

The Relationship Between Microbiota Awareness and Quality of Life in Patients with Irritable Bowel Syndrome: A Cross-Sectional Pilot Study

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Abstract

Objective: This study aims to evaluate the relationship between microbiota awareness and quality of life in patients diagnosed with irritable bowel syndrome (IBS), considering factors such as sex, body mass index (BMI), and IBS subtype.

Methods: The study included 101 IBS patients. Sociodemographic data were collected through a questionnaire, alongside the Microbiota Awareness Scale (MAS) and the Irritable Bowel Syndrome Quality of Life Scale (IBS-QOL). The MAS comprises subdimensions including “general information,” “product information,” “chronic diseases,” and “probiotics and prebiotics,” while the IBS-QOL includes subdimensions such as “dysphoria,” “activities,” “body image,” “health worries,” “food avoidance,” “social reaction,” “sexual,” and “social relationship.”

Results: MAS scores and its subdimensions did not differ significantly based on sex or IBS subtype ($P>0.05$). Participants with a normal BMI had higher product information scores compared to those who were overweight ($P=0.043$), while obese individuals scored higher in the chronic diseases subdimension than those who were underweight ($P=0.016$). Females scored higher than males in dysphoria ($P=0.026$), activity ($P=0.002$), body image ($P=0.003$), social reaction ($P=0.002$), sexual ($P=0.012$), and total IBS-QOL scores ($P=0.006$). Obese participants scored higher in body image ($P=0.017$), sexual ($P=0.039$), and social relationship ($P=0.034$) compared to those with normal BMI, while their social reaction ($P=0.035$) and total IBS-QOL scores ($P=0.045$) were higher than those who were underweight. IBS-QOL scores and its subdimensions did not differ significantly by IBS subtype ($P>0.05$). Correlation analysis between the two scales revealed a negative relationship between general information and social reaction ($r=-0.205$, $P=0.040$). A positive correlation was found between chronic diseases and dysphoria ($r=0.266$, $P=0.007$), health anxiety ($r=0.212$, $P=0.033$), and total IBS-QOL score ($r=0.199$, $P=0.046$). Negative correlations were observed between probiotics and prebiotics and activity ($r=-0.263$, $P=0.008$), social reaction ($r=-0.238$, $P=0.017$), sexual ($r=-0.203$, $P=0.042$), and total IBS-QOL score ($r=-0.223$, $P=0.025$).

Conclusion: In individuals with IBS, greater overall microbiota awareness is associated with an improved quality of life.

Keywords: Irritable bowel syndrome, microbiota awareness, prebiotic, probiotic, quality of life

INTRODUCTION

Irritable bowel syndrome (IBS) is a functional bowel disorder characterized by alterations in defecation habits accompanied by pain, in the absence of any identifiable organic or structural abnormalities. Its pathogenesis remains incompletely understood.¹ Studies have reported that IBS is more prevalent in females than males, particularly during middle age.²

There are no specific or sensitive biomarkers for IBS; the diagnosis is made based on the Rome IV criteria, which classify it into constipation-predominant IBS (IBS-C), diarrhea-predominant IBS (IBS-D), mixed IBS (IBS-M), and unclassified IBS (IBS-U).^{3,4} IBS is a widespread condition that imposes a significant health burden and reduces quality of life. Its etiology remains incompletely understood but is believed to result from multiple contributing factors. The pathophysiology is highly complex, involving changes in motility, visceral hypersensitivity, infections, gut-brain interactions, alterations in the microbiota, bacterial overgrowth, and food intolerances.⁵

The incomplete understanding of IBS pathogenesis complicates its treatment, making it challenging to achieve complete symptom control. Reports indicate that IBS patients experience an average reduction in work productivity of nine days per month.⁶ Consequently, there is a pressing need for more effective treatment options, with one promising area of research focusing on the microbiota.

The microbiota encompasses all microorganisms, including bacteria, fungi, and viruses, that inhabit various regions of the human body.⁷ The greatest diversity of microbiota is found in the intestines.^{8,9} The gut's bacterial population is maintained in a delicate balance, and disruption of

this equilibrium is termed dysbiosis.¹⁰ Dysbiosis can lead to the loss of colonization resistance, allowing certain pathogenic microorganisms to dominate. Although findings vary across studies, dysbiosis is considered a significant factor in the pathophysiology of IBS.¹¹ Alterations in the microbiota of IBS patients have been observed compared to healthy controls, and bacterial, viral, and parasitic infections have been implicated as triggers for IBS.¹²⁻¹⁴ Targeted treatments, such as prebiotics, probiotics, or fecal transplantation, have shown promise in alleviating disease symptoms in IBS patients.¹⁵ Consequently, the gut microbiota plays a pivotal role in shaping future treatment strategies for IBS.

