Prevalence of Irritable Bowel Syndrome and its Associated Factors Among Medical Students

Muneer Almutairi[1*], Moayad AlQazlan[1], Abdullah Alshebromi[1], Mohannad Alawad[1], and Moeen Zafar[2]

[1] *College of Medicine, Qassim University, Qassim, Saudi Arabia*

[2] *Department of Internal Medicine, College of Medicine, Qassim University, Qassim, Arabia*

Corresponding e-mail: muneer_almutairi@hotmail.com

ABSTRACT

Background and aim: *Irritable bowel syndrome (IBS) is a common functional gastrointestinal disorder and is the most commonly diagnosed one by gastroenterologists. In this study, we aim to explore the frequency of IBS among medical students in Qassim, and the factors associated with this disorder among them.* ***Materials and methods:*** *A cross sectional study was carried out among medical students of all academic levels in three local universities in Qassim region; Qassim University, Unizah as well as Alrajhi colleges of medicine. Data for the study were collected throughout the 1st semester of the academic year 2015-2016 using a validated, self-administered, and anonymous paper questionnaire. The questionnaire included three main sections: Demographics, Rome III criteria and hospital anxiety and depression scale (HADS).* ***Results:*** *Among 511 students completed the study and of those 70 (13.7%) had IBS. Senior medical students are 3.61 times more likely to have IBS than juniors (p<0.001). Depression was significantly associated with IBS (p=0.042). Stepwise logistic regression showed that chronic health problems, more advanced academic level and personal history of IBS were significant predictors for IBS.* ***Conclusion:*** *The prevalence of IBS is 13.7% among medical students in Qassim region. Depression, age, living situation, advanced academic years, family or personal history, or an episode of travellers' diarrhoea were the main predictors of IBS. Offering psychological and emotional support along with stress management courses in order to deal with stress is recommended.*

Keywords: IBS, irritable bowel syndrome, medical students, stress, anxiety, depression

INTRODUCTION

Irritable bowel syndrome (IBS) is a common functional gastrointestinal disorder characterized by frequent alteration in bowel habits along with abdominal pain or discomfit and/or bloating, in the absence of organic lesion in the intestine [1,2]. It's considered as the most frequently diagnosed disorder by gastroenterologists, and, in the US alone, the physician visits for IBS account for 2.4 and 3.5 million annually [3,4]. It is ranging widely among all societies and socio-economic classes [5,6]. The prevalence of IBS ranges from 9% to 23% worldwide. However, it varies from one country to another according to the diagnostic tool used. Based on Rome III criteria, IBS affects about 10% to 15% and 10% to 20% in North America, and western countries, respectively [3,7,8]. On the other hand, two different studies were conducted in Saudi Arabia; Makkah and Aljouf. In Makkah, 26.7% of the subjects were diagnosed with IBS by using Rome III criteria. In Aljouf, the prevalence of IBS was 8.9% by using Manning criteria, and 9.2% by using Rome II criteria [6,9].

There are other factors that may impact the prevalence of IBS including age and gender. IBS affects females more than males, and is more common among those who are under 45 years of age [10,11]. IBS poses a great burden on patients' quality of life, and is considered as the 2nd most common cause of work absenteeism [12-14].

A large number of university students experience psychological issues like stress and anxiety. A study was done in China which revealed that medical students are at higher risk of developing IBS compared to science and engineering

students [1]. This result may be due to the fact that medical students are continuously dealing with psychological stress throughout their medical years because of numerous exams and long courses. In Jeddah, Saudi Arabia, the prevalence of IBS among medical students was high accounting for 31.8% [15,16].

Regarding the diagnosis of IBS, different diagnostic criteria have been established such as Manning criteria, Rome criteria I and Rome Criteria II [17]. However, the Rome III criteria is the current diagnostic tool for IBS [18]. This questionnaire was created by the Rome III committee, in 2006. The criteria classify the IBS subtypes using stool consistency that shows an accurate diagnosis of IBS because it's the closest to the clinical criteria [1].

