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Prevalence of Irritable Bowel Syndrome and Its Association with Anxiety Among Students of Private and Public Medical Colleges

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ABSTRACT

Background: Irritable bowel syndrome (IBS) is a chronic gastrointestinal disorder characterized by fluctuating bowel habits, abdominal discomfort, and bloating, without anatomical abnormalities. IBS symptoms are often exacerbated by stress.
Objective: To assess the prevalence of Irritable bowel syndrome and investigate its association with anxiety levels among medical students in Khyber Pakhtunkhwa, Pakistan.
Materials and Methods: This analytical cross-sectional study was conducted in medical colleges in Khyber Pakhtunkhwa from May to September 2023. A sample of 270 medical students was selected using non-probability convenience sampling. Inclusion criteria were consenting medical students, while non-medical students and those with insufficient responses were excluded. Data were collected using a structured questionnaire, including the Birmingham questionnaire (based on ROME II criteria) for assessing IBS symptoms and the Generalized Anxiety Disorder 7 Scale for measuring anxiety levels. Data analysis was performed using SPSS version 26, regression and correlation tests were performed to assess the relationship between anxiety levels and IBS prevalence among medical students. Descriptive statistics were used to summarize the data, and results were presented in the form of tables and figures.
Results: A total of 270 students met the inclusion criteria, with 108 (40%) diagnosed with IBS according to ROME II criteria. Females (52.7%) had a higher prevalence of IBS than males (47.2%). Severe anxiety prevalence was 19% according to GAD-7, with 43% of IBS-diagnosed students experiencing severe anxiety. Data analysis revealed a significant association (P< 0.001) between IBS and anxiety symptoms.
Conclusion: IBS is prevalent among medical students, often exacerbated by stress and anxiety from their demanding curriculum. Patients diagnosed with IBS should be screened for anxiety and managed accordingly.
Keywords: Anxiety, Irritable Bowel Syndrome, KPK, Medical Students, Stress.

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INTRODUCTION

Irritable bowel syndrome (IBS) is a common gastrointestinal disorder causing fluctuating bowel movements (constipation and diarrhea), abdominal cramps, and bloating without anatomical defects. Symptoms vary in severity and affect daily activities.[1] It affects the functioning of the GI tract without any structural or biochemical abnormalities.[2] Functional GI disorders, like IBS, have a complex pathogenesis involving brain-gut dysfunction, altered bowel motility, visceral hypersensitivity, gut flora changes, hereditary predisposition, and dietary habits.

Anxiety disorders are characterized by symptoms that include worry, social and performance fears, unexpected and/or triggered panic attacks, anticipatory anxiety, and avoidance behaviors.[3] Stress seems to be the major aggravating factor of this condition hence professionals with a busy and hectic routine and disrupted psychosocial behavior seem to be the major population affected by this disorder.[4] IBS is prevalent among medical students and professionals due to their hectic routines, academic pressures, and the constant stress of their future careers.[5] IBS adversely affects healthcare professionals, leading to poor academic performance, lack of interest, and mental health issues. Medical students and professionals experience inconsistency and absenteeism due to this condition.[6]

Irritable bowel syndrome is present in 10% to 20% of people worldwide.[7] The prevalence in regions such as North America, Europe, Australia, and New Zealand is approximately 8.1%. IBS is generally more prevalent in Western populations compared to Asian populations. In some areas, such as an urban region in Egypt, prevalence rates can be significantly higher, reaching up to 34.2% among the local population.[8]

According to research done in Jeddah, Saudi Arabia, 31.8% of medical students and interns had IBS.[9] A study conducted in Peshawar, Pakistan showed the prevalence of 19.8% among university students. It is also noted that IBS is approximately twice as common in women compared to men. According to published research, the prevalence of IBS is 2:1 more common in women than in men.[10]

Stress is one of the main causes of IBS. There is a theory that stress causes colonic spasms. Research corroborating this hypothesis from around the globe has shown that 40–60% of IBS cases have underlying psychological disorders, which is far greater than controls who are healthy or who have other chronic illnesses.[11]

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Irritable Bowel Syndrome (IBS) is a prevalent condition among medical students due to academic pressure, hectic schedules, and high-stress levels. Studies have shown a strong association between IBS and anxiety, yet there is limited research focusing on medical students in Pakistan, particularly comparing those in public and private medical colleges. Understanding the prevalence of IBS and its correlation with anxiety in this specific population is essential for developing targeted interventions to support students' mental and physical health. This study aims to bridge this gap by assessing and comparing IBS prevalence and its association with anxiety among medical students from both public and private institutions.

