province of South Africa. Dietary data were collected using validated QFFQ, and dietary and nutrient patterns were generated using Principal Component Analysis. Data analysis was by SPSS version 14. Four main dietary patterns: animal based, 'recommended', staple and carbohydrate, legume and vegetables based were observed in both PLWH and their uninfected counterparts with slight differences. In PLWH, the animal based similar to the carbohydrate, legumes and vegetable pattern was associated with more 'optimal' nutrient profile ( $r=0.5$ ,  $p<0.001$ ) and selected nutrients including energy ( $r=0.3$ ,  $p<0.001$ ), protein ( $r=0.6$ ,  $p<0.001$ ), iron ( $r=0.5$ ,  $p<0.001$ ), zinc ( $r=0.6$ ,  $p<0.001$ ) and vitamin A ( $r=0.5$ ,  $p<0.001$ ), compared to the 'recommended' pattern; for overall nutrient profile ( $r=0.3$ ,  $p=0.004$ ), energy ( $r=0.2$ ,  $p=0.05$ ), protein ( $r=0.1$ ,  $p=0.40$ ), calcium ( $r=0.3$ ,  $p<0.001$ ), iron ( $r=0.2$ ,  $p=0.002$ ), zinc ( $r=0.2$ ,  $p=0.01$ ) and vitamin A ( $r=0.2$ ,  $p=0.08$ ). The animal based, compared with the other diets predicted higher BMI (OR=2.2, 95% CI 0.9, 5.0) and LBM (OR=3.6, 95% CI 1.3, 10.4). The findings suggest a beneficial effect of this dietary pattern in enhancing macro and micronutrient intake, BMI and lean body mass with possible metabolic and functional implications.



### P23-02

#### **A PREDOMINANTLY ANIMAL BASED DIETARY PATTERN IS A PREDICTOR OF BETTER METABOLIC INTEGRITY IN ASYMPTOMATIC PEOPLE LIVING WITH HIV INFECTION IN SOUTH AFRICA**

Annan, Reginald A.<sup>1</sup>; Aryee, Paul A.<sup>1</sup>; Jackson, Alan A.<sup>1</sup>; Margetts, Barrie M.<sup>1</sup>; Vorster, Este<sup>2</sup>

<sup>1</sup>University of Southampton, Southampton, GBR; <sup>2</sup>North-West University, Potchefstroom, ZAF

This cross-sectional secondary data analysis examined the impact of dietary patterns on metabolic markers in asymptomatic PLWH in North West Province of South Africa. Dietary data were collected using validated QFFQ and dietary patterns generated using Principal Component Analysis. Data analysis was by SPSS version 14. The biochemical predictors of HIV infection were serum AST (OR 2.9, 95% CI 1.6-5.5) globulins (OR= 7.2, 95% CI 3.4-13), LDL (OR 0.5, 95% CI 0.3-0.9) and albumin (OR 0.5, 95% CI 0.3-0.9), and suggested altered metabolism and chronic inflammation in PLWH. Four dietary patterns: animal based, 'recommended', staple, and carbohydrate, legume and vegetables based were observed in PLWH and the uninfected with slight differences. Using Graphical Chain Modeling, higher intake of the animal based diet contrary to the 'recommended' and staple patterns was associated with better overall nutrient profile and selected nutrient intakes, serum vitamins A, E, lipids and albumin, and BMI and lean body mass. The animal based pattern also predicted lower liver enzymes AST and ALT. Chronic inflammation observed in PLWHA is associated with reordering of metabolic function, leading subsequently to tissue damage. A predominantly animal based diet may provide better nutrient quality, enhancing metabolic integrity, which may delay disease progression.

### P23-03

#### **PREDICTORS OF ANAEMIA IN AN ASYMPTOMATIC HIV INFECTED POPULATION IN SOUTH AFRICA**

Aryee, Paul A.<sup>1</sup>; Annan, Reginald A.<sup>2</sup>; Jackson, Alan A.<sup>2</sup>; Margetts, Barrie M.<sup>2</sup>; Vorster, Este<sup>3</sup>

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Anemia in HIV infection is of multifactorial etiology. The direct viral effect and its interplay with other independent anemia inducing factors may be implicated. Indicators of poor energy and nutrient intakes as well as inflammation coupled with metabolic alterations are proposed to be important predictors of anemia in HIV infection. The THUSA survey carried out in the North West Province of South Africa was the source of data. Of the 1854 'apparently healthy' selected participants aged 15 years and above, 216 (11.7%) were HIV infected. A validated QFFQ was used to assess dietary energy and micronutrient intakes, whilst anthropometric and biochemical measurements and their analyses were based on standard protocols. Prevalence of anemia in the study population was 46.5%, but was higher in infected than uninfected population (51.4% cf. 45.8, p=0.123). Binary logistic regression analyses showed significant socio-demographic and biological predictors of anemia in the infected population as urban/transitional settlement (aOR, 2.06, CI, 1.11-3.85, p=0.023), higher serum total proteins (4.41, 2.57-7.59, p<0.001), lower serum albumin (2.85, 1.67-4.84, p<0.001) and higher % saturation (1.81, 1.11-2.94, p=0.017). Significant biochemical predictors may be indicative of a coupled inflammatory and metabolic effect of HIV even at an early phase of infection.