Despite the fact that, IBS is considered as a common disorder in western countries, it's still an area of little research in Arab countries, especially in Saudi Arabia. Furthermore, a few studies have investigated the prevalence and the risk factors in college students, specifically medical students. Moreover, the literature lacks sufficient information concerning medical students of Qassim region. Thus, our goal for this study is to estimate the spread of IBS among medical college students of Qassim region, and to identify the factors associated with it to aid for future diagnosis and prevention. In addition, we will determine the effect of increase in academic level on the frequency of IBS as well as finding correlation between anxiety/depression and IBS.

MATERIALS AND METHODS

Study setting and design

An observational cross sectional study was conducted in April and May 2016 of the academic year 2016-2017 in Qassim, Saudi Arabia.

Ethical consideration

This study was reviewed and approved by Regional Research Ethics Committee-Qassim Region.

Inclusion and exclusion criteria

The study included medical students of three local universities in Qassim region; Qassim University College of Medicine, Unizah College of Medicine as well as Alrajhi College of Medicine. Participants must be 18-30 of age and enrolled in one of the three universities as undergraduates.

Sample size

Because this study is a cross-sectional one, we tried to include everyone in every academic level from both genders; males and females.

Data collection method and instruments

Data collectors approached each one of them from all academic levels, and have given a full verbal explanation of the study, its goals and importance. Participants were told how and why they were selected and that they're not obligated to take part in the study. They were then informed of their rights, including their full right, and under any circumstances, to leave the study at any stage. They were also notified that whatever information they give will be kept confidential and are going to be only used for research purposes; they also have the right to not answering any question. Participants weren't given any incentives. Those who have given a verbal consent to take part, were handed a copy of the survey used in the study, and were told to ask for a clarification about any question they don't understand in the survey. Respondents who reported the presence of one or more red-flag item were excluded out of the study.

Data for the study were collected throughout the 1st semester via validated, self-administered, and anonymous paper questionnaire. The tool was piloted by distributing it among 15 participants. Every participant was asked to evaluate the following points: A) whether the questionnaire design and arrangement positively motivate participants to complete the survey? B) How long does it take to complete every questionnaire? C) Are the questions understood, comprehensive, easy to read and whether they were interpreted similarly by all respondents? D) Is there any systematically missed item? E) whether responses sufficiently and appropriately grouped? F) whether the questions cover the study objectives? Certain modifications were made accordingly including editing the demographics section design, questions, and range of grade point average responses. The latter were modified into (>=4, or <4) rather than (<3.0, 3.0-3.49, 3.5-3.99, 4.0-4.49, >=4.5). The questionnaires are divided into 3 main parts; Sociodemographic