MATERIALS AND METHODS

This study employed an analytical cross-sectional design to evaluate the prevalence of irritable bowel syndrome and its association with anxiety among medical students. The ethical board of Northwest School of Medicine approved this study. (Ref No: 108/RC/NWSM/2024)

The study was conducted from 13th May to 20th September 2023 at various public and private medical colleges across Khyber Pakhtunkhwa.

A sample size of 270 was determined using Cochran's formula, where n= sample size, Z = standard error associated with chosen level of confidence (1.96 at 95% confidence), p= estimated prevalence of IBS among medical students (0.5)[12] and e= absolute allowable error (5%). Non-probability convenience sampling was used to select participants. The sampling frame consisted of medical students from all years currently enrolled in public and private medical colleges across Khyber Pakhtunkhwa (estimated to be 2485×5= 12425) —including Abbottabad International Medical College, Ayub Medical College, Bacha Khan Medical College, Bannu Medical College, Gajju Khan Medical College (GKMC), Gomal Medical College, Jinnah Medical College, Khyber Medical College, Khyber Girls Medical College, Northwest School of Medicine, Nowshera Medical College, Peshawar Medical College, Rehman Medical Institute, Saidu Medical College, and Women Medical College, who provided informed consent were eligible for inclusion, regardless of conditions such as irritable bowel syndrome (IBS) or anxiety. However, individuals currently using medications for anxiety or other psychiatric conditions, students with medical conditions affecting bone metabolism (e.g., endocrine disorders or those on corticosteroid therapy), and participants who provided incomplete or ambiguous responses compromising the reliability of the data were excluded from the study.

Operational definitions for the study include the following: Irritable bowel syndrome is a common gastrointestinal disorder causing fluctuating bowel movements (constipation and diarrhea), abdominal cramps, and bloating without anatomical defects. Symptoms vary in severity and affect daily activities.[1] Anxiety disorders are characterized by symptoms that include worry, social and performance fears, unexpected and/or triggered panic attacks, anticipatory anxiety, and avoidance behaviors.[3]

A structured, self-administered questionnaire was distributed through face-to-face interviews after obtaining consent. The questionnaire consisted of two parts: Part-A included demographic data while part-B included the irritable bowel syndrome scale using Birmingham questionnaire,[13] and the Generalized Anxiety Disorder 7-item (GAD-7) Scale.[14] Scores were interpreted as follows:

- IBS scores <15 indicated no IBS, scores 15-25 indicated probable IBS.
- GAD-7 scores of 5 indicated mild anxiety, 10 indicated moderate anxiety, and 15 indicated severe anxiety.

Data analysis was performed using SPSS 26. Mean and standard deviation were calculated for age while frequencies and percentages were determined for categorical variables such as IBS, and anxiety. Logistic regression was performed to assess the relationship between anxiety levels and IBS prevalence among medical students. Descriptive statistics were used to summarize the data, and results were presented in the form of tables and figures. The Chi-square test revealed (p=0.001) indicating that there is a significant association between IBS and anxiety symptoms.

RESULTS

The study population had a mean age of 22 years ±1.38 standard deviation, with 155 (56.9%) male and 115 (42.8%) female participants. The respondents were drawn from various esteemed Medical colleges of KPK.

According to ROME II criteria, 108 students (40%) were found to have irritable bowel syndrome There was a preponderance of females 57 (52.7%) with IBS over males 50 (47.2%): (Table 01).

Table 01. Summary of IBS status in males and females

IBS	Total (%)	Male (%)	Female (%)
IBS Positive	108 (40)	50 (47)	58 (53)
IBS Negative	162 (60)	86 (53)	76 (47)

The prevalence of Irritable Bowel Syndrome (IBS) symptoms among the students was significant. Notably, 81 (75.5%) of the students experienced abdominal pain occasionally or more frequently. Bloating was reported by 66 (61.9%) of the respondents with similar frequency. Episodes of constipation were experienced by 57 (53.0%) occasionally or more frequently, and diarrhea was reported by 60 (56.2%) of the students with the same frequency.

This study also assessed the anxiety levels among medical students using a GAD-7. The findings revealed that 54 (19%) of the respondents experienced severe anxiety (scoring >15). Moderate anxiety (scoring 10 to 14) was observed in 65 (24%) of the participants, while mild anxiety (scoring 5 to 9) was the most common, affecting 84 (31%) of the students. Notably, 66 (24%) of the respondents reported no anxiety (scoring 0 to 4).

