

Frequency of Functional Bowel Disorders among Healthy Volunteers in Mexico City

Max Schmulson^{a, b} Orianna Ortíz^c Mariana Santiago-Lomeli^a
Gabriela Gutiérrez-Reyes^a María Concepción Gutiérrez-Ruiz^d
Guillermo Robles-Díaz^{a, b} Douglas Morgan^e

^aLiver, Pancreas and Motility Laboratory (HIPAM), Department of Experimental Medicine, Faculty of Medicine, Universidad Nacional Autónoma de México-UNAM, ^bGastroenterology Department, Clínica Lomas Altas S.C., ^cDepartment of Internal Medicine, Centro Médico Nacional Siglo XXI, and ^dDepartment of Health Sciences, Universidad Autónoma Metropolitana-UAM, Iztapalapa, Mexico City, Mexico; ^eDivision of Gastroenterology, University of North Carolina, Chapel Hill, N.C., USA

Key Words

Functional bowel disorders, frequency · Functional bowel disorders, Mexico · Functional bowel disorders, Rome II criteria · Rome II Modular Questionnaire · Irritable bowel syndrome

Abstract

Background: The frequency of functional bowel disorders (FBD) in Mexico using the Rome II criteria is unknown. **Methods:** The Rome II Modular Questionnaire (RII-MQ) was translated into Spanish in coordination with the Rome Committee and their Latin American program. Volunteers were recruited by advertisement in Mexico City, and administered the RII-MQ. **Results:** The study population consisted of 324 healthy volunteers, with a mean age of 35.7; 66% were female. The most prevalent disorders were heartburn 35%, irritable bowel syndrome (IBS) 35%, functional bloating 21%, proctalgia fugax 21%, and functional constipation 19%. Based on gender, IBS-C was 4 times more frequent in females than males (19 vs. 4.6%) and functional bloating 3 times more

frequent (10 vs. 3.7%). Differences according to occupation included a higher prevalence of ulcer-like dyspepsia ($p = 0.04$), IBS-C ($p = 0.018$) and proctalgia fugax ($p = 0.034$) among students. **Conclusions:** This is the first study to use RII-MQ to determine the prevalence of FBD in urban Mexico. The prevalence of IBS was significant and is related to a number of factors, including the stress of living in an overpopulated city. Selection bias is likely operative. A community-based study is warranted.

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Introduction

Previous limited studies utilizing the Manning criteria and the Rome I criteria suggest that irritable bowel syndrome (IBS) has a prevalence that ranges between 17 and 20% in selected populations in Mexico [1]. Little is known about the prevalence of the functional bowel disorders (FBD) utilizing the Rome II criteria [2]. This classification groups the FBD in 6 categories based upon their anatomical region, with 21 total disorders. Furthermore,

the Rome II Modular Questionnaire (RII-MQ) is published in English [3]. Therefore, as part of the current study, we translated and validated the RII-MQ into Mexican Spanish. The current survey among healthy volunteers in a university setting in Mexico City proposed to determine the FBD prevalence in this population. The study was conducted in coordination with the Rome Committee and their program in Latin America.

Methods

Translation of the RII-MQ

The RII-MQ was translated into Mexican Spanish according to the guidelines provided by Sperber and the Rome Committee [4]. Translation of the original questionnaire into Mexican Spanish was done by two independent, bilingual gastroenterologists. Differences in the two translations were reconciled with the Gastroenterologist Project Leader. The revised version of the questionnaire was then 'back-translated' into English by an independent, bilingual translator. Further revisions were again facilitated with the Project Leader. The RII-MQ was then piloted in a group of 16 patients with FBD and 16 controls matched by gender in Mexico City. Small changes were made following the pilot phase. The final translated version into Mexican Spanish was used in the present study.

Validation

As IBS is the most frequent FBD, this was the focus for the validation phase. We determined the reproducibility of the final Mexican Spanish version to diagnose IBS. For this step, 10 patients who were seen in gastroenterology consultation, answered the questionnaire twice, 2 weeks apart. The questionnaire reproducibility for diagnosing IBS had a $\kappa = 0.800$ ($p = 0.010$).

Prevalence Survey

A cross-sectional survey design was used to assess the prevalence of the functional gastrointestinal disorders in healthy volunteers utilizing the RII-MQ. Academic and non-academic personnel of a public university in Mexico City (Universidad Autonoma Metropolitana-UAM, Iztapalapa) were invited by advertisement to participate in a cross-sectional seroprevalence study of celiac disease. Enrolled subjects were asked to complete the RII-MQ in a self-administered fashion.