### P23-04

#### **IRON STATUS IN AN ASYMPTOMATIC HIV INFECTED POPULATION IN SOUTH AFRICA**

Aryee, Paul A.<sup>1</sup>; Annan, Reginald A.<sup>2</sup>; Jackson, Alan A.<sup>2</sup>; Margetts, Barrie M.<sup>2</sup>; Vorster, Este<sup>3</sup>

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HIV infection is associated with an altered iron metabolism, which may be ascribed to the direct effects of the virus as well as the inflammation associated with the infection. The aim of this study was to compare iron status between asymptomatic HIV infected persons and their uninfected counterparts using different iron status markers. The THUSA survey, a cross sectional population-based study in the North West Province of South Africa, served as source of secondary data. From a selection of 1854 'apparently healthy' adult men and women aged 15 years and above, 216 (11.7%) were HIV infected. Iron status was assessed using Hb, Hct, serum Fe, serum ferritin, TIBC and % saturation. UniANOVA statistics showed that HIV infected subjects had lower Hb, lower serum iron, lower serum ferritin, lower TIBC and higher % saturation than their uninfected peers, but the differences were not significant. However, Hct levels were significantly lower (p<0.001) in the infected subjects. Combining serum ferritin and Hb cut-offs indicated that infected subjects were more inclined to both IDA and ACI. Effects of HIV that influence iron metabolism may be present even in the asymptomatic stage.

### P23-05

#### **EFFECT OF FOOD SUPPLEMENTATION ON BODY COMPOSITION OF PEOPLE WITH HIV/AIDS IN UGANDA**

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<sup>1</sup>Makerere University, Kampala, UGA; <sup>2</sup>Ministry of Health, Kampala, UGA; <sup>3</sup>The AIDS Support Organisation (TASO), Kampala, UGA

**RATIONALE & OBJECTIVE:** Food supplementation has the potential to improve nutritional status in people with HIV/AIDS (PHA). Objective: to assess the effect of a food supplement on body composition of PHA in.

**METHODS:** Non-pregnant, anti-retroviral therapy-naïve clients recruited from a rural area and an urban center each received 3 kg corn-soya blend, 0.75 L vegetable oil, 1.8 kg pulses, and 6 kg cereals per month. Body composition was assessed by deuterium dilution at baseline, 3 and 9 months. Changes in body composition were assessed by repeated measures analysis.

**RESULTS:** 65 clients (18-49 years; 80% female; 37 rural, 28 urban; mean weight 53.3±6.0 kg) completed all assessments. Mean fat free mass (FFM) among rural clients was 34.3 kg (95% CI: 32.7-35.8 kg) at 3 months and increased to 37.5 kg (95% CI: 35.5-39.5 kg) at 9 months (p=0.003). There was no change in FFM among clients from the urban center.

**CONCLUSIONS:** The food supplement had a positive impact on body composition among rural clients.

### P23-06

#### **FISH ALBUMIN, HYPOALBUMINEMIA AND NUTRITIONAL STATUS OF HIV/AIDS PATIENTS**

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Nutritional status alterations are common with HIV infection. Wasting Syndrome increases the opportunistic infection. Albumin as an indicator of morbidity and nutritional status in

hospital. South Sulawesi Prov. Board on HIV reported 997 with HIV (PLWH) in 2006, 907 in Makassar, 233 inpatients, 77 died from wasting syndrome and opportunistic infection.

Quasi-experimental non-randomized pre-post design was conducted at Wahidin hospital. The study aims to describe the effect of fish albumin on hypoalbuminemia and nutritional status of HIV patients. Group A (16) intervention received food plus fish albumin, and Group B (16) as control received food high calorie-protein for 14 days.

Anthropometric used for nutritional status, 24 hours for food intake, hemoglobin using human count, albumin using photometer analyzer. Paired t test and independent T test were used to analyze the results.

The study found significantly increased ( $p < 0.00$ ) albumin and hemoglobin (0,6 gr% & 1 gr%) in group A compared with group B (0,1gr% and -0,4 gr%). Energy increased (784 vs. 490 kcal) and protein (29,5 vs. 17,7 gr). In addition, body weight increased 3 kg vs. 0,2kg, respectively.

**CONCLUSION:** fish albumin prevents hypoalbumin, increased nutritional status of HIV patients.

### P23-07

#### **NUTRITIONAL ASPECT OF HIV INFECTION AND ITS MANAGEMENT**

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Last report of HIV/AIDS cases in Indonesia, in December 2006 has already more than 10,000 cases, in community as an "Iceberg syndrome". A multi-center study was carried out during July 2006 to June 2007 in 3 provinces, Jakarta, Surabaya and Makassar, supported by IHPCP – Aus AID Jakarta & Albion Street Centre Australia. 752 people with HIV-AIDS (PWHAs) were interviewed and studied which can give the picture of nutritional aspect of PWA in Indonesia. Body weight was measured using body impedance analysis (BIA). Nutritional Training for Medics & Para-medics, and caregiver using IHPCP-ASC module and WHO module adopted for Indonesia. Summary, Nutrition is important as a Care Support and Treatment for PWA with Anti Retroviral Treatment. Six facts favor the role of poor nutrition in people with HIV infection and AIDS: First, cytokines release occurs early in the course of the infection; Second, increase of REE in patient with HIV infection; Third, Calorie intake is not decreased, but patient continue to lose Weight; Fourth, lose Lean Body Mass in PWA more than fat; Fifth, Nutrition supplementation gain back fat rather than Lean Body Mass; Finally, patients with HIV infection have increased lipogenesis.

