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Exploring the relationship between irritable bowel syndrome and psychosocial, demographic, and health factors in Syrian hospital settings

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Abstract

Background Irritable bowel syndrome (IBS) is a prevalent and complex gastrointestinal disorder that profoundly affects patients' quality of life. This study, the first of its kind in Syria, explores the intricate relationship between IBS and demographic factors, with a focus on gender, age, socioeconomic status, the presence of chronic diseases, and psychological status.

Methods A cross-sectional study of 562 participants was conducted in Damascus to investigate the prevalence of IBS and its association with psychological distress. Participants were assessed using a structured questionnaire that collected data on demographic factors, chronic diseases, and psychological distress. Statistical analysis, including chi-square, t-tests and one-way Anova, were performed to identify associations between these factors and IBS prevalence.

Results The results revealed a higher prevalence of IBS among females and participants aged 40–50. Socioeconomic status was found to play a significant role, with lower income levels correlating with a higher likelihood of IBS. Furthermore, participants with chronic diseases exhibited an elevated likelihood for IBS, emphasizing the importance of considering comorbidities in IBS management. IBS was strongly associated with psychological distress, with a higher prevalence of depression and distress among participants with IBS. Weight was also associated with IBS, with a higher BMI linked to an increased likelihood of the condition.

Conclusion This study highlights the multifaceted nature of IBS, and underscores the need for a comprehensive approach that integrates the physical and psychological aspects of its assessment and management. While this research provides valuable insights, it also acknowledges its limitations and calls for further investigation to elucidate the underlying mechanisms of these associations and develop tailored interventions for participants with IBS.

Keywords Irritable Bowel Syndrome (IBS), Psychological distress, Rome criteria, Syrian population, Cross-sectional study

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Background

Irritable bowel syndrome (IBS) is one of the most common and potentially debilitating gastrointestinal disorders, characterized by abdominal pain, bloating, and changes in bowel habits, without any organic pathology [1]. IBS affects approximately 4–5% of adults worldwide [2]. Traditionally, IBS was diagnosed through exclusion, but the Rome criteria have become the gold standard for diagnosis in both research and clinical practice [3]. These criteria necessitate recurrent abdominal pain, averaging at least 1 day per week over the last 3 months, along with two or more of the following: 1) related to defecation, 2) related with changes in stool frequency, and 3) associated with changes in stool appearance [4]. IBS is further categorized into IBS with predominant constipation (IBS-C), IBS with predominant diarrhea (IBS-D), mixed IBS with alternating constipation and diarrhea (IBS-M), and unclassified IBS (IBS-U) [5]. Despite its prevalence and often chronic, recurring nature, the underlying pathophysiology of IBS remains incompletely understood, with no definitive treatment available. Treatment primarily focuses on symptom relief [6]. IBS is strongly associated with elevated rates of anxiety and depression among adults, which may be related to visceral hyperalgesia and autonomic nervous system dysfunction [7]. Psychiatric symptoms and disorders independently elevate the likelihood of developing IBS and can exacerbate or perpetuate its symptoms [8]. Arab countries are among the least explored populations globally in IBS research [9]. Nevertheless, limited data are available on IBS in certain countries, such as Egypt, where a study conducted in an urban area in the Suez governorate reported a high prevalence rate of 34.2% among the studied groups [10]. Further investigations are warranted to elucidate the complex relationship between mental health disorders and irritable bowel syndrome (IBS). This study represents the first endeavor in Syria to reveal the relationship between psychological factors and IBS.

Methods

A descriptive cross-sectional study was conducted among participants who visited the largest government hospitals in Damascus, including Al-Mouwasat Hospital, Al-Assad University Hospital, Obstetric Hospital, Children's University Hospital, and Dermatology Hospital, to assess the potential correlation between irritable bowel syndrome (IBS) and the psychological state of participants. A paper questionnaire was created and sufficient copies were printed to ensure a wide sample population. In-person interviews were conducted with the participants, and for a better understanding, each question was presented independently and explained in depth. This information was then logged confidentially. Participants were chosen at random from waiting areas, hallways, and

lodging spaces, and were encouraged to participate in the study. This study was conducted from February 15 to March 15, 2023.

Participants and data collection

Participants were Included from various hospitals in Damascus, including both patients and their accompanying visitors. Individuals aged 18 years or older were randomly selected and invited to take part in the study. All participants were informed of the significance and objectives of the study before providing their written consent. Initially, the sample included 600 participants, but after removing those who declined to provide complete data, the final count was 562. Those who could not read or write were assisted. The data were carefully examined and validated after entry to eliminate any potential bias that might have resulted from the in-person interviews. The Ethics Committee of the Faculty of Medicine in Damascus approved this study, assigned the serial number 3553. This approval was granted in accordance with the Declaration of Helsinki.

