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Prevalence of irritable bowel syndrome and associated factors in intern doctors at a state university in western black sea, Turkey: A cross-sectional study

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Abstract

Irritable bowel syndrome (IBS) is a functional digestive disorder that affects medical students at a higher rate than the general population. Intern doctors are the most affected class by IBS among medical students. Determining the prevalence of IBS and associated risk factors is essential for taking preventive measures. We aimed to investigate the prevalence and predictors of IBS among intern doctors in this study. This study was conducted using an online survey for intern doctors in the 2021-2022 academic year. Rome IV criteria were utilized for IBS diagnosis. Anxiety and depression scores were calculated according to the Hospital Anxiety and Depression Scale (HADS). The prevalence of IBS in the 249 participants was 31.7% included in this study. 32.1% of all participants had depression, 44.2% had anxiety, 65.1% had sleep disorders, 73.1% had MSE (medical specialty exam) anxiety, and 96% were concerned about carrying out the medical profession after graduating from university. Female gender ($p<0.001$), using regular medication ($p=0.019$), not exercising regularly ($p=0.002$), sleep disturbance ($p<0.001$), food hypersensitivity ($p=0.001$), having a history of severe acute gastroenteritis (AGE) before IBS symptoms started ($p<0.001$), IBS in first-degree relatives ($p<0.001$), be low income ($p<0.001$), having a divorced parent ($p=0.008$), not having siblings ($p=0.002$), severe emotional stress history in the last six months ($p=0.004$), having depression ($p<0.001$), having anxiety ($p<0.001$), and MSE anxiety ($p<0.001$) identified as risk factors associated with IBS. The multivariant analysis determined independent risk factors affecting the prevalence of IBS in intern doctors as female gender, depression, anxiety, and severe AGE history before IBS symptoms started. In this study, it was determined that approximately one-third of the interns were diagnosed with IBS. Stress management training can be considered to screen this group for IBS and psychological problems and to help them cope with these stressors.

Keywords: Irritable bowel syndrome, intern doctors, depression, anxiety

Introduction

Irritable bowel syndrome (IBS) is a functional digestive disorder that significantly decreases the quality of life and is defined by recurrent abdominal pain coupled with irregular stool frequency or form [1,2]. The IBS prevalence is usually reported in the 10–20% range. However, it is difficult to determine due to heterogeneity ranging from 1.1% to 35.5% across countries [3]. Adverse events in early childhood, psychological factors or gastrointestinal infections, or a genetic predisposition triggered by changes in the mucosal barrier, gastrointestinal sensory, motor, and enteric nervous system that controls secretory responses, are blamed for the etiology [2]. After organic causes of digestive symptoms have been ruled out, IBS is diagnosed according to the Rome IV criteria. Typically for IBS, abdominal pain must have started at least six months ago, recurring at least one day per week on average, and has persisted for the past three months. This abdominal pain is associated with at least two changes in defecation, an alteration in stool frequency, or an alteration in stool form (appearance) [4].

Although there is no known definitive treatment for IBS, it is essential to determine the prevalence of IBS and associated risk factors for raising awareness and taking preventive measures such as dietary regulations and various psychological interventions [5]. It might be considered that medical students experience more stress than other students because of the long educational process, long working hours, difficult exams, and challenges associated with dealing with patients. Consequently, the increased prevalence of IBS may be predisposed by medical education [6,7]. According to reports, the prevalence of IBS among medical students can range

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from 9.3 percent to 35.3 percent globally [8]. It has been shown in a study conducted in a medical school in Saudi Arabia that the prevalence of IBS is higher among medical school students in interns than in the lower class [9]. However, no specific study was found for this group.

The procedure can become even more stressful if senior medical students' (interns) prepare for the Medical Specialization Exam (MSE), which is a challenging examination process in our country, as well as their preparation for appointment to professional life. In this group, it was aimed to evaluate the prevalence of IBS and the factors affecting IBS.

