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Effect of Stress on Irritable Bowel Syndrome (IBS) Among Female and Male Students in Hafr Al Batin University, Saudi Arabia.

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Abstract

*Background***:** Irritable bowel syndrome (IBS) is a long-term chronic condition that affects the gastrointestinal tract. It can arise from various factors, including stress, and is characterized by abdominal pain and cramping, bloating, diarrhea, constipation causing discomfort. IBS is manageable with diet, stress management, and medication.

Aim: To investigate the impact of psychological stress on irritable bowel syndrome among female and male students at Hafr Al Batin University in Saudi Arabia.

Methodology: A quantitative cross-sectional self-administered survey was designed and conducted among male and female students at Hafr Al Batin University during a specified time period January 14th - May 23rd, 2024, utilizing a non-randomized sampling technique.

Results: Significant insights were provided into IBS prevalence among the 361 participants, where 107 students were diagnosed with IBS, while 254 did not have, or were unaware of having IBS. When comparing female and male participants across various age groups, no statistically significant correlation was found between the incidence of IBS with gender and age . However, it is essential to consider the study's limitations, including sample size and potential bias. Larger studies may reveal different trends.

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Conclusion: This research serves as a foundational baseline study for understanding stress related IBS. This condition was notably prevalent among the students, particularly during periods of exams and stress. Thus, it is imperative to educate students about IBS, its management, and treatment options. Additional studies are necessary to improve the overall well-being of students with IBS by exploring effective management techniques and investigating the underlying factors.

Keywords: IBS, stress, management, attitude, lifestyle, male and female students

1. Introduction:

Irritable bowel syndrome (IBS) is a long-term chronic condition that affects the gastrointestinal tract. It is recognized as one of the most prevalent psychosomatic disorders, characterized by dysfunction in colonic motility that is inconsistent with overall digestive tract function, as noted by Guthrie and Thompson (2002). This dysfunction may manifest as accelerated transit, resulting in diarrhea, or slowed transit, leading to constipation; some individuals experience a combination of both at different times (DuPont et al., 2014). Severe abdominal pain often accompanies these symptoms. The complexity of IBS continues to challenge specialists, as its etiology may involve psychological factors (Cash and Chey, 2004).

Research on IBS has predominantly focused on Western populations and has revealed various pathophysiological mechanisms that help explain associated symptoms (Cash and Chey, 2004). Clinically, IBS is defined as a chronic condition of unknown origin, characterized by altered bowel habits and abdominal pain without identifiable organic pathology. Proposed mechanisms include post-infectious inflammatory responses, disordered intestinal motility, and visceral hypersensitivity. In addition, the brain–gut interaction has garnered significant attention, particularly regarding how behavioral and psychiatric conditions influence IBS symptoms (Guthrie and Thompson, 2002; Holtmann, Ford and Talley, 2016).

Stress affects multiple body systems, including the cardiovascular, respiratory, endocrine, gastrointestinal, nervous, muscular, and reproductive systems. Evidence suggests that psychosocial stress can alter gastrointestinal motor function and sensation, likely exacerbating symptoms in patients with functional GI disorders (Cash and Chey, 2004; Holtmann, Ford and Talley, 2016).

Anxiety disorders, somatoform disorders, and a history of physical or sexual abuse have been reported in approximately 42% to 61% of IBS patients referred to specialized care. Somatization appears particularly prevalent in these individuals and may influence treatment outcomes. Moreover, the positive effects of psychological therapies on symptom relief support the role of emotional stress as a potential etiological factor in IBS development (Holtmann, Ford and Talley, 2016; Hungin et al., 2003). The connection between psychological factors and the onset of IBS has been well established (Shen, Kong and Hou, 2009). As IBS is classified as a psychosomatic disorder, emotional shocks can manifest as somatic symptoms, influenced by individual psychological makeup (Ladep et al., 2006).

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A range of biological, psychological, and social factors contribute to the pathogenesis of IBS, including gender, diet, lifestyle, stress, post-traumatic stress disorder, and psychiatric conditions (Anbardan et al., 2012; Gulewitsch et al., 2013). Despite the global prevalence of IBS, there remains a scarcity of research examining its occurrence and related factors in specific populations. Therefore, the present study investigates the impact of psychological stress on IBS among female and male students at Hafr Albatin University in Saudi Arabia.

