



ORIGINAL ARTICLE

Quality of life, perceived stress and nutrition of patients with irritable bowel syndrome: A descriptive study

Zehra Margot Çelik ^{1*},  Şule Aktaç ¹,  Güleren Sabuncular ¹,  Tuğçe Dirican ²,  Aleyna Habibe Demir ² ¹ Marmara University, Faculty of Health Sciences, Department of Nutrition and Dietetics Maltepe, İstanbul. zcelik@marmara.edu.tr / sule.aktac@marmara.edu.tr / gulerenserin@gmail.com² Graduate Student – Dietitian Maltepe, İstanbul. Email: tugce.diricann@gmail.com / aleynaademirr98@gmail.com

Abstract

Background: Irritable Bowel Syndrome (IBS) is a chronic and common functional bowel disorder that currently has no definite treatment. Depending on the type and severity of the individual's symptoms, medication, diet, and/or lifestyle changes are recommended. **Aims:** This study aimed to determine the relationship between the quality of life, perceived stress levels, and nutrition of individuals diagnosed with IBS. **Subjects and Methods:** Between March 2020 and March 2021, 340 patients with IBS volunteered for this study. The demographic information questionnaire, Irritable Bowel Syndrome Quality of Life (IBS-QOL) scale, Perceived Stress Scale-14 (PSS-14), and Food Frequency Questionnaire were applied via an online form. **Results:** From the 340 patients, 230 were eligible. Out of them, 27% followed a special diet for IBS. When the IBS-QOL scores of men were compared according to their educational status, the scores of those with a high school or higher education level (109.7±32.8) were found to be higher than those with a lower education level than high school (95.4±17.5) (p=0.008), while the educational status of women did not affect the IBS-QOL scores (p>0.05). The mean IBS-QOL score of men was 44.8 ± 20.1 and lower than women (50.9±21.7) (p=0.030). The mean IBS-QOL score of women following an IBS-specific diet was 57.6 ± 22.6 and higher than women who did not follow an IBS-specific diet (48.2±20.9) (p=0.023). The IBS-QOL scores of women with gluten or lactose intolerance were lower than women without any intolerances (p=0.004). The mean IBS-QOL score for women with lactose intolerance was higher than those with gluten intolerance (p=0.004). When the IBS-QOL scores were evaluated according to the frequency of food consumption, no significant differences were found in the food groups (p>0.05). In this study, no significant correlation was found between IBS-QOL scores and PSS-14 scores (p>0.05). **Conclusions:** The prediction equations developed for healthy populations are not accurate enough to determine the energy requirements in SCD.

Article information

***Corresponding author:** Zehra Margot Çelik, Marmara University, Faculty of Health Sciences, Department of Nutrition and Dietetics Marmara University Faculty of Health Sciences Başbüyük Health Campus, No: 3 34854 Başbüyük/Maltepe, İstanbul. Turkey. Tel: +90 216 777 5726, Email: zcelik@marmara.edu.tr

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1 Introduction

Irritable bowel syndrome (IBS) is a functional bowel disease that is indicated by abdominal pain, bloating, dyspeptic complaints (gas, bloating), and changes in bowel movements ¹. According to a meta-analysis on the prevalence of IBS, it is seen in an average of 11.2% of the world's population but is reported to differ between countries and regions. It has been shown that IBS is more frequently seen in women ². In a study conducted in Turkey ³, in which 7,520 participants from 32 cities were included, the prevalence of IBS was found to be 33.5%. Currently, there is no definitive treatment for IBS. However, depending on the type and severity of the individual's symptoms, medication, diet, and/or lifestyle changes are recommended ⁴. Food intolerance, which is frequently encountered in individuals with IBS, is recognized as one of the important causes of gastrointestinal symptoms. In

previous studies, it was shown that the symptoms usually occur after food intake and this situation is affected by the food preferences of the individuals ⁵⁻⁹. The association of symptoms being experienced with food intake has led to a prevailing focus on nutrition in the treatment of IBS ¹⁰. It has been reported that, hot spices, alcoholic beverages, caffeine, and foods rich in carbohydrates and fats increase symptoms ^{6, 9, 11}. One of the most up-to-date and common methods of nutritional therapy to improve symptoms of patients with IBS is the low fermentable oligosaccharides, disaccharides, monosaccharides, and polyols (FODMAPs) diet, which restricts short-chain carbohydrates, which are poorly absorbed and undergo rapid fermentation in the colon ¹². The low-FODMAPs diet is based on the reduction of fermented oligosaccharides (fructans and galacto-oligosaccharide, as in wheat and rye products, legumes, nuts, artichokes, onion, garlic etc.), disaccharides (products containing lactose such as

milk, yogurt etc.), monosaccharides (fructose, a single sugar found in honey and some fruits including apples, pears, watermelon, and vegetables including sugar snap peas etc.), and polyols (mannitol and sorbitol, as found in apples, pears, peach, cauliflower, mushrooms etc.)¹³.

