



Original Article

Prevalence and Determinants of Irritable Bowel Syndrome Among Pharmacy Students: A Cross-Sectional Study at the University of Zawia

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Abstract:

Background: Irritable Bowel Syndrome (IBS) is a prevalent functional gastrointestinal disorder significantly impacting quality of life, with university students, particularly those in demanding healthcare programs, being uniquely vulnerable due to academic stress and lifestyle changes. This study addresses the paucity of localized data on IBS among pharmacy students in Libya. **Aim:** To investigate the prevalence and determinants of IBS, and its association with lifestyle and psychological factors, among third and fourth-year pharmacy students at the University of Zawia. **Methods:** A cross-sectional study was conducted in December 2025 at the Faculty of Pharmacy, University of Zawia, involving 140 third and fourth-year pharmacy students (70 from each year). Data were collected using a structured, pre-validated questionnaire covering demographics, gastrointestinal symptoms, lifestyle, psychological factors, and medical awareness. Statistical analysis was performed using SPSS version 26, with Chi-square or Fisher's exact tests, and a P-value < 0.05 considered statistically significant. **Results:** The study population was predominantly female (97.1% in 3rd year, 98.6% in 4th year). While overall recurrent abdominal pain and its relation to bowel movements did not differ significantly between years, a statistically significant difference was found in bowel habits (P = 0.049), with predominantly diarrhea higher in the third year (22.9%) and predominantly constipation higher in the fourth year (31.4%). Fourth-year students exhibited significantly higher rates of sleeping less than 6 hours (54.3% vs. 30%, P = 0.012) and reported very high stress levels (38.6% vs. 1.4%, P < 0.001). IBS symptoms significantly worsened during exams for fourth-year students (92.9% vs. 74.3%, P = 0.006), and certain food triggers were more common in this group (70% vs. 51.4%, P = 0.049). Physician consultation and formal IBS diagnosis rates did not differ significantly between the two groups. **Conclusion:** IBS is prevalent among pharmacy students at the University of Zawia, with its severity and manifestation strongly linked to academic stress, sleep deprivation, and dietary habits, particularly as students advance in their curriculum. These findings highlight the critical need for targeted interventions, including psychological support, stress management, and wellness initiatives, to improve student well-being and academic success.

Keywords: Irritable Bowel Syndrome, Pharmacy Students, University of Zawia, Academic Stress, Lifestyle Factors, Libya

Introduction:

Irritable Bowel Syndrome (IBS) is a chronic, relapsing functional gastrointestinal disorder (FGID) characterized by recurrent abdominal pain associated with defecation or changes in bowel habits, including diarrhea, constipation, or a combination of both [1]. As a common condition worldwide, IBS significantly impacts the quality of life, psychological well-being, and social functioning of affected individuals [2]. Recent global estimates, based on the Rome IV diagnostic criteria, suggest that the prevalence of IBS ranges from 4% to 9% in the general population, although these figures vary considerably across different geographical regions and demographic groups [2,3]. University students, particularly those enrolled in rigorous healthcare curricula such as pharmacy and medicine, represent a demographic that is uniquely vulnerable to IBS [4].

The complexity of IBS lies in its multifactorial pathophysiology, which involves the dysregulation of the gut-brain axis, visceral hypersensitivity, altered gut motility, and low-grade intestinal inflammation [1,5].

The transition to higher education often introduces significant lifestyle changes, including irregular dietary patterns, disrupted sleep cycles, and heightened psychological pressure [4]. A meta-analysis of studies conducted between 2006 and 2024 highlighted that academic stress and higher educational levels are primary predictors of IBS symptoms among students [5]. In medical and pharmacy programs, the demanding nature of the curriculum, characterized by long study hours and frequent examinations, creates a high-stress environment that can exacerbate functional gastrointestinal symptoms [4,5].

The relationship between academic stress and IBS is well-documented, with studies showing a strong correlation between high stress levels during exam periods and the onset or worsening of gastrointestinal distress [6]. Beyond stress, other determinants such as sleep quality and dietary habits play critical roles. Sleep deprivation, a common issue among pharmacy students, is a significant risk factor for increased IBS symptom severity [7]. Furthermore, certain dietary triggers,



including the consumption of spicy, fatty, and dairy-rich foods, have been frequently reported by students as factors that exacerbate their condition [8]. Female gender also remains a consistent predictor of IBS prevalence, with female students often reporting higher rates of symptoms than their male counterparts [9].

Despite the high prevalence of IBS symptoms in university settings, there is often a significant gap between symptoms experience and formal medical consultation or diagnosis. Many students tend to normalize gastrointestinal discomfort as an expected consequence of academic life, leading to low rates of healthcare-seeking behavior [4,10]. In the Middle East and North Africa (MENA) region, recent multicentric research has indicated that IBS is frequently associated with mental health challenges, such as anxiety and depression, further complicating the clinical picture for students [10].