Considering that the gut microbiota is influenced by factors such as nutrition (prebiotics and probiotics), stress, lifestyle, and exercise, this study aims to assess the relationship between microbiota awareness and quality of life in IBS patients, analyzed by sex, body mass index (BMI), and IBS subtype.

MATERIAL AND METHODS

Ethical Considerations

Ethical approval for the study was granted by the Ağrı İbrahim Çeçen University Scientific Research Ethics Committee on December 28, 2023, under reference number 295. Between February 1, 2024, and July 31, 2024 (a six-month period), patients presenting to the Gastroenterology Clinic of Ağrı Training and Research Hospital in Ağrı, Türkiye, with IBS were recruited for the study on a voluntary basis. Verbal consent was initially obtained from all individuals who agreed to participate. Subsequently, the Informed Consent Form was read, signed by the participants, and a copy was provided to them. The study protocol was designed in compliance with the principles of the Declaration of Helsinki.

Inclusion Criteria

- Being diagnosed with IBS according to the Rome IV criteria.³
- Aged between 18 and 50 years.
- No chronic diseases other than IBS (e.g., diabetes mellitus, hypertension, malignancy, chronic kidney failure).
- No use of any medications in the last six months, including antibiotics or IBS treatments.
- Willingness to participate in the study.

Data Collection Tools

Data were gathered through a sociodemographic information questionnaire, the Microbiota Awareness Scale (MAS), and the Irritable Bowel Syndrome Quality of Life Scale (IBS-QOL), all of which were developed based on a comprehensive literature review.

Sociodemographic Information Questionnaire

This form collected data on participants' age, sex, body weight, height, marital status, and profession. Body weight (kg) was measured using a scale with a sensitivity of 0.1 kg (ALTUS AL 808 SM), while height (m) was measured using a digital-screen Ultrasonic Harpenden Stadiometer with a sensitivity of 0.1 cm. BMI was calculated and classified as follows: <math><18.5 \text{ kg/m}^2</math> as "Underweight," $18.5\text{--}24.99 \text{ kg/m}^2$ as "Normal weight," $25.0\text{--}29.9 \text{ kg/m}^2$ as "Overweight," and $\geq 30 \text{ kg/m}^2$ as "Obese."¹⁶

Microbiota Awareness Scale

The MAS was developed by Külcü and Önal¹⁷ in 2020 to evaluate microbiota awareness levels in adults and has been validated for use in the Turkish population. The scale comprises 20 questions divided into four subdimensions: "General Information," "Product Information,"

MAIN POINTS

- Irritable bowel syndrome (IBS) is a functional bowel disorder characterized by the absence of an organic etiological factor, marked by pain and changes in defecation habits. Recently, it is believed that dysbiosis, characterized by an imbalance in the gut microbiota composition, plays a role in the etiology of IBS.
- Microbiota awareness can generally be defined as the fundamental knowledge of the relationship between microbiota and disease, as well as awareness regarding prebiotic and probiotic information.
- The study has shown that higher microbiota awareness is associated with improved quality of life in patients with IBS. Therefore, efforts to increase microbiota awareness could be effective in reducing disease symptoms and improving the quality of life in IBS patients.

"Chronic Disease," and "Probiotics and Prebiotics." Each question is scored on a scale of 1 to 5, with a total possible score ranging from 20 to 100. Higher scores reflect greater microbiota awareness.¹⁷

Irritable Bowel Syndrome Quality of Life Scale

The IBS-QOL was developed by Patrick et al.¹⁸ in 1998 to evaluate the quality of life in patients with IBS. Its Turkish validity and reliability were established by Özgürsoy Uran et al.¹⁹ in 2016. The scale comprises 34 items divided into eight subdimensions: "Dysphoria," "Activities," "Body Image," "Health Worries," "Food Avoidance," "Social Reaction," "Sexual," and "Social Relationship." Each item is scored on a scale of 1 to 5, yielding a total score between 34 and 170. Higher scores indicate a lower quality of life.¹⁸

