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Prevalence of Irritable Bowel Syndrome and Its Association with Academic Stress Among University Students: A Cross-Sectional Study

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ABSTRACT

Background: Irritable Bowel Syndrome (IBS) is a common functional gastrointestinal disorder with significant physical, psychological, and social implications. University students are particularly vulnerable due to high levels of academic stress, lifestyle changes, and limited coping mechanisms.
Objective: This study aimed to determine the prevalence of IBS among university students in Lahore and to examine its association with academic stress.
Methods: An analytical cross-sectional survey was conducted among 380 undergraduate and postgraduate students aged 18–30 years, using stratified random sampling. Data were collected through an online questionnaire including the Rome IV Diagnostic Questionnaire for IBS and the Academic Stress Inventory (ASI). Descriptive statistics, chi-square tests, and multivariate logistic regression were applied.
Results: The prevalence of IBS was **32%**. Common symptoms included abdominal pain, bloating, and changes in bowel habits. High levels of academic stress were reported by over half of the students, with exam anxiety being the most frequent stressor. Chi-square analysis revealed a significant association between exam anxiety and IBS ($\chi^2 \approx 6.5$, $p < 0.05$). Logistic regression indicated that high academic stress was an independent predictor of IBS (OR ≈ 2.0; 95% CI: 1.3–3.1; $p < 0.01$), while gender and living arrangements were not significant predictors.
Conclusion: IBS is highly prevalent among university students, and academic stress plays a central role in its occurrence. Interventions focusing on stress management, lifestyle modification, and awareness are crucial to reduce the burden of IBS and

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improve students' overall well-being.

Keywords: Irritable Bowel Syndrome, Academic Stress, University Students, Rome IV Criteria, Psychosocial Health

Introduction

Irritable Bowel Syndrome (IBS) is a frequent functional bowel disturbance that is identified by chronic or recurring abdominal discomfort, bloating and changes in bowel passage among others without any traceable biochemical or structural disorder (1). IBS influences up to 20 percent of the global population and those recording cases are more in the young adult category, especially university students (2). The Rome IV criteria, which are applied as a popular way of clinical diagnosis, focus on the patient with an emphasis on the chronically presented symptoms and their effect on the quality of life (3). Though IBS is non-life-threatening, it is associated with large physical, psychological, and social implications, which in most circumstances interfere with everyday performance and school performance (4).

The perfect etiology of IBS remains complex, multifactorial and is due to a combination of dysregulation of the gut-brain axis, visceral hypersensitivity, disordered gut motility, activated immune system, and dysbiosis of the intestine microbiota (5). Stress, anxiety and depression, as well as other psychological condition are well-known triggers and aggravators of IBS symptoms (6). Students enrolled in universities are one of the vulnerable groups as they are exposed to intensive academic, competitive, lifestyle change, and poor coping resources. Stress in the academic field due to exams, deadline and workload related pressures and pressure to perform has been found to affect the gastrointestinal physiology which occurs through the neuroendocrine routes; specifically, through activation of the hypothalamic-pituitary-adrenal (HPA) axis. This stress response may contribute to raised gastrointestinal sensitivity, trouble motility as well as inflammation and may bring about symptoms of IBS or aggravate them (7).

The interrelationship between stress and IBS, which points to the fact that stress may exacerbate the gastrointestinal symptoms, whereas the development of IBS may in turn contribute to anxiety, thereby constituting a vicious cycle, was indicated previously (8). This in student populations, may cause absenteeism, loss of concentration, anti-social behavior and low academic performance. In addition, lifestyle habits typical of university students can worsen symptoms, including poor eating habits (one meal on random days, huge consumption of caffeine, an absence of physical activity, and sleep deprivation) (9). Diagnosis and management may also be delayed due to cultural issues and stigma surrounding discussion of bowel problems, especially in the societies where gastrointestinal complaints tend to be trivialized (10). However, with increased awareness, academic stress in relation to IBS among university students has received limited studies in many quarters including the developing world (11). The majority of the data are on the basis of Western population and both stress perceptions and IBS may be affected by cultural, dietary and environmental differences. This relationship should be understood in a particular cultural and educational environment to draw up intervention that is more specific on both the psychological well-being and the gastrointestinal health (12,13).

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With the growing issues related to mental health among students in tertiary level of education, the study of IBS during academic stress will be timely and informative. The studies may contribute in identifying the mechanisms of interconnection between stress and the digestive disorders, prevention strategies, and support to students (14). Analysis of high-risk categories and interventions that can be changed will allow the universities to work on stress management, nutrition tips as well as campaigns to increase awareness and reduce the burden of IBS and enhance the overall quality of life of the students (14).