Material and Methods

Study population and design

This cross-sectional observational study was conducted as an online survey for intern doctors at Zonguldak Bulent Ecevit University between June 23 and July 1 in the 2021-2022 academic year. Questionnaires were answered entirely voluntarily, and no awards were given for participation. Those with overt or occult gastrointestinal bleeding, a history of organic bowel disease, first-degree relatives with colon cancer, first-degree relatives with inflammatory bowel disease, those who lost 10% of their body weight in the last six months, and those with malignancy were excluded from the study. After organic causes of digestive symptoms had been ruled out, IBS was diagnosed according to the Rome IV criteria [4].

Survey questionnaire

The questionnaire consisted of the first part of 24 questions about the sociodemographic characteristics of intern doctors and IBS symptoms and the second part of 14 questions measuring anxiety-depression states. The details of the questionnaire were described in supplementary material 1. Body mass index (BMI) was defined as under 18.5 underweight, 18.5-24.9 normal weight, 25-29.9 overweight, and 30 and above obese. Regular physical exercise was defined as the regular exercise performed for at least 40 minutes at least three days a week. Although there were suitable conditions for sleep in the last six months, sleep problems such as difficulty initiating and maintaining sleep or fatigue due to insomnia in daily life were defined as sleep disturbance. Severe emotional stress was defined as experiencing extreme emotional stress in the past six months, such as the death of a loved one. Anxiety and depression scores were calculated according to the Hospital Anxiety and Depression Scale (HADS) for anxiety (HADS-Anxiety) and depression (HADS-Depression) and classified as 0-7: normal, 8-12: borderline abnormal (borderline case), 11-21: anormal [10].

Statistics

The SPSS (Statistical Package for Social Sciences) version 22.0 (IBM Inc., Chicago, USA) was employed for statistical assessment. Data were presented as numbers (%) or means ±standard deviations. Descriptive statistics (frequencies and percentages) were used to describe the categorical study and outcome variables. For the comparison of categorical data, the $\chi 2$ test was used. Logistic Regression analysis was used to determine independent risk factors for IBS. p-values ≤ 0.050 were used to define statistical significance.

Ethics Approval

Zonguldak Bülent Ecevit University Faculty of Medicine Non-Invasive Clinical Research Ethics Committee accepted the present study (Protocol No: 2022/12, Approval date: 22/06/2022). The study procedure adheres to the ethical principles established in the Helsinki Declaration of 1964.

Results

A total of 290 intern doctors in the 2021-2022 academic year were surveyed, and 269 participants answered the questionnaire (92.7%). 20 participants were excluded from the study because their first-degree relative had colon cancer, lost more than 10% of their weight in the last six months, and had overt or occult bleeding and anemia. As a result, the responses of 249 participants were included in the study.

58.2% of the participants included in the study were female, and 60.6% were in the normal BMI range. 33.3% of the participants were smokers, and 35.7% regularly used alcohol. Only 22.1% of participants practiced regular exercise, and 8.8% had food hypersensitivity or food allergy. 9.6% had a history of chronic diseases such as migraine, fibromyalgia, hypertension, asthma, diabetes mellitus, and psychiatric illness, and 19.3% had a history of regular drug use. Only 4 (1.6%) of all participants were married, and 59.4% claimed their income was sufficient. The majority (74.3%) lived in separate houses from their families, 20.5% lived in the same house with their family, and only 5.2% lived in a dormitory. The parents of 87.1% of the participants were married and living together, 8.4% of the parents were divorced, and one or both of the parents of 4.4% had died. 41.8% of their mothers and 63.9% of their fathers were university graduates or higher. 11.2% had no siblings, while 75.1% had two or fewer siblings.

