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ORIGINAL ARTICLE

Frequency of Irritable Bowel Syndrome (IBS) and its Risk Factors among MBBS Students of Allama Iqbal Medical College, Lahore

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ABSTRACT

Background: Currently, there is a growing concern towards epidemiological and clinical research on functional gastrointestinal disorders. Irritable Bowel Syndrome is defined as a functional gastrointestinal disorder characterized by abdominal discomfort, abdominal pain, and altered bowel movements. It is the most common gastrointestinal disorder. It can be diarrhea-predominant IBS, constipation-predominant IBS, and mixed type IBS.

Objective: The objective of this study was to determine the frequency of IBS among medical students of Allama Iqbal Medical College and to determine conditions and lifestyle habits that may act as significant risk factors for developing IBS.

Methods: A cross-sectional study was conducted for over 5 months. A sample of 323 individuals was studied whereas the sampled individuals were selected using a "stratified random sampling technique". The study was conducted by collecting data through an online questionnaire during the global COVID pandemic. The questionnaire consisted of three parts. The first section consisted of demographic information, the second section consisted of a standard questionnaire determining the risk factors of IBS i.e., personal food and lifestyle habits, and the last section was aimed at determining whether the person was a case of IBS or not using the widely accepted and used “Rome III Criteria” and determining the predominant pattern of IBS.

Results: The frequency of IBS was found to be 15.5%. Analysis of collected data revealed that the predictors for IBS were stress and reduced hours of daily sleep. It was also observed that a positive family history of irritable bowel syndrome predisposed the development of IBS in a person. 30% of subjects with a positive family history of IBS had symptoms suggestive of IBS.

Conclusion: The study concludes that there is a high incidence of IBS among medical students because they live under higher stress conditions, concerning their academics and professional duty than students and professionals from other educational fields.

Keywords: Irritable bowel syndrome, abdominal pain, stress, food consumption.

INTRODUCTION

Currently, epidemiological and clinical research is focusing on functional gastrointestinal disorders also known as "Gut-Brain Disorders". Irritable bowel syndrome is one such disorder of the gastrointestinal tract characterized by abdominal pain, discomfort, and altered bowel movements.[1] It is known to be one of the most common disorders encountered by gastroenterologists in general practice.[2,3] Although its pathophysiology is unclear, gender, diet, lifestyle, sleeping habits, and stress have all been identified as significant risk factors for the development of IBS.[4,5]

According to “Rome III criteria”, IBS patients are subtyped as constipation-predominant IBS (IBS-C), diarrhea-predominant IBS (IBS-D), mixed-type IBS (IBS-M), and unsub-typed IBS (IBS-U).[6]

The worldwide prevalence ranges between 3-22% of the population.[7] In U.S IBS affects about 15% of the patients. One-third are managed by primary physicians and the other third by gastroenterologists.[8,9] In the US, IBS accounts for 12% of primary care visits and 2.2 million prescriptions.[10] A study conducted in Saudi Arabia showed 8.9%-9.2% affected people.[11] In Asia, prevalence is over 50%.

In Pakistan, studies showing the prevalence of IBS are limited. 13% IBS prevalence has been found in a study conducted in Abbottabad. IBS mainly depends upon age and sex. It is most common below the age of 25 years and mostly affects females.[12,13,14] In India, however, a study showed 7.9% males and 6.9% females affected.[14,15]

Symptoms of IBS may relate to the hypersensitivity of nerves found in the walls of the gastrointestinal tract. Some cases are familial. Medical students belong to a particular group that experiences tremendous emotional and cognitive changes.[15] Constant rivalry for jobs, poor living and eating habits, as well as extensive study and exams, are all related to medical students' increased susceptibility to IBS.[16]

The Rome III criteria is the current diagnostic tool for IBS.[17] The questionnaire was created by the Rome III committee. The criteria classify IBS subtypes based on stool consistency that shows an accurate diagnosis of IBS because it is the closest to clinical criteria.[18] Moreover, it is worth noting, majority of the people suffer from IBS, but only some people seek medical attention in the absence of curative therapy.[19,20]

The study aimed to determine the frequency of IBS among medical students, the risk factors associated with IBS.