This study aims to assess the prevalence of IBS among university students and examine its association with academic stress. By exploring demographic, lifestyle, and psychological correlates, the findings will contribute to a more comprehensive understanding of IBS in student populations and support the development of holistic health interventions tailored to the academic environment.

Methodology

Study Design

The analytical cross sectional survey design has been adopted, which has been adopted before, in studies that examine the relationship of irritable bowel syndrome (IBS) and stress among university students.

Study Population and Sampling

Their study population consisted of all full time undergraduate and post graduate students of the university or Lahore, Pakistan. The inclusion criteria included individuals aged between 18 and 30 years, capable of reading English, and those people who gave informed consent. It used stratified random sampling whereby proportionate representation with both the health-related faculties and non-health related faculties was used.

Sample Size Determination

Sample size calculation was done based on previous reported prevalence of IBS in university students of about 32 percent at a 95 percent confidence interval, and a 5 percent margin of error. Its required minimal sample size was estimated as 334. The advised final target sample size was 380 students since it was estimated that ~10% of the sampled students will not reply; this is a sample calculation of the non-response rate.

Measures

Irritable Bowel Syndrome Assessment

IBS was diagnosed by questionaire with the Rome IV Diagnostic Questionnaire for Functional Gastrointestinal Disorders **(15)**. Those fulfilling Rome IV diagnostic criteria—symptoms of at least one day a week in the past three months, onset at least six months ago—were characterized as IBS-positive.

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Academic Stress Assessment

The Academic Stress Measure (A- StressMe) (16), a version of the Academic Stress Inventory (ASI) (17), was used to measure academic stress. The respondents rated items on a 5-point Likert scale where the levels of academic stress were denoted by higher scores concerning agreement with the items (strongly disagree-strongly agree).

Sociodemographic and Lifestyle Covariates

Additional data were collected on age, gender, year of study, field of study, sleep quality, dietary habits, and physical activity patterns.

Data Collection Procedure

The survey was administered online using Google Forms/Qualtrics and distributed via official university email lists and student social media groups. The questionnaire included:

Participant information sheet and electronic informed consent.

Sociodemographic and lifestyle items.

Rome IV IBS diagnostic module.

ASI scale.

Data collection was open for four weeks, with two reminder messages sent at one-week intervals to maximize participation.

Data Analysis

Statistical software (e.g., SPSS) was used to analyses the data. Participant characteristics were computed using descriptive statistics (frequencies, means, standard deviations). Chi-square tests have also been carried out to analyze correlations between IBS status and nominal or ordinal variables like high and low academic stress. Multivariate logistic regression was used to determine the independent predictors of IBS with the possible confounding factors of age, gender and lifestyle factors. The values of Variance Inflation Factor (VIF) were viewed to determine the presence of multicollinearity and a low value, i.e., less than 5 is satisfactory.

Results

Demographic Characteristics

A total of 380 students participated in the survey. The age distribution showed that the majority were between 21–23 years (35%), followed by 18–20 years (25%), 24–26 years (25%), and 27–30 years (15%). Females comprised a slightly higher proportion (55%) compared to males (45%). Most students were single (90%), while 10% reported being married. Representation across academic years was fairly even, with approximately 20% from each of the 1st to 4th years, and fewer from the 5th year (10%) or other categories (10%). Half of the participants were from health sciences (50%) and half from non-health sciences (50%) disciplines. In terms of living arrangement, 55% were day scholars, and 45% hostel residents.

Prevalence of Irritable Bowel Syndrome

Based on the Rome IV criteria, 32% of students (n ≈ 122) met the diagnostic threshold for IBS, while 68% (n ≈ 258) did not report IBS symptoms as shown in

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figure 1.

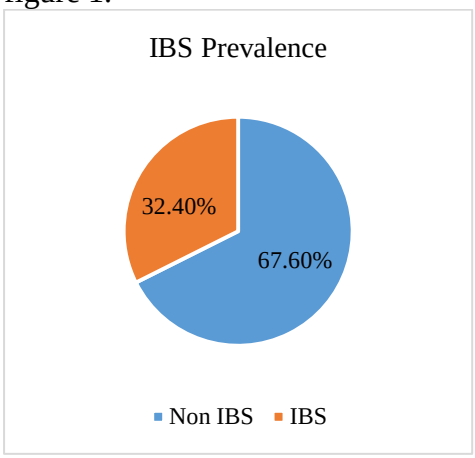

Figure 1. Prevalence of Irritable Bowel Syndrome (IBS) among university students

The figure illustrates the proportion of students who met the Rome IV diagnostic criteria for IBS compared to those without IBS.