31.7% of the participants had a diagnosis of IBS according to the Rome IV criteria. 1st-degree relatives of 16.1% of the participants had a diagnosis of IBS. 12.4% had a history of severe AGE before the diagnosis of IBS. 32.9% had a history of severe emotional stress in the last six months, and 65.1% had sleep disturbance. 71.9% were preparing for MSE, and 73.1% claimed that they experienced anxiety because of this exam. 96% of participants claimed that when they graduated from medical school, the thought of working as a physician under the conditions of our country caused them anxiety. 32.1% of all participants had depression, 21.7% had borderline depression, 46.2% had no depression according to the HADS-Depression scale, 44.2% had anxiety, and 19.7% had borderline anxiety, 36.1% had no anxiety according to the HADS-Anxiety scale.

Table 1 presented that the prevalence of IBS was significantly higher among females (44.1%) compared to males (14.4%) ($p<0.001$). It was observed that smoking and alcohol did not significantly change the prevalence of IBS. The prevalence of IBS was significantly higher in participants using regular medication (45.8%) ($p=0.019$), in those who did not practice regular physical exercise (36.6%) ($p=0.002$), those with sleep disturbance (41.4%) ($p<0.001$), food hypersensitivity (%63.6) ($p=0.001$), a history of severe AGE before IBS symptoms started (90.6%) ($p<0.001$) first degree relatives with a history of IBS (80%) ($p<0.001$), lower income (44.6%) ($p<0.001$), divorced parents (61.9%) ($p=0.008$), and no siblings (60.7%) ($p=0.002$).

Table 1. Relationship between IBS and sociodemographic characteristics of interns

		IBS		No IBS		
		n	%	n	%	p-value
Gender	Female	64	44.1	81	55.9	<0.001
	Male	15	14.4	89	85.6	
Marital status	Married	3	75	1	25	0.061
	Single	76	31	169	69	
Income	Enough	35	23.5	114	76.5	0.022
	Not enough	44	44	56	56	
BMI	Underweight	8	32	17	68	0.357
	Normal	42	27.8	109	72.2	
	Overweight	24	40	36	60	
	Obese	5	38.5	8	61.5	
Smoking	Yes	33	39.8	50	60.2	0.054
	No	46	27.7	120	72.3	
Alcohol	Yes	31	34.8	58	65.2	0.432
	No	48	30	112	70	
Chronic disease	Yes	9	37.5	15	62.5	0.523
	No	70	31.1	155	68.9	
Regular drug using	Yes	22	45.8	26	54.2	0.019
	No	57	28.4	144	71.6	
Food hypersensitivity	Yes	14	63.6	8	36.4	0.001
	No	65	28.6	162	71.4	
Regular exercise	Yes	8	14.5	47	85.5	0.002
	No	71	36.6	123	63.4	
AGE history	Yes	25	80.6	6	19.4	<0.001
	No	54	24.8	164	75.2	
IBS in family	Yes	32	80	8	20	<0.001
	No	47	22.5	162	77.5	
Living place	With family	17	27.9	44	72.1	0.962
	Private house	58	33	118	67	
	Dormitory	4	33.3	8	66.7	
Parents	Living together	63	29	154	71	0.008
	Divorced	13	61.9	8	38.1	
	Mother or father died	3	27.3	8	72.7	
Mother education	University	42	40.4	62	59.6	0.085
	Secondary school	21	26.6	58	73.4	
	Primary school	15	25.4	44	74.6	
	İlliterate	1	14.3	6	85.7	
Father education	University	58	36.5	101	63.5	0.165
	Secondary school	17	25	51	75	
	Primary school	4	19	17	81	
	Illiterate	0	0	1	100	
Sibling	No	17	60.7	11	39.3	0.002
	Two or less	54	28.9	133	71.1	
	Three or more	8	23.5	26	76.5	

