


The relationship between anxiety and irritable bowel syndrome symptoms among females

A cross-sectional study in Egypt

Heba Ahmed Abdelaziz, MD^a, Walid Ismail Ellakany, MD^b, Ahmed Ellakany, MD^b, Yomna E. Dean, Medical Student^b, Samah S. Rouzan, MD^b, Bdoor Ahmed A. Bamousa, MD^c, Mohamed A. Shebl, Medical Student^d, Sameh Samir Elawady, MD^e, Suman Verma, MD^f, Deepak Gir, MD^f, Taher Sbitli, MD^c, Ibram Zaki, Medical Student^g, Lakshya Motwani, MD^h, Ramy Eweis, MD^g, Naila Iqbal, MDⁱ, Jaffer Shah, BS^{j,*} , Hani Aiash, MD, PhD^{k,l}

Abstract

There is a scarcity of studies focusing on irritable bowel syndrome (IBS) and anxiety in Egypt. Accordingly, our study aimed to assess the association between anxiety and IBS symptomatology among Egyptian females. Three hundred eighty-three females (145 IBS and 238 controls) were included in the study, and data were obtained using structured predesigned questionnaires. IBS and anxiety symptoms were assessed according to the Rome IV criteria and the Arabic version of the beck anxiety inventory, respectively. Both IBS and non-IBS groups showed increased anxiety during the pandemic, without a significant difference between both groups (P value = .657). Higher levels of education were significantly associated with severe anxiety (P value = .031). Multivariate analysis of IBS patients showed that intermediate education was significantly associated with 75% lower odds for increased IBS symptoms compared with illiterate or read-and-write IBS patients [odds ratio (OR): 0.25, 95% confidence interval (CI) 0.06–0.95, P value = .042]. Urban residence was significantly associated with 13.5 times greater odds of increased IBS symptoms, compared with rural residence (OR: 13.48, 95% CI 3.55–51.25, P value < .001). Moreover, patients who lost their job during the pandemic were 12.9 times more likely to have increased symptoms (OR: 12.89, 95% CI 1.84–90.15, P value = 0.01). A unit increase in patients age and beck anxiety inventory score was associated with 68% and 75% greater odds for increased IBS symptoms, respectively (OR: 1.68, 95% CI 1.12–2.53, P value = .012; OR: 1.75, 95% CI 1.08–2.84, P value = .024). Increasing anxiety is associated with increased IBS symptoms. Therefore, IBS patients should be screened for anxiety, and the role of psychiatric management of anxiety in the amelioration of IBS symptoms must be explored.

Abbreviations: BAI = beck anxiety inventory, CI = confidence interval, IBS = irritable bowel syndrome, OR = odds ratio, SSRI = selective serotonin reuptake inhibitor.

Keywords: anxiety, COVID-19, functional colonic diseases, irritable bowel syndrome

1. Introduction

Irritable bowel syndrome (IBS) is the most common functional gastrointestinal disorder.^[1] Most IBS patients (33–90%) have

visceral hypersensitivity that is exacerbated by stress and anxiety.^[2] Psychological stress also leads to the alteration of intestinal motility; consequently, IBS is considered a stress-sensitive disorder.^[2,3]

All authors declare that the anonymity of the patient's data has been preserved. The authors obtained informed consent from the patients who participated in the study.

The authors have no funding and conflicts of interest to disclose.

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

All procedures performed in the study were in accordance with the ethical standards of the institutional research committee (Medical Research Ethics Committee of Alexandria Faculty of Medicine, Egypt—IRB Number: 00012098) and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

^a Alexandria University, High Institute of Public Health, Bab Sharqi, Egypt,

^b Alexandria University, Faculty of Medicine, Al Attarin, Egypt, ^c Alfaisal University, College of Medicine, Riyadh, Saudi Arabia, ^d Cairo University, Kasr Al-Ainy, Faculty of Medicine, Old Cairo, Egypt, ^e Neuro-endovascular Surgery Department, Medical University of South Carolina (MUSC), South Carolina, ^f Maharishi Markandeshwar Medical College, Mullana, Haryana, India, ^g Beni Suef University, Faculty of Medicine, Beni Suef, Egypt, ^h Nathiba Hargovandas Lakhmichand (NHL) Municipal Medical College, Ahmedabad, Gujarat, India, ⁱ Shadan Institute of Medical Sciences, Peeramcheru, Hyderabad, India, ^j Kateb University, Medical

Research Center, Kabul, Afghanistan, ^k SUNY Upstate Medical University, Medicine, Cardiovascular Perfusion, and Surgery Departments, NY, ^l Suez Canal University, Family Medicine Department, El Sheikh Zayed, Egypt.