Questionnaire

The questionnaire utilized multiple-choice items, developed and validated based on established medical references and literature. The survey used in this study was carefully designed to gather accurate data regarding participants' psychological states and digestive problems. The survey was modified from other research inquiries and a thorough method was used to check its accuracy in terms of meaning and ideas. The survey was first translated by linguists into Arabic, the respondents' language, and then back into English. By following this approach, it is ensured that the survey accurately conveys the intended concepts and meanings. An initial experimental study with 50 visitors was conducted to gauge the validity of the questionnaire, and the results were used to analyze the effectiveness of the survey and identify any potential issues. The survey was modified to account for any problems discovered during the initial statistical analysis. With an internal consistency equal to (0.869), this early statistical research demonstrated great reliability, utilizing this value. Most survey questions, which were presented in a closed format, provided a clear and orderly approach for gathering data.

The survey was conducted in three steps: Demographic information, including age, gender, weight, height, location of residence (rural or urban), education level, occupation, participants' chronic illnesses, and socioeconomic conditions that can have an impact on their mental health, is included in the first section. Socioeconomic status was categorized based on income, access to healthcare, and housing stability, where 'Poor' indicated limited

financial resources and access, 'Moderate' represented an average level of stability, and so forth.

The Participant Health Questionnaire (PHQ)-9 and Kessler Psychological Distress Scale (K6) were used in the second section to assess the psychological condition of the participants. The third section evaluates participants for fulfilment of the Rome IV criteria for Irritable Bowel Syndrome (IBS), which supports but does not constitute a clinical diagnosis.

PHQ-9

The Patient Health Questionnaire-9 (PHQ-9) was used to assess depressive symptoms [11]. The PHQ-9 is a self-reported measure consisting of nine items, each of which corresponds to one of the DSM-5 criteria for major depressive disorder. Participants were asked to rate how often they had experienced each symptom over the past two weeks on a scale from 0 (not at all) to 3 (nearly every day). The total scores on the PHQ-9 range from 0 to 27, with higher scores indicating a greater severity of depressive symptoms. Based on these scores, depressive symptoms could be divided into "none or minimum" (0–4), "mild" (5–9), "moderate" (10–14), "moderately severe" (15–19), and "severe" (20–27).

The Arabic PHQ-9 Questionnaire has been shown to be a reliable and valid measure of depression in a variety of populations, including primary care participants and individuals with chronic medical conditions. The cut-off value of 10 points recommended by the original PHQ-9 marker was used as screening cut-off values. The PHQ-9 showed good internal consistency with Cronbach's alpha of 0.857.

Kessler psychological distress scale (K6)

The Kessler Psychological Distress Scale (K6) is a self-report questionnaire designed to evaluate psychological distress and mental health symptoms [12]. The K6 consists of six questions that probe into emotional states and symptoms experienced over the preceding 30 days. Respondents rate each item on a scale ranging from 1 (none of the time) to 5 (all of the time). The total K6 scores range from 6 to 30, with higher scores indicating a higher degree of psychological distress. In general, K6 scores can be classified as follows: 6–11 signifying low distress, 12–14 indicating moderate distress, 15–19 indicating high distress, and 20–30 indicating very high distress. The K6 is frequently used as a screening tool to identify participants who may require further mental health assessment and support. The Arabic version of the Kessler Psychological Distress Scale (K6) has demonstrated reliability and validity as a valuable tool for assessing psychological distress in diverse populations. The items included in the K6 exhibit acceptable internal consistency, with Cronbach's alpha values of 0.81.

Statistical analysis

After collecting the data, they were filled into Google Forms and exported to Excel for analysis. Statistical analysis was performed using SPSS Inc. version 23 software package. To identify any relationship between demographic variables, psychological state, and Irritable Bowel Syndrome (IBS), chi-square tests, one-way ANOVA, Fisher's test, and independent t-tests were used. Statistical significance was set at $p < 0.05$.