Gastrointestinal symptoms associated with increased stress levels and intolerance to many foods not only lead individuals to change their eating habits and food preferences but also cause them to retreat from social environments and experience difficulties in their daily lives. As a result of all these factors, although IBS is not a life-threatening disease, the quality of life of individuals is seriously affected^{5,11,14}. In the study of Van Lanen *et al.*, it was determined that a low-FODMAP diet reduced IBS symptoms and improved quality of life¹⁵. A relationship was found between dietary zinc intake and body image and psychological health in patients in another study¹⁶. In the study of Melchior *et al.*, a significant relationship was found between low quality of life and severe food avoidance and restriction¹⁷.

This study was aimed to determine the relationship between the quality of life, perceived stress levels, and nutrition of individuals diagnosed with IBS.

2 Subjects and Methods

2.1 Study plan and population

The study was carried out with volunteers aged between 18 and 65, who had been diagnosed with IBS by a doctor were invited to the study via online announcements. The study was carried out between March 2020 and March 2021. This study was approved by the Non-Invasive Clinical Studies Ethics Committee of the Faculty of Health Sciences of Marmara University (Ethics committee number: 121; Date: 14.11.2019) and the research was conducted following the principles stated in the Helsinki Declaration. Before implementing the study, information about the study was provided to the patients and written consent was obtained by the researchers.

2.2 Data collection and evaluation

The demographic information questionnaire designed by the researchers consists of 40 questions in total; 21 questions are about the patient's demographic information and general health status, with 19 questions being about their nutritional habits. All questionnaires were administered to the patients via an online form.

The Irritable Bowel Syndrome Quality of Life (IBS-QOL) scale, developed by Patrick *et al.*¹⁸, was used to determine how IBS affected the quality of life of the participants. The Turkish validity and reliability study of IBS-QOL was carried out by Uran *et al.*¹⁹. This Likert-type scale consists of 34 items and 8 sub-dimensions. The sub-dimensions are; dysphoria, interference with activity, body image, health worry, food avoidance, social reaction, sexual issues, and relations. All items of the scale were reversed during the evaluation phase. The raw scores obtained were evaluated by converting them over 100 points using the formula (Converted score = scale raw score - number of items /

maximum score that can be obtained - min score that can be obtained X 100). Sub-dimension and total scores of the IBS-QOL scale range from 0-100. Higher scale scores indicate that individuals have a higher health-related quality of life²⁰.

The Perceived Stress Scale-14 (PSS-14) long-form was used to determine the stress status of the participants due to IBS and its symptoms. The scale, which was developed by Cohen *et al.*²¹, consists of a total of 14 items and was designed to measure how stressful situations in life are perceived. Participants evaluated each item on a 5-point Likert-type scale ranging from "Never (0)" to "Very often (4)". Seven of the items with positive expressions were scored in reverse²². Its Turkish validity and reliability were performed by Eskin *et al.*²³, in 2013, and PSS-14 scores range from 0 to 56. A high score indicates an increased perception of stress.

A food frequency questionnaire consisting of 33 items was used to determine the consumption frequency of food and/or food groups by participants. While preparing the food frequency questionnaire, publications in the literature were used^{23,24}. Within the scope of a pilot study, the food frequency questionnaire was administered to 15 individuals who represented the target group.

The height and weight values were self-reported, and the Body Mass Index (BMI) was calculated for each patient, according to the World Health Organization classification²⁵. Patients were divided into four groups; underweight if BMI was <18.50 kg/m², normal if BMI was 18.50 - 24.99 kg/m², overweight if BMI was >25.00 kg/m², obese if BMI was >30.00 kg/m².

2.3 Statistical analysis

The analysis of the data was performed using the Statistical Package for the Social Sciences (SPSS), version 16.0. Numbers and percentages were included in descriptive statistics. The conformance of the data to the normal distribution was checked with the Kolmogorov-Smirnov test. The student's t-test was used to evaluate the differences between the means of two groups, and the One-Way ANOVA test was used to compare more than two groups. The Tukey test was used in the post-hoc analysis. A p-value of 0.05 was accepted for statistical significance at the 95% confidence interval in all analyses.

3 Results

As shown in Figure 1, among 340 eligible volunteers with IBS, 110 did not meet inclusion criteria. A total of 230 IBS patients participated in this study.