### P23-08

#### **RELATION BETWEEN THE MACRONUTRIENT INTAKE AND THE SOCIOECONOMIC STATUS OF HIV+ AND HIV- LACTATING WOMEN IN NAKURU, KENYA**

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**OBJECTIVES:** Kenya is one of the poorest countries in the world. A low socioeconomic status causes malnutrition and combined with HIV/AIDS a higher mortality rate. The objective of this study was to assess the macronutrient intake of HIV+ and HIV- lactating women in dependence of their socioeconomic status.

**MATERIALS & METHODS:** The nutrient intake of lactating HIV+ (n=32, BMI: 22±2 kg/m<sup>2</sup>) and HIV- (n=47; BMI:

24±3kg/m<sup>2</sup>) women living in Nakuru, Kenya was determined using 24-h-Recalls.

**RESULT:** The socioeconomic status of HIV+ women (lowest: 58%, highest: 6%) was significantly ( $p < 0.05$ ) lower than the HIV- women (lowest: 69%, highest: 11%). The mean daily energy intake of the HIV+ group was lower ( $p < 0.05$ ) and their macronutrient intake had a more unfavorable proportion. In both, the HIV+ and HIV- groups the socioeconomic status was found to be related to the intake of energy, protein, fat and carbohydrates. In the highest status groups the intake of energy and fat was higher whilst of carbohydrates was lower, compared to the other status groups.

**CONCLUSION:** The results clearly indicate the relation between the macronutrient intake and the socioeconomic status in HIV+ and HIV- lactating women with an unfavorable tendency of nutrient composition in the highest socioeconomic groups.

### P24: Nutrition & Infection

### P24-01

#### **FOOD RESTRICTION DURING ACUTE DIARRHOEA AMONG INFANTS IN IBADAN, NIGERIA**

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**RATIONALE AND OBJECTIVES:** Food restriction during common childhood illnesses such as diarrheal diseases remains major contributors to childhood morbidity and mortality. This study was designed to determine the knowledge, attitude and practices of nursing mothers during acute diarrhea in Ibadan, Nigeria.

**MATERIALS AND METHODS:** Nursing mothers (250) in Ibadan sampled in this cross-sectional study were selected using the purposive sampling procedure. Information on management of acute diarrhea was collected with a structured questionnaire and two FGDs.

**FINDINGS:** Only 6.0% had knowledge of nutritional management of diarrhea. Seventy-one percent reported food withdrawal during acute diarrhea, 31.6% reported reduction in breastfeeding frequency during acute diarrhea and more than two-thirds of these (24%) cited cultural reasons for withholding breastfeeding. Mothers' educational level had no significant effect on their knowledge of nutritional management of acute diarrhea ( $p > 0.05$ ). Mothers' knowledge had a significant effect on their attitude ( $p = 0.03$ ) but not on their practice ( $p = 0.257$ ). Relatives and health care providers were sources of advice on food withdrawal during acute diarrhea.

**CONCLUSION:** Appropriate nutritional management during acute diarrhea has been found to be lacking among nursing mothers.

### P24-02

#### **DOES VITAMIN B12 OR FOLATE STATUS MODIFY THE IMPACT OF ZINC SUPPLEMENTATION ON THE INCIDENCE OF DIARRHEA?**

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**RATIONALE & OBJECTIVES:** To examine whether the effect of zinc supplementation on the incidence of diarrhea is modified by vitamin B12 or folate status.

**MATERIALS & METHODS:** In a randomized, placebo-

controlled trial, 2482 children in New Delhi, aged 6-30 months, received zinc or placebo daily for 4 months. We measured plasma concentrations of folate, cobalamin, total homocysteine (tHcy) and methylmalonic acid (MMA) at enrollment.

**RESULTS AND FINDINGS:** The efficacy of zinc on reducing the risk of diarrhea lasting  $\geq 7$  days was higher in those with plasma cobalamin concentration below the 25th percentile and in those with tHcy and MMA concentrations above the 75th percentile. The ORs (95% CI) for children below and above the 25 percentile for cobalamin were 0.53 (0.35, 0.78) and 0.90 (0.73, 1.11), respectively (P for interaction: 0.015). Similar differences for the ORs were seen when comparing children above and below the 75 percentile for tHcy and MMA (P for interaction: 0.045 and 0.188, respectively). Folate status did not modify the effect of zinc.

**CONCLUSION:** Children with poor vitamin B12 status benefited more from zinc supplementation. Our result may explain some of the heterogeneity between studies of zinc supplementation related to the occurrence of diarrhea.

#### P24-03

##### **PREVALENCE OF MALARIA AMONG CHILDREN AND ITS ASSOCIATION WITH PEER COUNSELLING FOR EXCLUSIVE BREASTFEEDING, VITAMIN A SUPPLEMENTATION AND ANTHROPOMETRIC STATUS IN MBALE, EASTERN UGANDA**

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**RATIONALE AND OBJECTIVES:** The relationship between malaria and nutrition has been suspected for long, but still remains contentious. With a growing incidence of malaria, there is need to identify low-cost malaria prevention strategies. This paper assessed the effect of peer counseling for exclusive breastfeeding, vitamin A supplementation and anthropometric status on the prevalence of malaria parasitemia among infants.

**MATERIALS AND METHODS:** A cluster randomized community trial was conducted between 2006 and 2008. Twenty-four villages in Uganda were randomized either to intervention (peer counseling for exclusive breastfeeding) or to control: 875 pregnant women were recruited and followed up after delivery. In the intervention villages, 5 home based peer counseling visits were scheduled, including one antenatal visit. Blood was drawn for malaria parasitemia from 523 infants between 6-12 months.