1.1 Objective of the Study:

The objective of this research is to investigate the impact of psychological stress on irritable bowel syndrome among female and male students at Hafr Al Batin University in Saudi Arabia.

2. Materials and Methods:

A quantitative cross-sectional observational study was conducted among female and male students at Hafr Al Batin University from January 14th to May 23rd, 2024. Utilizing a non-randomized sampling technique, a self-administered survey was specifically designed to capture relevant data. The questionnaire was developed in both English and Arabic, ensuring cultural and linguistic accessibility. The English version was initially crafted and subsequently translated into Arabic, the national language of Saudi Arabia.

- **Inclusion criteria**: Participants included female and male students aged 18 to 45 years from Hafr Al Batin University who were willing to complete the online questionnaire.
- **Exclusion criteria:** Students who were under 18 or over 45 years of age, as well as individuals reporting chronic illnesses (such as diabetes, hypertension, epilepsy, etc.), were excluded from the study to maintain a focused sample.

2.1 Study Variables:

- Independent variables: Age, gender, education, food habits
- Dependent variables: Knowledge, attitude, practice and awareness

2.2 Sample Size Determination:

The required sample size was calculated using the Raosoft calculator, ensuring level of significance (α), 0.05 with effect size 0.2 and power 85% , the sample size should not be less than 350 (G*Power 3.1.9.4).

2.3 Statistical Analysis:

Descriptive statistical data analysis was performed using Statistical Package for the Social Sciences (SPSS) software version 26.0 (IBM Inc. Chicago, Illinois, USA). Frequency distribution, percentage. For inferential statistics, chi-square and proportional t-test was used in addition to logistic regression and ANOVA (one-way analysis of variance) when needed. Level of statistical significance was set at $P < 0.05$.

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3. Results

Table 1 presents the demographic data of the 361 participants. The majority of the respondents were females (90%), significantly outnumbering males (10%). Participants' ages ranged from 18 to 45 years, with the largest group in their early twenties (33%) and a notable majority in their mid-twenties (55.9%).

Additionally, Table 1 outlines the key lifestyle habits among the participants, revealing potential risk factors within the sample population. A concerning 61.2% reported being inactive, and 46.3% admitted to consuming junk food. Conversely, only 27.4% were engaged in regular exercise, and 34.6% followed a healthy diet. These lifestyle choices may elevate the risk for various illnesses, including Irritable Bowel Syndrome (IBS), warranting further investigation.

Among the 361 participants, 107 individuals (100 females and 7 males) reported having IBS, while 254 were free from the condition (225 females and 29 males). Notably, a significant portion of the sample population (70.4%) has not been formally diagnosed with IBS, highlighting a gap in medical recognition that does not necessarily indicate the absence of the condition.

Table 1: Demographic Data Analysis for Total Sample, Including IBS and Control Groups

Variable	Level	IBS Group (n=107)	Control Group (n=254)	Overall (n=361)
		n (%)	n (%)	n (%)
Gender	Male	7 (6.5%)	29 (11.4%)	36 (10%)
	Female	100 (93.5%)	225 (88.6%)	325 (90%)
Age	18-20	41(38.3%)	78 (30.7%)	119 (33%)
	21-25	51(47.7%)	151 (59.4%)	202 (55.9%)
	26-30	8 (7.5%)	6 (2.4%)	14 (3.9%)
	31-40	4 (3.7%)	13 (5.1%)	17 (4.7%)
	More than 40	3 (2.8%)	6 (2.4%)	9 (2.5%)
Lifestyle	Regular exercise	31 (28.9%)	68 (26.8%)	99 (27.4%)
	Healthy food	35 (32.7%)	90 (35.4%)	125 (34.6%)
	Inactive	66 (61.7%)	155 (61%)	221 (61.2%)
	Junk food	51 (47.7%)	116 (45.7%)	167 (46.3%)

* IBS: Irritable Bowel Syndrome (IBS).

The overall questionnaire responses for the IBS and Control groups are summarized in Table 2. A notable 49.3% of participants were uncertain about the treatability of IBS, with 34.6% believing it is treatable and 16.1% asserting it is not, which was statistically significant (P=0.001).