Two hundred and thirty participants were included in the study, 43% of whom were women. Slightly more than half (55.5%) of the study population were university graduates. According to BMI values, 44.3% of the participants were in the normal group and 37% were overweight (Table 1). The mean age of the individuals was 36.5 ± 9.4 years, and the mean BMI was 23.9 ± 4.9 kg/m² in women and 24.9 ± 3.9 kg/m² in men (not shown in table).

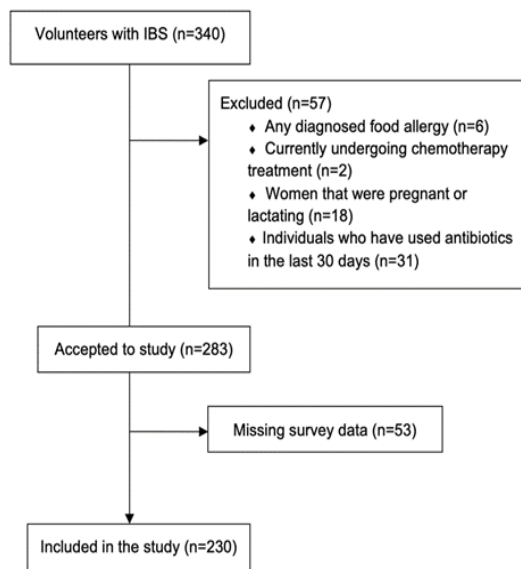


Figure 1: Volunteers with IBS, excluded and missing survey data between March 2020 and March 2021 flow chart

Table 1: Sociodemographic characteristics of the study population

| Sociodemographic characteristics | Male n (%) | Female n (%) | Total n (%) |
|----------------------------------|------------|--------------|-------------|
| Gender | 99 (43.0) | 131 (57.0) | 230 (100.0) |
| Education status | | | |
| Less than high school | 11 (11.1) | 10 (7.6) | 21 (9.1) |
| High school or higher | 88 (88.9) | 121 (92.4) | 209 (90.9) |
| BMI classification | | | |
| Underweight | 8 (8.1) | 15 (11.5) | 23 (10.0) |
| Normal | 32 (32.3) | 70 (53.4) | 102 (44.3) |
| Overweight | 53 (53.5) | 32 (24.4) | 85 (37.0) |
| Obese | 6 (6.1) | 14 (10.7) | 20 (8.7) |

BMI: Body mass index.

As summarized in Table 2, 53.3% of the participants had chronic diseases other than IBS such as dyslipidemia, hypertension, hypothyroidism, fibromyalgia, and/or asthma. It was stated that 27% of the participants followed a special diet for IBS, and their special diet consisted of FODMAP, gluten-free, lactose-free, elimination or Mediterranean diets.

It was reported that 40.4% of the participants had complaints that were severe enough to wake them up at night, and these complaints were bloating, gas, pain, and diarrhea. The PSS-14 score average was 31.2 ± 9.1 ; the mean scores for men were 29.6 ± 7.9 and 32.4 ± 9.8 for women (not shown in table).

The comparison of some characteristics according to IBS-QOL scores is shown in Table 3. The mean IBS-QOL score for all participants was 48.3 ± 21.2 , and the mean IBS-QOL score for men (44.8 ± 20.2) was found to be lower than that for women (50.9 ± 21.7) ($p = 0.030$). When the IBS-QOL scores of men were compared according to their educational status, the scores of those with a high school or higher education level (109.7 ± 32.8) were found to be higher than those with a lower education level than high school (95.4 ± 17.5) ($p = 0.008$), while the educational status of women did not affect the IBS-QOL scores ($p > 0.05$). While the difference between the IBS-QOL mean scores of those who followed and did not follow an IBS-specific diet in men was not significant ($p > 0.05$); in women, the mean score of women following an IBS-specific diet (57.6 ± 22.6) was higher than those who didn't (48.2 ± 20.9) ($p = 0.023$). When evaluated according to lactose/gluten sensitivity, there was no significant difference between the IBS-QOL mean scores ($p = 0.123$). While the difference in the mean scores of IBS-QOL according to intolerance was not statistically significant in men ($p > 0.05$), in women it was found to be significant ($p = 0.004$). No significant correlation was found between IBS-QOL score and age ($r = 0.129$; $p = 0.050$), BMI ($r = 0.021$; $p = 0.747$), and PSS-14 scores ($r = -0.445$; $p = 0.413$) (not presented in table).