Results

Demographic characteristics

The data of 562 participants were collected for this study ($N = 562$); 182 participants out of 562 were reported to be affected by IBS. As presented in Table 1, the majority of the participants were female, accounting for 60.9% ($n = 342$), while 39.1% were male ($n = 220$). Of the 182 IBS-affected participants, 32.4% were male ($n = 59$) and 67.6% were female ($n = 123$). Regarding economic status, most of the sample ($> 80\%$) did not exceed the average. Specifically, 29.4% ($n = 165$), 54.1% ($n = 304$), 11.4% ($n = 64$), 3.7% ($n = 21$), and 1.4% ($n = 8$) had poor, average, good, very good, and excellent economic conditions, respectively. Further details, characteristics, and differences are outlined in Table 1.

Demographic characteristics and prevalence of depression and distress

The current study investigated the association between demographic factors and the presence of Irritable Bowel Syndrome (IBS), and its relationship with the prevalence of depression and distress.

Gender

A significant gender difference was found in relation to IBS prevalence. A higher percentage of females (67.6%) reported being affected by IBS than males (32.4%) ($\chi^2 (1, N = 562) = 5.115, p = 0.024^*$). These results demonstrate that female participants have a higher likelihood of being affected by IBS.

Financial status

Financial status was significantly associated with IBS. A greater proportion of participants with poor (30.3%) and moderate (48.4%) financial status were affected by IBS than those with good financial status (2.7%) ($\chi^2 (4, N = 562) = 13.384, p = 0.01^*$). This finding confirms that those with lower economic conditions are more likely to experience IBS.

Chronic diseases

Our findings indicate a significant association between chronic diseases and IBS, with individuals having multiple chronic conditions showing an increased likelihood

Table 1 Characteristics of individuals by IBS status

Variable	Category	Affected by IBS (N = 182)	Percent (%)	Not Affected by IBS (N = 380)	Percent (%)
Gender	Male	59	32.4	161	42.4
	Female	123	67.6	219	57.6
Age	18–25	32	17.6	94	24.7
	25–30	21	11.5	47	12.4
	30–40	31	17.0	85	22.4
	40–50	46	25.4	67	17.6
	50–60	33	18.1	52	13.7
	> 60	19	10.4	35	9.2
Marital status	Single	50	27.5	125	32.9
	Married	114	62.7	222	58.4
	Divorced	9	4.9	9	2.4
	Widowed	9	4.9	24	6.3
Education level	Illiterate	30	16.5	45	11.8
	Primary	66	36.3	157	41.3
	Secondary	30	16.5	47	12.4
	Institute	9	4.9	31	8.2
	University	40	22.0	86	22.6
	Master's	7	3.8	14	3.7
Employment status	Unemployed	80	44.0	151	39.7
	Student only	18	9.9	44	11.6
	Student with extra work	5	2.8	24	6.3
	Doctor/Resident/Health sector	7	3.8	13	3.4
	Employee	22	12.1	57	15.0
Economic status	Retired	11	6.0	11	2.9
	Other	39	21.4	80	21.1
	Poor	55	30.3	110	28.9
	Moderate	88	48.4	216	56.9
	Good	21	11.5	43	11.3
Chronic diseases	Very good	13	7.1	8	2.1
	Excellent	5	2.7	3	0.8
	None	92	50.7	277	72.9
	Hypertension	17	9.3	21	5.5
	Diabetes	5	2.7	5	1.3
	Thyroid	13	7.1	14	3.7
	Blood Lipids	1	0.5	4	1.1
	Cardiac Failure	2	1.1	6	1.6
	Asthma	12	6.6	8	2.1
	Multiple Chronic Diseases	40	22.0	45	11.8

of IBS (Table 2). Among the participants affected by IBS, a higher percentage did not have any chronic diseases (50.7%), and a larger proportion of those not affected by IBS also did not have any chronic diseases (72.9%) ($\chi^2 (7, N = 562) = 32.362, p = 0.000^*$). Additionally, a greater proportion of the affected group with IBS (22.0%) had multiple chronic diseases than the unaffected group (11.8%), $p < 0.001$.

Table 2 Association of demographic factors, weight, height, depression, and distress with IBS

Factor	χ^2 (df, N=562)	p-value
Gender	5.115 (1)	0.024*
Financial Status	13.384 (4)	0.01*
Chronic Diseases	32.362 (7)	0.000*
Marital Status	4.472 (3)	0.215
Job	7.819 (6)	0.252
Education Level	6.116 (5)	0.295
Depression Prevalence	7.506 (1)	0.006*
Distress Prevalence	8.978 (1)	0.003*

Factor	t(df)	Mean $\pm$ SD (IBS)	Mean $\pm$ SD (No IBS)	p-value
Weight	-2.6 (560)	74.5 $\pm$ 12.3	78.9 $\pm$ 13.1	0.008*
Height	-0.982 (560)	167.2 $\pm$ 10.5	168.5 $\pm$ 9.8	0.327