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Regarding the genetic aspects of IBS, the sample population was nearly evenly divided. While a slight majority (47.9%) suggested a genetic link, while 52.2% disagreed with no statistically significant differences (P=0.599).

A statistically significant majority (77.83%) perceived stress as the primary cause of IBS. This perception aligns with the understanding that while stress can exacerbate IBS symptoms, the exact causes of the syndrome are multifaceted and not yet fully understood (P=0.023).

Bloating emerged as the most commonly reported and statistically significant symptom (51.2%), followed by cramping (29.9%), constipation (14.1%), and diarrhea (4.7%). These symptoms significantly varied among the individuals, with some experiencing a combination while others reported only a few (P=0.003).

Moreover, over half of the participants (51.5%) indicated they use medications or herbal remedies to alleviate IBS symptoms, suggesting a substantial segment of the population actively seek relief from discomfort (P=0.031).

A substantial statistically significant proportion (40.7%) experienced abdominal pain 1-2 days per week, while 23.3% reported pain 3-4 days per week. Some participants (6.4%) experienced pain 4-6 days a week, and 4.2% reported pain lasting more than a week, highlighting the recurring nature of abdominal pain among many individuals. It is essential to note that these data are based on self-reported experiences, which may not capture the full extent of the issue (P=0.002).

Most participants (61.8%) believed their IBS symptoms lasted several hours, followed by 29.6% who thought symptoms persisted for 2-3 days and 8.6% who believed symptoms could last for a week (P=0.050).

An overwhelming majority (88.9%) acknowledged a relationship between stress and IBS, corroborating current medical insights that stress can worsen IBS symptoms. Furthermore, 74.2% reported an increase in IBS symptoms during exam seasons, emphasizing a potential link between stress and symptom flare-ups during high-pressure times (P=0.050).

Importantly, 89.8% of the sample population did not report having a chronic disease. However, this self-reported data may mask undiagnosed chronic conditions in some individuals (P=0.050).

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Table 2: Questionnaire Responses with Frequency and Percentage for IBS and Control Groups

Questionnaire	Variables	IBS GROUP (n=107)	CONTROL GROUP (n=254)	TOTAL SAMPLE GROUP (n=361)	Proportional t-test and Chi-square
		n (%)	n (%)	n (%)	*P-value*
Do you think IBS is treatable?	No	27 (25.2%)	31 (12.7%)	58 (16.1%)	**0.001***
	Yes	19 (17.8%)	106 (43.3%)	125 (34.6%)	
	Maybe	61 (57.0%)	51 (20.8%)	178 (49.3%)	
Do you think IBS is a genetic disease?	No	49 (45.8%)	124 (50.6%)	173 (47.9%)	**0.599**
	Yes	58 (54.2%)	130 (53.1%)	188 (52.1%)	
What do you think is the most common cause of IBS?	Stress	91 (85.0%)	190 (77.6%)	281 (77.8%)	**0.023***
	Spicy food	10 (9.35%)	51 (20.8%)	61 (16.9%)	
	Infection	1 (0.93%)	4 (1.6%)	5 (1.4%)	
	Others	5 (4.67%)	9 (3.7%)	14 (3.8%)	
What are the most common symptoms you have experienced?	bloating	66 (61.7%)	119 (48.6%)	185 (51.2%)	**0.003***
	constipation	9 (8.4%)	42 (17.1%)	51 (14.1%)	
	cramping	30 (28%)	78 (31.8%)	108 (29.9%)	
	diarrhea	2 (1.9%)	15 (6.1%)	17 (4.7%)	
Do you use medication or herbals to relieve the symptoms?	No	36 (33.6%)	139 (56.7%)	175 (48.5%)	**0.031***
	Yes	71 (66.4%)	115 (46.9%)	186 (51.5%)	
On average how many days per week do you suffer from abdominal pain?	None	4 (3.7%)	88 (35.9%)	92 (25.5%)	**0.002***
	1 - 2 days	43 (40.2%)	104 (42.4%)	147 (40.7%)	
	3 - 4 days	37 (34.6%)	47 (19.2%)	84 (23.3%)	
	5 - 6 days	13 (12.1%)	10 (4.1%)	23 (6.4%)	
	> 7 days	10 (9.3%)	5 (2.0%)	15 (4.2%)	
How long do you think IBS symptoms last?	Several hours	56 (52.3%)	167 (68.2%)	223 (61.8%)	**0.050**
	2-3 days	34 (31.8%)	73 (29.8%)	107 (29.6%)	
	A week	17 (15.9%)	14 (5.7%)	31 (8.6%)	
Do you think there is a relationship between stress and IBS?	No	1 (0.9%)	4 (1.6%)	5 (1.4%)	**0.050**
	Yes	101 (94.4%)	220 (89.8%)	321 (88.9%)	
	Maybe	5 (4.7%)	30 (12.2%)	35 (9.7%)	
Have you experienced increase in symptoms in exam seasons?	No	12 (11.2%)	81 (33.1%)	93 (25.8%)	**0.050**
	Yes	95 (88.8%)	173 (70.6%)	268 (74.2%)	
Do you have a chronic disease?	No	91 (85%)	233 (95.1%)	324 (89.8%)	**0.050**
	Yes	16 (15%)	21 (8.6%)	37 (10.2%)	

