

Prevalence of irritable bowel syndrome in endometriosis patients: A cross-sectional study

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ABSTRACT

Background: Despite its prevalence, limited research has explored the direct correlation between irritable bowel syndrome (IBS) and endometriosis, particularly in regions like Saudi Arabia. This study aimed to bridge this gap by investigating the prevalence of IBS among endometriosis patients and identifying associated risk factors. **Materials and Methods:** The study conducted a cross-sectional analysis, it was done at King Abdulaziz University Hospital, Jeddah. From September to December 2023. Women who were diagnosed with endometriosis and aged above 18 years old were included. **Results:** Our study revealed that 47.8% of endometriosis patients had previously been diagnosed with IBS. Interestingly, Saudi patients exhibited a significantly higher prevalence of IBS compared to non-Saudi individuals. While no substantial link emerged between IBS prevalence and other demographic or endometriosis-related factors, patients with chronic digestive conditions like food intolerance, esophageal reflux, and inflammatory colon diseases showed a higher likelihood of IBS. **Conclusions:** This study underscores a substantial association between IBS and endometriosis, urging healthcare providers to consider IBS as a potential comorbidity in affected patients. The findings stress the importance of holistic assessments and awareness regarding overlapping symptoms and risk factors. Further research is encouraged to unveil underlying mechanisms and devise optimal management strategies for individuals grappling with both conditions.

Keywords: Irritable bowel syndrome and endometriosis, irritable bowel syndrome in Saudi Arabia, irritable bowel syndrome symptoms, relationship between irritable bowel syndrome and endometriosis

Introduction

Endometriosis is a chronic disease marked by the presence of endometrial tissue outside the uterine cavity.^[1] Its prevalence varies across the literature, but it has been reported to affect 7-10% of women.^[2] It frequently manifests as dysmenorrhea, menorrhagia, and chronic pelvic pain; however, it can also exhibit symptoms that resemble those of irritable bowel syndrome (IBS).^[3-6] IBS is a functional disorder of the gastrointestinal tract characterized by

altered bowel habits and chronic abdominal pain.^[7] The prevalence of IBS is approximately 11% worldwide, with wide variation by geographic region, and it is more common in females.^[7-10]

The significant overlap in symptom presentation between endometriosis and IBS is thought to be due to chronic inflammation that leads to chronic pelvic pain.^[11] Similarities in clinical presentation may also account for the frequent delay in diagnosis, with endometriosis taking an average of 6-7 years to be diagnosed.^[12-17] A nationwide study in the United States has shown that endometriosis increases the risk of IBS approximately threefold.^[18] Also, a recent systematic review and meta-analysis including 11 studies found that patients with endometriosis have an approximately threefold increased risk of developing IBS.^[19]

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Family physicians and general practitioners who evaluate patients presenting with IBS symptoms may consider endometriosis as a possible underlying cause. This awareness may result in early detection and the proper referral to a specialist or gynecologist for additional assessment and care. Additionally, by using this knowledge, the doctors can explain to the patients their condition. Therefore, the patients can be made more aware of their illness and the connection between endometriosis and IBS, improving their ability to control their symptoms and have a better awareness of their overall health. The majority of the included studies were conducted in North America and Europe. However, data regarding a direct association between IBS and endometriosis in Saudi Arabia or the Gulf region is still lacking. This study aimed to determine the prevalence of IBS among patients with endometriosis at a tertiary academic hospital in Jeddah, Saudi Arabia.

Materials and Methods

Study design, setting, and time

This cross-sectional descriptive study was done at King Abdulaziz University Hospital (KAUH), Jeddah, Saudi Arabia, from September to December 2023.

Study participants

The inclusion criteria were women above 18 years of age and diagnosed with endometriosis. Women who refused to participate, women with mental health conditions, and women who were following up outside KAUH were excluded.

Data collection

Hospital records of all patients diagnosed with endometriosis during the study period were reviewed to obtain patients' phone numbers and send the questionnaire to them after giving their consent verbally to participate in the study. The questionnaire collected data about participants' demographics, previous diagnoses with IBS, chronic diseases, chronic conditions of the digestive system, type of diagnostic method of endometriosis, and IBS symptoms among undiagnosed patients.