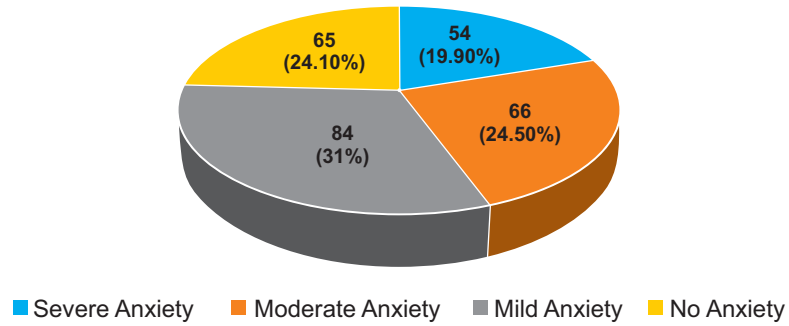


Figure 01. Anxiety scoring among medical students.

The study revealed participant-reported association between IBS and anxiety symptoms. 74 (69.1%) of respondents identified an association between their IBS and anxiety symptoms, with 100 (93.3%) reporting that certain triggers exacerbated both IBS and anxiety symptoms to varying degrees. The bar chart illustrates 47 (43%) students experience severe anxiety, representing the largest group, highlighting a strong association between IBS and high anxiety levels. This is followed by 31(28%) students with moderate anxiety and 25(23%) students with mild anxiety, indicating that a substantial portion of IBS-affected students suffer from varying degrees of anxiety. Only 5 (4%) students report no anxiety, underscoring that anxiety is a common issue among IBS students. Data analysis revealed (P< 0.001) indicating that there is a significant association between IBS and anxiety symptoms.

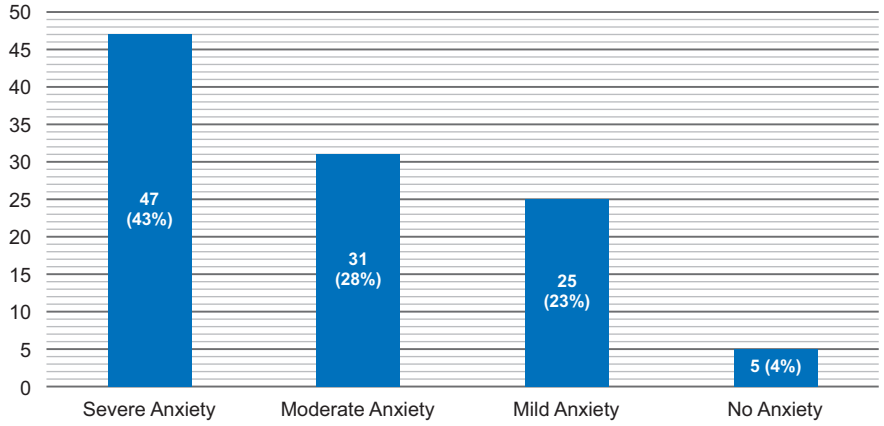


Figure 02. Self-reported association between Anxiety and IBS symptoms.

Table 02. Chi-Square tests for association between IBS and anxiety.

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	38-9944[a]	3	.000
Likelihood Ratio	41.167	3	.000
Liner-by-Linear Association	38.426	1	.000
N of Valid Cases	263		

a.0 cells (0.0%) have expected count less than 5. The minimum expected count is 22.54.

The lack of a significant association (p=0.4) between gender and IBS prevalence suggests that IBS affects male and female students similarly, However, the positive trend for significant association (p=0.02) between gender and higher anxiety prevalence suggest that there might be some differences in both genders of experiencing Anxiety with female students at a not-too-distant rate from high.

Table 03 provides a comparative analysis of anxiety levels and IBS positivity among students from public and private medical colleges. Chi-square test was also conducted for this comparison, yielding p-values of 0.4 for IBS and 0.8 for anxiety levels, suggesting that the variation could be by chance.

Table 03. Analysis of IBS and anxiety levels among students from public and private medical colleges

	Students from Public Medical Colleges	Students from Private Medical Colleges
Severe Anxiety	39%	61%
Moderate Anxiety	41%	59%
Mild Anxiety	51%	49%

a.21 cells (42.0%) have expected count less than 5. The minimum expected count is 0.84.

IBS Positive	37%	67%

a.55 cells (70.5%) have expected count less than 5. The minimum expected count is 0.42.