OPERATIONAL DEFINITIONS

IBS (Irritable Bowel Syndrome): It is a common gastrointestinal disorder involving an abnormal condition of gut contractions, motility and increased gut sensations (visceral hypersensitivity) characterized by abdominal pain/discomfort, gas, bloating, mucous in stools, and

irregular bowel habits with constipation, diarrhea or alternating diarrhea and constipation.

Rome III Criteria: It is a widely accepted criterion for diagnosing IBS as there are no biomarkers for IBS and there is a wide range of variation and intensity of symptoms that the patient might experience. If red flag symptoms are absent in patients, the “Rome III Criteria” can be used to diagnose IBS. Rome III Criteria have a sensitivity of 65%, a specificity of 100%, and a positive predictive value of 100%. Rome III criteria define IBS as;

Recurrent abdominal pain on average at least one 1day/week in the last 3 months, associated with two or more of the following criteria:

1- Improvement of abdominal pain after defecation
2- Change in frequency of stool passage
3- Change in stool consistency/form

Food Frequency Questionnaire: "A food frequency questionnaire (FFQ) consists of a finite list of foods and beverages with response categories to indicate the usual frequency of consumption over the time queried."

A simplified version of the food frequency version was used to assess the nutritional intake of the study group and check its relation with IBS. These questions inquired consumption of a fiber-based diet (i.e., fruits and vegetables), dairy (i.e., milk, cheese, yogurt, etc.), meat, sweets and snacks, and caffeine.

MATERIALS AND METHOD

Study design: The study design was cross-sectional.

Study setting: This study was carried out in Allama Iqbal Medical College.

Sample size: The sample size for this study consisted of 323 individuals.

Inclusion Criteria: The study included medical students enrolled at Allama Iqbal Medical College during the academic year (2020–2021), from the first to the fifth educational year.

Exclusion Criteria: All students with red flag symptoms were excluded from the study.

(Red flag symptoms include unexplained weight loss, rectal bleeding, change in bowel habits in patients under 60 years of age, family history of bowel/ovarian cancer, anemia, abdominal/rectal/pelvic mass, and raised inflammatory marker.)

Sampling Technique: Non-probability, convenience sampling technique was used.

Data Collection: A self-administered questionnaire was provided via Google docs. due to COVID-19 lockdown. This questionnaire was used to gather baseline information like the family history of irritable bowel syndrome, socio-demographic data, history of chronic disease, previous diagnosis of IBS, daily sleep hours, smoking, food habits via using a simplified version of food frequency questionnaire, exercising routine, experiencing a tragic event in past 6 months and complain of traveler's diarrhea. Regular exercise was defined as carrying out extensive sweat-breaking exercises at least 3-5 times a week. Traveler's diarrhea was defined as experiencing bloating, abdominal pain, diarrhea, loss of appetite, and fever on traveling.

RESULTS

We had a sample population of 322 medical students and to diagnose irritable bowel syndrome, among these students the Rome III criteria questionnaire was used.

Table 1: Frequency of IBS in total sample

Total Subjects	IBS Positive	Normal
323	50 (15.43%)	273 (84.57%)

In the examined medical student group, 50 students were tested positive for irritable bowel syndrome, resulting in an IBS frequency of (15.43%). The majority of the studied sample were female 213 consisting 176 normal and 37 IBS positive and male were 108 having 96 normal and 13 IBS positive. Related to residency 163 were hostellers among which 149 were normal and 14 were IBS positive and 159 were day scholars having 123 normal and 36 IBS positive. 44 were previously diagnosed with IBS among which 12 were still suffering from IBS while 32 were normally based on Rome III criteria for IBS. Out of 278 individuals who had not been previously diagnosed with IBS, 38 had symptoms suggestive of IBS. 63 students had positive IBS family history among which 19 were suffering themselves as well and 44 were normal. 259 students didn't have a family history of IBS out of which 31 were suggestive of IBS and 228 were disease-free.