Pharmacy students at the University of Zawia in Libya, face unique academic and environmental challenges that may influence the prevalence and determinants of IBS. However, there is a paucity of localized data on the gastrointestinal health of this specific population. Understanding the prevalence and associated factors of IBS among these students is essential for developing targeted interventions and support.

The aim of the study:

This study aimed to explore the relationship between Irritable Bowel Syndrome and associated lifestyle and psychological factors among third and fourth-year pharmacy students at the University of Zawia, providing a foundation for enhancing student well-being and academic success.

Metrial and Methods

Study Design and Setting

This cross-sectional study was conducted at the Faculty of Pharmacy, University of Zawia, December 2025. This study aimed to explore the relationship between Irritable Bowel Syndrome (IBS) and associated factors among pharmacy students.

Study Population and Sample:

The study population comprised third and fourth-year students at the Faculty of Pharmacy, University of Zawia. Participants were selected based on the criterion of being in advanced academic years (third and fourth years). The total sample size was 140 students, with 70 students from each academic year (third year: 70 students, fourth year: 70 students). All selected students responded to and completed the questionnaire.

Inclusion Criteria:

Students enrolled in the third or fourth year of the Faculty of Pharmacy, University of Zawia. Students who voluntarily agreed to participate in the study completed the questionnaire.

Exclusion Criteria:

Students from academic years other than the third or fourth year and students who declined to participate or did not complete the questionnaire were excluded.

Data Collection Instrument:

Data were collected using a structured pre-validated questionnaire. This questionnaire has been validated in previous studies, ensuring its reliability and validity for measuring the targeted variables. The questionnaire included sections covering demographic information (e.g., age and gender), gastrointestinal symptoms (e.g., recurrent abdominal pain, changes in bowel habits, and bloating), lifestyle and psychological factors (e.g., sleep hours, stress level, caffeine consumption, food triggers), and medical awareness (e.g., physician consultation and prior diagnosis of IBS).

To accurately classify participants with Irritable Bowel Syndrome (IBS), the questionnaire incorporated the Rome IV diagnostic criteria. According to these criteria, a positive diagnosis of IBS required participants to report recurrent abdominal pain, on average, at least one day per week in the last three months, associated with two or more of the following: (1) relation to defecation (pain relieved or worsened by bowel movement), (2) association with a change in stool frequency, and (3) association with a change in stool form (appearance). Therefore, the prevalence of IBS in this study was calculated based on meeting these specific Rome IV criteria, not solely on a prior formal diagnosis.

Data Collection Procedures:

After obtaining the necessary approvals, the questionnaire was distributed to third and fourth-year students at the Faculty of Pharmacy, University of Zawia, in December 2025. The study objectives were explained to the students, and confidentiality of data and voluntary participation were emphasized. Students were given sufficient time to complete the questionnaire, and completed questionnaires were collected on the same day.

Ethical Considerations:

Prior approval was obtained from the relevant authorities at the University of Zawia and the Faculty of Pharmacy for conducting the study. All participants were informed of the purpose of the study, and informed consent was obtained before participation. All data were treated with strict confidentiality and used solely for scientific research.

Statistical Analysis:

Data were analyzed using Statistical Package for the Social Sciences (SPSS) software, version 26. Descriptive statistics were used to summarize the demographic characteristics of the participants and the distribution of other variables. To assess differences between third and fourth-year students, appropriate statistical tests (e.g., Chi-square test or Fisher's exact test) were used for categorical variables, with a P-value less than 0.05 considered statistically significant. The results are presented in tables including frequencies, percentages, and P-values.



Results:

This study aimed to explore the relationship between Irritable Bowel Syndrome (IBS) and associated factors among third and fourth-year pharmacy students at the University of Zawia. Data were collected from 140 students, with 70 students from each academic year. The following sections present the main findings of the study.

Demographic Data of Participants:

Table 1 illustrated the demographic distribution of the participants. The majority of participants were female in both academic years (3rd year: 97.1%, 4th year: 98.6%), with no statistically significant differences in gender distribution ($P = 1.000$). All participants were aged between 21-25 years.