Data analysis

Data were statistically analyzed using the (SPSS) application version 26. To investigate the association between the variables, the Chi-squared test (χ^2) was applied to qualitative data that was expressed as numbers and percentages. Multivariate logistic regression analysis was done to assess the risk factors (independent predictors) of IBS among studied endometriosis patients. The odds ratio was calculated at a confidence interval (CI) of 95%. A $P < 0.05$ was regarded as statistically significant.

Ethical consideration

Ethical approval was obtained from the research ethical committee at King Abdulaziz University hospital, Jeddah, Saudi Arabia (Reference No. 407-23). All participants gave their informed consent before being included in the study, and their participation was entirely optional. The consent was obtained

before starting the survey completion. The respondents' names were not included in any part of the study, and the researcher maintained all personal information confidential.

Results

A total of 203 endometriosis patients responded to the survey, with 97/203 (47.8%) noting a previous diagnosis of IBS [Figure 1]. Prior diagnosis of endometriosis was based on imaging, and that of IBS was based on clinical diagnosis according to Rome IV criteria. Regarding socioeconomic status, most patients (69.5%, 141/203) had a Saudi nationality, approximately half (57.6%, 117/203) were married, 63.1% (128/203) had a university level of education, most of them were aged between 26 and 35 years old (43.8% (89/203), and 50.2% (102/203) were unemployed. It was found that IBS prevalence among participants was significantly higher among those with Saudi nationality compared to non-Saudi (76.3% vs. 23.7%) ($P \leq 0.05$). On the other hand, a non-significant relationship was found between IBS prevalence and other demographic characteristics ($P \geq 0.05$) [Table 1].

Most patients (71.4%, 145/203) noted a history of chronic diseases, with psychological disorders (including anxiety disorders and Major depressive disorder) and hyperlipidemia being the most common (12.8%, 26/145). More than half (61.6%, 125/203) had a chronic gastrointestinal condition, with food intolerance (such as lactose or dairy products) (39.9%, 81/125) and gastro-esophageal reflux disease (27.1%, 55/125) being the most common. The prevalence of IBS was significantly higher among patients with the recently mentioned chronic gastrointestinal conditions ($P \leq 0.05$) [Table 2].

Table 3 shows that a non-significant relationship was found between IBS prevalence and diagnostic methods of endometriosis, and all symptoms related to the disease ($P \geq 0.05$).

Of patients who denied a prior diagnosis of IBS (106/203, 52.2%), all of them noted some symptoms consistent with IBS. About half (54.8%, 58/106) had recurring abdominal pain, at least once a week, during the past three months that is related to bowel movements. About half (52.9%, 56/106) had recurring abdominal pain at least 1 day a week during the past three months, which is associated with a change in the frequency of bowel

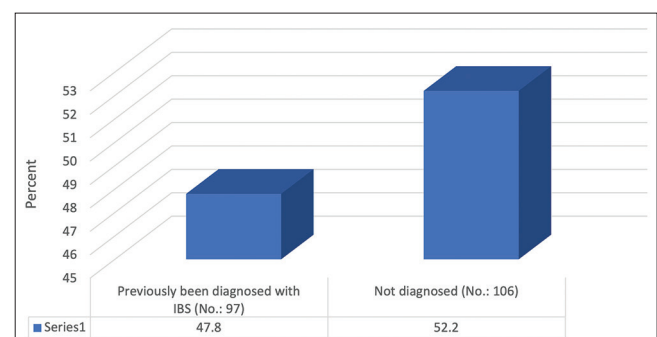


Figure 1: Percentage distribution of previous diagnosis with IBS among studied participants (No.:203) No., total number; Percent, %

Table 1: Relationship between IBS prevalence among studied participants according to their demographic characters (No. 203)