Table 2: Disease-related characteristics of the study population

| Sociodemographic characteristics | Male n (%) | Female n (%) | Total n (%) |
|---|------------|--------------|-------------|
| Participants with chronic diseases | 44 (44.4) | 79 (60.3) | 123 (53.5) |
| Participants following an IBS-specific diet | 24 (24.2) | 38 (29.0) | 62 (27.0) |
| Participants that have sleep-arousing complaints | 35 (35.4) | 58 (44.3) | 93 (40.4) |
| The state of having an intolerance | | | |
| Lactose intolerance | 18 (18.2) | 40 (30.5) | 58 (25.2) |
| Gluten intolerance | 8 (8.1) | 13 (9.9) | 21 (9.1) |
| Both | 20 (20.2) | 40 (30.5) | 60 (26.1) |
| None | 53 (53.5) | 38 (29.1) | 91 (39.6) |

IBS: Irritable bowel syndrome.

Table 3: Comparison of some characteristics according to IBS-QOL score

| | Male | | Female | | Total | |
|-----------------------------|--------------|--------------|--------------------------|--------------|--------------|--------------|
| | (Mean ± SD) | <i>p</i> | (Mean ± SD) | <i>p</i> | (Mean ± SD) | <i>p</i> |
| Gender | 44.8 ± 20.1 | - | 50.9 ± 21.7 | - | - | 0.030 |
| Education status | | | | | | |
| Less than high school | 95.4 ± 20.1 | | 77.3 ± 23.7 | | 86.8 ± 22.2 | |
| High school or higher | 109.7 ± 32.8 | 0.008 | 99.0 ± 28.9 | 0.304 | 103.5 ± 31.0 | 0.056 |
| IBS-specific dieting | | | | | | |
| Yes | 41.8 ± 19.9 | | 57.6 ± 22.6 | | 22.8 ± 2.9 | |
| No | 45.8 ± 20.3 | 0.405 | 48.2 ± 20.9 | 0.023 | 20.6 ± 1.6 | 0.164 |
| Intolerance | | | | | | |
| Lactose intolerance | 45.7 ± 20.8 | | 45.0 ± 22.0 ^a | | 45.2 ± 21.4 | |
| Gluten intolerance | 45.6 ± 20.3 | 0.639 | 38.9 ± 24.4 ^b | 0.004 | 41.4 ± 22.6 | 0.123 |

IBS-QOL: Irritable bowel syndrome - quality of life; Independent Sample t-test

The averages of IBS-QOL scores according to the food consumption frequency were given in Table 4. When the IBS-QOL scores were evaluated according to the frequency of food consumption, no significant differences were found in the food groups ($p > 0.05$).

The highest IBS-QOL score was found in those who consumed raw vegetables once a month (63.9 ± 21.4). Those who consumed starchy vegetables and legumes twice a month had IBS-QOL scores below 40 (38.0 ± 19.8 , 39.6 ± 19.6 ; respectively).

Table 4: Evaluation of IBS-QOL score according to food frequency consumption

| | IBS-QOL score (Mean ± SD) | | | | | | <i>p</i> |
|---------------------------|---------------------------|------------------|------------------|---------------|--------------|-------------|----------|
| | Everyday | 3-4 times a week | 1-2 times a week | Twice a month | Once a month | Never | |
| Milk | 47.1 ± 24.2 | 45.7 ± 17.9 | 47.0 ± 19.1 | 43.8 ± 25.9 | 49.6 ± 23.9 | 49.2 ± 21.2 | 0.430 |
| Yoghurt | 50.8 ± 19.6 | 45.3 ± 22.9 | 46.5 ± 21.2 | 41.2 ± 20.2 | 42.2 ± 23.2 | 52.2 ± 21.0 | 0.373 |
| Probiotic yoghurt | 45.4 ± 21.3 | 50.2 ± 23.8 | 47.6 ± 20.7 | 47.5 ± 20.9 | 45.0 ± 19.9 | 48.8 ± 21.2 | 0.950 |
| Cheese | 47.2 ± 21.1 | 45.9 ± 21.7 | 50.4 ± 20.6 | 50.4 ± 23.6 | 53.4 ± 10.2 | 50.9 ± 22.1 | 0.842 |
| Legumes | 56.3 ± 18.2 | 47.3 ± 21.0 | 48.6 ± 20.6 | 39.6 ± 19.6 | 44.5 ± 23.9 | 49.1 ± 21.9 | 0.120 |
| Nuts | 48.8 ± 20.8 | 47.0 ± 21.2 | 48.3 ± 20.8 | 52.3 ± 24.1 | 40.6 ± 20.4 | 49.0 ± 21.3 | 0.749 |
| Raw vegetables | 48.0 ± 19.7 | 47.5 ± 23.2 | 52.3 ± 20.1 | 50.5 ± 21.6 | 63.9 ± 21.4 | 45.8 ± 22.0 | 0.633 |
| Starchy vegetables | 49.7 ± 20.6 | 49.9 ± 21.9 | 49.1 ± 20.5 | 38.0 ± 19.8 | 47.1 ± 27.9 | 50.0 ± 20.1 | 0.403 |
| Onion-garlic | 50.0 ± 20.0 | 50.7 ± 21.4 | 44.3 ± 19.8 | 41.6 ± 24.9 | 51.4 ± 30.3 | 50.7 ± 24.9 | 0.533 |
| Fruits | 49.3 ± 21.6 | 46.5 ± 22.1 | 49.4 ± 20.8 | 45.8 ± 23.0 | 42.9 ± 12.7 | 48.3 ± 20.5 | 0.951 |
| Simit*-Poğaç** | 44.7 ± 22.3 | 50.5 ± 21.3 | 46.2 ± 23.6 | 46.9 ± 20.5 | 45.8 ± 16.5 | 49.2 ± 21.4 | 0.882 |
| Pickle | 49.2 ± 21.3 | 51.1 ± 19.6 | 49.8 ± 21.2 | 44.0 ± 25.0 | 47.3 ± 14.1 | 45.7 ± 22.6 | 0.701 |
| Egg | 51.3 ± 20.5 | 43.0 ± 21.3 | 42.9 ± 20.9 | 45.8 ± 23.8 | 47.4 ± 26.0 | 49.1 ± 22.7 | 0.191 |