IBS: Irritable Bowel Syndrome, AGE: Acute Gastroenteritis, BMI: Body Mass Index

Table 2. Relationship between IBS and psychological risk factors of interns

		IBS		No IBS		
		n	%	n	%	p-value
Sleep disturbance	Yes	67	41.4	95	58.6	<0.001
	No	12	13.8	75	86.2	
Emotional stress in the past six months	Yes	36	43.9	46	56.1	0.004
	No	43	25.7	124	74.3	
Preparing for the MSE	Yes	73	40.8	106	59.2	<0.001
	No	6	8.6	64	91.4	
MSE anxiety	Yes	76	41.8	106	58.2	<0.001
	No	3	4.5	64	95.5	
Professional life anxiety	Yes	77	32.2	162	67.8	0.416
	No	2	20	8	80	
Depression status	Normal	8	7	107	93	<0.001
	Borderline	9	16.7	45	83.3	
	Anormal	62	77.5	18	22.5	
Anxiety status	Normal	3	3.3	87	96.7	<0.001
	Borderline	6	12.2	43	87.8	
	Anormal	70	63.6	40	36.4	

IBS: Irritable bowel syndrome, MSE: Medical Specialization Exam

Also, Table 2 showed that the prevalence of IBS was significantly higher in participants with severe emotional stress history in the last six months (43.9%) (p=0.004), depression according to the HADS-Depression scale (77.5%) (p<0.001), and anxiety according to the HADS-Anxiety scale (63.6%) (p<0.001), those who are preparing for MSE (40.8%) (p<0.001), and those who have MSE exam anxiety (41.8%) (p<0.001).

The multivariant analysis determined independent predictors of IBS in intern doctors as female gender (OR:3.3; 95% CI: 1.2-9.1), depression (OR:10.8; 95% CI: 4.2-27), and anxiety (OR:8.7; 95% CI: 3-24), severe acute gastroenteritis history (OR: 13.1; 95% CI: 2.9-58) (Table 3).

Table 3. Logistic regression analysis of predictors of IBS among interns

	p-value	OR	95% CI
Female gender	0.017	3.3	1.2-9.1
Food hypersensitivity	0.070	4.1	0.8-19.3
Sleep disturbance	0.070	2.9	0.9-9.2
Regular exercise	0.174	2.4	0.6-8.8
Emotional stress in the past six months	0.973	1.0	0.4-2.5
AGE history	0.001	13.1	2.9-58.1
Depression	<0.001	10.8	4.2-27.9
Anxiety	<0.001	8.7	3.0-24.9

AGE: Acute Gastroenteritis, IBS: Irritable Bowel Syndrome OR: Odds-Ratio, CI: Confidence Interval

Discussion

The present study showed that the prevalence of IBS among intern doctors was 31.7%, according to the Rome IV criteria. The generally reported prevalence of IBS is in the range of 10-20% [3]. We found this rate higher in intern doctors than in the general population. This study was conducted with university students in the Western Black Sea Region of Turkey. It may be related to regional differences and, most importantly, the high rates of depression and anxiety in our participants. In a study conducted on medical school students in Saudi Arabia, the prevalence of IBS was 31.8%. Still, this value was determined as the general rate among all medical school students in this study. In subgroup analyses, it was observed that while the prevalence of IBS was 19.8% in first-year faculty students, it increased to 46% among interns [9]. In Korea, the overall prevalence of IBS was 29.2%, without correlation with the grade level of medical school [11]. IBS was present among Pakistani medical students at a rate of 28.3% [12]. In nursing and medical school students, IBS was present in 35.5% of cases, according to a Japanese study. It was also noted that the IBS group had much greater stress levels (including anxiety and depression) and life events [13]. Because of their demanding academic and clinical training, medical students may experience higher stress levels, which may contribute to their higher prevalence of IBS. The prevalence of IBS among medical students in the countries mentioned above is consistent with our study.