Variable	Total n (%)	Diagnosed with IBS		χ^2	P
		No No. (%)	Yes No. (%)		
Age (years)				0.54	0.969
18–25	33 (16.3)	17 (16)	16 (16.5)		
26–35	89 (43.8)	46 (43.4)	43 (44.3)		
36–45	59 (29.1)	32 (30.2)	27 (27.8)		
46–55	19 (9.4)	10 (4.9)	9 (9.3)		
56–65	3 (1.5)	1 (0.9)	2 (2.1)		
Nationality				4.08	0.043
Saudi	141 (69.5)	67 (63.2)	74 (76.3)		
Non-Saudi	62 (30.5)	39 (36.8)	23 (23.7)		
Marital status				7.23	0.065
Widow	1 (0.5)	1 (0.9)	0 (0.0)		
Single	69 (34)	28 (26.4)	41 (42.3)		
Married	117 (57.6)	66 (62.3)	51 (52.6)		
Divorced	16 (7.9)	11 (10.4)	5 (5.2)		
Education				3.1	0.684
Illiterate	2 (1)	1 (0.9)	1 (1)		
Primary	3 (1.5)	2 (1.9)	1 (1)		
Middle	9 (4.4)	5 (4.7)	4 (4.1)		
Secondary	33 (16.3)	20 (18.9)	13 (13.4)		
University	128 (63.1)	61 (57.5)	67 (69.1)		
Postgraduate	28 (13.8)	17 (16)	11 (11.3)		
Employment status				0.24	0.886
Student	20 (9.9)	10 (9.4)	10 (10.3)		
Unemployed	102 (50.2)	55 (51.9)	47 (48.5)		
Employed	81 (39.9)	41 (38.7)	40 (41.2)		

%, Percentage. χ^2 , Chi-squared test. No., number. $P < 0.05$ is considered significant

movements. Also, 45.2% (48/106) had recurring abdominal pain at least one day a week during the past three months, which is related to a change in the appearance of stool. In the past 3-6 months, the most common IBS findings among patients were as follows: a blood test indicates anemia related to iron deficiency (22.6%, 24/106) and a new change in bowel habits (20.7%, 22/106) [Table 4].

Multivariate logistic regression analysis was done to assess the independent predictors of IBS among studied patients. It was found that having a Saudi nationality [OR: 1.43 (1.21-2.84), $P = 0.014$], having food intolerance (such as lactose or dairy products) [OR: 2.98 (1.33-6.67), $P = 0.008$], or having inflammatory colon diseases (ulcerative colon disease, Crohn's disease) [OR: 3.09 (1.17-8.15), $P = 0.023$] were risk factors (independent predictors) of IBS among studied patients as displayed in Table 5.

Discussion

The co-occurrence of IBS and endometriosis is common and may be attributed to shared underlying mechanisms or common physiological pathways. Both conditions exhibit similar symptoms, such as abdominal pain and changes in bowel habits, which can lead to misdiagnosis or delayed diagnosis. It is noteworthy that a significant proportion of patients with distinct gynecological issues may coincidentally experience IBS. In the current study, we found that more than half of patients without a proper diagnosis of IBS reported recurring abdominal pain at least once a week in the past three months, specifically

Table 2: Relationship between IBS prevalence among studied participants according to chronic diseases and chronic conditions of the digestive system (No. 203)

Variable	Total No. (%)	Diagnosed with IBS		χ^2	P
		No No. (%)	Yes No. (%)		
Chronic disease					
No	58 (28.6)	67 (63.2)	60 (61.9)	0.04	0.842
Yes	145 (71.4)	39 (36.8)	37 (38.1)		
Type of chronic disease (No. 145)					
DM	9 (4.4)	4 (3.8)	5 (5.2)	0.22	0.633
HTN	14 (6.9)	7 (7.7)	7 (7.2)	0.03	0.863
Hyperlipidemia	26 (12.8)	10 (9.4)	16 (16.5)	2.26	0.133
CVS	2 (1)	1 (0.9)	1 (1)	0.004	0.95
Psychological	26 (12.8)	13 (12.3)	13 (13.4)	0.05	0.809
Chronic conditions of the digestive system				16.99	<0.001
No	78 (38.4)	55 (51.9)	23 (23.7)		
Yes	125 (61.6)	51 (48.1)	74 (76.3)		
Type of chronic gastrointestinal conditions (No. 125)					
Food intolerance (such as lactose or dairy products)	81 (39.9)	28 (26.4)	53 (54.6)	16.82	<0.001
Peptic ulcer disease	13 (6.4)	8 (7.5)	5 (5.2)	0.48	0.487
Gastro-esophageal reflux disease	55 (27.1)	21 (19.8)	34 (35.1)	5.95	0.015
Inflammatory bowel disease	32 (15.8)	9 (8.5)	23 (23.7)	8.83	0.003
Celiac disease	3 (1.5)	2 (1.9)	1 (1)	0.25	0.614
GI malignancy	1 (0.5)	1 (0.9)	0 (0.0)	0.92	0.338
Pancreaticobiliary disease	12 (5.9)	4 (3.8)	8 (8.2)	1.82	0.177