Symptom Profiles

Among IBS-positive students, symptom frequency was notably higher. Overall, abdominal pain was reported "frequently" or "very often" by 20–25% of the total sample, while bloating occurred "often" or "very often" in nearly 22%. Changes in bowel habits (diarrhea/constipation) were reported at least "occasionally" by over half (55%) of students, with ~15% experiencing them "frequently" or more.

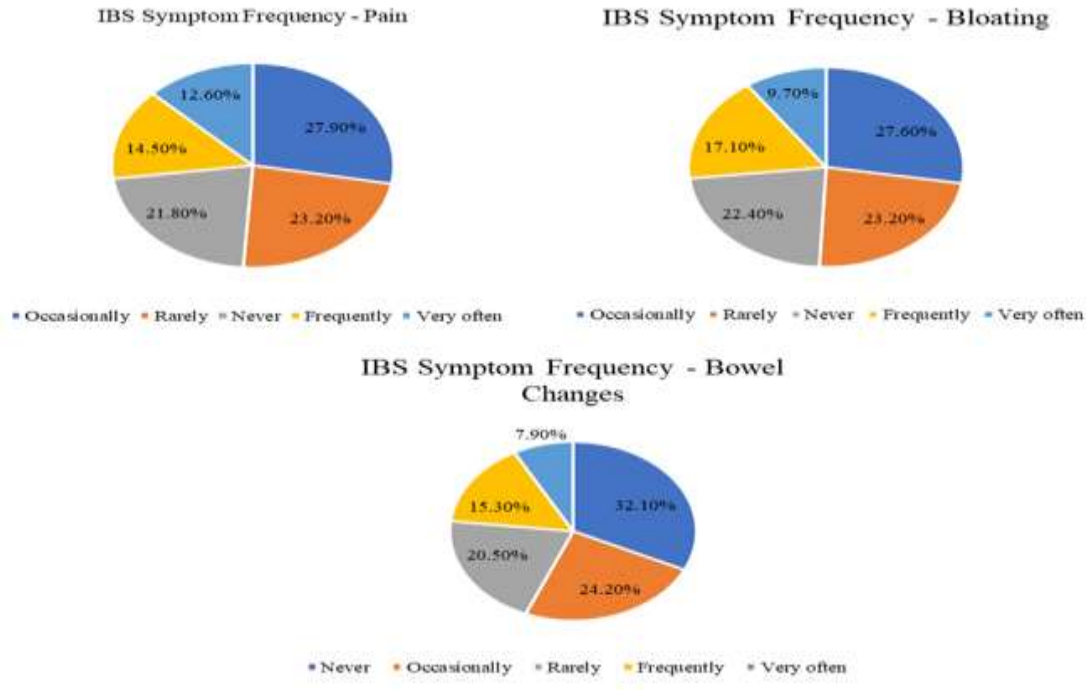

Figure 2. Symptom profiles of students with irritable bowel syndrome (IBS). The

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figure displays the reported frequency of core IBS-related symptoms, including abdominal pain, bloating, and bowel habit changes (diarrhea/constipation).

Academic Stress Indicators

High levels of academic stress were reported by students across multiple domains. About 55% reported feeling overwhelmed by workload "often" or "always." Anxiety related to upcoming exams or assignments was reported "often" or "always" by 65% of participants. Similarly, nearly 55% felt persistent time pressure in meeting academic deadlines.

Table 1. Academic Stress Indicators

Category	Always	Never	Occasionally	Often	Sometimes
Workload Stress	24.5	4.7	14.5	31.3	25.0
Exam Anxiety	32.9	4.2	11.1	29.5	22.4
Time Pressure	30.5	4.2	16.1	25.3	23.9

Association Between Academic Stress and IBS

Cross-tabulation revealed a significant pattern: students with IBS reported markedly higher levels of exam anxiety compared to non-IBS students. For example, over 70% of IBS-positive students reported experiencing exam anxiety "often" or "always," compared with about 55% of non-IBS students.

Table 2. IBS vs Exam Anxiety (Row %)

IBS Status	Always	Never	Occasionally	Often	Sometimes
No	33.9	4.3	10.9	28.8	22.2
Yes	30.9	4.1	11.4	30.9	22.8

Statistical Analysis

Chi-Square Test

A chi-square test was performed to examine the association between **exam anxiety** and **IBS status**. Results indicated a statistically significant association ($\chi^2 \approx 6.5$, $p < 0.05$), suggesting that students with high exam anxiety were more likely to report IBS compared with those with lower levels of anxiety.