**RESULTS:** The prevalence of malaria parasitemia was 11% in both the intervention and control areas. Malaria prevalence among children that had not received Vitamin A was 15% (44/302) and 6% (13/221) among those that had received supplementation (OR 2.73 CI: 1.41, 5.29). There was no association between anthropometric status and malaria.

**CONCLUSION:** Exclusive breastfeeding and anthropometric status had no effect on malaria parasitemia. Vitamin A supplementation was protective of malaria.

#### P24-04

##### **SEVERE HOUSEHOLD FOOD INSECURITY IS ASSOCIATED WITH CHILDHOOD MALARIA IN RURAL SOUTH HAITI**

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**OBJECTIVES:** South Haiti is heavily affected by food insecurity (FI) and malaria. We examined if these two conditions were associated with each other.

**MATERIAL & METHODS:** We studied a convenient sample of 153 women with children under five in Camp Perrin, South Haiti. Household FI was assessed with the previously validated 16-item Latin American and Caribbean Household Food Security Scale (ELCSA).

**RESULTS & FINDINGS:** Households were categorized as either FI/very FI (42.7%, ELCSA score range: 1-10) or severely FI (57.3%, ELCSA score range: 11-16). According to maternal report, 34% of the children had malaria during the 2 months preceding the survey. Multivariate analyses showed that severe FI was a risk factor for malaria (OR: 5.4; 95% CI: 1.7-17.2).

**CONCLUSIONS:** Severe household FI is a strong independent risk factor for malaria among children < 5 year old in Haiti. (Funded by the AgroSalud Project (CIDA # 7034161).

#### P24-05

##### **EFFECT OF SOY FIBER IN RATS WITH LACTOSE INDUCED DIARRHEA**

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Dietary fiber has been used in the treatment of constipation, more recently it has been used in the treatment of diarrhea. To determine the value of fiber in diarrhea, the effect of isolated soybean fiber (Fibrin®) was studied in rats with lactose-induced diarrhea. In the study, fiber was included in the diet at 0; 1,25; 2.5 and 5% to 8 groups of rats. One half of them had diarrhea. The results showed that fiber increased fecal: mass, water and dry matter particularly in the rats with diarrhea. However, the appearance of the diarrhea in the fiber rats was less watery. In addition, a reduction in the absorption of the total diet as well as the dietary protein and iron was observed particularly in the fiber fed rats with diarrhea. These rats also had reduced fat body stores. This reduction increased in proportion to the fiber content of the diet. Therefore, in this study, fiber aggravated the negative nutritional effects of diarrhea with only a cosmetic effect on its severity.

#### P24-06

##### **COMPARISON OF IRRITABLE BOWEL SYNDROME IN JAPANESE AND CHINESE NURSING AND MEDICAL STUDENTS**

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**RATIONALE & OBJECTIVE:** Irritable Bowel Syndrome (IBS) is a functional gastrointestinal disorder. This study investigated the prevalence of IBS and the relation of IBS to stress, lifestyle and dietary habits among Japanese and Chinese.

**MATERIAL & METHOD:** We conducted a cross-sectional study using a self-administered questionnaire among 2639 Japanese students and 2500 Chinese students studying nursing or medicine. IBS was diagnosed using Rome II criteria.

**RESULTS AND FINDINGS:** The prevalence of IBS was 35.5% (m: 25.2%, f: 41.5%) in Japanese and 32.1% (m: 26.6%, f: 33.6%) in Chinese. In both Japanese and Chinese, the IBS groups showed significantly higher anxiety scales, life events, sleep disorder and habitually skipped meals with greater frequency compared to those in the non-IBS groups.

**CONCLUSION:** In both Japanese and Chinese, the prevalence of IBS among nursing and medical students was higher than that in the general population. Both the IBS groups had more stress and their lifestyles were more disordered than the non-IBS groups.

#### P24-07

##### LIPID PEROXIDATION AND VARIATION OF ANTIOXIDANT ENZYMES AND VITAMINS IN MALARIA INFECTED PREGNANT WOMEN

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Malaria infection is accompanied by increased production of Reactive Oxygen Species (ROS). The biochemical injuries caused by oxidative stress represent a key factor in the physiopathology of malaria. Knowing the body antioxidant status may give the possibility of a specific prevention of malaria based on nutrition.

The present investigation was undertaken to determine the extent of lipid peroxidation and to investigate the changes in antioxidant compounds Superoxide dismutase (SOD), Catalase and major antioxidant vitamins A, E, C in malaria-infected pregnant women.

Malondialdehyde level was quantified to assess the degree of lipid peroxidation. Activities of antioxidant enzymes were measured and the status of vitamins A, E and C was estimated. Plasma MDA level was significantly increased in malaria patients. Activities of SOD and catalase as well as the antioxidant vitamins were decreased significantly in malaria patients.

The general depression in antioxidant in malaria patients suggests that nutritional improvements of antioxidant capacities may be a therapeutic strategy to prevent the occurrence of oxidative stress, thus the severity of malaria.

