STUDENTS' CORNER
RESEARCH ARTICLE

Prevalence of irritable bowel syndrome and functional dyspepsia and their relationship with generalized anxiety disorder among medical students in Karachi

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Abstract

Objective: To assess the prevalence of inflammatory bowel syndrome and functional dyspepsia in medical students and their relationship with generalised anxiety disorder and other relevant factors.

Method: The descriptive cross-sectional study was conducted in Karachi from August to November 2020 after approval from the ethics review board of Jinnah Sindh Medical University, and comprised students of either gender aged at least 18 years from different medical colleges in the city. Data was collected using validated tools Rome III criteria for inflammatory bowel syndrome and functional dyspepsia and Generalised Anxiety Disorder-7. Data was analysed using SPSS 26.

Results: Of the 305 subjects, 185(60.70%) were male and 120(39.30%) were female. The overall mean age was 21.43±2.13 years. The prevalence of inflammatory bowel syndrome was 17(5.57%), while that of functional dyspepsia was 2(0.66%). Further, 122(40%) students had minimal anxiety, 112(36.72%) mild, 43(14.10%) moderate and 28(9.18%) had severe anxiety. There was no significant relationship of either inflammatory bowel syndrome or functional dyspepsia diagnosis with generalised anxiety disorder ($p>0.05$), but a significant relationship existed between inflammatory bowel syndrome diagnosis and generalised anxiety disorder score ($p=0.041$). Significant relationships were found between inflammatory bowel syndrome diagnosis and use of non-steroidal anti-inflammatory drugs. The relationship of generalised anxiety disorder diagnosis with gender and probiotic use was significant ($p<0.05$), and so was the relationship of generalised anxiety disorder score with gender and level of physical activity ($p<0.05$).

Conclusion: Medical students with a higher generalised anxiety disorder score and those who used non-steroidal anti-inflammatory drugs frequently had a higher likelihood of developing inflammatory bowel syndrome.

Keywords: Anxiety, Functional dyspepsia, Irritable bowel syndrome, Medical students. (JPMA 72: 2132; 2022)

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Introduction

Irritable bowel syndrome (IBS) and functional dyspepsia (FD) fall into the general term of Functional Gastrointestinal Disorders (FGIDs) and are characterised by the absence of any organic cause.[1] There is an incomplete understanding of their pathophysiology, with ties to gut motility, central nervous system (CNS) messaging, altered immune function, microbiota and hypersensitivity.[2] Both the CNS and the enteric nervous system have the capability to produce neurotransmitters. The alteration of the gut microbiome may change the biosynthesis, release and reuptake of neurotransmitters, causing a disturbance in serotonergic signalling processes operating between the CNS and the enteric nervous system, leading to emotional distress. Also, the serotonin type 4 (5-HT4) receptors in the gastrointestinal (GI) tract are found on enteric neurons and smooth muscle cells, and the stimulation leads to acetylcholine release and prokinetic effects.[3] IBS is characterised by altered bowel habits and associated abdominal pain or discomfort.[1] A disorder occurring mostly in individuals less than 45 years of age, it has a striking prevalence of 8.5% and 12.6% in Bangladesh and Iran, respectively.[4,5] A 28.3% prevalence of IBS was found in a study in Pakistan using the Rome III criteria, with a female predominance of 85.29%.[6]

FD is characterised according to the Rome III Criteria by four primary symptoms: epigastric pain, postprandial fullness, epigastric burning, and early satiation. Risk factors for dyspepsia include environmental factors, use of non-steroidal anti-inflammatory drugs (NSAIDs), as well as psychological and physical wellbeing.[7] The prevalence of undiagnosed dyspepsia has a great global variation with rates ranging from 6.7% to 43.8% in Japan, India and the United Arab Emirates (UAE).[8-10] Prevalence also depends on the criteria used to diagnose FD; an overall

