



PREVALENCE OF IRRITABLE BOWEL SYNDROME AND ASSOCIATED PSYCHOLOGICAL FACTORS AMONG YOUNG ADULTS

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ABSTRACT

Objective: To determine the prevalence of irritable bowel syndrome (IBS) and its association with psychological factors among young adults presenting to tertiary care hospitals in Pakistan.

Material & Methods: A descriptive cross-sectional study was conducted in the Departments of Gastroenterology of tertiary care hospitals in Pakistan after obtaining institutional ethical approval. Between September 2023 and March 2024, 341 young adults were enrolled using a non-probability consecutive sampling technique. Demographic and clinical data were collected using a structured proforma. IBS was diagnosed according to the Rome IV criteria, while anxiety, depression, and stress were assessed using the Depression Anxiety Stress Scale-21 (DASS-21). Multivariable logistic regression analysis was performed to identify independent predictors of IBS.

Results: The mean age was 24.8 ± 4.3 years, and 176 (51.6%) participants were female. IBS was diagnosed in 97 (28.4%) participants, with the mixed subtype being the most frequent (36.1%). Moderate-to-severe anxiety, depression, and stress were significantly more common among participants with IBS than those without (all $p < 0.001$). On multivariable analysis, moderate-to-severe anxiety (aOR=3.84, 95% CI: 2.18–6.75), stress (aOR=2.57, 95% CI: 1.46–4.51), positive family history of IBS (aOR=2.41, 95% CI: 1.34–4.36), female sex (aOR=1.72, 95% CI: 1.02–2.91), and depression (aOR=1.89, 95% CI: 1.08–3.33) were independently associated with IBS.

Conclusion: Nearly one-third of young adults had IBS, with anxiety emerging as the strongest independent predictor. Routine psychological assessment may facilitate early diagnosis and multidisciplinary management of IBS in young adults.

Keywords: Irritable bowel syndrome; Rome IV; Anxiety; Depression; Stress; DASS-21; Young adults; Pakistan.

INTRODUCTION

Irritable bowel syndrome (IBS) is a chronic disorder of gut–brain interaction defined by recurrent abdominal pain associated with altered bowel habits in the absence of identifiable structural or biochemical abnormalities. It is one of the most common functional gastrointestinal disorders in the world, and causes significant impairment in quality of life, reduced academic and occupational productivity, increased healthcare resource utilization, and considerable socioeconomic burden (1). Even though IBS is not associated with a higher mortality rate, its chronic and recurrent course disrupts physical, emotional, and social well-being. This complex pathogenesis of IBS may reflect abnormal GI motility, visceral hypersensitivity, dysbiosis of gut microbiota, immune activation, and dysfunctions in the bidirectional gut–brain axis (2).

The prevalence of IBS appears to vary considerably by geographic region, owing to differences in diagnostic criteria lulupedias.org. Currently, global meta-analyses have reported a weighted prevalence in the broad region of 11% to 14%, based on the fact that this is highly heterogeneous by country. Female gender, anxiety, depression, and chronic stress are consistently risk factors among patients with this condition of arrested development; The male-gender is affected less frequently. University students are categorized among high-risk, vulnerable populations due to academic pressure, dietary habits irregularities, sleep disruption, and lifestyle changes, which may increase the susceptibility of developing inflammatory bowel syndrome (IBS) (3).

The Rising Public Health Concern in the general population has had a higher prevalence at around 33.2% and about 28–34% among college and medical students. Moreover, psychiatry studies in Pakistan have found a strong correlation between IBS and anxiety, so that students with IBS had more than 50% psychopathology. However, the bulk of available evidence comes from either a single institution or student population, and therefore results may not be generalizable (4-6).

Young adulthood is a period of great transition, where psychological stress characterized by anxiety, depression, and emotional instability is common and may affect gastrointestinal function via the gut–brain axis. In Pakistan, the disease burden of IBS is increasing, but data assessing IBS among adults with its psychological correlates using modern standardized diagnostic criteria remain inadequate. In addition, regional lifestyle, educational, and psychosocial conditions require local evidence to clarify disease. Thus, this study aimed to estimate the prevalence of IBS and its relationships with psychological factors in young adults, as data are typically needed for effective risk stratification and prevention while incorporating the metrics that can support specific mental health interventions in this population.