Statistical Analysis

Frequencies are reported in percentages and 95% CI, and were compared by χ^2 . Continuous variables are reported in mean \pm SE and analyzed by the Student t test. A $p \leq 0.05$ is considered significant.

Results

We enrolled 324 subjects in this cross-sectional survey utilizing the RII-MQ validated in Mexican Spanish. A total of 215 females (66.4%) and 109 males (33.6%) par-

ticipated, with no difference in age (30.8 ± 0.8 vs. 32.0 ± 1.1 years). Of the volunteers, 196 (60.5%) were students, 16 (4.9%) professors and 112 (34.6%) administrative and general employees. The overall frequencies of the different FBD are outlined in table 1. IBS was common (35.5%), followed by functional bloating and proctalgia fugax. The frequency of the FBD by occupation is outlined in table 2. According to gender, males reported aerophagia more commonly than females, 23.9% (95% CI 16.2–33.0) vs. 12.1% (95% CI 8.1–17.2), $p = 0.010$. There was no difference in the IBS prevalence according to gender, but compared to males, females reported more frequent constipation predominant IBS (IBS-C), 4.6% (95% CI 1.5–10.4) vs. 19.1% (95% CI 14.0–25.0), $p = 0.00$, and also functional bloating, 10.7% (95% CI 6.9–15.6) vs. 3.7% (95% CI 1.0–9.1), $p = 0.033$. There were no differences in the prevalence of the other FBD, according to gender (table 1).

Based on the occupation, functional dyspepsia, functional constipation and proctalgia fugax were more frequent among the students (table 2). Of note, the female population sampled was higher among students and employees (69.9 and 63.4%, respectively), compared with faculty (43.8%, $p = 0.074$).

Discussion

This is the first epidemiological study of FBD in Mexico by using the RII-MQ. We established FBD prevalence rates among healthy volunteers in a university population. IBS followed by functional bloating, proctalgia fugax and functional constipation were most common.

Gastroesophageal reflux disease, as diagnosed by the Rome II questionnaire, was frequent with a 35.5% prevalence. This is in agreement with other similar studies. In the study by Locke et al. [5], 42% of subjects experienced at least one episode of heartburn during the previous year in this population-based study in Olmsted County, Minnesota. And in the telephone survey by Diaz-Rubio et al. [6] in Spain, 32% reported reflux with a validated questionnaire. These studies are similar, in that they evaluated the presence of heartburn symptoms. In the absence of physician exclusion of organic disorders, the Rome II instrument potentially includes subjects with pathologic reflux and motility disorders, as well as true functional heartburn [3].

IBS is the most common FBD in the world with a prevalence in the range of 5–25% [7]. In Mexico, previous small studies using different criteria have shown a preva-

Table 1. Frequency of functional bowel disorders

Functional gastrointestinal disorders	All (n = 324)		Males (n = 109), %	Females (n = 215), %
	%	95% IC		
Esophageal disorders				
Globus	4.6	2.6–7.5	2.8	5.6
Rumination syndrome	1.2	0.3–3.1	1.8	0.9
Chest pain	8.3	5.7–11.9	6.4	9.3
Functional heartburn	35.5	30–41	38.5	34.0
Functional dysphagia	2.5	1.1–4.8	1.8	2.8
Gastroduodenal disorders				
Functional dyspepsia	8.0	5.3–11.5	4.6	9.8
Ulcer-like	4.3	2.7–7.1	3.7	4.7
Dysmotility	3.4	1.7–6.0	0.9	4.7
Aerophagia	16.0	12.2–20.5	23.9	12.1
Functional vomiting	1.2	0.3–3.1	0	1.9
Bowel disorders				
Irritable bowel syndrome	35.5	30.3–41.0	30.3	38.1
IBS-D	11.4	8.2–15.4	15.6	9.3
IBS-C	14.2	10.6–18.5	4.6	19.1
Mixture	9.9	6.9–13.7	10.1	9.8
Functional abdominal bloating	21.0	16.7–25.8	3.7	10.7
Functional constipation	18.8	14.7–23.5	14.7	21.4
Functional diarrhea	3.4	1.7–6.0	4.6	2.8
Unspecified functional bowel disorders	14.2	10.6–18.5	11.0	9.3
Functional abdominal pain				
Functional abdominal pain syndrome	0.6	0.1–2.2	0.9	0.5
Unspecified functional abdominal pain	4.6	2.6–7.5	0	3.3
Biliary disorders				
Gallbladder dysfunction	4.6	2.6–7.5	2.8	5.6
Sphincter of Oddi dysfunction	0.3	0.0–1.2	0	0.5
Anorectal disorders				
Functional incontinence	7.1	4.6–10.5	6.4	7.4
Soiling	5.2	3.1–8.3	5.5	5.1
Gross incontinence	1.9	0.7–4.0	0.9	2.3
Levator ani syndrome	2.5	1.1–4.8	0.9	3.3
Proctalgia fugax	21.0	16.7–25.8	21.1	20.9
Pelvic floor dyssynergia	3.1	1.5–5.6	1.8	4.2