* Correspondence: Jaffer Shah, Kateb University, Medical Research Center, Kabul, Afghanistan (e-mail: Jaffer.Shah@kateb.edu.af).

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Despite the prevalence of abundant information found in current literature, IBS remains a widely misconceived and underdiagnosed condition in Egypt. The clinical manifestations are often falsely attributed to other gastrointestinal conditions, leading to a misdiagnosis, delay in diagnosis/treatment, or inappropriate treatment, further exacerbating the physical and emotional stress inflicted upon IBS patients by their condition. This highlights the need to address the lack of awareness and knowledge regarding IBS in Egypt, which in turn can improve patient care and overall quality of life. Presently, there is a scarcity of studies focusing on IBS and anxiety in Egypt.

IBS patients have a heightened hypothalamic-pituitary-axis response to corticotropin-releasing hormone; leading to a higher level of cortisol in these patients compared with healthy individuals. The amygdala, which plays an important role in the modulation of neurophysiological response to stress and the perception of anxiety, has elevated levels of cortisol during periods of stress. This has led to increased sensitivity of the colon to distension, as shown in experimental animal studies.^[2,4] Animal studies focusing on rodents with high anxiety traits have found higher levels of colonic sensitivity and increased visceromotor response.^[2]

An example of a more recently common but significant global stressor was the COVID-19 pandemic, which has affected nations and communities worldwide. Despite its lower mortality rate (3.4%) compared with the previous severe acute respiratory syndrome (9.6%), it carries a higher socioeconomic burden due to its high rates of transmission; owing to global modernization.^[5,6] During the pandemic, we faced multiple psychophysiological stressors, including isolation measures, social disconnection, fear, doubt, suspicion, working from home either partially or totally, the risk of changes in income, and many

others.^[7] The pandemic played a critical role in inducing stress and anxiety in all patients, including but not limited to the IBS patients demographic.

Our study focused on anxiety in female IBS patients as individuals suffering from IBS have a lifetime prevalence for mental disorders ranging from 38% to 100%; 5% to 50% for anxiety disorders.^[8] Females are more susceptible to IBS^[9] and psychological stressors, especially in the presence of a significant global stressor such as the COVID-19 pandemic, with a more impaired quality of life relative to their male counterparts.^[10,11] So, the present study deems it essential to investigate the relationship between anxiety and IBS symptoms among female patients suffering from IBS.

2. Methods

2.1. Participants

This cross-sectional study was carried out during April -July 2021 period at Alexandria main University hospital and outpatient clinics in Egypt.

Female patients who met the Rome IV criteria of IBS^[13] comprised the IBS group, while those who didn't fulfill the criteria served as the control group. Females who reported the use of antidepressants and/or anxiolytics were excluded from the study.

2.2. Sample size calculations:

The sample size was calculated using the G*Power program for Windows (version 3.1.9.7. by Franz Faul, Kiel University, Germany, 2020).^[14] Using the procedure "Means: Difference

Table 1

Distribution of the study sample according to sociodemographic characteristics (n = 383).