***** Statistically significant at $p<0.05$.

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4. Discussion:

This study examined the impact of psychological stress on the development of irritable bowel syndrome (IBS) among female and male students at Hafr Al Batin University, Saudi Arabia, and sought to raise awareness regarding management and treatment.

Among 361 participants, 107 students met criteria for IBS, while 254 reported they did not have, or were unaware of having, IBS. Comparing females and males, there was no statistically significant correlation between IBS incidence across age groups. These findings should be interpreted in light of limitations, including sample size and potential selection and information biases, which could obscure subgroup effects; larger, multi-center studies may reveal different trends.

IBS is the most prevalent disorder of brain–gut interaction, affecting approximately 5–10% of the global population (Mayer, Ryu and Bhatt, 2023). European research has estimated an overall prevalence of about 11.5%, broadly comparable to figures reported in the United States (Hungin et al., 2003; Lacy and Spiegel, 2016). By contrast, studies in Asia report a wider prevalence range of 2.3%–34%, with indications of rising morbidity in some student cohorts (Das et al., 2024; Gulewitsch et al., 2013; Shen, Kong and Hou, 2009). Consistent with the present findings, Olden and Drossman (2000) reported that IBS predominantly affects adults in their twenties and thirties and is associated with psychological distress, sexual dysfunction, and sleep disorders.

With respect to beliefs about treatability, students diagnosed with IBS were less likely to consider it treatable than their peers without IBS (25.2% vs 43.3%). This disparity likely reflects personal experiences with symptom fluctuation and management burden and should be understood as perceptions rather than evidence-based conclusions. While there is no universally curative therapy, multiple effective treatments can meaningfully reduce symptom severity and improve function; the observed pattern could also be a chance finding linked to greater healthcare contact among those with IBS.

There remains no conclusive evidence that IBS is hereditary; notably, views on heredity did not differ between those with and without IBS in this cohort. Nonetheless, genetics may contribute to susceptibility, likely in interaction with environmental factors and early-life exposures (Saito, 2011).

The most prevalent symptoms in this sample—bloating, constipation, cramps, and diarrhea—were statistically associated with an IBS diagnosis. Students with IBS reported a broader range and greater frequency of symptoms, and longer perceived symptom duration than those without IBS, a pattern that resonates with work linking psychosocial load and symptom amplification in gut–brain disorders (Mawdsley and Rampton, 2006; Sexton, Walker and Graff, 2017).

Among students with IBS, 88.8% reported worsening symptoms during examination periods. IBS diagnosis was significantly associated with increased symptoms during exams, supporting the potential role of psychological stress in precipitating flares. Similar associations between academic stress and IBS have been reported in student populations (Das et al., 2024), and more

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broadly within the literature on stress-related disease activity in inflammatory conditions (Bernstein, 2016; Wu et al., 2024). In a large population-based study of ulcerative colitis and Crohn's disease, Bernstein, Singh and Graff (2010) found that perceived stress predicted flares over one year among patients not recently exposed to nonsteroidal anti-inflammatory drugs or antibiotics. Mawdsley and Rampton (2006) further reported that adverse life events and chronic stress may contribute to relapse risk in inflammatory bowel disease and that experimental stress can augment mucosal inflammation—findings that conceptually align with the current observation of stress-linked symptom exacerbations.