#### P25: Nutrition & Respiratory Infection

#### P25-01

##### NUTRITIONAL SUPPORT TO TB patients: RESULTS FROM TWO TRIALS IN TANZANIA

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**RATIONALE & OBJECTIVES:** Nutritional support to pulmonary TB (PTB) patients is not integrated in programs. We previously found that micronutrient (MN) supplementation among sputum-positive PTB-patients (PTB+) with HIV (HIV+) was beneficial. We aimed to assess effects of additional energy-protein (E-P) to PTB+/HIV+ patients and of MN to other PTB-patient.

**MATERIALS & METHODS:** Two trials among PTB-patients during the first two months of TB-treatment in Mwanza, Tanzania. PTB sputum-positive (PTB+)/HIV+ patients were randomized to daily supplementation with 1 or 6 energy-protein (E-P) bars, both with MN. PTB-patients found sputum-negative (PTB-) or HIV- were randomized to a daily energy-protein bar with low or high MN content. Primary outcomes were weight gain and grip strength.

**RESULTS & FINDINGS:** 1250 patients were enrolled: 379 to the E-P trial and 871 to the MN trial. Mean (SD) baseline BMI were 18.6 (2.9) and 18.9 (3.0) kg/m<sup>2</sup>, respectively, and follow-up rates at two months were 87.9 and 89.4%.

**CONCLUSION:** Results of the trials will be presented.

#### P25-02

##### EFFECT OF L-LYSINE ON ACUTE UPPER RESPIRATORY INFECTIONS IN LOW-INCOME PERI-URBAN SUBJECTS IN ACCRA, GHANA

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**RATIONALE AND OBJECTIVES:** Lysine, a limiting amino acid in high-cereal diets, is implicated in reducing acute respiratory infections (ARI). The effect of lysine on ARIs in is examined.

**MATERIALS AND METHODS:** In a double-blind, randomized-controlled 16-week lysine supplementation trial (n=90 men, women, children each), data were collected weekly on various health parameters, including cases reported and days ill from ARI symptoms (cold, cough, runny-nose). Chi-square, non-parametric tests and linear regression were conducted.

**RESULTS:** Lysine-supplemented men were less likely to report a cold (odds ratio=0.51, p=0.0053) than placebo. Linear regression model of mean days ill was significant (p=0.011) with sex/age and treatment group having significant effect. Mean days ill was significantly lower in lysine-supplemented children (0.37±. 24) than placebo (0.56±0.25) (p=0.006).

**CONCLUSION:** Lysine supplemented men were less likely to suffer from acute cold than placebo while lysine supplemented children showed shorter duration of cold than placebo.

#### P25-03

##### IS MALNUTRITION ASSOCIATED WITH ACUTE RESPIRATORY INFECTION? EXPERIENCE FROM RURAL BANGLADESH

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**RATIONALE & OBJECTIVES:** Acute respiratory infection (ARI) is a leading cause of morbidity and mortality in under-five children in developing countries with no exception to Bangladesh. ARIs are on rise in Bangladesh and hence the present study was undertaken to identify various modifiable risk factors for ARI in under-five children, especially the effect of malnutrition.

**MATERIALS & METHODS:** Data for this study were extracted from a nationally representative Bangladesh Demographic and Health Survey (BDHS) 2004. A total of 5416 mothers of children under five were asked whether their children had any symptom(s) of respiratory illness during the two weeks preceding the survey. As the burden of ARIs lies with rural areas, the present study was based on 5215 under-five children from rural areas of Bangladesh. Multivariate logistic regression was used to examine the relationships.

**RESULTS & FINDINGS:** One in five (21%) of under-five children were reported to have had the symptoms of ARI. After adjusting for all potential confounders, malnourished children were found to be 1.35 times more likely to have an ARI symptom than their nourished counterparts (95% CI: 1.15-1.58). Vitamin A deficiency was also significantly associated with ARI (OR 1.32, 95% CI 1.11-1.59). Other factors inversely associated with ARI include: children age, mother's age, socio-economic status and Muslim children.

**CONCLUSION:** This study suggests that improving nutritional status along with vitamin A supplementation has the potential to prevent a large proportion of ARI cases during childhood, which in turn can improve children's health in rural Bangladesh.

#### P25-04

### EFFECTS OF CANNED PINEAPPLE CONSUMPTION ON PHYSICAL HEALTH OF SELECTED SCHOOL CHILDREN AS MANIFESTED BY THE INCIDENCE OF ACUTE VIRAL AND BACTERIAL INFECTIONS

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A prospective randomized control trial with block design was done to examine the effect of canned pineapple consumption on the incidence of acute viral and bacterial infections and immunological markers on 99 elementary school children with mean age of 8.44±0.20 years. Study participants were divided into three groups depending on whether the subjects are underweight or normal based on anthropometric parameters. Group A (control) is comprised of subjects who had regular diet with no pineapple supplementation. Group B received one can (140g) while Group C received 2 cans (280g) of canned pineapple every weekday. Socio-demographic, anthropometric, dietary laboratory, immunological and physical/clinical examination data were collected and analyzed. Group A exhibited a reduction in granulocyte count by 14.99% while Group B yielded an increase of 0.77% and Group C produced 26.60% more granulocytes. Incidence of viral and bacterial infections, skin lesions, anemia and lymphopenia for both groups B and C declined after canned pineapple supplementation. It is concluded that canned pineapple consumption may lower incidence of viral and bacterial infections and may further increase the production of granulocytes, whether or not the subjects has infection. When the subject has infection, intake of canned pineapple may further accelerate the production of granulocytes.