Characteristics	Study groups			P value
	IBS (n = 145)	Control (n = 238)	Total (n = 383)	
Age (yr), No. (%)				
20–29	22 (15.2%)	36 (15.1%)	58 (15.1%)	.091
30–39	47 (32.4%)	83 (34.9%)	130 (33.9%)	
40–49	52 (35.9%)	60 (25.2%)	112 (29.2%)	
50–59	24 (16.6%)	59 (24.8%)	83 (21.7%)	
Mean ± SD	40.26 ± 8.8	40.4 ± 9.3	40.4 ± 9.1	.850
Range	24–56	24–56	24–56	
Marital status, No. (%)				
Single	27 (18.6%)	24 (10.1%)	51 (13.3%)	.095
Married (have children)	82 (56.6%)	156 (65.5%)	238 (62.1%)	
Married (no children)	13 (9.0%)	18 (7.6%)	31 (8.1%)	
Divorced	23 (15.9%)	40 (16.8%)	63 (16.4%)	
Education, no. (%)				
Illiterate/read and write	51 (35.2%)	62 (26.1%)	113 (29.5%)	.011*
Intermediate	36 (24.8%)	94 (39.5%)	130 (33.9%)	
University/ higher	58 (40.0%)	82 (34.5%)	140 (36.6%)	
Income				
Not enough/in debt	54 (37.2%)	63 (26.5%)	117 (30.5%)	.007*
Enough	54 (37.2%)	78 (32.8%)	132 (34.5%)	
More than enough	37 (25.5%)	97 (40.8%)	134 (35.0%)	
Occupation				
Full-time work	31 (21.4%)	52 (21.8%)	83 (21.7%)	.082
Part-time work	31 (21.4%)	28 (11.8%)	59 (15.4%)	
Not working during pandemic	22 (15.2%)	55 (23.1%)	77 (20.1%)	
Never worked	37 (25.5%)	63 (26.5%)	100 (26.1%)	
Retired	24 (16.6%)	40 (16.8%)	64 (16.7%)	
Residence				
Rural	23 (15.9%)	25 (10.5%)	48 (12.5%)	.125
Urban	122 (84.1%)	213 (89.5%)	335 (87.5%)	

IBS = irritable bowel syndrome.

* Statistically significant at $P < .05$.

between 2 independent means (2 groups),” A sample size of 130 per group was calculated, which was large enough to detect an effect size (d) of 0.35 for the mean difference in total anxiety score between the IBS and non-IBS, at an alpha-error probability of 0.05 and a study power (1-beta error probability) of 0.80. An additional 10% of the calculated number was added to compensate for the nonresponse rate. However, 238 eligible controls were available and included in this study for the sake of increasing the study power.

2.2.1. Sampling design. A convenience sample of patients attending the Alexandria main university outpatient clinic were invited to participate in the study. Only those who were willing to participate were included till a predetermined sample was reached.

2.2.2. Data collection. Data were collected through a structured interview using a predesigned questionnaire for personal, sociodemographic characteristics (including age, marital status, residence, education and occupation, income, and the number of family members), and psychiatric history, particularly medication history.

IBS symptoms were assessed according to the Rome IV criteria for the diagnosis of irritable bowel syndrome.^[13] It necessitates that the patient has been complaining of recurrent abdominal pain (at least a day per week in the previous 3 months). This pain could be related to defecation or a change in stool frequency or appearance.^[15]

For the assessment of Anxiety, the Arabic version of the beck anxiety inventory (BAI) was utilized.^[16] It is a 21-item multiple-choice self-report inventory that measures the severity of anxiety in adolescents and adults. The items describe the emotional, physiological, and cognitive symptoms of anxiety. Each symptom item has 4 possible answer choices: Responses range from; not at All = 0, mild = 1, moderate = 2, and Severe = 3. The values for all items are summed to calculate the total score, which ranges between 0 and 63 points. A total score of 0 to 7 is interpreted as a “Minimal” level of anxiety, 8 to 15 as “Mild,” 16 to 25 as “Moderate and 26 to 63 as “Severe.”^[16] The Arabic version of Beck’s anxiety index was found to be reliable (Cronbach α of 0.73) by Talaat et al^[18] in their study.

2.3. Statistical analysis

The collected data were analyzed using IBM SPSS software package version 20. The Kolmogorov- Smirnov test was used to verify the normality of the distribution of continuous variables. Categorical variables were described using frequencies and percentages. Continuous variables were summarized as mean and standard deviation. Associations between categorical variables were assessed using the Chi-square test. Multivariate analysis was performed using a binary logistic regression model to identify the predictors of increased IBS symptoms among IBS patients. Adjusted associations of the logistic regression were

Table 2
Distribution of endorsed anxiety symptoms among IBS patients and controls (n = 383).