Statistical Analysis

Data analysis was conducted using SPSS software version 27.0 (IBM Corp., Armonk, NY, USA). Descriptive statistical methods, including frequency, percentage, mean, and standard deviation, were employed for data evaluation. The normality of data distribution was assessed using Q-Q plots, with skewness and kurtosis values between ± 3 considered indicative of a normal distribution. For normally distributed data, independent samples t-tests were used to compare two independent groups, while one-way ANOVA was utilized for comparisons among more than two independent groups. When significant differences were detected, the Bonferroni correction was applied to determine the source of the difference. Pearson correlation analysis was used to examine relationships between quantitative variables. A p-value of <math><0.05</math> was considered statistically significant. No artificial intelligence tools were utilized at any stage of the study.

RESULTS

The sociodemographic characteristics of the participants are summarized in Table 1. The mean age of participants (18-50 years) is 35.33 ± 10.69 years, with 63.4% being female and 36.6% male. Based on BMI classification, 3% of participants are underweight, 41.6% are of normal weight, 26.7% are overweight, and 28.7% are obese. Regarding marital status, 71.3% are married, and 28.7% are single. Employment status shows that 40.6% are unemployed, 41.6% work in the public or private sector, and 17.8% are students. Distribution by IBS subtype indicates that 57.4% have IBS-C, while 42.6% have IBS-D.

The comparison of MAS and its subdimension scores by sex, BMI classification, and IBS subtype is detailed in Table 2. No significant differences were observed in MAS and subdimension scores based

Table 1. Distribution of participants according to sociodemographic characteristics (n=101)

		n	%
Age (Years)		35.33±10.69	
Sex	Female	64	63.4
	Male	37	36.6
BMI Classification	Underweight	3	3.0
	Normal weight	42	41.6
	Overweight	27	26.7
	Obese	29	28.7
Marital Status	Married	72	71.3
	Single	29	28.7
Occupation	Unemployed	41	40.6
	Public/private sector worker	42	41.6
	Student	18	17.8
IBS Subtype	İBS-C	58	57.4
	İBS-D	43	42.6

Descriptive statistics are expressed as mean±standard deviation or frequency (n) and percentage (%).

on sex or IBS subtype ($P>0.05$). However, participants with normal BMI had significantly higher scores in the “Product Information” subdimension compared to those who were overweight ($P=0.043$). Additionally, obese participants scored significantly higher in the “Chronic Disease” subdimension compared to those who were underweight ($P=0.016$).

The comparison of IBS-QOL and its subdimension scores by sex, BMI classification, and IBS subtype is summarized in Table 3. Females scored significantly higher than males in the subdimensions of dysphoria ($P=0.026$), activities ($P=0.002$), body image ($P=0.003$), social reaction ($P=0.002$), sexual ($P=0.012$), and in total IBS-QOL scores ($P=0.006$). When analyzed by BMI, obese participants scored significantly higher in body image ($P=0.017$), sexual ($P=0.039$), and social relationship ($P=0.034$) subdimensions compared to those with normal weight. Additionally, their social reaction ($P=0.035$) and total IBS-QOL scores ($P=0.045$) were significantly higher compared

to those who were underweight. However, no significant differences were found in IBS-QOL or its subdimension scores based on IBS subtype ($P>0.05$).

The results of the correlation analysis between the total and subdimension scores of MAS and IBS-QOL are summarized in Table 4. A negative correlation was observed between the “General Information” subdimension and “Social Reaction” ($r=-0.205$, $P=0.040$). Positive correlations were found between the “Chronic Disease” subdimension and dysphoria ($r=0.266$, $P=0.007$), health worries ($r=0.212$, $P=0.033$), and total IBS-QOL score ($r=0.199$, $P=0.046$). Additionally, negative correlations were identified between the “Probiotics and Prebiotics” subdimension and the following IBS-QOL subdimensions: activities ($r=-0.263$, $P=0.008$), social reaction ($r=-0.238$, $P=0.017$), sexual ($r=-0.203$, $P=0.042$), and total IBS-QOL score ($r=-0.223$, $P=0.025$).

DISCUSSION

Targeting a healthy microbiota in IBS treatment and fostering high microbiota awareness may play a crucial role in the disease’s prognosis and management. This study aimed to evaluate the relationship between microbiota awareness and quality of life in patients with IBS.

