



Perception of symptomatic abdominal bloating in irritable bowel syndrome among Saudi Arabian patients

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ABSTRACT

Aim: To evaluate the association between symptomatic abdominal bloating among Saudi patients and diagnosis of irritable bowel syndrome (IBS) and patient characteristics that may be affecting their perception of the symptom.

Methods: Patients with IBS symptoms presenting to the Gastroenterology Clinic at the International Medical Centre (Jeddah, Saudi Arabia) between August 2013 and July 2016 were recruited using the ROME III criteria for IBS diagnosis. Bowel symptoms and abdominal bloating were collected for statistical comparison with the patient gender, age, and body mass index (BMI).

Results: Among the total 305 patients who presented complaining of IBS symptoms, abdominal bloating was predominant, being reported by 257 (84.3%; 122 males and 135 females); the remaining patients either reported no experience of this symptom (n = 22) or no response (n=26). However, among the total patient population only 230 (75.4%) received an IBS subtype diagnosis that is statistically significant different between patients with abdominal bloating compared to those with no bloating (p 0.004). However, a statistical comparison between the bloating symptom among IBS patients and the various IBS subgroups showed no association with sex, age or BMI.

Conclusions: Among the patients with IBS at our hospital, a perception of abdominal bloating is typically a true symptom of the disease, particularly for the (IBS- Mixed) IBS-M subtype. Moreover, the perception of abdominal bloating is not associated with patient sex, age or BMI.

1. Introduction

Abdominal bloating is a commonly encountered complaint in Gastroenterology and Internal Medicine clinics in Saudi Arabia. Often this complaint is first assessed under the clinician's perception that the symptom is related to diet and/or general stress, with less suspicion of disease conditions such as irritable bowel syndrome (IBS). Yet, the reported prevalence of IBS in Saudi Arabia is remarkable high, ranging from 9% to 40% according to the different versions of the ROME criteria applied by the different research groups assessing a total of 3421 patients.[1-5] In a clinic, psychosocial factors of body image disorders are sought first. Upon ruling-out of such factors, the patient's perception of mid-abdominal protrusion of the abdomen is then evaluated by examination to detect any pathological extracellular fluid accumulation, which if excluded leads to the suspicion of intestinal gas.

Imaging and electrodiagnostic studies, usually by CT scan of the abdomen and electromyography of the anterior abdominal musculature, are performed to detect physical features related to symptomatic distension. These include relaxation of the anterior abdominal wall with diaphragmatic contraction and decreased lung volumes.[6-8] Positive findings are tracked for a response to interventions which relax this type of muscle tension, such as biofeedback exercises, or spontaneous resolution (suggesting a stress or behavior etiology).[9] In addition, if the volume of free gas in the bowel is comparable to that in a healthy control, it is not considered to be the physical cause of the patient's complaint of bloating.[10]

Unfortunately, somatization and psychological comorbidities, such as anxiety and depression, have been shown to be associated with functional bowel disorders, complicating the diagnosis as they may provide a non-physiological attribute to the patient's sensation of bloating.[11-13] Investigations into this phenomenon, specifically

investigating the influence of patient gender, weight and body mass index (BMI), have yielded contradictory findings.[14, 15] The aims of this study, therefore, were to determine the prevalence of abdominal distension among the consecutive patients presenting to our Gastroenterology Clinic in relation to eventual diagnosis of IBS and its subtypes in particular, and to evaluate the statistical association between the presenting complaint, IBS diagnosis, and gender, age, and BMI.

2. Materials and Methods

Study design and patient population

Consecutive patients who presented with a complaint of IBS symptoms to the Gastroenterology Clinic at International Medical Centre (Jeddah Saudi Arabia) between August 2013 and July 2016 were recruited to this cross-sectional study. Inclusion criteria were aged above 15 years, with a complaint of abdominal bloating, and symptoms triggering IBS suspicion which are recurrent abdominal pain, alternating bowel motions with constipation and diarrhea according to ROME 3 criteria [16]. Patients with chronic inflammatory abdominal conditions, malabsorption syndrome, functional dyspepsia, functional constipation or celiac disease were excluded. The study was carried out with the approval of the institutional review board of International Medical Centre (No. IMC-IRB 2010 – 12 -002).