One Way Anova

*Simit: A kind of dough bread dipped in molasses and covered with sesame.

**Poğaç: An oily pastry that usually contains cheese, potatoes, ground meat or olives.

4 Discussion

In this study, it was determined that 27% of the participants followed a special diet for IBS to minimize their symptoms, and 40.4% had complaints that aroused them from sleep. It has been determined that women's IBS-specific quality of life is higher than that of men and that following an IBS-specific diet and not being lactose or gluten intolerant increases the quality of life for women.

The effect of IBS on quality of life has been examined in various studies; gender ²⁶, age ²⁷, anxiety level ^{28,29}, depression level ²⁶, BMI ^{30,31} have all been evaluated. In contrast to our study, Tang *et al.* ³² found that women with IBS had lower IBS-QOL scores (74.09 ± 8.06) than men (80.40 ± 6.62). Like our study, Jamali *et al.*, found that age was not related to the quality of life of individuals with IBS ²⁷. In the study conducted by Tang *et al.* ³², a difference was found between women with IBS and age groups, and it is thought that this difference may be related to menopause. In two different meta-analyses related to IBS, it was determined that the anxiety levels in individuals with IBS were higher than in healthy controls ^{28,29}. In another study, it was found that IBS affects the level of anxiety and depression in individuals ²⁶. Unlike other studies, in our study, no significant correlation was found between IBS-QOL scores and PSS-14 scores. Being overweight is a common phenomenon in patients with IBS ³⁰. The association between QOL and symptom severity followed a negative dose-response pattern. According to the study conducted by Dong *et al.*, 30.3% of patients with IBS were overweight or obese ³⁰; we found that in our study group 45.7% of patients with IBS were overweight or obese, a higher level than that found by Dong *et al.* In particular, the frequency of being overweight or obese in men (59.6%) was found to be higher than in women. In a study conducted with 35 participants with IBS, no relationship was found between BMI and IBS-QOL scores ³¹. Like Weaver *et al.* ³¹, in this study, no significant correlation was found between BMI and IBS-QOL scores.

Different dietary approaches in the treatment of IBS help to reduce symptoms and increase the quality of life ³³. According to a study conducted by Østgaard *et al.* ²⁴, it was determined that diet consultation helped IBS patients to avoid food rich in FODMAPs and increased IBS-QOL scores. In a study examining the effect of a low-FODMAP diet, a gluten-free diet, and a well-balanced diet on symptoms and quality of life in individuals with IBS, the IBS-QOL scores after dietary intervention increased on the low-FODMAP diet, balanced diet, and gluten-free diet, respectively, but there was no significant difference between diets ³⁴. Similarly, we observed that the quality of life in women who followed a specific diet for IBS was higher.