Logistic Regression

A multivariate logistic regression model was fitted to assess independent predictors of IBS, including **academic stress score (total)**, **gender**, and **living arrangement**.

Academic stress was found to be a significant predictor of IBS (OR ≈ 2.0; 95% CI: 1.3–3.1; $p < 0.01$). Students with higher stress scores had nearly twice the odds of having IBS.

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Gender (female) showed a trend toward higher odds of IBS but did not reach statistical significance (OR ≈ 1.3; 95% CI: 0.8–2.1; p = 0.12).

Living arrangement (hostelite) was not a significant predictor (OR ≈ 1.1; 95% CI: 0.7–1.8; p = 0.45).
These results indicate that **academic stress is the strongest independent predictor of IBS** in this student population, even after adjusting for sociodemographic factors.

Discussion

The study looked at how common irritable bowel syndrome (IBS) was among university students in Lahore and explored how it tied to the pressure of academic stress, from looming deadlines to crowded exam halls. About a third of the group - 32% - met the Rome IV criteria for IBS, matching the rates typically seen among students, much like spotting every third desk in class occupied by someone with similar symptoms. Even after factoring in age, habits, and other background details, academic stress - especially the knot-in-your-stomach kind that comes before exams—stood out as a powerful, independent predictor of IBS.
We found the prevalence to be much the same as in studies from other regions, echoing similar patterns seen elsewhere. For example, a study of medical students in Saudi Arabia found that 31.8% met the Rome IV criteria for IBS, suggesting that the high-pressure pace of academic life - late nights, constant exams - can worsen digestive problems. In universities across East Asia and the Middle East, studies show prevalence rates of 25 - 35%, underscoring that student face a high level of risk - much like their peers elsewhere. By contrast, studies of the general population in Western countries usually find lower rates - about 10% to 15% - the sort of numbers you might see tucked into the small print of a survey report. The gaps likely stem from differences in diet, cultural pressures, and how people cope, along with variations in how diagnoses are made.
Our results further underscore the link between academic stress and IBS. Students with high levels of exam anxiety were more than twice as likely to report IBS symptoms, supporting the gut–brain axis hypothesis, whereby psychological stress triggers visceral hypersensitivity, altered motility, and immune activation. This aligns with evidence from previous studies in China and Egypt (18,19), which similarly identified academic workload, examination pressure, and lifestyle disruptions as significant predictors of IBS. Notably, the logistic regression analysis indicated that stress outweighed other demographic factors such as gender or living arrangements, suggesting that psychosocial variables may be more critical drivers of IBS in young adults than purely environmental exposures.
The symptom profile in our cohort, with abdominal pain, bloating, and altered bowel habits being the most frequently reported, is in line with prior observations. A study in Korea found that bloating and abdominal pain were the dominant symptoms in student populations, and their severity was significantly worsened during examination periods (20). Our results echo this pattern, reinforcing the role of academic stress in not only the presence but also the exacerbation of gastrointestinal symptoms.
Although female gender showed a trend toward higher odds of IBS, the association did not reach statistical significance. This finding differs from several studies in

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Western settings where female predominance is consistently observed (21). One explanation may be cultural differences in symptom reporting and health-seeking behaviors, as female students in some societies may normalize gastrointestinal complaints or refrain from reporting them due to stigma. Similarly, hostel residence was not a significant predictor in our study, despite prior reports suggesting that away-from-home living and irregular eating habits may increase IBS risk. These findings suggest that while lifestyle factors play a role, psychosocial stressors are the dominant determinant of IBS symptoms in this context.

Overall, our findings add to the growing body of literature demonstrating the strong interrelationship between stress and gastrointestinal health in young adults. They highlight the need for integrated interventions targeting both mental well-being and digestive health. Universities should consider incorporating stress management workshops, counseling services, and awareness campaigns on healthy eating and lifestyle practices.

Conclusion

This study demonstrated that nearly one-third of university students met the Rome IV diagnostic criteria for irritable bowel syndrome, with abdominal pain, bloating, and bowel habit changes being the most frequently reported symptoms. Academic stress, particularly exam-related anxiety, emerged as the strongest independent predictor of IBS, whereas gender and living arrangements were not significant contributors. These findings highlight the critical role of psychosocial stress in gastrointestinal health among students and underscore the importance of early recognition, stress management strategies, and institutional support programs. Targeted interventions focusing on both mental well-being and lifestyle modification may help reduce the burden of IBS and improve the academic performance and quality of life of students.

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