Beck anxiety inventory (BAI)	Study groups		Total (n = 383)	P value
	IBS (n = 145) No. %	Control (n = 238) No. %		
Beck anxiety inventory (BAI):				
1. Numbness or tingling	107 (73.8%)	178 (74.8%)	285 (74.4%)	.828
2. Feeling hot	106 (73.1%)	164 (68.9%)	270 (70.5%)	.382
3. Wobbliness in legs	106 (73.1%)	181 (76.1%)	287 (74.9%)	.519
4. Unable to relax	113 (77.9%)	175 (73.5%)	288 (75.2%)	.333
5. Fear of worst happening	99 (68.3%)	182 (76.5%)	281 (73.4%)	.078
6. Dizzy or lightheaded	107 (73.8%)	193 (81.1%)	300 (78.3%)	.093
7. Heart pounding/ racing	98 (67.6%)	175 (73.5%)	273 (71.3%)	.212
8. Unsteady	112 (77.2%)	185 (77.7%)	297 (77.5%)	.911
9. Terrified or afraid	116 (80.0%)	168 (70.6%)	284 (74.2%)	.041*
10. Nervous	106 (73.1%)	174 (73.1%)	280 (73.1%)	.999
11. Feeling of choking	110 (75.9%)	184 (77.3%)	294 (76.8%)	.745
12. Hands trembling	111 (76.6%)	186 (78.2%)	297 (77.5%)	.716
13. Shaky/ unsteady	95 (65.5%)	186 (78.2%)	281 (73.4%)	.007*
14. Fear of losing control	113 (77.9%)	174 (73.1%)	287 (74.9%)	.291
15. Difficulty in breathing	114 (78.6%)	178 (74.8%)	292 (76.2%)	.393
16. Fear of dying	94 (64.8%)	175 (73.5%)	269 (70.2%)	.071
17. Scared	108 (74.5%)	193 (81.1%)	301 (78.6%)	.126
18. Indigestion	110 (75.9%)	172 (72.3%)	282 (73.6%)	.439
19. Faint/lightheaded	105 (72.4%)	196 (82.4%)	301 (78.6%)	.021*
20. Face flushed	109 (75.2%)	195 (81.9%)	304 (79.4%)	.113
21. Hot/ cold sweats	103 (71.0%)	168 (70.6%)	271 (70.8%)	.926
Severity of anxiety symptoms:				
1. Moderate	18 (12.4%)	26 (10.9%)	44 (11.5%)	.657
2. Severe	127 (87.6%)	212 (89.1%)	339 (88.5%)	
Change in anxiety symptoms:				
Increased	113 (77.9%)	202 (84.9%)	315 (82.2%)	.085
No change	32 (22.1%)	36 (15.1%)	68 (17.8%)	
Number of reported increased symptoms:	n = 113	n = 202	n = 315	
1–7	51 (45.1%)	90 (44.6%)	141 (44.8%)	.932
8–14	23 (20.4%)	54 (26.7%)	77 (24.4%)	.213
15–21	39 (34.5%)	58 (28.7%)	97 (30.8%)	.286

IBS = irritable bowel syndrome.

* Statistically significant at $P < .05$.

Table 3**Distribution of sociodemographic and IBS characteristics by anxiety symptoms severity during the pandemic (n = 383).**