The enrolled patients were assessed by the ROME III criteria for active gastrointestinal symptoms of recurrent abdominal pain, diarrhea, constipation and/or abdominal bloating; ROME III was the current version at the time of this study's commencement. Each patient was interviewed for their medical history and asked to complete the Arabic version of ROME III functional bowel disorders questionnaire (Appendix 1). Dietary history was not intended in the study due to the variability in answers that may occur due to recall bias. In addition,

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data on the patient characteristics of sex, age, and BMI were collected and each patient underwent a physical examination. Laboratory investigations were performed on the cohort of functional bowel disorders patients, namely complete blood count, serum chemistry panel, serum blood urea and creatinine, serum TSH (thyroid stimulating Hormone), ESR, serum Glucose. Diagnosis of IBS and classification as IBS with constipation (IBS-C), IBS with diarrhea (IBS-D), and the IBS-C/D mixed (IBS-M) subtype were made accordingly. The variables of IBS subtype, sex and BMI were binary. All other variables examined were dichotomous and subcategorized according to BMI grouping: underweight, normal, overweight, and obese.[17] Age was subcategorized into three groups: young [15-24 years], middle age (25-44 years), and old (45-64 years).

Statistical analysis

The chi-square test was used to assess statistical associations and their strength with alpha (i.e. type 1 error threshold) set at 0.05.

3. Results

Among the total 305 patients who presented with a complaint of IBS symptoms, abdominal bloating was predominant, being reported by 257 (84.3%; 122 males and 135 females). The remaining patients either reported no experience of this symptom ($n = 22$; 11 males, 11 females) or did not respond to this inquiry ($n = 26$). However, among the total patient population only 230 (75.4%) received an IBS subtype diagnosis ($p = 0.004$), 37 (16.1%) patients with IBS-C, 46 with IBS-D (20.0%), and 172 (74.8%) with IBS-M. Table 1 describes the basic laboratory investigations done for the cohort.

Table 1: Baseline laboratory investigations of the cohort.

	Cases (n= 305)
Gender	
Male	151 (49.5%)
Female	154 (50.5%)
Age	Range, Mean \pm SD (15 – 68), 34.89 \pm 11.4
Laboratory tests	Median, IQR (Inter-Quartile range)
Hemoglobin (g/dl)	13.6 (12.5, 16.9)
MCV (fl)	83.4 (77.9, 90)
Platelets ($\times 10^9/L$)	267 (129, 373)
Na (mmol/l)	138 (135, 144)
K (mmol/l)	4.2 (3.4, 5)
Urea (mg/dl)	20 (6.4, 44)
Creatinine (mg/dl)	0.7 (0.4, 4.8)
TSH (uIU/ml)	1.86 (0.3, 5.4)
ESR (mm/h)	10 (0, 80)
Glucose (mg/dl)	95 (74, 336)

Association of bloating with IBS subtypes

Among the subgroups, complaints of abdominal bloating were made by 7.2 % of IBS-C patients, 8% of IBS-D patients, and 33 % of IBS-M patients (Table 2). Statistical comparison of the rates of bloating complaint and IBS diagnosis indicated a significant association, with IBS subtype showing the greatest association ($p = 0.004$), followed by IBS-M ($p = 0.579$) and IBS-D ($p = 0.229$).

Table 2: Comparison of patient characteristics among our study population with and without reported abdominal bloating.

	Patients with reported abdominal bloating	Patient without reported abdominal bloating	p-value*
All IBS subtypes, n=485			
IBS	217 (44.7%)	13 (2.7%)	0.004
IBS-C	35 (7.2%)	2 (0.4%)	1.00
IBS-D	40 (8%)	6 (1.3%)	0.229
IBS-M	160 (33%)	12 (2.5%)	0.579
Sex, n (%)			
Male	122 (47.5 %)	11(50%)	0.82
Female	135 (52.5%)	11(50%)	
Age categories, n (%)			
Young	40	6	0.218
Middle age	157	11	
Old age	53	4	
BMI			
Underweight and normal	84	7	0.821
Overweight and obese	161	12	

*p-value (two-tailed) < 0.05 is statistically significant (bolded text). IBS with constipation (IBS-C), IBS with diarrhea (IBS-D), IBS-C/D mixed (IBS-M), body mass index (BMI).

Association of bloating with patient characteristics

Statistical comparison between the bloating symptom among IBS patients and the various IBS subgroups showed no association with sex, age or BMI (Table 3).