* $p < 0.05$; values in bold denote statistical significance. χ^2 = chi-square statistic; df = degrees of freedom; SD = standard deviation; IBS = irritable bowel syndrome

Prevalence of depression and distress

Participants with IBS (44%) were more likely to report a probable diagnosis of depression than those without IBS (32.1%) ($\chi^2 (1, N = 562) = 7.506, p = 0.006^*$). Similarly, participants with IBS (44%) were more likely to report a probable diagnosis of distress than those without IBS (31.8%) ($\chi^2 (1, N = 562) = 8.978, p = 0.003^*$). These results indicate a higher prevalence of depression and distress among IBS participants.

Marital status, job, and education level

No significant differences were found in marital status, job, or education level between the groups. These findings suggest that marital status, job, and educational level were not associated with the presence of IBS in this study.

Weight and Height: When examining weight, a significant association with IBS was observed using a t-test ($t(560) = -2.6, p = 0.008$). However, no significant association was found between height and IBS ($t(560) = -0.982, p = 0.327$), as shown in Table 2.

This study found a significant association between the demographic factors and Irritable Bowel Syndrome (IBS). Females had a higher prevalence of IBS, while poor or moderate financial status and the presence of chronic diseases were also associated with IBS. Participants without chronic diseases showed a lower prevalence of IBS (49.5%), while those with multiple chronic conditions had an increased IBS prevalence (21.5%) ($\chi^2(1, N = 562) = 32.362$). Moreover, IBS participants had a higher prevalence of depression and distress. Marital status, job status, and education level were not significantly associated with IBS. These findings emphasize the importance of considering demographic factors in IBS assessment and management.

Fisher's Exact Test was performed to examine the association between demographic and clinical factors and Irritable Bowel Syndrome (IBS) for categories with

cell counts less than 5, chosen for its appropriateness in handling small sample sizes. The results indicated no significant associations: for Economic Status: Excellent, the p-value was 0.619, suggesting no difference between IBS groups; for Chronic Diseases: Blood Lipids, the p-value was 0.206, indicating no significant relationship with IBS; and for Chronic Diseases: Cardiac Failure, the p-value was 0.132, showing no significant association. These results suggest that none of the tested variables, when considering the low-frequency categories, are significantly related to IBS. Further research with larger sample sizes or more balanced data may be necessary to confirm these findings.

Discussion

Irritable bowel syndrome (IBS) is widely recognized as one of the most prevalent gastrointestinal disorders. In light of the results obtained in our study, it is apparent that female demographics predominated among our participants, with a ratio of approximately 2:1 in favor of females. This finding is consistent with other studies that have reported a female predominance in IBS, with ratios ranging from 2:1 to 2.5:1 among those seeking medical care [13]. This gender distribution mirrors the patterns observed in previous research [14, 15], aligning with several studies that have consistently reported a higher prevalence of IBS among females compared to their male counterparts [16–18]. The underlying hypothesis posits that sex hormones may influence the mechanisms governing the brain-gut microbiota axis, ultimately contributing to IBS development [14]. In our study, a higher likelihood of IBS was observed in the age group 40–50. This closely aligns with the findings of a meta-analysis conducted across Asia, which reported a higher prevalence of IBS among younger age groups, with a mean age of 40.0 [19]. Notably, it has been reported that IBS is more prevalent among younger individuals, with a confirmed negative correlation between age and IBS symptom severity, for which no clear explanation has been provided [20, 21]. One potential explanation could be that the unique social and economic stressors associated with middle adulthood, including occupational pressures and family responsibilities, exacerbate IBS symptoms in individuals already predisposed to the condition. Another consideration might be that IBS symptoms worsen with prolonged exposure to these stressors over time, leading to an increase in symptom severity and diagnostic rates among individuals in this age bracket.

It is also noteworthy that 32.3% of hospital visitors in our sample met the Rome IV criteria for IBS—a prevalence considerably higher than typically reported in the general population, which warrants further investigation. This elevated rate may be influenced by the hospital setting, where individuals are more likely to be experiencing

ongoing health concerns or psychosocial stressors that contribute to IBS-like symptoms.

