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Original Article

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Aspects on Self-Reported Symptoms in Irritable Bowel Syndrome: A Cross-Sectional Study

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Abstract

Background: Irritable bowel syndrome (IBS) is the major form of functional bowel disorders, where the diagnosis is based on set criteria and characterized by abdominal pain and changes in bowel habits. Epidemiological data, alongside self-reported outcomes, are of interest with regard to IBS, as these factors may need to be addressed to optimize underlying IBS. This study aims to examine the effect of IBS on certain aspects of life, including sleep quality alongside some epidemiological aspects with regards to the presence of IBS in the Jazan region of Saudi Arabia.

Methods: Individuals were invited to participate in the study by replying to a validated questionnaire, whereby respondents self-identified as having IBS or not. Non-parametric comparisons using Fisher's exact test, between those with self-reported IBS versus those without IBS, were performed, with $P < 0.05$ considered significant.

Results: Of 728 respondents, 244 (33.5%) had self-reported IBS, and 484 (66.5%) did not. Respondents with IBS were more likely female ($P < 0.001$), younger age ($P = 0.002$), city-dwelling ($P = 0.028$), divorced ($P = 0.028$) and smokers ($P = 0.003$). Overall, education level did not differ amongst the groups ($P = 0.093$). A minority (13.5%) of those with self-reported IBS were diagnosed by a gastroenterology specialist. Abdominal pain, distension, constipation and diarrhea were all more prevalent ($P < 0.001$) in the IBS group compared to the non-IBS group. The IBS group had poorer sleep quality compared to the non-IBS group ($P = 0.006$), although no difference in medications for sleep was present between the two groups ($P = 0.271$).

Conclusions: Self-reported IBS was highly prevalent in our region, with risk factors for its presence being similar to those reported in previous studies. Sleep deprivation was highly prevalent in IBS patients, albeit not leading to increased prescription of relevant therapies for aid of sleep in these patients. However, marital separation and city-dwelling seemed to confer a higher self-reported IBS status. These issues should be investigated using more robust, Rome IV criteria-centered questionnaires in the future.

Keywords: Irritable bowel disease; Abdominal pain; Sleep quality; Functional bowel disorders

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Introduction

Irritable bowel syndrome (IBS) is a common functional gastrointestinal disorder characterized by some symptoms such as abdominal pain, bloating, and changes in bowel habits. IBS effects tens of millions worldwide, with prevalence around 10-15% in the general population [1]. The exact pathophysiology of IBS is not well understood, but multiple factors have been proposed such as gut-brain interactions, altered gastrointestinal motility, visceral hypersensitivity, genetic predisposition, and psychosocial factors [2].

There is no specific test to diagnose IBS, and the diagnosis is based on the exclusion of organic causes [3]. Several management approaches have been found to be effective, including dietary management, pharmacological treatments, and psychological therapies [4]. One of the dietary approaches is a low-FODMAP diet, which helps in alleviating symptoms of many IBS patients [5].

Sleep deficiency affects around 37.6% of IBS patients. Sleep deficiency implies poor sleep quality and sleep deprivation [6]. IBS symptoms are reportedly worse immediately after the occurrence of poor sleep [7]. Some studies [8] even suggest that the prescription of certain medications to improve sleep is associated with less self-reported pain associated with IBS. Hypno-sedatives and anxiolytics have been previously reported to be prescribed at a significantly higher proportion

in patients with IBS, compared to those who did not have IBS, which further adds to the notion that gut-brain interaction is a significant contributor to the pathogenesis of IBS [9].

This study aims to investigate the impact of IBS on various aspects of life, including sleep quality, and explores its epidemiological patterns in the Jazan region of Saudi Arabia.

Materials and Methods

Study design

The research study was conducted using a cross-sectional descriptive and observational study design among the general population in Jazan city, which is located in the Southwest corner of Saudi Arabia. The study was conducted from December 2023 to July 2024.

Study population

The study population included adults aged ≥ 18 year who lives in Jazan, Saudi Arabia.

Data processing and statistical analysis

Data analysis was performed using the Statistical Package for the Social Sciences (SPSS), version 25.0 (IBM Corp., Armonk, NY). The reliability of the questionnaire was evaluated by the following study [10] using Cronbach's alpha, which was 0.85. Numbers (percent) were used to represent categorical variables. The Chi-square test was applied to compare qualitative variables. Statistics were deemed significant when the P value is less than 0.05, using Fisher's exact test.

Sample type and sample technique

Based on the latest census report, the population that lives in Jazan region is estimated to be 1.568 million. Accordingly, the sample size equation for a cross-sectional study design from the online Raosoft software was used to determine the sample size for our research study, which resulted in 384 individuals. The research study utilized a parameter (P = 50%), an error margin not exceeding 5%, and a confidence interval of 95% to obtain a maximum sample size. In addition, a 25% non-response rate was anticipated for this study. By using a simple random sampling technique, the sample of this study was selected.