%, Percentage. χ^2 , Chi-squared test. No., number. $P < 0.05$ is considered significant

Table 3: Relationship between IBS prevalence among studied participants according to diagnostic methods and symptoms related to endometriosis (No. 203)

Variable	Total No. (%)	Diagnosed with IBS		χ^2	P
		No No. (%)	Yes No. (%)		
How was your endometriosis diagnosed?				7.84	0.449
Ultrasound imaging	37 (18.2)	21 (19.8)	16 (16.5)		
MRI	54 (26.6)	25 (23.6)	29 (29.9)		
Final diagnosis from an obstetrician-gynecologist	30 (14.8)	13 (12.3)	17 (17.5)		
During surgeries	75 (40)	47 (44.3)	34 (35.1)		
Symptoms associated with endometriosis					
Menstrual bleeding in large quantities	104 (51.2)	48 (45.3)	56 (57.7)	3.14	0.076
Absence of a menstrual cycle	26 (12.8)	12 (11.3)	14 (14.4)	0.43	0.507
Pelvic pain	181 (89.2)	92 (86.8)	89 (91.8)	1.29	0.256
Diarrhea	74 (36.5)	34 (32.1)	40 (41.2)	1.83	0.176
Difficulty urinating	69 (34)	30 (28.3)	39 (40.2)	3.19	0.074
Dysmenorrhea	174 (85.7)	89 (84)	85 (87.6)	0.55	0.456

%, Percentage. χ^2 , Chi-squared test. No., number. $P < 0.05$ is considered significant

Table 4: Prevalence of IBS symptoms among undiagnosed patients (No. 106)

Prevalence of IBS symptoms among undiagnosed patients	No. (%)
Have you had recurring abdominal pain, at least one day a week, during the past three months that is related to pain during bowel movements?	
No	48 (45.2)
Yes	58 (54.8)
Have you had recurring abdominal pain at least one day a week during the past three months that is associated with a change in the frequency of bowel movements (toilet visits)?	
No	50 (47.1)
Yes	56 (52.9)
Have you had recurring abdominal pain at least one day a week during the past three months that is related to a change in the appearance of your stool?	
No	58 (54.8)
Yes	48 (45.2)
If you have not been diagnosed with IBS, please check if any of the following have applied to you in the past three to six months:	
Unintended weight loss	8 (7.5)
A blood test indicates anemia related to iron deficiency	24 (22.6)
A noticeable abdominal mass or swollen lymph nodes	6 (5.6)
Family history of colon cancer or inflammatory bowel disease (ulcerative colitis or Crohn's disease)	10 (9.4)
Evidence of visible stomach bleeding (i.e., dark black stools or bloody or bloody stools, which is red blood coming from the anus)	6 (5.6)
A new change in bowel habit (abdominal movement)	22 (20.7)
Pain at night or passage of stool during sleep.	6 (5.6)
Age 50 years or older and you have not previously been screened for colon cancer, with symptoms (difficulty during defecation, blood in the stool)	2 (1.8)

%, Percentage. No., number

associated with pain during bowel movements. Similarly, a study conducted by Lea *et al.*^[5] compared the symptomatology of IBS with laparoscopically confirmed chronic pelvic inflammatory disease (PID) and endometriosis. Their study showed that

patients with IBS experienced significantly more upper abdominal pain, colicky pain, exacerbation of pain by food or stress, disturbance of bowel habits, distension, and nausea compared to the PID patients.^[5] On the other hand, patients with PID had other specific features such as intermenstrual bleeding, premenstrual exacerbation of pain, and fornical tenderness.^[5]