When evaluating the MAS and its subdimension scores, no significant differences were observed based on sex or IBS subtype. However, participants with normal BMI had higher product information scores compared to those who were overweight, while obese participants scored higher in the chronic disease subdimension compared to those who were underweight (Table 2). Contrary to our findings, a study conducted among adults attending a nutrition consultancy center in Bursa reported that females had higher general information and total MAS scores compared to males.²⁰ Conversely, another study found that males scored higher on the MAS than females.²¹ These discrepancies likely result from variations in nutritional and health-related knowledge among different populations.

In Horzum’s study,²¹ unlike our results, no significant relationship was found between MAS scores and BMI. However, Kumral et al.²² report-

Table 2. Comparison of MAS and subdimensions scores of the participants according to sex, BMI classification and IBS subtype (n=101)

Variables	General Information		Product Information		Chronic Disease		Probiotic and Prebiotic		Total MAS Score		
	\bar{X}	SS	\bar{X}	SS	\bar{X}	SS	\bar{X}	SS	\bar{X}	SS	
Sex	Female	23.84	2.83	6.03	2.00	17.06	2.67	17.27	2.37	64.20	6.31
	Male	23.92	2.10	6.22	1.73	16.70	2.21	17.27	3.02	64.11	5.39
	Test value	-0.141**		-0.470**		0.694**		-0.009**		0.077**	
	P	0.888		0.640		0.489		0.993		0.939	
BMI Classification	Underweight (1)	24.33	3.51	7.33	1.53	13.67	1.53	18.00	2.65	63.33	5.13
	Normal weight (2)	23.98	3.04	6.60	2.12	16.40	2.85	17.88	2.60	64.86	7.27
	Overweight (3)	23.44	2.28	5.41	1.45	17.37	2.17	16.81	2.90	63.04	4.97
	Obese (4)	24.07	2.05	5.90	1.78	17.62	1.93	16.72	2.27	64.31	4.77
	Test value	0.353***		2.826***		3.590***		1.562***		0.528***	
	P	0.787		0.043*		0.016*		0.204		0.664	
IBS Subtype	İBS-C	23.66	2.47	6.09	1.88	16.79	2.41	17.34	2.48	63.88	5.86
	İBS-D	24.16	2.71	6.12	1.95	17.12	2.64	17.16	2.81	64.56	6.15
	Test value	-0.979**		-0.078**		-0.640**		0.344**		-0.564**	
	P	0.330		0.938		0.524		0.731		0.574	

* $P<0.05$, **Independent samples t test, ***One-way analysis of variance (ANOVA)

Table 4. Correlation analysis results between MAS and IBS-QOL and its subdimensions

Scales and Subdimensions	General Information		Product Information		Chronic Disease		Probiotic and Prebiotic		Total MAS Score	
	r	P	r	P	r	P	r	P	r	P
Dysphoria	-0.102	0.311	-0.064	0.528	0.266*	0.007*	-0.172	0.086	-0.028	0.781
Activities	-0.113	0.261	-0.037	0.712	0.056	0.579	-0.263*	0.008*	-0.152	0.128
Body Image	0.014	0.888	-0.152	0.129	0.194	0.052	-0.144	0.149	-0.024	0.810
Health Worries	0.003	0.977	-0.046	0.648	0.212*	0.033*	-0.160	0.110	0.005	0.957
Food Avoidance	-0.075	0.459	0.076	0.449	0.096	0.341	-0.116	0.247	-0.019	0.852
Social Reaction	-0.205*	0.040*	-0.098	0.330	0.115	0.251	-0.238*	0.017*	-0.175	0.079
Sexual	0.036	0.723	0.018	0.860	0.078	0.440	-0.203*	0.042*	-0.035	0.727
Social Relationship	-0.071	0.483	-0.068	0.496	0.192	0.054	-0.079	0.430	-0.006	0.949
Total IBS-QOL Score	-0.097	0.336	-0.066	0.510	0.199*	0.046*	-0.223*	0.025*	-0.077	0.443

*P<0.05

remains scarce. This pilot study underscores the need for more comprehensive research and public health initiatives aimed at increasing microbiota awareness. Such efforts could support not only the well-being of individuals with IBS but also contribute to the overall health of the population.

Ethics Committee Approval: Ethics committee approval was obtained from Ağrı İbrahim Çeçen University Scientific Research Ethics Committee (Approval Number: 295, Date:28.12.2023).

Informed Consent: Verbal and written informed consent was obtained from participants.

Peer-review: Externally peer-reviewed.

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