lence range from 14 to 20% and a female:male ratio of 2.5:1.0 [1]. In the current study using the Rome II criteria, we found an unexpected high frequency of IBS. Several explanations can be given related to study design and the study population. An element of bias in the questionnaire is possible, although it was translated according to established guidelines with input from the Rome II Committee. However, high reproducibility for IBS was found in the validation phase. Selection bias is likely operative in the study population. Subjects were recruited by adver-

tisement for a celiac disease seroprevalence study among university students, faculty and staff. In addition to bias introduced in the recruitment process, the FBD prevalence may be different in this educated population, and not reflective of the general population in Mexico City. The worldwide prevalence using the Rome II criteria has a wide range, between 3 and 25% [8]. In two studies that used the same instrument as in our study, the results were also very different [9, 10]. In the first study, Thompson et al. [9] found a prevalence of 12% in a household study

Table 2. Frequency of functional bowel disorders according to occupation

FBD	Frequency, % (95% CI)			p
	students	professors	employees	
Esophageal disorders				
Globus	4.1 (1.8–7.9)	0 (0–20.6)	6.3 (2.5–12.5)	NS
Rumination syndrome	1.5 (0.3–4.4)	0 (0–20.6)	0.9 (0.0–4.9)	NS
Chest pain	10.2 (6.3–15.3)	6.3 (0.2–30.2)	5.4 (2.0–11.3)	NS
Functional heartburn	37.2 (30.5–44.4)	31.3 (11.0–58.7)	33.0 (24.4–42.6)	NS
Functional dysphagia	2.6 (0.8–5.9)	0 (0–20.6)	2.7 (0.6–7.6)	NS
Gastroduodenal disorders				
Functional dyspepsia	10.2 (6.3–15.3)	0 (0–20.6)	5.4 (2.0–11.3)	NS
Ulcer-like	6.6 (3.6–11.1)	0 (0–20.6)	0.9 (0.0–4.9)	0.040
Dysmotility	3.6 (1.4–7.2)	0 (0–20.6)	3.6 (1.0–8.9)	NS
Aerophagia	16.8 (11.9–22.8)	12.5 (1.6–38.3)	15.2 (9.1–23.2)	NS
Functional vomiting	1.0 (0.1–3.6)	0 (0–20.6)	1.8 (0.2–6.3)	NS
Bowel disorders				
IBS	38.8 (31.9–46.0)	18.8 (4.0–45.6)	32.1 (23.6–41.6)	NS
IBS-D	10.7 (6.8–15.9)	12.5 (1.6–38.3)	12.5 (7.0–20.1)	NS
IBS-C	18.4 (13.2–24.5)	0 (0–20.6)	8.9 (4.4–15.8)	0.018
Mixture	9.7 (5.9–14.7)	6.3 (0.2–30.2)	10.7 (5.7–18.0)	NS
Abdominal bloating	8.2 (4.7–12.9)	6.3 (0.2–30.2)	8.9 (4.4–15.8)	NS
Functional constipation	20.4 (15.0–26.7)	18.8 (4.0–45.6)	17.0 (10.5–25.2)	NS
Functional diarrhea	3.1 (1.1–6.5)	6.3 (0.2–30.2)	3.6 (1.0–8.9)	NS
Unspecified functional bowel disorders	6.6 (3.6–11.1)	31.3 (11.0–58.7)	12.5 (7.0–20.1)	0.003
Functional abdominal pain				
Functional abdominal pain syndrome	0 (0.0–1.9)	0 (0–20.6)	1.8 (0.2–6.3)	NS
Unspecified functional abdominal pain	2.0 (0.6–5.1)	6.3 (0.2–30.2)	1.8 (0.2–6.3)	NS
Biliary disorders				
Gallbladder dysfunction	6.6 (3.6–11.1)	0 (0.2–20.6)	1.8 (0.2–6.3)	NS
Sphincter of Oddi dysfunction	0 (0.0–1.9)	0 (0–20.6)	0.9 (0.0–4.9)	NS
Anorectal disorders				
Functional incontinence	5.1 (2.5–9.2)	6.3 (0.2–30.2)	10.7 (5.7–18.0)	NS
Soiling	3.1 (1.1–6.5)	6.3 (0.2–30.2)	8.9 (4.4–15.8)	NS
Gross incontinence	2.0 (0.6–5.1)	0 (0–20.6)	1.8 (0.2–6.3)	NS
Levator ani syndrome	1.5 (0.3–4.4)	0 (0–20.6)	4.5 (1.5–10.1)	NS
Proctalgia fugax	25.5 (19.6–32.2)	6.3 (0.2–30.2)	15.2 (9.1–23.2)	0.034
Pelvic floor dyssynergia	3.6 (1.4–7.2)	6.3 (0.2–30.2)	2.7 (0.6–7.6)	NS