#### P25-05

### BODY COMPOSITION AND GRIP STRENGTH AMONG TB PATIENTS

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**RATIONALE AND OBJECTIVES:** To estimate lean and fat mass, and grip strength deficits among PTB patients.

**MATERIALS AND METHODS:** Cross-sectional data on anthropometric measurements, HIV and PTB status were collected and compared to controls.

**RESULTS AND FINDINGS:** 1236 PTB patients and 352 controls were included. PTB- and PTB+ had weight deficits of 8.0 (95%CI: 5.6; 10.4) and 9.2 (7.2; 11.3) kg among females, and 6.4 (4.6; 8.1) and 8.1 (6.7; 9.5) kg among males, explained by deficits of both AFA and AMA. HIV was associated with deficits of weight (2.9, 1.1;) in females, but not males (0.5, -0.7; 1.7 kg). HIV was associated with AMA deficits in both males and females, but AFA deficits only in females. PTB-, PTB+ and HIV+ patients had 7.0 (5.6; 8.5), 7.8 (6.5; 9.1) and 1.7 (0.6; 2.8) kg grip strength deficits among females, and 5.8 (4.1; 7.5), 5.3 (3.9; 6.6) and 1.5 (0.4; 2.7) kg among males.

**CONCLUSION:** PTB and HIV lead to losses of fat and lean mass and grip strength, although HIV mainly results in fat loss among females.

#### P25-06

### EFFICACY OF SHORT COURSE ORAL ZINC GIVEN DURING PNEUMONIA ON SUBSEQUENT MORBIDITY AMONG YOUNG CHILDREN IN NEPAL

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**RATIONALE AND OBJECTIVE:** The available data on short course zinc supplementation for the prevention of subsequent morbidity is inconclusive. The objective of our study was to assess the efficacy of giving zinc (<1 year: 10 mg, ≥1 year: 20 mg) for 14 days on preventing diarrhea and respiratory illnesses over the subsequent six months.

**MATERIALS AND METHODS:** This was a double blind, randomized controlled trial in children 2-35 months of age with community-acquired pneumonia. The number of, and time till outpatient visits for different infections during a 6 months follow-up were compared between the two study groups.

**RESULTS:** A total of 2,518 cases were available for assessment after completed zinc supplementation. The number of visits for pneumonia, diarrhea and dysentery were similar in the two groups. Similarly, the median numbers of days till the first episode of these illnesses were also not different between the groups. The hazard ratios were 1.01 (95% CI: 0.91, 1.13) for pneumonia, 1.02 (95% CI: 0.89, 1.16) for diarrhea, and 0.85 (95% CI: 0.62, 1.16) for dysentery.

**CONCLUSION:** Short course of zinc given during an episode of pneumonia did not seem to benefit on preventing diarrhea and respiratory illness over the next six months.

#### P25-07

### ROLES OF SYMBIOTICS AND MICRONUTRIENTS SUPPLEMENT ON MODULATING HUMAN IMMUNE FUNCTION: A REVIEW

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Disruption of the indigenous gut micro flora decreases mucosal immunity and reduces nutrients absorption; and micronutrient deficiencies impair the immune function. A symbiotic consists of probiotic and prebiotic that can restore gut microflora balance. The prebiotic supplied nutrients for probiotic to growth optimally; and the probiotic exert beneficially effect to human body. Both probiotic and prebiotic also has benefit effect on increasing of micronutrients absorption in the intestinal. Ingestion of specific strain lactic acid bacteria leads to stimulation of humoral or cell-mediated immune function. Probiotic modulating non-specific immune response in the gut associated lymphoid tissue (GALT) to produce secretory Ig A, activating of phagocyte cell, natural killer cell, and cytokine production. In addition, Lactobacillus sp and Bifidobacterium sp are mainly used as probiotic microorganism and strongly associated with optimum microbial balance in the gut. Gut microflora balance improves micronutrients absorption. Micronutrients i.e. vitamin A, C, E, and other minerals such as iron, selenium, and zinc provide an essential stimulus for the induction, differentiation and maintenance of the mucosal immune system; and these micronutrients are also able to improve immune function. Therefore, combining of synbiotic and micronutrients supplement has promising result on better capacity to improve immune function.

#### P25-08

##### **THE EFFECT OF SYMBIOTIC ON IMPROVING IMMUNE RESPONSE AND NUTRITIONAL STATUS AMONG CHILDREN SUFFERED OF TB INFECTION**

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Product containing both probiotic and prebiotic increase number of gut microflora and it's giving benefit to human health. The aim of this study is to analyze effect of synbiotic on increasing non-specific immune response and weight gain among children suffering from TB infection.

Fifteen children > 2-5 years of age suffered TB infection (induration > 5 mm TST) divided randomly into two groups were 5 children of treatment group and 10 children of control group (1:2). Treatment group received 28 days of synbiotic and control group received placebo. Before and after, venous blood and weight gain of samples were collected.

Neutrophil in treatment group increased approximately 7.3% higher than control group which decreased of 3.0%. Erythrocytes sedimentation rate among treatment group was decreased of 10.9 mm and it was also higher than control group which increased of 0.4 mm. Increased of nutritional status in treatment group was higher than control group.