METHODOLOGY

After approval from the Institutional Ethical Review Committee, this descriptive cross-sectional study was conducted in the Department of Gastroenterology and Psychiatry at tertiary care hospital Jinnah Sindh Medical University (JSMU) / Jinnah Postgraduate Medical Centre (JPMC), Karachi, Pakistan for a period of 6 months (1st September 2023 to 31st March 2024).

Sample size was calculated using the WHO Sample Size Calculator based on the 95% confidence level, 5% margin of error, and estimated prevalence of IBS in young adults (33.2%) reported in a previously published Pakistani literature (7). The calculated minimum sample size was 341 participants. Non-probability consecutive sampling was done to enroll participants till the sample size was achieved to make up for incomplete questionnaires and missing information

Inclusion Criteria

Eligible participants were young adults of either sex aged 18 to 35 years who presented to the participating tertiary care hospitals during the study period and provided written informed consent. Participants were screened for irritable bowel syndrome by using Rome IV diagnostic criteria. Participants were included in the study if they could read and complete the study questionnaires independently.

Exclusion Criteria

Exclusion criteria included being younger than 18 years or older than 35 years. We also exclude participants who estimated they had inflammatory bowel disease or celiac disease in the past, those with colorectal cancer, gastrointestinal tuberculosis and malignancy (including non-Hodgkin lymphoma), those with a history of intestinal obstruction or major gastrointestinal surgery including bariatric surgery, chronic pancreatitis liver pus gross Chronic liver diseases pregnancy severe psychiatric illness requiring hospitalization within 5 years cognitive impairment preventing the filling questionnaires acute infectious gastroenteritis very incomplete clinical recordsquestionnaires were excluded.

Data Collection

Data were collected in the form of a structured predesigned proforma by the principal investigator and trained research assistants with written informed consent from all participants. Given Demographic variables, such as age, sex (male/female), marital status, education level (college graduates vtraditionally defined urban: province based on urban and rural living dwellings according to World Health Organization classification definitions) occupations at the time of recruitment (doctors vs non doctors); cigarette smoking status; alcohol intake also exercise (aerobic parttime or fulltime) sleep duration (3–or in part from a year due to global dietary behaviours trends analysed) minimal dietetic historywas obtained more info information poster annually july via participants & tricenter amends service month Medical family history of irritable syndrome borne’s bowels mapping other gastrointestinal complications were measured.

Anthropometric measurements such as height, weight, body mass index (BMI), and waist circumference were collected using standardized protocols. Clinical features such as duration of gastrointestinal symptoms, bowel habit pattern (constipation-predominant, diarrhea-predominant, mixed type or unclassified), characteristics of abdominal pain, bloating-associated gastrointestinal symptoms, and past medical history, medications, and healthcare utilization were obtained.

Diagnosis of IBS was verified according to the Rome IV diagnostic criteria by the treating gastroenterologist (8). Those who met diagnostic criteria were diagnosed with IBS according to their bowel habits as IBS with constipation (IBS-C), IBS with diarrhea (IBS-D), or more generalized mixed bowel habits and classified as either IBS-M, if the patient cycled between sets of bowel habits —more than 25% of all profiles indicated stools that were hard and lumpy together with very loose or watery stools—or non-classified where this was not applicable.

The validated Depression Anxiety Stress Scale-21 (DASS-21) questionnaire was used to assess psychological status (9). The 21-item questionnaire assesses symptoms of depression, anxiety and stress over the last week, with seven items for each of these three domains. Each domain was then multiplied by 2, appertaining to the DASS-21 scoring guide and classified into normal, mild, moderate, severe and extremely severe categories based on cut-off values. The questionnaire was completed in a quiet space but under the eye of trained research staff to ensure completeness and mitigate response bias.