Characteristics	Anxiety severity		Total (n = 383)	P value
	Moderate (n = 44)	Severe (n = 339)		
Age (yr), No. (%)				
20–29	4 (9.1%)	54 (15.9%)	58 (15.1%)	.480
30–39	18 (40.9%)	112 (33.0%)	130 (33.9%)	
40–49	11 (25.0%)	101 (29.8%)	112 (29.2%)	
50–59	11 (25.0%)	72 (21.2%)	83 (21.7%)	
Marital status, No. (%)				
Single	2 (4.5%)	49 (14.5%)	51 (13.3%)	.346
Married (have children)	30 (68.2%)	208 (61.4%)	238 (62.1%)	
Married (no children)	4 (9.1%)	27 (8.0%)	31 (8.1%)	
Divorced	8 (18.2%)	55 (16.2%)	63 (16.4%)	
Education, no. (%)				
Illiterate/read and Write	20 (45.5%)	93 (27.4%)	113 (29.5%)	.031*
Intermediate	14 (31.8%)	116 (34.2%)	130 (33.9%)	
University/higher	10 (22.7%)	130 (38.3%)	140 (36.6%)	
Income				
Not enough/in debt	10 (22.7%)	107 (31.6%)	117 (30.5%)	.377
Enough	15 (34.1%)	117 (34.5%)	132 (34.5%)	
More than enough	19 (43.2%)	115 (33.9%)	134 (35.0%)	
Occupation				
Full-time work	4 (9.1%)	79 (23.3%)	83 (21.7%)	.171
Part-Time work	7 (15.9%)	52 (15.3%)	59 (15.4%)	
Not working during pandemic	12 (27.3%)	65 (19.2%)	77 (20.1%)	
Never worked	15 (34.1%)	85 (25.1%)	100 (26.1%)	
Retired	6 (13.6%)	58 (17.1%)	64 (16.7%)	
Residence				
Rural	7 (15.9%)	41 (12.1%)	48 (12.5%)	.472
Urban	37 (84.1%)	298 (87.9%)	335 (87.5%)	
IBS symptoms (n = 145):	n = 18	n = 127	n = 145	
1	11 (61.1%)	94 (74.0%)	105 (72.4%)	.268
2	14 (77.8%)	98 (77.2%)	112 (77.2%)	1.000
3	15 (83.3%)	100 (78.7%)	115 (79.3%)	.766
4	11 (61.1%)	101 (79.5%)	112 (77.2%)	.128
5	12 (66.7%)	61 (48.0%)	73 (50.3%)	.139
6	8 (44.4%)	66 (52.0%)	74 (51.0%)	.550
Change in IBS symptoms (n = 145):	n = 18	n = 127	n = 145	
Increased intensity	13 (72.2%)	100 (78.7%)	113 (77.9%)	.548
No change	5 (27.8%)	27 (21.3%)	32 (22.1%)	
Number of IBS symptoms of increased intensity (n = 113):	n = 13	n = 100	n = 113	
1–2	2 (15.4%)	24 (24.0%)	26 (23.0%)	.490
3–4	4 (30.8%)	27 (27.0%)	31 (27.4%)	.774
5–6	7 (53.8%)	49 (49.0%)	56 (49.6%)	.746

1: Abdominal pain related to defecation; 2: Change in the stool frequency; 3: Associated with a change in stool form or appearance; 4: Altered stool passage; 5: Mucorrhea; 6: Abdominal bloating or subjective distention.

IBS = irritable bowel syndrome.

* Statistically significant at $P < .05$.

presented as odds ratio (OR) and 95% confidence interval (CI). Statistical significance was considered at $P < .05$.

3. Results

3.1. Sociodemographic characteristics

A total of 383 females participated in the study, with a mean age of 40.26 ± 8.8 in the IBS group and 40.4 ± 9.3 in the control group. The majority of the IBS females lived in urban areas (84.1%) and were married with children (56.6%). A higher level of education was observed among the IBS group (P value = .011), with 40% having a university degree or higher, while a higher percentage of the control group identified their education level as intermediate (39.5%). On the other hand, lower income was reported among IBS patients compared with the control (P value = .007). (Table 1)

3.2. Anxiety levels

During the pandemic, both IBS and control groups reported an increase in their anxiety, 77.9%, and 84.9%, respectively.

In terms of severity of anxiety symptoms, the majority of the sample had severe anxiety (88.5%). This demonstrates that the pandemic has affected all individuals and led to a major increase in anxiety levels across different populations. (Table 2)

3.3. Sociodemographic characteristics and anxiety symptoms

Most of the individuals showing severe anxiety were aged 30 to 39 years (33.0%) and were married (61.4%). The level of education among these patients was a significant factor in differentiating severe from moderate anxiety, with a statistically significant difference ($P = .031$); higher levels of education were associated with severe anxiety (Table 3). Most of the IBS group reported increased IBS symptoms (77.9%), with the majority of the sample reporting an increase in 5 to 6 IBS symptoms (49.6%) (Table 3). The most common IBS complaint was a change in the stool form or appearance (79.3%), followed by altered stool passage (77.2%), Change in the stool frequency (77.2%), abdominal pain related to defecation (72.4%), bloating (51.0%), and mucorrhea (50.3%). (Table 3)