Table.1 shows that out of the total studied sample, there is a greater percentage of females (74%) than males (26%) who suffer from IBS. 72% IBS-positive individuals were found to be living in boarding facilities as compared to only 14% of the total IBS-positive subjects who were day-scholars. 30% of the subjects who had symptoms suggestive of IBS had a positive family history of IBS.

Table 2: Demographic Comparison between IBS and Non-IBS Individuals

Variable	Normal	IBS patients
SEX		
Males	96 (35.3%)	13 (26%)
Females	176 (64.7%)	37 (74%)
RESIDENCY		
Hostilities	149 (54.78%)	36 (72%)
Day scholars	123 (45.22%)	14 (28%)
FAMILY HISTORY OF IBS		
Positive	44 (16.18%)	19 (38%)
Negative	228 (83.82%)	31 (62%)
PREVIOUSLY DIAGNOSED		
Yes	32 (11.76%)	12 (24%)
No	240 (88.24%)	38 (76%)

On comparing and evaluating the lifestyle characteristics of the sample population it was found out that out of the 224 students who took their breakfast regularly, 33 presented as IBS positive cases while 191 were normal. Of the 98 students who did not have breakfast regularly, responses of 17 individuals were suggestive of IBS whereas 81 were normal. Among 174 students who were exercising 28 were IBS positive and 146 were disease-free. 148 students didn't exercise regularly out of which 22 were IBS cases and 126 were healthy. 235 students slept less than 8 hours a day among which 48 were IBS positive while 187 were disease-free. 87 students slept more than 8 hours a day out of which 2 were

IBS patients and 85 were normal. Among all studied medical students who participated in the study, 11 were smokers, 10 individuals were free of disease with only 1 IBS positive case. The rest of 311 students were having no smoking history but still, 49 were IBS positive and 262 were negative for the disease. 267 students were used to taking fluids with meals among which 39 were having disease and 228 were disease-free. The rest 55 students did not have fluids during meal time but 11 were still having disease and 44 were negative for IBS.

Table.3 shows that the majority (72%) of subjects who were identified as IBS positive slept less than 6 hours every day.

Table 3: Comparison of Lifestyle Characteristics Between Normal Students and IBS Patients

Variable	Normal	IBS patients
HAVING BREAKFAST		
Yes	191 (70.22%)	33 (66%)
No	81 (29.78%)	17 (34%)
REGULAR EXERCISE		
Yes	146 (53.68%)	28 (56%)
No	126 (46.32%)	22 (44%)
SLEEPING HOURS		
Less Than 8h/Day	187 (68.74%)	48 (96%)
More Than 8h/Day	85 (31.26%)	2 (4%)
SMOKING		
Yes	10 (3.68%)	1 (2%)
No	262 (96.32%)	49 (98%)
DRINKING FLUIDS WITH MEAL		
Yes	228 (83.82%)	39 (78%)
No	44 (16.18%)	11 (22%)

Table 4: Comparison of Health Problems Between Normal Students and IBS Patients

Variable	Normal	IBS Patients
CHRONIC DISEASE		
Yes	26 (9.56%)	2(4%)
No	246 (90.44%)	48(96%)
TRAVELLER'S DIARRHEA		
Yes	31 (11.4%)	23 (46%)
No	187 (68.74%)	18 (36%)
Sometimes	54 (19.86%)	9 (18%)
EMOTIONAL STRESS		
Yes	100 (36.76%)	27 (54%)
No	172 (63.24%)	23 (46%)