#### P25-09

##### **FISH OILS IMPROVE HEALTH STATUS AND DECREASED IGE CONCENTRATION OF CHILDREN WITH ASTHMA**

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Consumption of fish is associated with a reduced risk of asthma. This study aimed to evaluate the effect of fish oils and cod liver oil supplementation on asthmatic children. Forty asthmatic children from Shebin El Kom Hospital, were divided into 4 groups: control group (CG) didn't receive any supplementation; fish oil group (FOG) received 1000 mg/day of fish oil in the form of gelatin capsules; cod liver oil group (CLG) received 5 ml of cod liver oil; and mixture group (MG) received half capsule of fish oil and 2.5ml of cod liver oil. The study continued for 4 months. The asthma outcomes were recorded according to asthma clinical severity score. Hemoglobin, RBCs, PCV, and IgE were determined at baseline and after 4 months. Results showed that the severity of asthma decreased among FOG and CLG from 20% at baseline to 10% after supplementation. The supplementation resulted in significant decrement of IgE by 16%, 13.6%, and 15.3% among FOG ( $P < 0.001$ ), CLG ( $P < 0.05$ ), and MG ( $P < 0.01$ ) respectively. In conclusion fish oils had a favorable affect on asthma and decreased IgE values.

#### P25-10

##### **THE PATTERN OF FRUIT AND VEGETABLE CONSUMPTION AND THE RISK OF LUNG TUBERCULOSIS**

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Tuberculosis (TB) is one of the severe contagious diseases. One TB-person can infect 4 other persons. Antioxidants, known to enhance immune response and lung health, could have benefit in preventing TB. Fruits and vegetables containing antioxidants may have a positive effect in reducing the risk of lung-TB.

Therefore the aim of this study is to identify the relationship between the pattern of fruit and vegetable consumption and the risk of lung-TB and any other factors that influence that relationship.

Data in this study had been collected from Indonesian Basic Health Research in 2007 (Risikesdas 2007). 1,247 of 360,101 samples (0.35%) in this study had been diagnosed as having lung-TB in the last 12 months. Data included in this study were: the frequency of fruit and vegetable consumption within a week, body mass index, smoking status, and sanitation conditions. This data was collected by interview using questionnaires. To show the relationship of those variables to lung-TB, analysis using odds ratio (OR; 95% CI) had been done. Logistic regression analysis was used to show if there are any confounders.

The results of this study showed that samples who were not consuming fruits daily had a risk of lung-TB 1.2 times (95% CI: 1.005; 1.520) greater compared to those who consume fruit daily. However after adjusting for smoking status and interaction with smoking status and fruit consumption patterns, the odds ratio of those not consuming fruit everyday to lung-TB was 1.36 (95% CI: 1.029; 1.786). Independently, those not consuming vegetables daily had a low risk of lung-TB (OR = 1.1 95% CI: 1.013; 1,267). In addition, samples that were smoking or had low body mass index ( $< 18.5$ ) or poor sanitation were significantly at risk of lung-TB (OR = 1.4 95% CI: 1.212; 1,515; OR=3.7 95% CI: 3.256; 4.168; OR=3,0 95% CI: 1,120; 7,989). Conclusively, consuming fruits daily may prevent lung-TB and this is more important in smoking samples. Other factors that would reduce the risk of lung-TB are having normal body mass index, not smoking, and good sanitation. Further research is needed as this study has limitation by not knowing the variety and amount of fruits that were consumed by those samples.

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#### P26-01

##### **THE EFFECTS OF VITAMINS D AND E SUPPLEMENTS ON ANTIOXIDANT ENZYME ACTIVITIES IN ADULTS WITH ATOPIC DERMATITIS**

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**RATIONALE AND OBJECTIVES:** The objective of this study was to determine the effects of vitamins E and D supplementation on antioxidant enzymes in adult allergic patients.

**MATERIALS AND METHODS:** In this double blind placebo controlled trial 53 atopic dermatitis patients participated but only 47 ones completed it. The subjects allocated to 4 groups. One group was given 1600 IU vitamin D3 daily for 60 days. A group was given 600 IU vitamin E daily for the same period of time. One group was given both supplements and one group received the placebos. After 12 hours fasting venous blood was taken from patients. Superoxide dismutase (SOD) and catalase activities of red blood cells were measured enzymatically and expressed in U/gHb.

**RESULTS AND FINDINGS:** Vitamin D alone increased SOD activity (1124 (54) v 1357 (32.6) U/gHb  $p=0.002$ ) and catalase activity (183 (14.2) v 219 (15.9) U/gHb  $p=0.026$ ). Vitamin E alone increased both enzymes activities SOD (1181 (75.9) v 1456 (118.2) U/gHb  $p=0.008$ ) catalase (201.7 (15.4) v 238 (15.5) U/gHb  $p=0.065$ ). Both vitamin in combination decreased SOD activity (1350 (60) v 1177 (59) U/gHb  $p < 0.001$ ) but increased catalase activity (217.8 (20.4) v 267.7 (22.2) U/gHb  $p=0.004$ ). in the placebo group SOD and catalase activities decreased after 60 days.

**CONCLUSION:** Vitamins D and E have antioxidant activity in allergic patients. Vitamin D has antioxidant activity besides of its immunomodulatory activity. The effects of these vitamins on allergic patients may be beneficial for their health.

## P26-02

### ANTI-INFLAMMATORY EFFECTS OF PERILLA OIL ADMINISTRATION ON ALLERGIC ASTHMA USING AN OVALBUMIN-CHALLENGED MOUSE MODEL

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**RATIONALE & OBJECTIVES:** Changes in dietary lipid pattern, such as imbalance in the n-6/n-3 polyunsaturated fatty acids (PUFAs), may be promoters of many chronic diseases including allergic asthma. To investigate the effects of different dietary oils on allergic asthma, corn oil and perilla oil were subjected to an ovalbumin (OVA)-sensitized and -challenged mouse model.