Statistical Analysis

Using Statistical Package for the Social Sciences (SPSS) version 26.0 (IBM Corp., Armonk, NY, USA), data were entered and analysed. Continuous variables were checked for normality using the Shapiro–Wilk test and reported as mean $\pm$ standard deviation (SD), while categorical variables were reported as frequencies and percentages. The independent samples t-test was used to compare continuous variables between IBS/non-IBS participants. Categorical variables were compared using the Chi-square test or Fisher's exact test, as appropriate. Variables with p-values <0.20 in univariate analysis and clinically relevant variables were included in a multivariable binary logistic regression model to identify independent risk factors of IBS. Logistic regression results are reported as usual: adjusted odds ratios (aORs) with 95% confidence intervals (CIs). The Hosmer–Lemeshow test was used to assess the goodness-of-fit of the final model. In all analyses, a two-tailed p-value of <0.05 was considered statistically significant.

RESULTS

A descriptive cross-sectional study included 341 young adults. The mean age of the participants was 24.8 ± 4.3 years, with the majority belonging to the 18–25 years age group (218, 63.9%). There were 176 (51.6%) females and 165 (48.4%) males. Based on the Rome IV diagnostic criteria, 97 (28.4%) participants were diagnosed with irritable bowel syndrome (IBS), while 244 (71.6%) did not fulfill the diagnostic criteria. Among participants with IBS, the mixed subtype (IBS-M) was the most common (36.1%), followed by diarrhea-predominant IBS (IBS-D) (29.9%), constipation-predominant IBS (IBS-C) (24.7%), and unclassified IBS (IBS-U) (9.3%). According to the DASS-21 questionnaire, moderate-to-extremely severe anxiety, depression, and stress were observed in 116 (34.0%), 98 (28.7%), and 104 (30.5%) participants, respectively. Baseline demographic and clinical characteristics are presented in Table 1.

Table 1. Baseline demographic and clinical characteristics of study participants (n = 341)

Baseline and clinical parameters	Frequency (%)
Age Group (Years)	
18–25	218 (63.9)
26–30	82 (24.0)
31–35	41 (12.0)
Gender	
Male	165 (48.4)
Female	176 (51.6)
IBS Status (Rome IV)	
IBS Present	97 (28.4)
IBS Absent	244 (71.6)
IBS Subtype (n = 97)	
IBS-C	24 (24.7)
IBS-D	29 (29.9)
IBS-M	35 (36.1)
IBS-U	9 (9.3)
Moderate-to-Severe Anxiety	116 (34.0)
Moderate-to-Severe Depression	98 (28.7)
Moderate-to-Severe Stress	104 (30.5)
Current Smokers	56 (16.4)
Positive Family History of IBS	63 (18.5)

Participants diagnosed with IBS demonstrated significantly higher frequencies of psychological distress than those without IBS. Moderate-to-severe anxiety was observed in 58 (59.8%) participants with IBS compared with 58 (23.8%) participants without IBS ($p < 0.001$). Similarly, depression and stress were significantly more prevalent among participants with IBS. Female sex and a positive family history of IBS were also significantly associated with IBS. Detailed associations are presented in Table 2.

Table 2. Association between irritable bowel syndrome and psychological factors

Psychological factors	IBS Present n (%)	IBS Absent n (%)	p-value
Moderate-to-Severe Anxiety	58 (59.8)	58 (23.8)	<0.001
Moderate-to-Severe Depression	47 (48.5)	51 (20.9)	<0.001
Moderate-to-Severe Stress	51 (52.6)	53 (21.7)	<0.001
Female Sex	61 (62.9)	115 (47.1)	0.011
Current Smoking	23 (23.7)	33 (13.5)	0.026
Positive Family History of IBS	31 (32.0)	32 (13.1)	<0.001

Abbreviations: IBS, Irritable Bowel Syndrome; DASS-21, Depression Anxiety Stress Scale-21.

Footnote: Data are presented as n (%). Comparisons were performed using the Chi-square test. A p-value <0.05 was considered statistically significant. Significant p-values are shown in bold. IBS was diagnosed according to the Rome IV criteria, and psychological distress was assessed using the DASS-21 questionnaire.

Figure 1 demonstrates the distribution of psychological distress among study participants according to IBS status. Anxiety was the most common psychological disorder among participants with IBS, followed by stress and depression. Overall, nearly 60% of participants with IBS exhibited clinically significant anxiety, indicating a substantial psychological burden associated with the disorder.