data, IBS diagnostic criteria and a questionnaire to assess anxiety and depression. Sociodemographic characteristics, daily life habits as well as history of irritable bowel syndrome were obtained as baseline information. Amongst these information, the followings were asked about: age, gender, marital status (single, married), living status (living alone, with family or with friends), which college of medicine the participant is a student at (Qassim University, Unizah College, Suliman Alrajhi), academic year (1st, 2nd, 3rd, 4th, 5th), current Grade Point Average (<4, ≥4), current parents' situation (living together, divorced, dead "one or both"), average family income (SAR <4000, 4000-10,000, >10,000), height (in cm) and weight (in kg), exercising regularly (yes, no), common food source (home, restaurant), frequency of fast food consumption (daily, 4-6 times, 1-3 times, never), daily sleeping hours (<8 h, 8 h, or more), history of food allergies (yes, no), cigarette smoking status (currently a smoker, previous smoker, never smoked), family history of IBS (yes, no), and personal history of IBS (yes, no). For the IBS, diagnostic criteria questionnaire, ROME III criteria were used. According to ROME III Criteria, IBS is diagnosed based on the presence of a recurrent abdominal pain or discomfort for at least 3 times/month during the past three months. This pain, or discomfort, is accompanied by two or more of the following: a) Improvement with defecation. b) Onset associated with a change in the form (appearance) of stool. c) Onset associated with a change in the stool frequency. A duration of six months from the onset of the symptoms is required to diagnose IBS. IBS is further classified into different subtypes based on the predominant symptom, either diarrhoea-predominant (IBS-D), constipation-predominant (IBS-C), mixed (IBS-M), or un-subtyped IBS (IBS-U). Diagnosing IBS may possibly be established by following the ROME III criteria after excluding the red flag symptoms that include fever, vomiting, rectal bleeding, weight loss which might hint at other diagnoses [1]. Omitting the red flag symptoms renders 100% specificity and 65% sensitivity in diagnosing IBS by using ROME III criteria [3]. In our study, the following items were included as red flags [1]; blood in the stools, black stools, vomiting blood, anaemia, fever, unintentional weight loss of 4.5 kg over the previous three months, family history of colon cancer, inflammatory bowel disease, and/or celiac disease. Respondents who reported the presence of one or more red-flag items were excluded out of the study. To assess the level of anxiety as well as depression, hospital anxiety, and depression scale (HADS) was used. It is a valid standardized tool containing 14 questions; seven of which are set to assess anxiety (HDAS-Anxiety) and the other seven questions are for depression (HDAS-Depression) [19].

Statistical analysis

The prevalence of IBS among all students was calculated and then compared between groups using the Chi-squared test or Fisher's exact test, as appropriate for categorical variables and the Mann-Whitney U test for continuous variables. The relationship between student characteristics and the odds of IBS were also explored suing univariable logistic regression models with results expressed as odds ratio (OR) with 95% confidence intervals (95% CI). Independent predictors of IBS were identified using a forward selection approach, with variables with p<0.05 added to the model. Associations between characteristics and type of IBS (IBS-M versus other) were explored using chi-squared test, Fisher's exact test and Mann-Whitney U test with odds ratio estimated as above using logistic regression. Analysis was conducted using SPSS v 22.
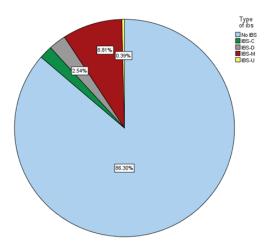

Figure 1 IBS status of all respondents

In total 511 students completed the study and of those 70 (13.7%) had IBS (Figure 1). Among those who had IBS, IBS-M was the most common type reported by 45 students (64.3%), with IBS-C reported by 10 (14.3%), IBS-D by 13 (18.6%) and IBS-U by 2 (2.9%).

Table 1 Demographic characteristics and odds of IBS

Variables		Non-IBS	IBS	X2	p-value	Odds ratio	95% CI for odds ratio
Student gender	Male	280 (85.6)	47 (14.4)	0.349	0.554	1	-
	Female	161 (57.5)	23 (12.5)	-	-	0.85	0.50 to 1.45
Student age		21 (20 to 23)	22 (21 to 24)	MW	0.004*	1.25	1.08 to 1.45
Marital Status	Single	422 (86.5)	66 (13.5)	FE	0.539	1	-
	Married	19 (82.6)	4 (17.4)	-	-	1.35	0.44 to 4.08
Living status	Alone	41 (80.4)	10 (19.6)	10.597	0.005	1	-
	Family	313 (84.6)	57 (15.4)	-	-	0.75	0.35 to 1.58
	Friends	87 (96.7)	3 (3.3)	-	-	0.14	0.04 to 0.54
Current Parent status	Living Together	380 (86.2)	61 (13.8)	0.819	0.664	1	-
	Divorced	17 (81.0)	4 (19.0)	-	-	1.47	0.48 to 4.50
	Dead (one or both)	41 (89.1)	5 (10.9)	-	-	0.76	0.29 to 2.00

FE=Fisher's exact test, MW= Mann-Whitney U test.