Table 3: The relation between IBS subtypes and sex among patients with reported abdominal distension.

IBS subtype	Male patients with reported abdominal distension	Female patients with reported abdominal distension	p-value*
IBS	106	111	0.35
IBS-C	16	19	0.79
IBS-D	21	19	0.48
IBS-M	79	81	0.52

* p value (two tailed) < 0.05 is statistically significant. IBS with constipation (IBS-C), IBS with diarrhea (IBS-D), IBS-C/D mixed (IBS-M).

4. Discussion

Symptomatic abdominal bloating has a wide range of physical etiologies, including gastrointestinal factors (i.e. impaired gas transit, excessive gas in the bowel, rectal hypersensitivity, dysmotility with delayed intestinal transit, and hard stool)[18] as well as extra gastrointestinal factors (i.e. relaxation of oblique anterior abdominal muscles, diaphragmatic descent, and anorectal dysfunction).[19] Despite the evidence of these factors, experimentally and clinically, the condition of symptomatic abdominal bloating is not consistently managed and clinical interventions are not widely applied, particularly in Saudi Arabia.

IBS patients frequently complain of and present with abdominal bloating, which can be related to the disease and/or other psychophysiological factors.[20] Our patient population did not show an association between symptomatic abdominal bloating and either sex, age or BMI. However, several studies in the literature, from various countries, have reported different and inconsistent results. Cain et al. [14] reported an IBS cohort of post-menopausal women from the United States having significantly more bloating than the men. Two Australian studies showed a positive correlation between increased BMI more than 30 and symptomatic bloating. On the contrary, Agrawal et al. [20] reported that in patients from the United Kingdom BMI does not correlate with bloating or colonic transit. Furthermore a large meta-analysis refuted this association between obesity and symptomatic bloating [21]. In our study, IBS subtype was the only factor significantly associated with symptomatic bloating for both sexes, but was not exclusive to either of them (Table 3). This may be explained by visceral hypersensitivity and impaired brain-gut axis.

Patel et al. [13] reported an association of the IBS-M subtype with bloating, which was absent for IBS-D and IBS-C. Although the categorization of IBS subtypes was defined in the ROME III update, there is still some overlap in symptoms among the three, such as functional diarrhea and chronic idiopathic constipation. Undoubtedly, we have gaps in our understanding of these subtypes, which may affect the ability to accurately categorize each.[22]

It is customary to believe that constipation is associated with increases in gas entrapment. Indeed, Hernando et al. [15] observed more abdominal and gaseous distension in patients with the IBS-C subtype, proposing the underlying mechanism to involve significant colonic gas accommodation and impaired gas clearance as compared to healthy controls. In our patient population, however, statistical comparisons of either sex with symptomatic bloating revealed no significant association with any IBS subtype. It is noted that Lactose intolerance is commonly found in IBS patients and especially in females. With this condition, IBS symptoms become very pronounced, even more so among those of younger age, and the condition has been shown to have a significant association with symptomatic bloating.[23] Due to meticulous breath test diagnosis and instrument availability, our study did not address this entity.

Our study, like any other, contains limitations inherent to its study design. First, our patient population was small and restricted to a specific geographical region (urban setting in Saudi Arabia). These two caveats may limit the generalizability of our findings. Our patients were also interviewed to obtain some of the historical data, and recall bias or personal inability to accurately quantify the degree of abdominal bloating may have impacted the data. Finally, we used the second to last version of the ROME criteria; ROME criteria IV was published in 2016. Regardless of these limitations, our results show

that it is important for clinicians in this region to be aware of the potential for symptomatic abdominal bloating to be physically related to or an effect of a functional bowel disorder, and not simply dismissed as a psychological phenomenon. In addition, the symptom may be a distinguishing factor among the IBS subtypes, and this warrants further investigation.

5. Conclusion

The literature on functional bowel disorders has shown conflicting findings on the association between bloating and patient characteristics as well as IBS subtypes. The lack of significant association found in our study between bloating and personal characteristics of our patients in Saudi Arabia fits with the findings reported in the literature from other countries in our region. The only association we found was with IBS subtype, and our collective findings highlight the importance for clinicians in this region to consider IBS and its subtypes in their efforts to manage and treat patients with symptomatic abdominal bloating.

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