Ethical considerations

The Standing Committee for Scientific Research (Jazan University, Saudi Arabia) authorized the study protocol under the reference number of REC-45/08/976. Each individual involved in the study provided their informed consent prior to participation. This study was conducted following the Declaration of Helsinki.

Results

A total of 840 patients were invited to respond through the aforementioned channels in the Methods section. Overall, 728 responded to the questionnaire, generating a response rate of approximately 87%. Of these, 244 (33.5%) had self-reported IBS and 484 (66.5%) did not have IBS.

Respondents who had IBS tended to be of the female gender (P < 0.001), of younger age (P = 0.002) and were mainly city-dwellers (P = 0.005). IBS was more prevalent in divorced individuals (P = 0.028). Education level did not seem to impact the overall presence of IBS in our respondents (P = 0.093), albeit there was a tendency towards IBS respondents having higher education level. There was a non-significant tendency towards IBS being more prevalent in the unemployed population (P = 0.063). IBS group had a higher proportion of current and previous smokers compared to non-IBS group (P = 0.003). Table 1 details the aforementioned data points.

The majority of the respondents who had IBS were diagnosed through a self-reported visit to a physician, with a sizeable minority 82 (33.6%) being diagnosed by an internist. General practitioners were responsible for 49 (20.1%) of the diagnoses, family medicine specialists for 60 (24.6%) of the cases, and gastroenterologists diagnosed IBS in 33 (13.5%) cases. Twenty (8.2%) patients were diagnosed through "other" physicians.

When comparing the symptoms associated with IBS in individuals with self-reported IBS versus those without, abdominal pain (P < 0.001), abdominal distension (P < 0.001), constipation (P < 0.001) and diarrhea (P < 0.001) were more commonly present in the IBS group. Abdominal pain (72.5%) and distension (77.0%) were the most commonly reported symptoms in the IBS group. Table 2 provides a detailed summary of these findings.

With regards to sleep quality, the IBS group had lower proportion of "very good" sleep compared to non-IBS group (18.0% vs. 27.3%, P = 0.006). Furthermore, IBS group had a lower proportion of individuals getting > 6 h of continuous sleep hours compared to the non-IBS group (23.8% vs. 40.9, P < 0.001). A sizeable minority of the IBS group as compared to non-IBS group reported difficulty sleeping ≥ 3 times/week (32.0% vs. 19.2%, P < 0.001). In addition to this, the IBS group was overrepresented in having ≥ 1 awakening at night per week when compared to the non-IBS group (68.0% vs. 57.0%, P = 0.001). Moreover, in the IBS-group, 23.0% reported repetitive awakening earlier than expected compared to 15.3% in the non-IBS group (P = 0.007). There was no difference (P = 0.271) in the medicines used for aiding sleep in IBS-group versus the non-IBS group. Table 3 provides a detailed summary of these comparisons.

Physical exercise > 3 times per week was less prevalent in the IBS group (7.0%) compared to the non-IBS group (13.4%), though this difference was not significant (P = 0.065). Coffee consumption of ≥ 1 cup/day was significantly more com-

Table 1. General Characteristics of Respondents Stratified by Self-Reported IBS Status

Parameters	IBS (n = 244)	Non-IBS (n = 484)
Gender		
Female	168 (68.9)	267 (55.2)
Male	76 (31.1)	217 (44.8)
Age, years		
< 18	10 (4.1)	14 (2.9)
18 - 23	32 (13.1)	121 (25.0)
24 - 33	97 (39.8)	155 (32.0)
34 - 44	42 (17.2)	86 (17.8)
45 - 54	52 (21.3)	83 (17.1)
55 - 64	9 (3.7)	25 (5.2)
≥ 65	2 (0.8)	0 (0)
Place of residence		
Mountain	2 (0.8)	8 (1.7)
Villages	84 (34.4)	222 (45.9)
City	158 (64.8)	254 (52.5)
Marital status		
Widowed	2 (0.8)	6 (1.2)
Single	101 (41.4)	221 (45.7)
Married	123 (50.4)	244 (50.4)
Divorced	18 (7.4)	13 (2.7)
Education level		
High school	58 (23.8)	153 (31.6)
Below high school	5 (2.0)	7 (1.4)
Bachelor's	168 (68.9)	308 (63.6)
Master's	13 (5.3)	16 (3.3)
Employment status		
Student	43 (17.6)	124 (25.6)
Unemployed	55 (22.5)	83 (17.1)
Employed	133 (54.5)	251 (51.9)
Other	13 (5.3)	28 (5.4)
Smoking status		
Never smoker	174 (71.3)	398 (82.2)
Currently smoker	49 (20.1)	58 (12.0)
Previous smoker	21 (8.6)	28 (5.8)

IBS: irritable bowel syndrome.

mon in the IBS group (72.5%) compared to the non-IBS group (57.3%) (P = 0.001). Table 4 illustrates these results.