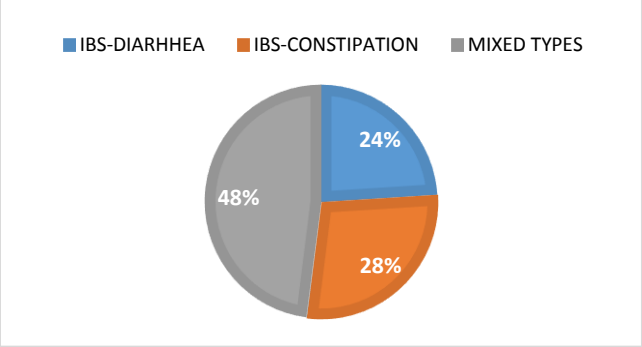
Among studied medical students, 28 were suffering from chronic health problems out of which responses of 2 individuals were suggestive of IBS and 26 were disease-free. While 294 students having no history of chronic health problems but still 48 were IBS positive and 246 were negative for the disease. A total of 54 students experienced traveler's diarrhea among which 31 were IBS negative and 23 were suffering from IBS. Out of the 205 students having no prior history of traveler's diarrhea, 18 were IBS positive and 187 were disease-free. 63 students sometimes experienced traveler's diarrhea among which 9 were IBS positive and 54 were negative for the disease. A total of 127 medical students had experienced substantial emotional stress in the previous six months, out of which 27 students had symptoms indicative of IBS While 100 students had no complain suggestive of IBS.195 students had no history of emotional stress but still 23 were positive for IBS while 172 were negative.

Table.4 shows that 54% of the IBS-positive individuals had emotional stress from the past six months. The majority of the IBS-positive individuals (64%) experienced traveler's diarrhea.

Regarding food frequency questionnaires 122 students were taking vegetables and fruits less than 3 times a week among which 17 were IBS positive and 105 IBS negative. Similarly, 200 students were having fruits and vegetables in their daily routine but still, 33 were IBS positive while 167 were negative for IBS. 214 students were used to having sweets and snacks less than three times a week still 34 students were confirmed with IBS condition 180 were disease-free. Out of 323 total population, 108 were using sweets and snacks more than three times a week among which 92 were disease-free and 16 were IBS positive. 213 medical students who were in the habit of using meat less than three times a week 41 were IBS positive while 172 were negative for the disease. 109 students were having meat in their meal more than three times a week among which 100 were disease-free and 9 IBS positive.96 students were using dairy products less than 3 times a week and still 23 were IBS positive while 73 were having negative results. And 226 students were using dairy products more than three times a week among which 27 were suffering from IBS and 199 were disease-free.

Table 5: Comparison of Food Frequency Between Normal Students and IBS Patients

Variable	Normal	IBS Patients
VEGETABLES AND FRUITS		
Less than 3 times/week	105 (38.6%)	17 (34%)
More than 3 times/week	167 (61.40%)	33 (66%)
SWEETS AND SNACKS		
Less than 3 times/week	180 (66.18%)	34 (68%)
More than 3 times/week	92 (33.82%)	16 (32%)
MEAT		
Less than 3 times/week	172 (63.24%)	41 (82%)
More than 3 times/week	100 (36.76%)	9 (18%)
CAFFEINE		
Less than 3 times/week	105 (38.6%)	21 (42%)
More than 3 times/week	167 (61.4%)	29 (58%)
DAIRY PRODUCTS		
Less than 3 times/week	73 (26.84%)	23 (46%)
More than 3 times/week	199 (73.16%)	27 (54%)



After evaluating the responses of the studied population that had symptoms suggestive of IBS, it was revealed that 12 (24%) had diarrhea as their primary

symptom (IBS-D), 14 (28%) had constipation as their primary symptom (IBS-C), and 24 (48%) had a mixed subtype of IBS.

It was found that positive family history of IBS, stress, and daily sleeping hours have a significant relation with IBS. The chi-square value for positive family history was 12.68, for the stress it was 13.37 and for sleeping hours was 19.69, making their p-values less than 0.05 making them possible risk factors. (Reference chi-square value was 3.43).