IBS was present in 14.7% of Malaysian private medical school students throughout all semesters. This rate is lower than our study may be because it was conducted on private university students, regional differences, and the inclusion of all semesters of medical school [7]. In addition, when the factors affecting IBS were evaluated in that study, depression was found as the only independent risk factor. In the present study, depression and MSE exam anxiety were determined as independent risk factors for IBS. In addition, 65.1% of all our participants had sleep disorders, 32.9% had a history of severe emotional stress, 32.1% had depression, 44.2% had anxiety, 73.1% had MSE exam anxiety, and after graduating from medical school, 96% of them were concerned about carrying out the medical profession under the conditions of our country. During their academic and clinical training, medical students are exposed to various factors that have been demonstrated to raise their risk of depression, anxiety, and stress. The ambition, competition for success, and desire for excellence of medical students with the classic "Type A" personality lead them to learn behaviors that may harm psychological health [14]. A meta-analysis showed the global prevalence of depression among medical students to be 28%. Also, female gender, first semester and graduation, and being a medical student in the Middle East were found to increase the likelihood of depression [15]. Alaqeel et al. [6] reported that medical students in their final university years had higher levels of anxiety, which causes IBS.

Being female was identified as a 3.3-fold independent risk factor for IBS in the current study, as stated in two systematic reviews [2,3]. We found higher IBS in those with sleep disorders. Ibrahim et al. [9] found that compared to other students, those who slept for fewer than eight hours per day had a slightly greater prevalence of IBS. According to Okami et al. [13], sleep disturbances are more common in men with IBS. Conversely, the overnight call was not linked to IBS development, according to the Canadian study on medical students [16].

IBS was found to be higher in those with a history of severe AGE before IBS symptoms started, those with a history of food sensitivities, those who did not practice regular physical exercise or use a regular medication, and those with a first-degree relative with IBS in this study. Individuals exposed within 12 months of AGE experienced a four-fold increase in the development of IBS, according to a meta-analysis of 45 observational studies. Female gender, psychological distress before infection, and infection severity were risk factors for the development of post-infection IBS [17]. As noted in a recently published review, food allergy symptoms may mimic IBS, or the bloating of food intolerance due to FODMAPs may cause symptoms, especially in viscerally hypersensitive IBS patients [18]. In one randomized controlled trial, improvement in IBS symptoms was observed after exercise by a physiotherapist compared to a control group with no change in physical activity [19]. According to a recent Saudi Arabian study, food allergies, family history of IBS, psychological stress, anxiety, regular use of non-steroidal anti-inflammatory medicines, smoking, and a history of infections before the onset of symptoms are risk factors significantly linked to IBS [20]. Our study did not find any difference between smoking and alcohol habits in IBS patients.

The risk of IBS was also found to be higher in those whose parents were divorced and in the group without siblings, which may be related to the additional stress burden on the participants. Again, we found the prevalence of IBS to be higher in the group with lower income. Consistent with our findings, low socioeconomic level and lower per capita income were linked to IBS patients who also had anxiety and depressive disorders [21].

As far as we know, this is the first study to assess the factors determining the prevalence of IBS, specifically for interns.

However, it has some limitations, such that its results cannot be generalized because it was conducted on senior medical students in a region, and some questions are based on subjective data.

Conclusion

In this study, it was determined that 31.7% of the interns in a state medical school in the Western Black Sea region of Turkey were diagnosed with IBS according to the Rome IV criteria. A high rate of anxiety, depression, anxiety about the MSE exam, and post-graduation anxiety about working as a physician in our country were found in the participants. Female gender, depression, anxiety, and severe AGE history were independent risk factors associated with IBS. Stress management training can be considered to screen this group for IBS and psychological problems and to help them cope with these stressors.

Conflict of interests
The authors declare that there is no conflict of interest in the study.

Financial Disclosure
The authors declare that they have received no financial support for the study.

Ethical approval
Zonguldak Bülent Ecevit University Faculty of Medicine Non-Invasive Clinical Research Ethics Committee accepted the present study (Protocol No: 2022/12, Approval date: 22/06/2022).

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