Discussion

In our study, we analyzed the results obtained from a self-reported questionnaire on IBS-associated symptoms. In the included population, there was a relatively high prevalence of self-reported IBS. Previous studies have reported prevalence rates ranging approximately from 5% to 25% [11-15]. A previous study from our area reported a prevalence of 16% of IBS in our population [16], which is significantly lower than the prevalence found in our study. There are, however, pertinent aspects which deserve to be highlighted in our study.

Table 2. Symptoms Reported in IBS and Non-IBS Group

Reported symptoms	IBS (n = 244)	Non-IBS (n = 484)
Abdominal pain		
Yes	177 (72.5)	100 (20.7)
No	67 (27.5)	384 (79.3)
Abdominal distension		
Yes	188 (77.0)	131 (27.1)
No	56 (23.0)	353 (72.9)
Constipation		
Yes	131 (53.7)	69 (14.3)
No	113 (46.3)	415 (85.7)
Diarrhea		
Yes	104 (42.6)	46 (9.5)
No	140 (57.4)	438 (90.5)

IBS: irritable bowel syndrome.

First of all, females were over two times more likely to self-report IBS than males, which aligns with previous studies on the subject [17, 18]. What may skew the results in our study is the fact that the majority of the respondents were females, with 60% of the respondents being of the female gender. With regards to age, the patients in the lower age bracket (below 33 years of age) seemed to report IBS more frequently than older individuals, which is similar to previously published data [19, 20].

An interesting finding in our study, however, is the relatively low prevalence of IBS in dwellers of the rural areas, with 27.5% of village dwellers reporting IBS symptoms compared to 38.3% of city dwellers. A previous study from Italy [21] reported similar findings, while another study from Bangladesh [22] reported almost equal rates of IBS in rural and urban population, respectively. Our findings may be difficult to explain based solely on our study, but multiple studies have reported more prevalent depressive states in urban versus rural communities [23, 24]. When that is put together with the well-established IBS pathogenesis model involving the so called "brain-gut axis" [25], the explanation may lie in the increased rate of depression and anxiety in the urban setting. Furthermore, increased health literacy in the city-dwelling population [26] and reduced healthcare access in the rural population [27] may additively contribute to the difference presented in our study.

Yet another relevant finding is the increased self-reported prevalence of IBS in individuals who reported being divorced compared to the other marital status categories, as 58.1% of divorced individuals reported having IBS, while 31.4% of single

Table 3. Sleep-Related Parameters in IBS vs. Non-IBS Group

Parameters	IBS (n = 244)	Non-IBS (n = 484)
Sleep quality		
Very good	44 (18.0)	132 (27.3)
Good	72 (29.5)	161 (33.3)
Medium	107 (43.9)	151 (31.2)
Poor	19 (7.8)	35 (7.2)
Very poor	2 (0.8)	5 (1.0)
Continuous sleep hours		
> 6 h	58 (23.8)	198 (40.9)
4 - 6 h	139 (57.0)	216 (44.6)
2 - 4 h	35 (14.3)	63 (13.0)
< 2 h	12 (4.9)	7 (1.4)
Difficulty sleeping per week		
Very rarely	17 (7.0)	116 (24.0)
< 1 time/ week	53 (21.7)	122 (25.2)
1 - 2 times/week	96 (39.3)	153 (31.6)
3 - 6 times/week	48 (19.7)	56 (11.6)
Almost every night	30 (12.3)	37 (7.6)
Awakening at night per week		
Very rarely	29 (11.9)	117 (24.2)
< 1 time/week	49 (20.1)	91 (18.8)
1 - 2 times/week	79 (32.4)	133 (27.5)
3 - 6 times/week	43 (17.6)	60 (12.4)
Almost every night	44 (18.0)	83 (17.1)
Waking earlier than expected		
Never	11 (4.5)	49 (10.1)
Rarely	61 (25.0)	119 (24.6)
Sometimes	116 (47.5)	242 (50.0)
Repetitively	56 (23.0)	74 (15.3)
Medications for sleep		
Yes	15 (6.1)	20 (4.1)
No	229 (93.9)	464 (95.9)

IBS: irritable bowel syndrome.