The associations between demographic characteristics and odds of IBS are summarised in Table 1. *Age was significantly associated with IBS (p=0.004), with odds increasing by 25% with every year increase in age (OR=1.25). Living situation was also significant, with the odds of IBS highest among those who live alone (p=0.005). Gender, marital status, and parents living situation were not significant.

Table 2 Academic characteristics and odds of IBS

Variables		Non-IBS	IBS	X2	p-value	Odds ratio	95% CI for odds ratio
University	Qassim University College of medicine	241(82.8)	50 (17.2)	8.685	0.013†	1	-
	Onizah college of medicine	97(94.2)	6 (5.8)	-	-	0.3	0.12 to 0.72
	Sulliman AlRajhi College of medicine	103 (88.0)	14 (12.0)	-	-	0.66	0.35 to 1.24
Academic level	1st year	102 (91.1)	10 (8.9)	20.407	<0.001	1	-
	2nd year	103 (92.0)	9 (8.0)	-	-	0.89	0.35 to 2.28
	3rd year	100 (90.1)	11 (9.9)	-	-	1.12	0.46 to 2.76
	4th year	71 (80.7)	17 (19.3)	-	-	2.44	1.06 to 5.65
	5th year	65 (73.9)	23 (26.1)	-	-	3.61	1.61 to 8.08
GPA	<4	160 (83.8)	31 (16.2)	1.379	0.24	1	-
	>=4	260 (87.5)	37 (12.5)	-	-	0.73	0.44 to 1.23

†There was a difference in levels of IBS across the three universities (p=0.013) with IBS most common in Qassim university and least in Onizah college (Table 2). As academic level increased the odds of IBS also increased, this those in 5th year 3.61 times more likely to have IBS than 1st years (p<0.001). GPA was not associated with IBS risk.

Table 3 Lifestyle characteristics and odds of IBS

Variable	Non-IBS	IBS	X2	p-value	Odds ratio	95% CI for odds ratio
BMI, median (IQR)	24.2 (21.6-27.8)	25.1 (22.8-29.4)	MW	0.07	1.04	0.99 to 1.09

‡BMI category	Underweight	30 (88.2)	4 (11.8)	4.646	0.326	1	-
	Normal	211 (87.9)	29 (12.1)	-	-	1.03	0.34 to 3.14
	Overweight	112 (84.8)	20 (15.2)	-	-	1.34	0.43 to 4.22
	Obese	42 (85.7)	7 (14.3)	-	-	1.25	0.34 to 4.67
	Morbidly obese	19 (73.1)	7 (25.9)	-	-	2.76	0.71 to 10.73
Common food source	Home	257 (85.7)	43 (14.3)	0.227	0.634	1	-
	Restaurant	1832 (87.1)	27 (12.9)	-	-	0.88	0.53 to 1.48
	Fast food consumption frequency	-	-	-	-	-	-
	Never	20 (76.9)	6 (23.1)	2.342	0.505	1	-
	1-3 times per week	265 (84.2)	39 (12.8)	-	-	0.49	0.19 to 1.30
	4-6 times per week	93 (86.9)	14 (13.1)	-	-	0.5	0.17 to 1.47
	Daily	60 (84.5)	11 (15.5)	-	-	0.61	0.20 to 1.67
Daily sleeping hours	Less than 8 hours	297 (85.6)	50 (14.4)	0.365	0.546	1	-
	8 hours or more	141 (87.6)	20 (12.4)	-	-	0.84	0.48 to 1.47
Smoking status	Currently a smoked	17 (73.9)	6 (26.1)	3.132	0.209	1	-
	Previous smoker	14 (87.5)	2 (12.5)	-	-	0.41	0.07 to 2.33
	Never smoked	410 (86.9)	62 (13.1)	-	-	0.43	0.16 to 1.13
Regular exercise	No	328 (86.1)	53 (13.9)	0.044	0.834	1	-
	Yes	112 (86.8)	17 (13.2)	-	-	0.94	0.52 to 1.69

MW=Mann-Whitney U test. ‡BMI, eating habits, hours of sleep, smoking status and participating in regular exercise did not impact on risk of IBS.