Food intolerance is frequently encountered in IBS patients and can increase the severity of their symptoms ¹². A meta-analysis indicates that lactose intolerance is more common in individuals with IBS ³⁵. Cozma-Petruț *et al.* ³³ found that the available evidence regarding the preference of a gluten-free diet in IBS patients is contradictory, however, McKenzie *et al.* ³⁶ found that gluten restriction for 4 to 8 weeks improves IBS symptoms and reduces intestinal permeability with daily bowel movements. In another meta-analysis, it is stated that there is insufficient evidence to recommend a gluten-free diet to reduce the symptoms of IBS ³⁷. In the study of Paduano *et al.* ³⁴, the gluten-free diet has been shown to increase the quality-of-life scores less than a low-FODMAP diet and balanced diet. In the studies carried out by Cozma-Petruț *et al.* ³³ and McKenzie *et al.* ³⁶, it was seen that IBS symptoms did not improve to a great extent and quality of life was not seriously affected by a decrease in the consumption of milk and dairy products. A low lactose diet has been recommended in patients with IBS for whom milk sensitivity is suspected and where lactose hydrogen breath testing is not available or appropriate ^{33,36}. Similarly, in this study, it was found that the frequency of consumption of milk and dairy products did not affect the quality of life due to IBS and that the quality of life for women with gluten and lactose intolerance was lower than those with no intolerance.

The frequency of consumption of foods and beverages has also been shown to affect IBS symptoms and accordingly the IBS-QOL scores of patients in studies ^{38,39,40}. In a recent study, it was determined that individuals who drink coffee once a week or more have higher IBS rates than those who do not drink coffee at all ⁴⁰. In 2015, Guo *et al.* ⁴¹ found a significant relationship between IBS symptoms and legume consumption. Consumption of certain types of food has been reported to increase symptoms, decrease the quality of life of patients, and should be avoided for patients with IBS ⁸. Unlike previous findings, in this study, it was determined that the frequency of food consumption did not make a difference in terms of the IBS-QOL score.

Our study has several limitations, including the small sample size, the collection of data through an online form, and using a non-validated food frequency questionnaire. These factors may hinder generalizations from our findings

5 Conclusions

Our study shows that IBS is related to impaired quality of life of patients; following an IBS-specific diet therapy and food intolerances have significant effects on the quality of life of patients with IBS, especially for women. For IBS patients, nutrition-related factors and IBS-QOL scores should be evaluated for better health outcomes.

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Author Contribution: Z.M.Ç. conceived and designed the study, Z.M.Ç, T.D and A.H.D undertook the literature research. All authors participated in the experiment and data acquisition. Z.M.Ç and G.S. performed the data analysis. Z.M.Ç, Ş.A. and G.S carried out the statistical analysis, prepared, reviewed and drafted the manuscript. All authors approved the final version before submission. All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest: The authors declare no conflicts of interest regarding the publication of this paper.