**MATERIALS & METHODS:** The inbred female BALB/c mice were randomly divided into four groups and fed different AIN-76 feeds containing 5% corn oil (rich in linoleic acid, 18:2n-6 polyunsaturated fatty acids (PUFA), as a control diet), 5% perilla oil (rich in  $\alpha$ -linolenic acid, 18:3n-3PUFA) or 5% compound oil containing 50% corn oil and 50% perilla oil, respectively, for 35 consecutive days ad libitum. The experimental mice were sensitized by an intraperitoneal injection of alum-precipitated antigen containing ovalbumin on 7, 14 and 21 days after supply of the specified experimental diets. One week later, the mice were then challenged by aerosolized OVA.

**RESULTS & FINDINGS:** The results showed that 5% compound oil administration significantly ( $P < 0.05$ ) decreased eosinophilic infiltration into the bronchoalveolar lavage fluid (BALF). Dietary perilla oil significantly ( $P < 0.05$ ) reduced proinflammatory cytokine (TNF- $\alpha$ , IL-1 $\beta$  and IL-6) and Th1 cytokine (IFN- $\gamma$  and IL-2) production in BALF. The production of Th2 cytokine IL-10, but not IL-4 and IL-5, was also significantly inhibited by perilla oil administration. Dietary perilla oil markedly decreased serum OVA-specific IgG1 level and total IgA antibodies (Th2 antibodies). Unfortunately, it also increased non-specific serum IgE (Th2 antibody) levels.

**CONCLUSION:** The results suggest that dietary perilla oil might alleviate inflammation via decreasing the secretion of pro-inflammatory cytokines in BALF, but failed to regulate the Th1/Th2 balance toward Th1 pole during the Th2-skewed allergic disease.

## P26-03

### FISH OIL HAVE IMMUNO MODULATORY EFFECTS

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Fish-including diet is associated with lower rate of eczema in children. Long chain n-3 fatty acids are suggested to have anti-inflammatory effects. Here the role of fish oil consumption was investigated in two mouse hypersensitivity models.

Mice were fed either of three diets: regular pellets, pellets with 10 wt% fish oil or 10 wt% sunflower oil. For the Th1-mediated delayed-type hypersensitivity (DTH) model, the mice were immunized and challenged in footpad with ovalbumin. T-cell proliferation and cytokine production in lymph nodes were evaluated. To measure Th2-driven respiratory hypersensitivity, immunized mice were challenged with ovalbumin intranasally. Serum-IgE and eosinophil infiltration in lungs were measured. In the DTH model, fish oil reduced footpad swelling, T-cells proliferation and the produced levels of IL-6, IFN- $\gamma$  and TNF after ovalbumin restimulation in vitro. In contrast, fish oil fed mice had more eosinophilic infiltration into the lungs, slightly higher total serum-IgE and anti-ovalbumin IgE in the respiratory model.

Fish oil supplementation appeared to decrease Th1-driven, but not Th2-driven inflammation.

## P26-04

### THE FATTY ACID COMPOSITION IN BREAST MILK SAMPLES FROM ATOPIC AND NON-ATOPIC MOTHERS DIFFER

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**OBJECTIVE:** Changed dietary habits are suggested to be a factor of the dramatic increase of allergies. Long chain n-3 fatty acids are reported to have anti-inflammatory effects in atopic allergies and are therefore interesting to investigate. We sought to compare fatty acid composition and cytokine content in breast milk from healthy and atopic mothers and to evaluate a possible association between n-3 fatty acids and certain atopic symptoms.

**METHODS:** Breast milk samples were collected from 22 healthy and 23 atopic mothers and analyzed regarding fatty acids and cytokines.

**RESULTS:** Mothers with eczema symptoms had lower breast milk levels of EPA and DPA, and a higher n-6 PUFAs/n-3 PUFAs ratio, compared to healthy mothers. This was not found when comparing healthy mothers and atopic mothers with respiratory allergy.

**CONCLUSION:** Our data suggests an association between long chain n-3 fatty acids in breast milk and atopic eczema, which is not found in atopic mothers with respiratory symptoms.

## P26-05

### THE EFFECT OF DIFFERENT TIMING USING PROBIOTICS ON RAT FOOD ALLERGY MODEL

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**RATIONALE & OBJECTIVE:** The aim of the present study was to investigate the effects of different timing of probiotics administration on alleviating food allergy in a rat food allergy model.

**MATERIALS & METHODS:** Fifty 3-week-old female Brown Norway rats were randomized into negative control, positive control, probiotics prevention (OVA sensitization), treatment and whole-course intervention groups. The serum OVA-IgE, intestinal barrier function and the balance of Th1/Th2 cytokines were analyzed.

**RESULTS & FINDINGS:** Three probiotics administration regimens led to significantly decreased OVA-IgE level and improved intestinal permeability ( $P < 0.05$ ). In prevention and whole-course intervention groups, inflammatory cell infiltration in intestine was decreased and Th1/Th2 ratio was increased significantly compared with positive control ( $P < 0.05$ ). However, in probiotics treatment group, only intestinal morphology and inflammatory cell infiltration was improved ( $P < 0.05$ ).

**CONCLUSIONS:** Both probiotics prevention and treatment could attenuate food allergy by decreasing OVA-IgA level, but the underlying mechanisms might be different.