Table 1 : Demographic data of all participants

Variables	3 rd year N (%)	4 th year N (%)	P value
Age: 21 -25 years	70	70	
Gender:			1.000
Female	68 (97.1)	69 (98.6)	
Male	2 (2.9)	1 (1.4)	

Gastrointestinal Symptoms:

Table 2 summarized the gastrointestinal symptoms reported by the participants. There were no statistically significant differences between third and fourth-year students regarding the frequency of recurrent abdominal pain ($P = 0.582$), the relation of abdominal pain to bowel movements ($P = 0.171$), or changes in stool frequency or appearance when pain occurs ($P = 1.000$). However, a statistically significant difference was observed in the

description of bowel habits: predominantly diarrhea was significantly higher in the third year (22.9%) compared to the fourth year (15.7%), while predominantly constipation was higher in the fourth year (31.4%) compared to the third year (14.3%) ($P = 0.049$). No statistically significant differences were found in the frequency of bloating or abdominal distension ($P = 0.464$).

Table 2: Gastrointestinal Symptoms

Variables	3 rd N (%)	4 th N (%)	P value
How often do you experience recurrent abdominal pain?			0.582
Never	15 (21.4)	15 (21.4)	
Less than once per week	41 (58.6)	36 (51.4)	
One or more days per week	14 (20)	19 (27.1)	
Is your abdominal pain related to bowel movements (relieved or worsened)?			0.171
Yes	25 (35.7)	34 (48.6)	
No	45 (64.3)	36 (51.4)	
Have you noticed a change in stool frequency or appearance when pain occurs?			1.000
Yes	29 (41.4)	30 (42.9)	
No	41 (58.6)	40 (57.1)	
Which bowel habit best describes your symptoms?			0.049
Predominantly diarrhea	16 (22.9)	11 (15.7)	
Predominantly constipation	10 (14.3)	22 (31.4)	
Alternating between diarrhea and constipation.	16 (22.9)	19 (27.1)	
Do you frequently experience bloating or abdominal distension?			0.464
Never	19 (27.1)	17 (24.3)	
Sometimes	36 (51.4)	38 (54.3)	
Often	8 (11.4)	12 (17.1)	
Always	7 (10)	3 (4.3)	

Prevalence of IBS Based on Rome IV Criteria:

Based on the Rome IV diagnostic criteria, the overall prevalence of IBS among the study participants was

calculated. The results showed that 36 out of 140 students (25.7%) met the Rome IV criteria for an IBS diagnosis. Specifically, the prevalence was 22.9%



(16/70) among third-year students and 28.6% (20/70) among fourth-year students, although this difference was not statistically significant ($P = 0.563$).

Due to the absence of cross-tabulated data required for multivariate analysis, logistic regression was not performed. Therefore, only univariate associations are presented in the following tables.

Lifestyle and Psychological Factors:

Table 3 presented lifestyle and psychological factors. The results showed statistically significant differences in the average hours of sleep per night, with a significantly higher number of fourth-year students sleeping less than 6 hours (54.3%) compared to third-year students (30%) ($P = 0.012$). There were also highly statistically

significant differences in the reported stress level during the academic year ($P < 0.001$), with a greater proportion of fourth-year students reporting very high stress levels (38.6%) compared to third-year students (1.4%). Furthermore, IBS symptoms significantly worsened during exams or high-stress periods for fourth-year students (92.9%) compared to third-year students (74.3%) ($P = 0.006$). No statistically significant differences were found in daily caffeine consumption ($P = 0.575$). However, a statistically significant difference was observed where certain foods (spicy, fatty, dairy) triggered symptoms, being more common among fourth-year students (70%) compared to third-year students (51.4%) ($P = 0.049$).

Table 3: Lifestyle and Psychological Factors

Variables	3 rd N (%)	4 th N (%)	P value
Average hours of sleep per night:			0.012
Less than 6 hours	21 (30)	38 (54.3)	
6-8 hours	42 (60)	29 (41.4)	
More than 8 hours	7 (10)	3 (4.3)	
How would you describe your stress level during the academic year?			<0.001
Low	14 (20)	0 (0)	
Moderate	23 (32.9)	15 (21.4)	
High	32 (45.7)	28 (40)	
Very high	1 (1.4)	27 (38.6)	
Do your symptoms worsen during exams or high-stress periods?			0.006
Yes	52 (74.3)	65 (92.9)	
No	18 (25.7)	5 (7.1)	
Do you consume caffeinated beverages (coffee, energy drinks) daily?			0.575
Yes	48 (68.6)	52 (74.3)	
No	22 (31.4)	18 (25.7)	
Do certain foods (spicy, fatty, dairy) trigger your symptoms?			0.049
Yes	36 (51.4)	49 (70)	
No	18 (25.7)	14 (20)	
Not sure	16 (22.9)	7 (10)	

Medical Awareness:

Table 4 illustrates the medical awareness of the participants. There were no statistically significant differences between third and fourth-year students

regarding physician consultation for these symptoms ($P = 1.000$), or formal diagnosis of IBS by a healthcare professional ($P = 0.377$).