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20.8% global prevalence is estimated, but this is subject to how specific the definitions of dyspepsia, pain and discomfort are.[11] The causes of these disorders are uncertain, but a biopsychosocial interrelationship is suggested.[2] In comparison with healthy controls, individuals with FGIDs meet the criteria for a variety of psychiatric diagnoses such as anxiety, depression and somatisation, more frequently.[12] Medical students face tremendous levels of stress due to the enormity of their course material and are prone to be psychologically affected by their experiences in hospital rotations. A 2019 study in a medical college in Karachi reported the prevalence of depression, anxiety and stress as high as 71%, 72% and 35% respectively.[13]

Another important factor to note is that the year 2020 brought with it the undeniable consequences of the coronavirus disease-2019 (COVID-19) pandemic, one of which has been the mental wellbeing of people worldwide. The current study was planned to assess the prevalence and risk factors of IBS and FD among medical students, and their correlation with generalised anxiety disorder (GAD).

Materials and Methods

The descriptive cross-sectional study was conducted in Karachi from August to November 2020. After approval from the ethics review board of Jinnah Sindh Medical University, the sample size was calculated using OpenEpi version 3[14] with 95% confidence interval (CI), 5% absolute precision and 28.3% anticipated population proportion prevalence of IBS among medical students in Karachi.[6] The sample was raised using convenience sampling technique. Students of either gender aged at least 18 years from all years of the academic course at different medical universities in the city were included. Non-medical students and diagnosed cases of any gastrointestinal disease were excluded.

The participants filled out an online questionnaire consisting of five sections: introduction to the research and informed consent; demographic data and general questions regarding FGIDs' association, like cigarette smoking, tea/coffee consumption, consumption of fatty foods, NSAID use, probiotic use, and level of physical activity; Rome III criteria for IBS and FD;[15] and GAD score.

A diagnosis of IBS was made based on the Rome III criteria: ≥3 months, with ≥6 months previous onset of abdominal pain or discomfort associated with ≥2 of the following: improvement with defecation, onset associated with a change in frequency of stool or onset associated with a change in the appearance of stool.[15] Additional questions regarding the specificities of frequency and appearance of stool helped to categorise a diagnosis of IBS into one of its categories: IBS with constipation (IBS-C), IBS with diarrhoea (IBS-D), mixed IBS (IBS-M), and un-subtype or unknown IBS (IBS-U).

A diagnosis of FD was made on the Rome III criteria: ≥3 months, with a ≥6 months previous onset of ≥1 of the following: postprandial fullness, early satiation, epigastric pain, or epigastric burning, in the absence of structural abnormality on upper GI endoscopy.[15]

The GAD-7 score diagnosis criterion consists of 7 questions and is calculated by adding the values ascribed to individual responses:

Not at all 0; Several days 1; More than half the days 2' Nearly every day 3. The total ranges 0-21.

Scores of 0-4, 5-9, 10-15, and >15 indicate minimal, mild, moderate and severe anxiety, respectively.[16]

Data was analyzed using SPSS 26. Descriptive statistics were used to determine mean, standard deviation, frequencies and percentages, as appropriate. Chi-square test, t-test and analysis of variance (ANOVA) were used, as appropriate. P0.05 was considered statistically significant.

Results

Of the 305 subjects, 185(60.70%) were male and 120(39.30%) were female. The overall mean age was 21.43±2.13 years. The prevalence of IBS was 17(5.57%), and 10(58.80%) of them had IBS-M. FD was found in 2(0.66%) subjects (Table-1).

Further, 122(40%) students had minimal anxiety, 112(36.72%) mild, 43(14.10%) moderate and 28(9.18%) had severe anxiety. There was no significant association between IBS and GAD diagnoses (p>0.05), or between FD and GAD diagnoses (p>0.05).

Overall, 26(8.50%) students took probiotics, 254(83.30%) consumed tea/coffee on a daily basis, 32(10.50%)

Table-1: Prevalence of IBS and FD (n=305).