DISCUSSIONS

These findings suggest that clinical diagnosis of IBS and anxiety are common health problems among medical students, with different prevalence rate as well as symptom severity. Distribution of demographic analysis displays that the vast majority are young adults with age range mainly from 19 to 25 years old, which has been consistent with other research regarding medical student populations.[10,15,16] This gender distribution with a slightly more prevalent in male patients was observed probably due to the fact that similar studies across region yielded consistent results.[17,18] A frequency table of IBS symptoms shows that a substantial proportion of students suffer from each symptom with the largest percentage reporting "sometimes" or "occasionally". This result is consistent with the study that reported considerable IBS prevalence among Saudi medical students.[19] Nevertheless, very few students reported their symptoms as "all the time" or even just "most of the time", showing how relatively uncommon severe IBS was amongst this student group. The anxiety frequency table illustrates a mosaic of experiences, with many students reporting symptoms of at least some magnitude. Specifically, 59.1% reported that they did not have anxiety "at all," the rest endured from "several days" to just under daily. Findings on issue of anxiety level variability were consistent with previous studies by,[15] reporting a similar trend in medical students. Numerous research have documented the connection of anxiety with IBS, whether causing or aggravating it.[20]

The KMO measure and the significant Bartlett's Test of Sphericity in connection with results from an exploratory factor analysis (EFA) indicated general suitability and double-checked whether pattern would be robust upon adequate sampling. The identified factors, including the IBS Symptom Severity Factor (ISSF), General Anxiety Factor (GAF) and IBS Impact/Functioning Factor provide a construct-based view of the dimensions of symptoms, impact and anxiety in patients with IBS. The pattern matrix further underscores the strong associations between specific items and the identified factors, highlighting key indicators of IBS and anxiety. Correlation analysis reveals significant relationships among the identified factors, with a strong positive correlation between the IBS Symptom Severity Factor and the IBS Impact and Functioning Factor. This suggests that as the severity of IBS symptoms increases, its impact on students' functioning also intensifies, a finding consistent with previous research.[21]

Additionally, the moderate positive correlation between the IBS Symptom Severity Factor and the General Anxiety Factor underscores the interlinked nature of IBS and anxiety, as documented in various studies [8,20]. Chi-Square tests examining the relationship between gender and the prevalence of IBS and anxiety provide nuanced insights. The lack of a significant association between gender and IBS prevalence suggests that IBS affects male and female students similarly, a finding echoed in other studies.[22,23] However, the positive trend for significant association between gender and higher anxiety prevalence suggest that there might be some differences in both genders of experiencing Anxiety with female students at a not-too-distant rate from high. This is in trend with studies from different cultural background and calls for more disentangling of gender specific risk factors to anxiety.[21]

The higher frequencies observed for IBS and anxiety levels in private medical colleges are influenced by factors such as differences in curriculum structure, financial stress, competition, or environmental pressures.

General anxiety factor and IBS-related impact on functioning are both viable as independent variables influencing the dependent variable, such as trigger

components for each. Large coefficients indicate that these variables strongly predict IBS and anxiety through triggers, further confirming the interrelation between these conditions.[17,19] The association between the predictors and dependent variable was relatively weak, but all were positively correlated with each other suggesting that reducing anxiety and its contributing factors could reduce also IBS symptoms among medical students influences on their overall functioning.

The study narrow focus on Khyber Pakhtunkhwa, allowing for a detailed analysis of a specific population, which can provide valuable insights for local healthcare interventions. The study's limitations include the inability to generalize the results because the sample size was small and the research was done in a small population. As a cross-sectional study, it establishes associations but does not imply causation. Consequently, longitudinal studies are needed to explore the dynamics and evolution of the observed associations, providing a more comprehensive understanding of the research topic.

CONCLUSION

Irritable Bowel Syndrome (IBS) is a common condition among medical students, yet awareness about it remains limited. Emotional stress and morbid anxiety are significant contributing factors to IBS development. It is crucial to educate students about the potential adverse consequences of IBS and emphasize the importance of stress management. Counseling sessions can play a vital role in reducing stress levels among medical students, ultimately helping to mitigate IBS symptoms.

Ethical Consideration

This study was approved by Institutional Review Board of Northwest School of Medicine, Peshawar, Pakistan.

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Conflict of Interest

Authors declared no conflict of interest.

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DATA SHARING STATEMENT: The data that support the findings of this study are available on request from the corresponding author. The data is not publicly available due to privacy or ethical restrictions.

AUTHORS' CONTRIBUTION

The following authors fulfill authorship criteria as per ICMJE guidelines;

Qazi N:	Substantial contribution to conception and design, drafting the manuscript, final approval, agreed to be accountable for all the work.
Fazal F:	Substantial contribution to conception and design, data acquisition, drafting the manuscript, final approval, agreed to be accountable for all the work.
Rehman S:	Analysis and interpretation of data, drafting the manuscript, final approval, agreed to be accountable for all the work.
Umair M:	Analysis and interpretation of data, critical revision, final approval, agreed to be accountable for all the work.

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