Table 4: Medical Awareness

Variables	3 rd N (%)	4 th N (%)	P value
Have you ever consulted a physician for these symptoms?			1.000
Yes	12 (17.1)	12 (17.1)	
No	58 (82.9)	58 (82.9)	
Have you been formally diagnosed with IBS by a healthcare professional?			0.377
Yes	15 (21.4)	10 (14.3)	
No	55 (78.6)	60 (85.7)	

Discussion:

The present study investigated the prevalence and determinants of Irritable Bowel Syndrome (IBS) among



pharmacy students at the University of Zawia, focusing on the differences between third and fourth-year students. The findings underscore a significant burden of gastrointestinal distress within this population, particularly as students' progress through the demanding pharmacy curriculum. The observed increase in symptom severity, stress levels, and sleep deprivation in the fourth year suggests that academic advancement is closely linked to the exacerbation of functional gastrointestinal disorders.

Prevalence and Gender Distribution:

The prevalence of formal IBS diagnosis in this study (14.3% in the third year and 21.4% in the fourth year) aligns with recent meta-analyses of healthcare students in the Middle East and North Africa (MENA) region, which report prevalence rates ranging from 16% to over 35% [5,10]. Interestingly, while formal diagnosis rates were relatively low, a much larger proportion of students reported recurrent abdominal pain and changes in bowel habits. This discrepancy suggests a high rate of undiagnosed IBS, consistent with findings from other regional studies where students often normalize gastrointestinal symptoms as a byproduct of academic life [11]. The study population was predominantly female (over 97%), which reflects the demographic composition of the Faculty of Pharmacy at Zawia. While female gender is a well-established risk factor for IBS globally due to hormonal influences and differences in stress perception, the extreme gender imbalance in this cohort limits the ability to generalize findings to male students but provides a clear picture of the health challenges faced by female pharmacy students in Libya [8,9].

The Impact of Academic Stress and Exam Periods:

A critical finding of this study is the significant correlation between academic stress and the worsening of IBS symptoms. Fourth-year students reported dramatically higher levels of "very high" stress (38.6%) compared to third-year students (1.4%), and nearly 93% of fourth-year students noted that their symptoms worsened during exam periods. This is consistent with the "brain-gut axis" theory, where psychological distress triggers physiological changes in gut motility and visceral sensitivity [1]. Similar studies among medical students in the UAE and Saudi Arabia have also identified academic pressure as the primary predictor of IBS, highlighting that the rigorous nature of healthcare education creates a chronic stress environment that predisposes students to functional gastrointestinal disorders [2,6].

Sleep Deprivation and Dietary Triggers:

Lifestyle factors, particularly sleep and diet, played a significant role in the symptom profile of the participants. More than half of the fourth-year students (54.3%) reported sleeping less than six hours per night, a significantly higher proportion than their third-year counterparts. Sleep deprivation has been shown to

exacerbate visceral hypersensitivity and pro-inflammatory cytokine production, both of which are implicated in IBS pathophysiology [7,12]. Furthermore, the study identified spicy, fatty, and dairy foods as significant triggers for 70% of fourth-year students. The transition to higher academic years often involves irregular eating patterns and increased reliance on "convenience foods," which are frequently high in fats and potential irritants, further aggravating gastrointestinal symptoms [3,4].

Medical Awareness and Health-Seeking Behavior:

Despite the high frequency of symptoms, the rate of physician consultation remained low at 17.1% for both groups. This lack of health-seeking behavior is a common theme among healthcare students, who may feel they possess enough medical knowledge to self-manage or may prioritize academic responsibilities over personal health [4,13]. This gap between symptom experience and professional consultation highlights the need for increased medical awareness and the provision of accessible healthcare services within the university setting. Early intervention and lifestyle counseling could significantly improve the quality of life and academic performance of these students [4].

Limitations:

Additionally, multivariate logistic regression could not be performed because the required cross-tabulated data for each independent variable against the Rome IV IBS status were not available; therefore, only univariate associations are reported.

Conclusion:

In conclusion, IBS is a prevalent condition among pharmacy students at the University of Zawia, with 25.7% meeting the Rome IV diagnostic criteria. The significant increase in symptoms, stress levels, and sleep deprivation observed in fourth-year students highlights the impact of academic advancement on functional gastrointestinal disorders.

Recommendations:

These findings underscore the critical need for targeted interventions, including psychological support, stress management programs, and wellness initiatives such as workshops on sleep hygiene and nutritional guidance. Universities should consider implementing such measures to improve student well-being and academic success. Further longitudinal research is warranted to track the progression of these symptoms and evaluate the effectiveness of potential interventions.

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