3.4. Multivariate analysis of the predictors of increased IBS symptoms among patients with IBS

Multivariate analysis of IBS patients showed that age, education, residence, work, and level of anxiety score were significant predictors of increased IBS symptoms during the pandemic. A unit increase in patients age and BAI score was associated with 68% and 75 greater odds for increased IBS symptoms, respectively (OR: 1.68, 95% CI 1.12–2.53, P value = .012; OR: 1.75, 95% CI 1.08–2.84, P value = .024). Intermediate education was significantly associated with 75% lower odds for increased IBS symptoms compared with illiterate or read-and-write IBS patients (OR: 0.25, 95% CI 0.06–0.95, P value = .042). Urban residence was significantly associated with 13.5 times greater odds of increased IBS symptoms, compared with rural residence (OR: 13.48, 95% CI 3.55–51.25, P value < .001). Moreover, patients who lost their job during the pandemic were 12.9 times more likely to have increased symptoms (OR: 12.89, 95% CI 1.84–90.15, P value = .01). (Table 4)

4. Discussion

This study showed that the majority of the sample had severe anxiety (88.5%) during the pandemic and 77.9% of IBS patients reported worsening of the IBS symptoms. Individual IBS symptoms failed to differentiate between severe and moderate anxiety; however, the level of education among these patients was a significant factor in differentiating severe from moderate anxiety. Multivariate analysis showed that age, urban residence, intermediate education, work (i.e., not working during the pandemic), and total anxiety score significantly predict the increased IBS symptoms among IBS patients.

The higher prevalence of low socioeconomic state in IBS opposes the findings of Howell et al 2004^[19] and Mendall et al 1998,^[20] studies that concluded that affluent childhood is an independent risk factor for adult IBS. The Drossman et al 1993^[21] study supports our results; as they stated that functional gastrointestinal disorders, including IBS, are more common among individuals with low socioeconomic status. Furthermore, IBS patients were more commonly living in urban areas, reinforcing the findings of Gwee et al 2005,^[22] which stated that IBS is a disease of urbanization.

Our study reports that 87.6% of IBS patients suffered from severe anxiety. This reaffirms the findings of Zamani et al 2019,^[23] Cho et al 2011,^[24] and Roohafza et al 2016,^[25] all of whom demonstrated IBS patients as more likely to suffer from anxiety symptoms and anxiety disorders compared to healthy subjects. Fond et al 2014,^[26] in their meta-analysis, reached a similar conclusion. However, in comparison with non-IBS patients, there was not a significant difference between IBS and non-IBS groups; emphasizing that during the COVID-19 pandemic period, anxiety has increased throughout the populations.^[27–29] This is reinforced by our further analysis which showed that individuals who had higher levels of education were more likely to suffer from severe anxiety due to higher self-awareness concerning their health and higher levels of knowledge regarding COVID-19. Similar findings were seen in the studies conducted by Moghanibashi-Mansourieh et al 2020,^[30] and Zhang et al 2021^[31]; which stated that during the COVID-19 pandemic, people with higher levels of education had greater levels of anxiety, depression, and stress; with the presence of a significant association between education levels, and anxiety and depression levels.

According to our findings, increased BAI score was associated with a more significant increase in the number of IBS symptoms reported, further reinforcing the conclusive findings of Jerndal et al 2010^[32] and Labus et al 2007^[33]; that anxiety, particularly gastrointestinal-specific anxiety, is a strong predictor of gastrointestinal symptom severity in IBS patients. Popa et al 2015^[34] deduced in their review that IBS symptoms are exacerbated during periods of anxiety and stress. Anxiety has not only been linked to the exacerbation of IBS symptoms but was also linked to the onset of IBS; Sibelli et al 2016^[35] findings have illustrated that patients suffering from anxiety were more likely to develop IBS later in life.

Tabas et al 2004,^[36] Tack et al 2006,^[37] and Fadgyas-Stanculete et al 2014^[38] expressed that the usage of selective serotonin reuptake inhibitor (SSRIs) could help improve IBS symptoms and co-existing psychiatric disorders, including anxiety. However, Lin et al 2017^[39] counter-argues that SSRI users are at a higher risk of developing IBS in Taiwan. In addition to that, there have been some concerns regarding SSRI usage in IBS patients, as shown by Oh et al 2020^[40] in their critical review. This raises questions regarding the appropriate psychiatric management of IBS patients, who tend to have a higher prevalence

Table 4

Multivariate analysis* of the predictors of increased IBS symptoms among patients with IBS during the pandemic (n = 145).