Socioeconomic factors have also emerged as significant determinants of IBS symptoms. Notably, participants with limited financial resources, falling into the categories of poor or moderate financial status, exhibited a higher propensity for IBS than did those with excellent living conditions. The association between lower income and increased susceptibility to IBS can be attributed to the well-established correlation between reduced income and compromised overall health and quality of life, leading to elevated stress levels. This finding aligns with Canavan et al.'s and Imtinan et al.'s studies [16, 22], which support a link between financial status and IBS. Interestingly, contrasting viewpoints have been presented in the literature, with some studies suggesting a greater prevalence of IBS among participants with higher income levels [18, 20]. Participants with chronic diseases exhibit a significantly elevated likelihood of IBS. In fact, our study found that the absence of IBS symptoms was predominantly observed among participants without any chronic disease. These findings highlight chronic diseases as a notable contributing factor, corroborating earlier research that has established a link between IBS and a history of chronic diseases [23–25].

Furthermore, our research revealed that participants diagnosed with IBS tend to concurrently present with symptoms of depression, distress, and various other psychological disturbances. Compared to similar studies of general medical participants or participants with organic disorders, those with IBS consistently exhibited markedly higher rates of psychiatric comorbidity. The impact of stress as a significant moderator of IBS development has been previously investigated and confirmed [26]. However, the precise mechanism through which psychological stress triggers abdominal symptoms remains unclear. A comprehensive biopsychosocial model has been proposed to explain the complex pathophysiology of IBS [27]. This model underscores the presence of reciprocal influences and feedback mechanisms between gastrointestinal (GI) alterations and psychological factors, thus emphasizing a strong association between GI symptoms and psychological parameters. These findings are consistent with the outcomes of several prior researches [18, 23, 25, 28]. Psychosocial stressors significantly shape IBS treatment outcomes, highlighting the need to understand participants coping strategies that enhance symptom relief and quality of life [18].

Notably, marital status, occupational engagement, and education level were not significant determinants of IBS occurrence in our study. Nevertheless, it is worth noting that other investigations have reported a higher prevalence of IBS among participants with higher levels of education and those who are married [22, 23, 25]. Daily

stressors, including job/school and family/social relationships, cause significant variations in IBS symptoms, and are associated with anxiety and depression [29]. Finally, a conspicuous observation in our study was the elevated prevalence of IBS among higher BMI participants. Increased body mass index (BMI) was discernibly linked to an increased likelihood of IBS development, a phenomenon consistent with the findings of other investigations [24, 25].

Limitation

This study, while methodologically rigorous, has certain limitations. The lack of preexisting hospital data necessitated the use of qualified data collectors, which may have introduced variability in the accuracy of diagnostic assessments. Second, the study sample was confined to a specific city, limiting the generalizability of the findings. Additionally, self-reported measures of depression and IBS symptoms may introduce recall bias or misclassification, affecting the precision of the results. However, we used reliable and validated questionnaires that greatly reduced bias as well as a trained team to administer them. Furthermore, Our study did not specifically exclude other gastrointestinal disorders, which may share symptoms similar to IBS. Therefore, the reported prevalence of Rome IV IBS in our cohort could reflect a broader range of gastrointestinal symptoms. Future research could benefit from incorporating clinical assessments to clearly differentiate IBS from other gastrointestinal conditions. Despite these limitations, this study offers valuable insights for future research, contributing to our understanding of the complex relationship between depression and IBS.

Conclusion

This research highlights the complex nature of IBS, showing that demographic factors like sex, age, socioeconomic status, and chronic diseases significantly affect its prevalence. It also identifies a strong link between IBS and psychological distress. These findings suggest the need for a holistic approach to IBS management that includes both physical and psychological considerations. Further research is needed to understand these associations better and to develop tailored interventions.

Abbreviations

IBS	Irritable Bowel Syndrome
PHQ	Patient Health Questionnaire
K6	Kessler Psychological Distress Scale

Provenance and peer review

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Authors' contributions

JA, NS, HK, ZA, RAA, NS, HK, HA have participated in writing the manuscript and reviewing the literature. JA, NS analysed the data statistically and created tables. JA, ZA critically and linguistically revised the manuscript. JA contributed

to the revision and preparation of the manuscript. JA, AW conceived and supervised the conduct of the study. All authors read and approved the final manuscript.

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Data availability

The data generated or analyzed during this study is not available publicly due to being in Arabic. However, anyone who requires access to the dataset can reach out to corresponding author directly.

Declarations

Ethics approval and consent to participate

The Ethical Committee approved this study in the Faculty of Medicine at Damascus University, Syria with serial number (3553). Informed consent was collected from participants as a part of the electronic form. The study complied with the principles of the Helsinki Declaration.

Competing interests

The authors declare no competing interests.

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