IBS Diagnosis	**Frequency**
Yes	17 (5.60%)
No	288 (94.40%)
IBS subtypes	**Frequency**
Constipation	3 (17.60%)
Diarrhoea	4 (23.50%)
Mixed	10 (58.80%)
FD Diagnosis	**Frequency**
Yes	2 (0.70%)
No	303 (99.30%)

IBS: Inflammatory bowel syndrome, FD: Functional dyspepsia.

Table-2: Relationship of IBS and GAD diagnoses with demographic and other variables.

Variable	IBS Diagnosis		GAD Diagnosis	
	X2	p	X2	P
Age	8.72	0.56	35.76	0.22
Gender	1.40	0.24	9.04	0.03 *
Year of study	1.52	0.82	10.44	0.58
Use of probiotics	0.16	0.69	10.35	0.02 *
No. of cups of tea/coffee consumed	1.28	0.53	7.47	0.28
Frequency of fatty food consumption	3.72	0.30	14.56	0.10
Smoking	4.91	0.09	3.55	0.74
Use of NSAIDs	11.38	0.01 *	15.12	0.09
Level of physical activity	1.35	0.51	10.83	0.10

IBS: Inflammatory bowel syndrome, GAD: Generalised anxiety disorder, NSAIDs: Non-steroidal anti-inflammatory drugs, *significant statistical value.

Table-3: Relationship of GAD score with demographic data and other variables (n=305).

Variable	Categories	N (%)	dF	p-value
Age (years)	18-20	89 (29.2%)	2	0.99
	21-23	197 (64.6%)		
	24-26	19 (6.2%)		
Gender	Male	185 (60.7%)	1	0.03*
	Female	120 (39.3%)		
Year of study	1st year	35 (11.5%)	4	0.23
	2nd year	57 (18.7%)		
	3rd year	58 (19%)		
	4th year	121 (39.7%)		
	5th year	34 (11.1%)		
Use of probiotics	Yes	26 (8.5%)	1	0.72
	No	279 (91.5%)		
Tea/coffee consumption	Yes, 1-2 cups/day	195 (63.9%)	2	0.09
	Yes, > 2 cups/day	59 (19.3%)		
	No	51 (16.7%)		
Consumption of fatty foods	Not at all	13 (4.3%)	3	0.79
	Once a week	98 (32.1%)		
	2-3 times per week	125 (41%)		
	>3 times per week	69 (22.6%)		
Smoking	Yes, 1-5/day	23(7.5%)	2	0.64
	Yes, > 5/day	9 (3%)		
	No	273 (89.5%)		
NSAIDs use	Yes, for < 6 months	13 (4.3%)	3	0.07
	Yes, for 6-12 months	2 (0.7%)		
	Yes, for > 1 year	11 (3.6%)		
	No	279 (91.5%)		
Level of physical activity	Low	84 (27.5%)	2	0.01*
	Moderate	193 (63.3%)		
	High	28 (9.2%)		

GAD: Generalised anxiety disorder, NSAIDs: Non-steroidal anti-inflammatory drugs/ *significant statistical value.

smoked, 13(4.30%), 2(0.70%) and 11(3.60%) took NSAIDs for 6 months, 6-12 months, and 12 months, respectively, 98(32.10%), 125(41%) and 69(22.60%) consumed fatty foods once a week, 2-3 times a week and 3 times a week, respectively, 84(27.50%), 193(63.30%) and 28 (9.20%) had low, moderate and high levels of physical activity, respectively. There was a significant (p=0.01) relationship between IBS diagnosis and the frequency of NSAID use (Table-2).

A significant relationship existed between IBS diagnosis and GAD score (p=0.041). The relationship of GAD diagnosis with gender and probiotic use was significant (p<0.05), and so was the relationship of GAD score with gender and level of physical activity (p<0.05) (Table-3).