References

- [1] Olden, K. W. (2002). Diagnosis of irritable bowel syndrome. *Gastroenterology*, 122(6), 1701-1714. <https://doi.org/10.1053/gast.2002.33741>
- [2] Müller-Lissner, S.A., Bollani, S., Brummer, R.J., Coremans, G., Dapoigny, M., Marshall, J.K., Muris, J.W., Oberndorff-Klein, W.A., Pace, F., Rodrigo, L., Stockbrügger, R., & Vatn, M.H. (2001). Epidemiological aspects of irritable bowel syndrome in Europe and North America. *Digestion*, 64, 200–204. <https://doi.org/10.1159/000048862>
- [3] Özden, A., Köksal, A. Ş., Oğuz D., Çiçek, B., Yılmaz, U., Dağlı, Ü., Parlak E., Bahar K., Şahin B., Özler J., & Özden, A. (2006). The frequency of irritable bowel syndrome in primary care centers of Turkey. *The Turkish Journal of Academic Gastroenterology*, 5(1), 4-15.
- [4] Enck, P., Aziz, Q., Barbara, G., Farmer, AD., Fukudo, S., Mayer, EA., Niesler, B., Quigley, E.M., Rajilić-Stojanović, M., Schemann, M., Schwiller-Kiuntke, J., Simren, M., Zipfel, S., & Spiller, RC. (2016). Irritable bowel syndrome. *Nature Reviews Disease Primers*, 24(2), 16014. <https://doi.org/10.1038/nrdp.2016.14>
- [5] Kopczyńska, M., Mokros, Ł., Pietras, T., & Małecka-Panas, E. (2018). Quality of life and depression in patients with irritable bowel syndrome. *Gastroenterology Review*, 13(2), 102-108. <https://doi.org/10.5114/pg.2018.75819>
- [6] Lee, H.J., Kim, H.J., Kang, E.H., Jung, K.W., Myung, S.J., Min, Y.W., Choi, C.H., Ryu, H.S., Choi, J.K., Kwon, J.G., Hong, K.S. & Park, K.S. (2019). Self-reported Food Intolerance in Korean Patients with Irritable Bowel Syndrome. *Journal of Neurogastroenterology and Motility*, 25(2), 222–232. <https://doi.org/10.5056/jnm18125>
- [7] Hayes, P., Corish, C., O'Mahony, E. & Quigley, E.M. (2014). A dietary survey of patients with irritable bowel syndrome. *Journal of Human Nutrition and Dietetics*, 27 Suppl 2, 36–47. <https://doi.org/10.1111/jhn.12114>
- [8] Monsbakken, K.W., Vandvik, P.O. & Farup, P.G. (2006). Perceived food intolerance in subjects with irritable bowel syndrome-- etiology, prevalence and consequences. *European Journal of Clinical Nutrition*, 60(5), 667–672. <https://doi.org/10.1038/sj.ejcn.1602367>
- [9] Simrén, M., Månsson, A., Langkilde, A. M., Svedlund, J., Abrahamsson, H., Bengtsson, U., & Björnsson, E. S. (2001). Food-related gastrointestinal symptoms in the irritable bowel syndrome. *Digestion*, 63(2), 108–115. <https://doi.org/10.1159/000051878>
- [10] Lenhart, A., Ferch, C., Shaw, M. & Chey, W.D. (2018). Use of Dietary Management in Irritable Bowel Syndrome: Results of a Survey of Over 1500 United States Gastroenterologists. *Journal of Neurogastroenterology and Motility*, 24(3), 437–451. <https://doi.org/10.5056/jnm17116>
- [11] Böhn, L., Störsrud, S., Törnblom, H., Bengtsson, U. & Simrén, M. (2013). Self-reported food-related gastrointestinal symptoms in IBS are common and associated with more severe symptoms and reduced quality of life. *The American Journal of Gastroenterology*, 108(5), 634–641. <https://doi.org/10.1038/ajg.2013.105>
- [12] Altobelli, E., Del Negro, V., Angeletti, P. M. & Latella, G. (2017). Low-FODMAP diet improves irritable bowel syndrome symptoms: a meta-analysis. *Nutrients*, 9(9), 940. <https://doi.org/10.3390/nu9090940>
- [13] Van Lanen, A.S., de Bree, A., & Greyling, A. (2021). Efficacy of a low-FODMAP diet in adult irritable bowel syndrome: a systematic review and meta-analysis. *European Journal of Nutrition*, 60(6), 3505–3522. <https://doi.org/10.1007/s00394-020-02473-0>
- [14] Frändemark, Å., Törnblom, H., Jakobsson, S. & Simrén, M. (2018). Work Productivity and Activity Impairment in Irritable Bowel Syndrome (IBS): A Multifaceted Problem. *The American Journal of Gastroenterology*, 113(10), 1540–1549. <https://doi.org/10.1038/s41395-018-0262-x>
- [15] Van Lanen, AS., de Bree, A. & Greyling, A. (2021). Efficacy of a low-FODMAP diet in adult irritable bowel syndrome: a systematic review and meta-analysis. *European Journal of Nutrition*, 60(6), 3505–3522. <https://doi.org/10.1007/s00394-020-02473-0>
- [16] Rezazadegan, M., Shahdadian, F., Soheilipour, M., Tarrahi, M.J., & Amani, R. (2022). Zinc nutritional status, mood states and quality of life in diarrhea-predominant irritable bowel syndrome: a case-control study. *Scientific Reports*, 12(1), 1-8.
- [17] Melchior, C., Algera, J., Colomier, E., Törnblom, H., Simrén, M., & Störsrud, S. (2021). Food Avoidance and Restriction in Irritable Bowel Syndrome: Relevance for Symptoms, Quality of Life and Nutrient Intake. *Clinical Gastroenterology and Hepatology*, 20(6), 1290-1298. <https://doi.org/10.1016/j.cgh.2021.07.004>