in Canada. In the second study, Lu et al. [10] involved a Chinese cohort enrolled in a health maintenance program and found a 22% prevalence. Furthermore, in a patient sample from nine Asian regions recruited by the Asian Motility Club, IBS accounted for 35% of all the cases, a much higher prevalence than the known low frequency of IBS in these regions [8, 11, 12]. However, a component of the high rate of IBS in Mexico City may be related to the pathophysiology of IBS in this population. The genetic predisposition to FBD is unknown, but under in-

vestigation globally. The influence of multiple episodes of infectious diarrhea in the 'non-sterile' environment of developing nations is unknown [13]. In addition, the inherent 'urban stress' from living in one of the most populated cities in the world is likely operative.

We did not find any significant difference in the frequency of IBS according to gender, but IBS-C was 4 times more prevalent among females, while IBS-D tended to be higher among males. In a recent systematic review of 13 studies of IBS by Rome II, only 7 studies found a higher

prevalence among females and in 4 studies there were no differences according to gender as in the current study [8]. Furthermore, Saito et al. [14] in the USA found a higher prevalence in males compared to females. Our findings of gender and bowel habits are in agreement with the reports of studies evaluating gender differences in IBS that have reported higher frequencies of diarrhea among men and constipation among women [15–17]. Lastly, we did not find a significant overlap between IBS and functional dyspepsia. Only 8% of our volunteers were positive for functional dyspepsia and when IBS was excluded, the prevalence decreased to 7.4%.

Regarding functional constipation, the prevalence in the USA has been estimated to vary from 2 to 28%. It ranges from 4 to 19% by the Rome I criteria and a 15% prevalence has been reported with the Rome II criteria [18–20]. In a Canadian study a 15% prevalence was reported, with 21% among females and 8% among males [21]. Our figures are similar, and although we found a higher prevalence among females, it did not reach statistical significance, possibly related to the sample size. In Mexico we have observed an overlap between IBS-C, functional constipation and pelvic dyssynergia in constipated patients [22]. Moreover, functional constipation accounts for 25% of the total cases of constipation and up to 60% when those cases that overlap with IBS-C are in-

cluded. However, these diagnoses are not mutually exclusive in the RII-MQ used in our study.

In the current study we have also found similar rates of all functional anorectal disorders as reported elsewhere with the RII-MQ, but with an unexpected higher prevalence of proctalgia fugax, particularly among university students. Community-based studies in other parts of the world have reported that the prevalence of proctalgia fugax varies in the range of 8–18% [19, 23]. The Canadian study using the RII-MQ found a prevalence no higher than 5%, in contrast to the 21% in the current study [9]. Also, a slightly higher proportion among females has been reported and it appears that the overall prevalence declines after age 45 [24]. The latter is in agreement with the findings of higher frequency among students with a significant decline among professors and employees older than 40 years.

In summary, this is the first prevalence study of functional gastrointestinal disorders among healthy volunteers in Mexico City using the RII-MQ. We have found unexpected high frequencies of IBS and proctalgia fugax, which may be related to a selection bias in our study population as well as a possible altered FBD pathophysiology. A community-based study is important to further characterize the epidemiology of FBD in Mexico.

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