Table 3 indicates lifestyle characteristics and odds of IBS whereas Table 4 shows medical history and odds of IBS.

Table 4 Medical history and odds of IBS

Variables		Non-IBS	IBS	X2	p-value	Odds ratio	95% CI for odds ratio
Food allergies §	No	389 (68.4)	61 (13.6)	0.065	0.798	1	-
	Yes	52 (85.2)	9 (14.8)	-	-	1.1	0.52 to 2.35
Personal history of IBS	No	411 (89.5)	48 (10.5)	41.396	<0.001	1	-
	Yes	29 (56.9)	22 (43.1)	-	-	6.5	3.46 to 12.19
Family history of IBS	No	341 (89.7)	39 (10.3)	15.696	<0.001	1	-
	Yes	97 (75.8)	31 (24.2)	-	-	2.79	1.66 to 4.71
Chronic health problems	No	402 (88.9)	50 (11.1)	23.021	<0.001	1	-
	Yes	39 (66.1)	20 (33.9)	-	-	4.12	2.23 to 7.62
Travelers diarrhoea	No	410 (87.6)	58 (12.4)	7.29	0.007	1	-
	Yes	25 (71.4)	10 (28.6)	-	-	2.83	1.29 to 6.19

§Having food allergies was not associated with odds of IBS. However, a family or personal history, or an episode of travellers' diarrhoea were all associated with an increase in the odds of IBS being reported.

Table 5 Anxiety, depression, and odds of IBS

Variables		Non-IBS	IBS	X2	p-value	Odds ratio	95% CI for odds ratio
Depression level	Normal	238 (84.7)	43 (15.3)	6.344	0.042 ‖	1	-
	Borderline	107 (92.2)	9 (7.8)	-	-	0.47	0.22 to 0.99
	Morbid	55 (79.7)	14 (20.3)	-	-	1.41	0.72 to 2.76
Anxiety level	Normal	188 (88.7)	24 (11.3)	2.553	0.279	1	-
	Borderline	116 (85.3)	20 (14.7)	-	-	1.35	0.71 to 2.55
	Morbid	99 (82.5)	21 (17.5)	-	-	1.66	0.88 to 3.13

‖ Depression level was significantly associated with IBS, with IBS most common in those with depression (p=0.042) (Table 5). However, there was no association with anxiety level.

Table 6 Characteristics identified as independent predictors of IBS using stepwise logistic regression

Variables		Odds ratio	95% CI for odds ratio	p-value
Chronic health problems	No	1	-	0.001
	Yes	3.58	1.72 to 7.42	-
Academic level	1st year	1	-	0.011
	2nd year	0.63	0.22 to 1.81	-
	3rd year	0.75	0.27 to 2.10	-
	4th year	1.63	0.65 to 4.11	-
	5th year	2.87	1.16 to 7.06	-
Personal history of IBS	No	1	-	<0.001
	Yes	6.15	2.83 to 13.38	-

Stepwise logistic regression was used to identify the characteristics that were independently associated with IBS with the results presented in Table 6. Chronic health problems, more advanced academic level and personal history of IBS were all significant predictors for IBS. Respondents with chronic health conditions were 3-5 times more likely to have IBS than those without, while those with a personal history of IBS were over 6 times more likely to currently have IBS.