Predictor variables	Parameter estimates			
	β	S.E.	P value	OR (95% CI)
Constant	-22.73	8.73	.009†	
Age (yr)	0.52	0.21	.012†	1.68 (1.12–2.53)
Education (ref: illiterate/read and write)				
Intermediate	-1.40	0.69	.042†	0.25 (0.06–0.95)
University/higher	-1.06	0.63	.093	0.35 (0.10–1.19)
Marital status (ref: single)				
Married	0.35	0.59	.552	1.42 (0.45–4.53)
Divorced	0.28	0.77	.719	1.32 (0.29–5.98)
Urban residence (ref: rural)	2.60	0.68	<.001†	13.48 (3.55–51.25)
Work (ref: not working/retired)				
Not working during the pandemic	2.56	0.99	.010†	12.89 (1.84–90.15)
Working	0.71	0.59	.227	2.04 (0.64–6.44)
Insufficient income (ref: sufficient)	0.45	0.53	.395	1.57 (0.55–4.47)
Anxiety score	0.56	0.25	.024†	1.75 (1.08–2.84)
Anxiety score † age	-0.01	0.01	.029†	0.99 (0.98–1.00)

* Binary Logistic Regression Model (Enter): Dependent variable is "increased IBS symptoms" (Ref. no change).

Model fit: Chi-Square of Omnibus test = 33.84, df = 11, P value < .001; Hosmer and Lemeshow test: Chi-square = 5.23, df = 7, P = .632; Nagelkerke R-Square = 0.319; Overall percentage of correct classification: 82.8%.

CI = confidence interval, IBS = irritable bowel syndrome, OR = odds ratio.

of anxiety and other psychiatric disorders compared with the general population. Umrani et al 2021^[41] recommended that psychiatric evaluation should be done for patients presenting with IBS-like symptoms and that psychiatrists should be trained to screen for IBS.

5. Limitations

Several limitations should be considered in this study. First, the data of this study was self-reported making it susceptible to many sources of bias particularly recall bias.^[42] Second, the sample was limited to Alexandria Main University Outpatient Clinic; we recommend a broader cross-sectional study to be conducted on female IBS patients in Egypt. Finally, the cross-sectional design cannot address the temporal relationship between the exposure “that is, anxiety” and the outcome “that is, change in IBS symptoms”.

6. Conclusion

Anxiety leads to the worsening of the IBS symptoms. Due to the COVID-19 pandemic, anxiety levels have spiked among female IBS patients. Therefore, it is important to screen IBS patients for anxiety. We also recommend that the role of psychiatric management of anxiety in the amelioration of IBS symptoms be explored.

Author contributions

Conceptualization: Heba Ahmed Abdelaziz, Walid Ismail Ellakany.

Data curation: Heba Ahmed Abdelaziz, Walid Ismail Ellakany, Ahmed Ellakany.

Formal analysis: Sameh Samir Elawady.

Investigation: Heba Ahmed Abdelaziz, Walid Ismail Ellakany, Ahmed Ellakany.

Methodology: Heba Ahmed Abdelaziz, Walid Ismail Ellakany, Ahmed Ellakany.

Project administration: Heba Ahmed Abdelaziz, Walid Ismail Ellakany, Ahmed Ellakany.

Resources: Heba Ahmed Abdelaziz, Walid Ismail Ellakany, Ahmed Ellakany.

Software: Heba Ahmed Abdelaziz, Walid Ismail Ellakany, Ahmed Ellakany.

Supervision: Heba Ahmed Abdelaziz, Walid Ismail Ellakany, Ahmed Ellakany.

Validation: Heba Ahmed Abdelaziz, Walid Ismail Ellakany, Ahmed Ellakany.

Visualization: Heba Ahmed Abdelaziz, Walid Ismail Ellakany, Ahmed Ellakany.

Writing – original draft: Heba Ahmed Abdelaziz, Walid Ismail Ellakany, Ahmed Ellakany.

Writing—review & editing: Heba Ahmed Abdelaziz, Walid Ismail Ellakany, Ahmed Ellakany, Yomna E. Dean, Samah S. Rouzan, Bdoor Ahmed A. Bamousa, Mohamed A. Shebl, Suman Verma, Deepak Gir, Taher Sbitli, Ibram Zaki, Lakshya Motwani, Ramy Eweis, Naila Iqbal, Jaffer Shah, Hani Aiash.

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