Table 6: Chi-Square Values of Various Suspected Risk Factors

VARIABLES		IBS POSITIVE	IBS NEGATIVE	CHI-SQ
Gender	Male	13	96	1.622
	Female	37	176	
Stress	Yes	27	100	13.27**
	No	23	172	
Sleep Hours	6-8 hours	48	187	19.69*
	More than 8 h	2	85	
Exercise	Yes	28	146	0.091
	No	22	126	
Positive Family History of IBS	Yes	19	44	12.68*
	No	31	228	

*Variables with a significant relationship with IBS

As data was only collected from the medical students of Allama Iqbal Medical College, so the results cannot be generalized to the entire population.

DISCUSSION

Irritable bowel syndrome is a gastrointestinal condition that is defined by altered bowel habits without any underlying pathology. IBS is a common disorder or condition that has a significant influence on the patient's quality of life. Therefore, the purpose of this study was to assess the frequency of irritable bowel syndrome in the chosen study sample and to determine the risk factors associated with this condition.

The frequency of IBS among studied medical students (n=324) of Allama Iqbal Medical College according to Rome III criteria was found to be 50 (15.43%). Our results were similar to the studies

from Iranian universities. According to study results from Gilan University and the Shiraz University of Medical Sciences[22], 16.4 percent and 12.6 percent of people had IBS respectively[21.] Previous research done by Tan et al. in 2003, showed an IBS prevalence of 15.8% among young multi-ethnic medical students in Malaysia using Rome I criteria[23]. Research from Japan reported the maximum frequency of IBS among medical students, with 35.5 percent of the participants suffering from this condition. Similarly, the research found that 29.2 percent of medical students at a Korean medical school had IBS[21.] According to research conducted in medical school in Karachi, Pakistan, 28.3 percent of the students had IBS. Similarly, research from Pakistan's Aga Khan University discovered that 26% of medical students suffer from IBS.[21]

The disparity between our findings and those of other countries implies that there may be a true difference in the countries' living conditions. In the future, it may be interesting to see if these discrepancies in findings might be linked to cultural and nutritional patterns in other nations. Other causes of these discrepancies between our findings and other studies might include age group, sample size, and diagnostic criteria. We conducted our study by collecting data through online questionnaires during the lockdown due to the global COVID-19 pandemic. The reduced percentage of IBS-positive cases may be due to reduced stress levels experienced by students, away from pressure and stress of medical school and boarding environment.

Similarly, another research done by Chu et al. suggested that medical students were more at higher risk of developing IBS than engineering and science students.[23] According to research conducted in the United States in 2003, described that only 11 percent of college students matched the IBS criteria. According to Rome II and Manning Criteria, the prevalence was found 9.2% and 8.9% respectively, in cross-sectional research performed by Al-Hazmi et al. in 2011 among Saudi secondary school students. The disparity between research results of regular students and medical students is because of the immense stress that medical students face in their daily lives, which predisposes students to IBS. The extended time required to finish medical school, the multiple rigorous examinations, and the unpredictable and lengthy work hours are all instances of stress. Jimenez et al. (2010) found three stresses can be associated with clinical nursing practice external, clinical, and academic.[23].

According to our study, IBS is not prevalent in one gender as compared to the other. The p-value generated to check the significance of the relation between IBS and any specific gender gave a value greater than 0.05.

According to Korean research, the prevalence of IBS was reported higher compared to females, with 41% and 25%, respectively. According to a Pakistani study, males are more likely than females to suffer from IBS. However, according to Wells et al., the female-to-male ratio in medical students with IBS was 2:1.27. The prevalence of IBS was found higher in females than males in Pakistani research, while a Malaysian study found comparable results. A similar study in Japan found that 41.5 percent of females exhibited symptoms similar to IBS, compared to 13.8 percent of males[13].