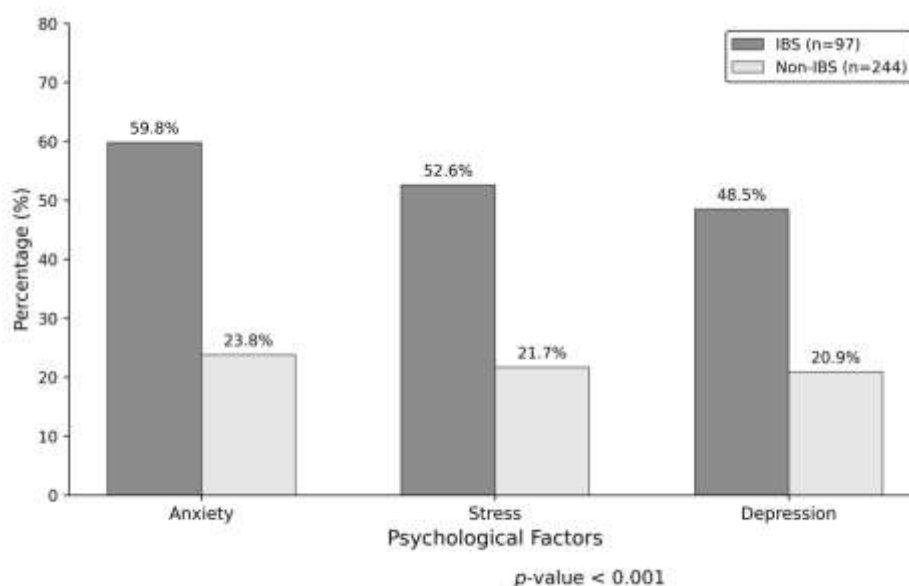


Figure 1. Distribution of moderate-to-severe anxiety, stress, and depression according to irritable bowel syndrome (IBS) status.

Multivariable logistic regression analysis demonstrated that moderate-to-severe anxiety remained an independent predictor of irritable bowel syndrome after adjustment for age, sex, smoking status, family history of IBS, depression, and stress. Participants with moderate-to-severe anxiety had 3.84-fold greater odds of having IBS (AOR: 3.84; 95% CI: 2.18–6.75; $p < 0.001$). Moderate-to-severe stress and a positive family history of IBS were also independently associated with IBS. Female sex showed a modest but statistically significant association with IBS, whereas smoking demonstrated borderline significance after adjustment. Depression was independently associated with IBS but exhibited a weaker association than anxiety. Table 3.

Table 3. Multivariable logistic regression analysis for predictors of irritable bowel syndrome

Predictors	Reference Category	Adjusted Odds Ratio (aOR)	95% Confidence Interval	p-value
Moderate-to-Severe Anxiety	Normal/Mild Anxiety	3.84	2.18–6.75	<0.001
Moderate-to-Severe Depression	Normal/Mild Depression	1.89	1.08–3.33	0.026
Moderate-to-Severe Stress	Normal/Mild Stress	2.57	1.46–4.51	0.001
Female Sex	Male	1.72	1.02–2.91	0.042
Age ≥ 26 years	18–25 years	1.29	0.75–2.23	0.354
Current Smoking	Non-Smoker	1.63	0.91–2.93	0.098

Positive History of IBS	Family No	2.41	1.34–4.36	0.003
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Dependent variable: Presence of irritable bowel syndrome according to the Rome IV diagnostic criteria.

Abbreviations: aOR, adjusted odds ratio; CI, confidence interval; IBS, irritable bowel syndrome; DASS-21, Depression Anxiety Stress Scale-21.

DISCUSSION

This study explored the prevalence of irritable bowel syndrome (IBS) as well as its relationship to psychological factors among young adults admitted to tertiary care hospitals in Pakistan. Among the 341 participants, 97 (28.4%) met Rome IV diagnostic criteria for IBS and 244 (71.6%) did not have IBS. In IBS patients, the mixed subtype (IBS-M) was the most frequent with 35 cases (36.1 percent), followed by IBS-D (29.9%), IBS-C (24.7%), and IBS-U. These data suggest that IBS is a major gastrointestinal health burden in young adults.