Our findings indicate that there is a significant relationship between IBS and endometriosis among the studied population. Our study revealed that 47.8% ($N = 97$) of endometriosis patients had a previous diagnosis of IBS. This finding suggests a potential association between these two conditions. Likewise, DiVasta *et al.*^[11] found that a higher proportion of adolescents with endometriosis had comorbid IBS compared to adolescents without endometriosis. They also stated that the odds of having IBS were 5.26 times higher in participants with endometriosis compared to those without endometriosis.^[11]

Furthermore, our study found a significantly higher occurrence of IBS in individuals with chronic GI conditions, food intolerance (e.g. lactose or dairy products), esophageal reflux, and inflammatory bowel disease compared to the general population. These findings suggest that these conditions may be associated with an increased risk of developing IBS. However, it is important to know that given the 15% prevalence of IBS among the general population,^[20] a similar proportion of patients with distinct gynecological issues may coincidentally experience IBS.

Our findings highlight the potential presence of IBS symptoms among patients without an official diagnosis, further emphasizing the overlap in symptoms and risk factors between IBS and gynecological conditions like endometriosis. Understanding the relationship between IBS and endometriosis has important clinical implications. It underlines the importance of considering IBS as a potential comorbidity in endometriosis patients, particularly those with identified risk factors. Healthcare providers should be aware of these associations and conduct

Table 5: Multivariate logistic regression analysis of risk factors of IBS among studied patients

Variable	B	Wald	P	Odds Ratio (95% CI)
Nationality	0.84	6.01	0.014	1.43 (1.21–2.84)
Having any chronic conditions of the digestive system	0.13	0.06	0.792	0.87 (0.33–2.01)
Food intolerance (such as lactose or dairy products)	1.09	7.08	0.008	2.98 (1.33–6.67)
Esophageal reflux	0.59	2.02	0.154	1.81 (0.79–4.12)
Inflammatory colon diseases (Ulcerative colon disease, Crohn's disease)	1.12	5.19	0.023	3.09 (1.17–8.15)

B, estimated coefficient. $P < 0.05$ is considered significant

comprehensive evaluations to prevent misdiagnosis or delayed diagnosis to eventually provide the appropriate management.

The study also identified certain risk factors associated with IBS in this population. Having a Saudi nationality, food intolerance (lactose or dairy products), and inflammatory bowel diseases (ulcerative colon disease or Crohn's disease) were found to be independent predictors of IBS. These findings emphasize the challenges of diagnosing both endometriosis and IBS due to overlapping symptoms and the lack of specific diagnostic tests. The average delay in diagnosing endometriosis, which can take several years, further underscores the importance of raising awareness and improving knowledge among healthcare professionals. Also, our results corroborate prior research, emphasizing that family physicians, frequently the initial point of contact for patients, should be aware of the overlap between IBS and endometriosis, emphasizing the importance of this research for their practice.

This study has some limitations. First, considering that it was only carried out at a single tertiary center, it cannot be applied to other healthcare settings. Second, collecting data included calling patients by phone, which affected the total number of responders, making them less than expected. Further research is warranted to explore the underlying mechanisms linking IBS and endometriosis and to determine the optimal management strategies for individuals affected by both conditions. Additionally, studies involving larger and more diverse populations would be beneficial to confirm and generalize these findings.

Conclusion

In conclusion, this research provides valuable insights into the relationship between IBS and endometriosis among patients at a tertiary academic hospital in Saudi Arabia. The study revealed a significant prevalence of IBS among endometriosis patients, with almost half of the participants having a previous diagnosis of IBS. This finding underscores the need for healthcare providers to be vigilant about the potential co-occurrence of these two conditions and consider IBS as a comorbidity in endometriosis patients as it may impact symptom management. There remains a need for comprehensive evaluations, timely diagnosis, and appropriate management strategies for individuals affected by both conditions. Further research is warranted to explore the underlying mechanisms linking IBS and endometriosis, as well as to develop more effective approaches for the diagnosis and management of patients with these overlapping conditions.

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Conflicts of interest

There are no conflicts of interest.

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