Table 7 Demographic characteristics and type of IBS

Variable		IBS-M	Other	X2	p-value	Odds ratio	95% CI for odds ratio
Student gender	Male	28 (62.2)	19 (76.0)	1.383	0.24	1	-
	Female	17 (37.8)	6 (24.0)	-	-	1.92	0.64 to 5.76
	Student age	22 (21 to 23)	23 (21 to 24)	MW	0.202	0.81	0.61 to 1.09
Marital Status	Single	42 (93.3)	24 (96.0)	FE	1	1	-
	Married	3 (6.7)	1 (4.0)	-	-	1.17	0.17 to 17.41
Living status	Alone	5 (11.1)	5 (20.0)	FE	0.763	1	
	Family	38 (84.4)	19 (76.0)	-	-	2	0.52 to 7.76
	Friends	2 (4.4)	1 (4.0)	-	-	2	0.13 to 29.81
Current Parent status	Living Together	37 (82.2)	24 (96.0)	FE	0.217	1	-
	Divorced	3 (6.7)	1 (4.0)	-	-	1.95	0.19 to 19.82
	Dead "one or both"	5 (11.1)	0	-	-	NA	-

FE=Fisher's exact test, MW= Mann-Whitney U test

Next the characteristics of respondents with IBS were summarised by type of IBS. Due to low numbers, analysis compared IBS-M to all others. Across all characteristics recorded, only BMI category varied significantly between the two groups with IBS-M tending to have lower BMIs than those with other subtypes (Table 7).

DISCUSSION

Irritable Bowel Syndrome is the commonest chronic disorder of the alimentary tract [20,21]. Its international prevalence is estimated to be 11.2% [22], and is impacted by various genetic, dietary, and social factors [23]. Several different

studies investigated its prevalence and showed a wide range of variability within each geographical region. For instance, IBS prevalence in North America approaches 21.0%, however; in South Asia, it is 7.0% [22]. Furthermore, Kim and Ban, stated that Koreans have less IBS prevalence rate as compared to that of the other western countries [24]. The current investigation shows that the prevalence of IBS among medical students is 13.7%. On the contrary, two different local studies conducted in King Abdulaziz University [15] and Prince Sattam bin Abdulaziz University [14] about the prevalence of IBS among medical students reported higher rates; (31.8%) and (21%), respectively. Naeem, et al. [25] reported a closely similar prevalence (28.3%) among medical students in Pakistan. However, the prevalence reported in our study was close to that reported by Miwa Hiroto [2] which was of 13.1%, and exactly similar to that reported by Mansour-Ghanaei, et al. [26]. This inconsistency in the results might be attributed to different factors limiting the estimation of the actual number of students having IBS, including the sample size and response rate [27-32].

Several studies reported findings concerning frequency of IBS among non-medical students. Dong, et al. [1] stated that the prevalence of IBS based on Rome III criteria is 7.85% among university and college students in China. In Lebanon, Costanian, et al. [27] conducted a cross-sectional study among students of five different local universities, and concluded that 20% of University students suffer from IBS. Nevertheless, results were more supportive of the hypothesis that medical students are more likely to be diagnosed with IBS compared to other students. Similarly, Okami, et al. [28] concluded that IBS prevalence rate was higher in the nursing and medical students.

Regarding IBS subtypes, the present study reported IBS-M to be the commonest amongst all the other subtypes constituting 64.3% followed by IBS-D (18.6%). Yang Liu, et al. [29] described a similar finding in his study among medical students in Beijing, China, with IBS-M constituting 43.9% of those who were diagnosed with IBS, and IBS-D being reported by 31.0%.

Many studies reported that females had a higher risk of IBS than males [15,29-33,26-28]. Liu, et al. [29] showed that female students were twice more likely to suffer from IBS than males. Ibrahim, et al. [15] reported that the first predictor of IBS was the female gender. However, our study showed no statistically significant relation between IBS and gender.

Ibrahim, et al. [15] reported that students living in dormitories had a higher prevalence than students living with their families. Similarly, a study conducted by Costanian, et al. [27] revealed that students living in private dormitories were three times more likely to suffer from IBS. Living situation was also significant in our study, with the odds of IBS being highest among those who live alone (p=0.005).

The current work illustrates that as the academic level increases, the rate of having IBS increases proportionately. Ibrahim, et al. [15] described similar findings.