We explored a potential association between IBS and coexisting chronic conditions; while trends were noted, results were not statistically conclusive and warrant larger studies with precise phenotyping and adjustment for confounders. Given the chronicity and functional impact of IBS, attention to health-related quality of life (HRQoL) remains essential (Hayes and Reeve, 2008). Patients with IBS typically report lower HRQoL relative to healthy controls, which is consistent with our findings (Frank et al., 2002; Olden and Drossman, 2000).

Lifestyle-related factors appear relevant in student populations. Prior studies suggest that regular physical activity may reduce IBS symptoms and improve gut health (Nunan et al., 2022), whereas frequent consumption of ultra-processed or "junk" foods has been associated with higher IBS likelihood (Buscail et al., 2017). This underscores the importance of balanced dietary patterns and structured stress-management during examination periods, as higher stress levels are linked to increased IBS risk among students (Ibrahim, Battarjee and Almehmadi, 2013; Mansour-Ghanaei et al., 2009), consistent with the recognized link between stress and functional gastrointestinal disorders (Das et al., 2024; Shen, Kong and Hou, 2009).

IBS is also a major women's health issue. Evidence points to an increased risk of unnecessary extra-abdominal and abdominal surgeries in women with IBS; for example, hysterectomy or ovarian surgery has been reported in 47%–55% of female IBS patients and appears more common in IBS than in ulcerative colitis cohorts (Longstreth and Yao, 2004; Whorwell, 2018). These observations highlight the importance of careful diagnostic stewardship and avoidance of low-yield invasive procedures.

Multiple factors have been implicated in IBS pathogenesis, including genetics, environment, infection, low-grade inflammation, gut microbiota, and stress (Bengtson et al., 2006; Gracie, Guthrie and Hamlin, 2018). In student and young-adult samples, physical inactivity, stress, and anxiety have frequently been linked with IBS (Elhosseiny, Mahmoud and Manzour, 2019; Ibrahim, Battarjee and Almehmadi, 2013), while smoking has shown a weak association (Basandra and Bajaj, 2014). Poor daily habits, unhealthy diets, inadequate exercise, and insufficient sleep—can aggravate symptoms (Buscail et al., 2017; Okami et al., 2011). Conversely, lifestyle and dietary modification, alongside evidence-based pharmacological and non-pharmacological interventions, can improve outcomes (Black and Ford, 2025).

In summary, our findings reinforce psychological stress and related mood states as important correlates of IBS in university students and as potential modifiers of disease course in related

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inflammatory conditions. The balance of clinical and experimental data supports IBS as a disorder at the intersection of gastrointestinal physiology and psychological processes. In the absence of accepted biochemical or structural markers, diagnosis remains clinical—based on typical symptom patterns and targeted negative investigations—while management should prioritize symptom control, HRQoL, and reduction of modifiable stressors through personalized, multimodal strategies.

5. Conclusion:

This study provides a baseline characterization of stress-related irritable bowel syndrome (IBS) in a university student population. IBS symptoms were common and intensified during periods of academic stress, particularly examinations. These findings support targeted student education on IBS, its triggers, and evidence-based management options. Further research is warranted to delineate underlying mechanisms and to evaluate interventions that improve symptom control and health-related quality of life in students with IBS.

6. Limitations:

- Sampling imbalance: Female participants were substantially over-represented due to challenges accessing male students, potentially limiting sex-specific inferences.
- Design and measurement: The cross-sectional, single-center design and reliance on self-reported data constrain causal interpretation and may introduce recall or reporting bias.

7. Significance :

This study advances understanding of IBS within a high-stress educational context, indicating that students are generally aware of a stress–IBS link but may lack detailed knowledge of evidence-based management. By identifying exam periods as a high-risk window for symptom exacerbation, the study highlights an actionable opportunity for timed interventions within universities. Given the potential academic and psychosocial impacts of IBS, institution-level strategies to reduce stress burden and support students are likely to yield meaningful benefits.

8 . Recommendations:

Based on the findings of this research, the stress experienced by students during their studies and exams appear to increase the risk of developing IBS. Therefore, university policymakers are encouraged to enhance support systems and resources for students to mitigate this issue.

Conflict of Interest:
The authors declare that there is no conflict of interest regarding the publication of this paper.

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