Table 4. Physical Exercise and Coffee Habits

Parameters	IBS (n = 244)	Non-IBS (n = 484)
Physical exercise per week		
Never	88 (36.1)	176 (36.4)
< 1 time/week	44 (18.0)	88 (18.2)
1 time/week	43 (17.6)	65 (13.4)
2 - 3 times/week	52 (21.3)	90 (18.6)
> 3 times/week	17 (7.0)	65 (13.4)
Coffee consumption		
Never	27 (11.1)	85 (17.6)
< 1 cup/day	40 (16.4)	122 (25.2)
1 cup/day	97 (39.8)	162 (33.5)
2 - 3 cups/day	65 (26.6)	87 (18.0)
> 3 cups/day	15 (6.1)	28 (5.8)

IBS: irritable bowel syndrome.

and 33.5% of married individuals reported having IBS. Such findings have been echoed in previously published research [28]. This, in effect, may be due to the previously mentioned brain-gut axis interaction [29]. Previous studies have reported increased IBS symptoms in individuals with problematic marital situations [30], and, generally, poorer health state in individuals who have undergone separation [31]. This may be related to both local factors in the gut microbiota alongside central nervous system alterations [32]. These factors, altogether, highlight the importance of different life stressors with regards to IBS symptoms development. It is important to identify these factors to be able to provide adequate psychological support as an addition to the medical support provided to these individuals.

Of those with self-reported IBS, almost 30% of the patients had some exposure to smoking as compared to roughly 20% of those without IBS. This relationship has been well established in previous studies [33, 34] and is especially relevant for patients with predominantly diarrheal symptoms [35], given nicotine's effects in increasing acid secretion and gastrointestinal motility overall [36]. It was also noted in our study that individuals reporting having IBS were more avid coffee drinkers, which is also a well-established modifiable risk factor for worsened IBS status [37]. There was also a tendency for individuals with IBS to engage in less physical exercise compared to those without IBS. Physical exercise has been reported to improve IBS symptoms according to published evidence [38, 39]. It is therefore reasonable that patients with IBS be counselled with regards to these aforementioned modifiable risk factors before undertaking a trial of medical therapy.

The majority of individuals who self-reported having IBS were diagnosed through visits to primary care physicians, with only a minority (less than 15%) receiving the diagnosis through a gastroenterologist, which is a rate in keeping with previous studies [40]. Overall, there has been a decline in the rate of referral of IBS patients to specialized gastroenterology clinics [41], which may be a reflection of more rigorous diagnostic criteria implemented in diagnosing IBS [42], alongside increased awareness amongst general practitioners [43] and the general population [44].

There was, overall, poorer sleep quality in individuals reporting IBS than those who did not report having IBS, which is consistent with previous studies [7, 45, 46]. The relation between sleep disorders and IBS is, however, a bidirectional one, best illustrated by the "chicken and egg" paradox [47]. This notion is further strengthened by the proven efficacy of tricyclic antidepressants, which act as both sedatives and neuromodulators in alleviating symptoms in patients with IBS [48]. In spite of this, the self-reported perscription rates of medications relevant for sleep is similar in both the IBS and non-IBS

group, suggesting that there may be potential for improvement with regards to addressing sleeping issues by our healthcare providers in patients diagnosed with IBS.

There are several limitations in our study which need to be addressed. We did not use a structured questionnaire (e.g., Rome IV diagnostic questionnaire) to assess the individuals included in our study, which may lead to "overdiagnosis" with regards to what is perceived by the individual as being IBS while actually being a different functional disorder. In addition to this, no questions were asked to detail the usage of IBS-specific therapies in the individuals who self-identified as having IBS. Yet another weakness is the absence of questions regarding the presence of any underlying psychiatric disorders, such as anxiety or depression, which are strongly associated with IBS.

In conclusion, self-reported IBS was highly prevalent in our region, with risk factors for its presence being similar to those reported in previous studies. Sleep deprivation was highly prevalent in IBS patients although it did not lead to increased prescription of relevant therapies for aid of sleep in these patients. However, marital separation and city-dwelling seemed to confer a higher self-reported IBS status. These issues should be investigated in more robust Rome IV criteria-centered questionnaires in the future using physician-confirmed diagnosis of IBS. This should be done to increase diagnostic accuracy and further validate our findings.

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None to declare.

Conflict of Interest

The authors declare no conflict of interest.

Informed Consent

Informed consent was obtained from every participant included in this study.

Author Contributions

Study conception and design: Ali Someili, Amani A. Mutaen. Data collection: Abdullah M. Alqahtani, Raghad A. Mobaraki, Yara A. Mutaen, Ghaida S. Almuhaysin, Faris A. Alhazmi, Mariam M. Tawhari, Ghadah T. Maghfori, Salem M. Ayyash, Nourah A. Duhmi, Ramzi Moraya. Analysis and interpretation of results: Ali Someili, Mostafa Mohrag, Mohammed Abdulrasak. Draft manuscript preparation: Ali Someili, Mostafa Mohrag, Mohammed Abdulrasak. All authors edited the manuscript and approved the final version. All authors have read and agreed to the published version of the manuscript.

Data Availability

The authors declare that data supporting the findings of this study are available within the article.

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