Furthermore, a study reported that the prevalence of IBS was more among female students. This gender predisposition for the disease might be explained by changes in social characteristics and behaviors.[21] Additionally, the stress and other symptoms associated with the menstruation cycle can be the reason behind an increase in females reporting IBS-related symptoms. On

the other hand, research indicating a higher prevalence of IBS disorder among males showed that the cultural barrier may act as a blockade, resulting in fewer female students reporting the IBS disease.[21]

Out of 50 students who had symptoms suggestive of IBS, 72% (36) students were hostellers and 28% (14) students were day-scholars. This may be due to the increased amount of emotional stress hostellers bear living away from their families. They were less concerned about their eating habits and eating habits play an important part in the severity of IBS.

Similar to our study, a study conducted in Bangladesh showed that there was no significantly prevalent IBS sub-type (diarrhea-predominant, constipation-predominant or intermittent constipation, and diarrhea) which may be due to the effect of the small sample size, but in other studies, a diarrhea-predominant subgroup was more prevalent.[22]

Physical and psychological stress are thought to have a significant role in the etiology of irritable bowel syndrome. Although the exact process is unknown, it is assumed that alterations in the central nervous system (CNS) in reaction to physical and psychological stresses result in colonic spasms, which appear as IBS symptoms. Therefore, in our study, we evaluated psychological issues and discovered that about 54% of our students suffering from IBS had experienced emotional stress in the preceding six months.[21]

According to previously conducted studies, Regular exercise as a lifestyle was found to be protective against the development of IBS. Our study outcomes did not show any significant relation between IBS and exercising routine. This study showed that 44% of students with IBS were not doing any exercises regularly while the other 56% of students were doing exercises regularly. The percentage difference was low because our study was carried out during a very long nationwide lockdown which gave people ample time to work out regularly. This gave us significantly improved results which were a bit different from previous studies.

Similarly, research conducted in Saudi Arabia revealed that the prevalence of IBS was higher among students who were not exercising regularly (37.3%) and students who were doing exercises prevalence of IBS was (26.1 percent). Additionally, research in Japan found that students with IBS were performing fewer exercises compared to those students who had IBS[21]. According to Kim et al., the prevalence of IBS was observed more in students exercising less frequently. Moreover, according to Dong et al, low exercise levels signified a higher risk for developing IBS among Chinese university students.[18]

Regarding sleep patterns, in our study, only 2% of the students who slept more than 8 hours were IBS positive, and 10% of students who slept for 6-8 hours were IBS positive. Our results were similar to some other studies. According to Al-Turki et al research, 'students with IBS were at a considerably higher risk of developing insomnia than other students. Canadian research, on the other hand, found no link between med students' overnight call schedule and the development of IBS.[23] Surprisingly, smoking was not found to be a major risk factor for the higher prevalence of IBS, since only one IBS positive student was a smoker. Similar findings were found in research from Saudi Arabia and Jeddah, these studies found no link between IBS and smoking. However, Indian research found that cigarette smokers are at more risk of developing IBS.[21] In our study 46% of IBS-positive students experienced traveler's diarrhea, 36% had no such complaint whereas 18% experienced it sometimes. Similar results were reported by a study from Almutairi et al. that traveler's diarrhea can be the cause for the high probability of IBS.[21]

CONCLUSIONS

The results of our study point out that there is a high prevalence (15.52%) of IBS among medical students. Medical students and professionals are the group of individuals in a society who live under constant stressful conditions. According to our study, it was seen that positive family history of IBS, short duration of sleep, prolonged durations of physical as well as emotional stress such as living in hostels, away from family, and tough studies, were the main predictors of IBS. Moreover, it was seen that a large number of students have experienced some extreme emotional/mental stress in the past six months which predisposes them to IBS and greatly enhances the severity of IBS symptoms.

RECOMMENDATIONS

- More such studies should be conducted to assess the perception of young students regarding IBS.
- Hygienic and healthy food must be available at cafeterias of institutions and restaurants and proper inspection should be done monthly to check the quality of food provided there.
- Stress management classes are necessary to prepare students to deal with a variety of pressures encountered during their medical school studies

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