The 28.4% prevalence demonstrated in the present study is comparable with the previous Pakistani studies demonstrating 28–34% prevalence among university students and young adults (10). Of note, prevalence rates from Saudi Arabia (20–35%) (11), India (15%) (12), and Pakistan (28%) (13) also reflect the same ranges depending on the population investigated, including patients with diabetes, obesity, and non-obese cohorts. The higher incidence in the adolescent population may be attributed to increased academic burden, psychological stress, eating pattern changes, sleep disturbances, and sedentary lifestyle. The discrepancies between studies can most probably be explained by differences in the Rome diagnostic criteria, as well as cultural characteristics and diet or health-seeking behaviour. The present study found an especially strong association with psychological distress in IBS. Compared with the 243 (23.8%) participants without IBS, moderate-to-severe anxiety was three times more prevalent in participants with IBS; 58/97 (59.8%) vs 58/243 (23.8%), $p < 0.001$. Similarly, the study found that 47 (48.5%) participants with IBS had moderate-to-severe depression vs. 51 (20.9%) without IBS ($p < 0.001$) and 51 (52.6%) participants with IBS had moderate-to-severe stress compared to 53 (21.7%) non-IBS patients ($p < 0.001$) (14, 15). These results replicate earlier international studies that show much higher rates of anxiety, depression and stress in people with IBS. Studies that combine data from multiple studies, known as meta-analyses, have demonstrated that patients with IBS are two to three times more likely to develop anxiety and depressive disorders than healthy individuals (16). Such a relationship is biologically plausible in that the impaired gut-brain axis, abnormal hypothalamic-pituitary-adrenal axis activity, visceral hypersensitivity, immune activation, and dysbiosis contribute to both GI symptoms and psychological disorders.

In our study, we have observed that IBS was more frequent in females than males. Out of 97 participants with IBS, females accounted for 61 (62.9%), and out of the other 245 participants without IBS, females accounted for 115 (47.1%), and female sex remained independently associated with being diagnosed with IBS after multivariable adjustment (AOR = 1.72; $p = 0.042$). This phenomenon, which has been reported around the world, is often explained by hormonal activity; differences in visceral pain perception; gastrointestinal motility disorder; and increased prevalence of anxiety disorders among women (17).

A positive family history of IBS was reported in 31 (32.0%) participants with IBS compared to 32 (13.1%) participants without IBS. This is consistent with prior evidence that both shared genetic susceptibility and environmental influences, dietary patterns, as well as illness behaviors learned from others likely all play a role in familial clustering of IBS (18). Although current smoking was more prevalent among IBS than non-IBS participants (23.7% vs 13.5%; $p = 0.026$), it was not statistically significant after multivariable adjustment, suggesting that smoking may reflect lifestyle or psychosocial factors that are associated with IBS but not an environmental determinant of IBS itself. The current study has important clinical implications. Almost one-third (28.4%) of young adults had irritable bowel syndrome (IBS), and among those affected, over half experienced clinically significant anxiety (59.8%) and stress (52.6%) (19). Such findings underscore the need for routine psychological assessment in young adults with chronic gastrointestinal symptoms. Management of anxiety and stress

with dietary counseling, lifestyle modification, stress management, and psychological interventions such as cognitive behavioral therapy early on may be beneficial in controlling symptoms, improving treatment adherence, and quality of life (20).

The present study has several strengths, such as the use of standardized Rome IV diagnostic criteria, a validated psychological assessment tool, and inclusion of participants from tertiary care hospitals in two major cities of Pakistan. However, some essential limitations should also be taken into account during this process. The cross-sectional nature of this analysis precludes any causal conclusions about the relationship between psychological distress and IBS. Lastly, data were collected from a hospital-based sampling strategy, which limits generalizability to the wider community, and the fact that psychological symptoms were based on self-administered questionnaires rather than formal psychiatric interviews. However, multicenter prospective studies are advisable to evaluate temporal relationships and the effect of psychological interventions on IBS outcomes.

CONCLUSION

Almost one-third of young adults had irritable bowel syndrome, being strongly associated with anxiety, depression and stress. Anxiety was the most significant independent risk factor for IBS, and female sex and family history of BRCA1/2++ were also independently associated with the disorder. It is therefore hypothesized that routine psychological screening and multidisciplinary management can be beneficial for timely diagnosis, thereby improving the clinical outcome of IBS in young adults.

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