Discussion

The prevalence of IBS in the study was significantly lower compared to other studies conducted in Pakistan despite using the same tool; the Rome III criteria. A study conducted in three medical colleges in Karachi reported 28.3% prevalence in 2012 and a study in Peshawar reported a 13.4% prevalence in males and 17.5% in females in 2018.[6,17] The differences can be attributed to the varying sampling techniques and sizes.

There is a great discrepancy regarding the prevalence of IBS in studies carried out around the world. This discrepancy exists not just in the prevalence of IBS in the general population, but also among medical students and interns. A systematic review of 16 studies determining the prevalence of IBS in medical students and interns concluded the prevalence to range from 9.3% to 35.5%.[18] Interestingly, the studies reporting the two ends of the range were from neighbouring countries; China and Japan.[19,20] This signifies how variable the prevalence of IBS can be even in similar geographical regions.

The relationship between the GAD score and IBS diagnosis is consistent with other studies that elaborate on the effect of psychological and psychiatric factors on IBS.[8] This study did not compare medical students with a non-medical students group, but other studies have indicated that medical students are a risk group for IBS due to the stressful cognitive and emotional challenges they face; they have higher reported IBS prevalence than the general population.[8]

A significant relationship between the use and frequency of use of NSAIDs and IBS is consistent with previous research,[21] but whether or not this can ascertain an aetiological association is unclear. A study that investigated the effect of NSAIDs on intestinal permeability in IBS suggests the response of the intestinal barrier to harmful agents is altered in IBS.[21] Regular use of medication was also found to have a positive relationship with IBS diagnosis in medical students.[21]

Although research has shown significant relationships of gender, physical activity, smoking, diet and probiotic use

with FGIDs,[5,6,8,9,19,21-23] they were not found to be statistically significant in the current study. This variability in data owes to differences in study design, regions the sample size was collected from, the tools for diagnosis being prone to response bias, and of course the pathophysiology of FGIDs themselves.

There was a higher GAD score seen in women compared to men. This is consistent with previous research done in different parts of the world and also in those conducted in Karachi.[24] This can be attributed to differences in metacognition, control strategies and social circumstances in women and men.[25] This aligns with specificities of the GAD questionnaire that women more frequently experienced than men in this study — 'not being able to stop or control worrying', 'worrying too much about a different thing', and 'becoming easily annoyed or irritable'.

In this study, students who smoked experienced 'being so restless, it is hard to sit still' less often than those who did not. A study that monitored medical students' smoking habits from the time of their registration to the end of their degree found that 32.3% of non-smokers had initiated smoking by the end of the degree, and males with high trait anxiety scores and smoking friends were at risk.[26] Students with higher levels of physical activity in this study less frequently felt 'nervous, anxious or on the edge' and 'not being able to stop or control worrying'.

Gender, smoking and physical activity showed significant relationships with GAD, but not to FGIDs in this study. Knowing from previous research,[9,10] these factors have shown positive relationships to FGIDs, especially IBS, and the absence of significant correlations in this study does exclude the part they play in the pathophysiology of FGIDs, and their relationship with GAD emphasises on FGIDs being disorders of gut-brain interaction with complex mechanisms. The fact that 23.28% of students had moderate or severe anxiety is a concerning issue that should be addressed by having measures to start the conversation regarding it and encourage preventative and coping strategies.

The current study has limitations, like convenience sampling technique, male preponderance, response bias due to non-response from some participants, and the questionnaire containing sensitive or embarrassing material (smoking, stool frequency, consistency, anxiety) that could have led to response inaccuracy despite the guarantee of complete anonymity. The time period during which data was collected was both amidst the COVID-19 pandemic and also a few months before anticipated exam dates, and the two factors could have exaggerated anxiety and GI symptoms.

Participants who had scored moderate to severe categorical scores on GAD-7 were advised to visit the nearby psychiatrists for consultation. However, pharmacological therapies were not recommended.

Conclusion

Medical students with a higher GAD score and those who used NSAIDs frequently had a higher likelihood of developing IBS.

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