Basandra, et al. [3] reported that IBS was significantly associated with inadequate practicing of physical activities by Indian medical students. Costanian, et al. [6] found that students who reported regular practicing of physical exercises had a significantly lower prevalence of IBS than others. The protective effect of physical activity was also reported by other studies [2,9]. On the other hand, our study showed no protective effect of physical activity on the prevalence rate of IBS. Similarly, BMI was reported to be statistically significant by Ibrahim, et al. [15] in contrast to the finding reported by our study.

Basandra, et al. [33] found that consumption of fatty foods was significantly correlated with a higher prevalence of IBS. However, the current study illustrated that prevalence rate of IBS among medical students in Qassim was not impacted by eating habits.

In the present study, having food allergies was not associated with odds of IBS. On the other hand, Ibrahim, et al. [15] reported that IBS was more frequent among those who had food hypersensitivity (64%) in comparison with those without food hypersensitivity (39.4%). Similar results were reported by Costanian, et al. [27].

Although our study showed no association between sleeping hours and prevalence of IBS, Ibrahim, et al. study [15] showed that students who slept fewer hours (<8 h/day) had a higher prevalence of IBS than others. Similarly, Liu, et al. [29] reported an association between sleep disturbances and IBS; participants with IBS had a significantly higher Pittsburgh sleep quality index (PSQI) score than others.

A study conducted among medical students revealed a significant association between IBS and cigarette smoking [33]. However, another study which support our study did not show such an association [15].

In regards to family and personal history of IBS, we have found that a family or personal history were all associated with an increase in the odds of IBS. Previously it was reported that there is a familial role of IBS among the general population [34,35]. A family-based case-control study in the USA confirmed the familial clustering of IBS cases and reported that IBS family history is a recognized predictor of it [34]. Similarly, another familial aggregation of IBS cases was observed in other western countries [35]. It was found that there is an increased IBS risk among the first, second, and third-degree relatives from a Swedish population. Genetic factors may also contribute to the pathophysiology, which indicates a genetic component of the familial clustering of IBS [36]. These studies correlate with the results obtained among medical students in our study.

Concerning chronic health problems, the present study revealed that having chronic health problems was a significant predictor of IBS. On the other hand, Ibrahim, et al. [15] reported that there was no statistically significant difference between the presence of other chronic diseases and IBS (p>0.05).

This study showed a significant impact of depression (p=0.042) on the prevalence of IBS. Students with morbid level of depression had higher prevalence (20.3%) of IBS compared to those with borderline depression (7.8%). Ibrahim, et al. [15] reported that (41.9%) of medical students with IBS were diagnosed as having morbid level of depression compared to normal students (31.5%) in Jeddah. According to Okeke, et al. [37] depression is one of the leading causes of IBS among Nigerian medical students.

Regarding anxiety, the present study showed that IBS prevalence was higher in students with morbid levels of anxiety (17.5) compared to those with borderline anxiety (14.7). However, there was no statistically significant difference. Out of 360 medical students included in study done in Karachi, Pakistan for IBS, anxiety was encountered among 55.8% of the students [25]. Sugaya, et al. [38] concluded that individuals who complain of IBS in Japan had higher scores on the HADS compared to the control group [6]. It has been shown that although the symptoms of IBS influence anxiety and depression, psychological factors themselves affect the motor abdominal functions, sensory threshold, and stress reactivity of the intestine [39].

CONCLUSION

The prevalence of IBS is 13.7% among medical students in Qassim region. Depression significantly correlate with a higher rate of IBS prevalence. However, there was no association with anxiety level. age, living situation, advanced academic years, family or personal history, or an episode of travellers' diarrhoea were the main predictors of IBS. We recommend offering psychological and emotional support as well as stress management courses in order to deal with stress faced by medical students during their academic education.

ACKNOWLEDGEMENTS

CONFLICT OF INTEREST

We declare that we have no conflict of interests.

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