- [18] Patrick, D., Drossman, D., Frederick, I., Dicesare, J. & Puder, K. (1998). Quality Of Life in Persons With Irritable Bowel Syndrome: Development and Validation of a New Measure. *Digestive Diseases and Sciences*, Vol. 43, No. 2 (February 1998), pp. 400- 411.
- [19] Uran, B., Karadakovan, A., Vardar, R., & Bor, S. (2016). Psychometric properties of the Irritable Bowel Syndrome Quality of Life Scale in Turkey. *Journal of Hepatology and Gastrointestinal Disorders*, 2(3), 1-7. <https://doi.org/10.4172/2475-3181.1000137>
- [20] Kaya-Güven, G., & Kiyak, E. (2020). Assessment of Quality of Life in Irritable Bowel Syndrome Patients. *Archives of Health Science and Research*, 7(2), 146-154. <https://doi.org/10.5152/ArcHealthSciRes.2020.582169>
- [21] Cohen, S., Kamarck, T. & Mermelstein, S. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior*, 24, 385-396. <https://doi.org/10.2307/2136404>
- [22] Eskin, M., Harlak, H., Demirkıran, F. & Dereboy, Ç. (2013). The Adaptation of the Perceived Stress Scale Into Turkish: A Reliability and Validity Analysis. *New Symposium Journal*, 51(3), 132-140.
- [23] Mazzawi, T., Hausken, T., Gundersen, D. & El-Salhy, M. (2013). Effects of dietary guidance on the symptoms, quality of life and habitual dietary intake of patients with irritable bowel syndrome. *Molecular Medicine Reports*, 8(3), 845-852. <https://doi.org/10.3892/mmr.2013.1565>
- [24] Østgaard, H., Hausken, T., Gundersen, D., & El-Salhy, M. (2012). Diet and effects of diet management on quality of life and symptoms in patients with irritable bowel syndrome. *Molecular Medicine Reports*, 5(6), 1382-1390. <https://doi.org/10.3892/mmr.2012.843>
- [25] WHO. Body mass index classification. (2020). Available from: <http://www.euro.who.int/en/health-topics/disease-prevention/nutrition/a-healthy-lifestyle/body-mass-index-bmi>. [Last accessed on 2022 15th January].
- [26] Tang, Y.R., Yang, W.W., Liang, M.L., Xu, X.Y., Wang, M.F., & Lin, L. (2012). Age-related symptom and life quality changes in women with irritable bowel syndrome. *World Journal of Gastroenterology*, 18(48), 7175–7183. <https://doi.org/10.3748/wjg.v18.i48.7175>
- [27] Jamali, R., Jamali, A., Poorrahnama, M., Omidi, A., Jamali, B., Moslemi, N., Ansari, R., Dolatshahi, S. & Ebrahimi Daryani, N. (2012). Evaluation of health related quality of life in irritable bowel syndrome patients. *Health and Quality of Life Outcomes*, 10, 12. <https://doi.org/10.1186/1477-7525-10-12>
- [28] Lee, C., Doo, E., Choi, J.M., Jang, S. H., Ryu, H.S., Lee, J.Y., Oh, J.H., Park, J.H. & Kim, Y.S. Brain-Gut Axis Research Group of Korean Society of Neurogastroenterology and Motility (2017). The Increased Level of Depression and Anxiety in Irritable Bowel Syndrome Patients Compared with Healthy Controls: Systematic Review and Meta-analysis. *Journal of Neurogastroenterology and Motility*, 23(3), 349–362. <https://doi.org/10.5056/jnm16220>
- [29] Fond, G., Loundou, A., Hamdani, N., Boukouaci, W., Dargel, A., Oliveira, J., Roger, M., Tamouza, R., Leboyer, M. & Boyer, L. (2014). Anxiety and depression comorbidities in irritable bowel syndrome (IBS): a systematic review and meta-analysis. *European Archives of Psychiatry and Clinical Neuroscience*, 264(8), 651–660. <https://doi.org/10.1007/s00406-014-0502-z>
- [30] Dong, Y., Berens, S., Eich, W., Schaefer, R., & Tesarz, J. (2018). Is body mass index associated with symptom severity and health-related quality of life in irritable bowel syndrome? A cross-sectional study. *BMJ Open*, 8(10), e019453. <https://doi.org/10.1136/bmjopen-2017-019453>
- [31] Weaver, K.R., Melkus, G.D., Fletcher, J., & Henderson, W.A. (2018). Perceived Stress, Its Physiological Correlates, and Quality of Life in Patients With Irritable Bowel Syndrome. *Biological Research for Nursing*, 20(3), 312–320. <https://doi.org/10.1177/1099800418756733>
- [32] Tang, Y.R., Yang, W.W., Wang, Y.L., & Lin, L. (2012). Sex differences in the symptoms and psychological factors that influence quality of life in patients with irritable bowel syndrome. *European Journal of Gastroenterology & Hepatology*, 24(6), 702-707. <https://doi.org/10.1097/MEG.0b013e328351b2c2>
- [33] Cozma-Petruș, A., Loghin, F., Miere, D. & Dumitrașcu, D.L. (2017). Diet in irritable bowel syndrome: What to recommend, not what to forbid to patients. *World Journal of Gastroenterology*, 23(21), 3771. <https://doi.org/10.3748/wjg.v23.i21.3771>
- [34] Paduano, D., Cingolani, A., Tanda, E., & Usai, P. (2019). Effect of Three Diets (Low-FODMAP, Gluten-free and Balanced) on Irritable Bowel Syndrome Symptoms and Health-Related Quality of Life. *Nutrients*, 11(7), 1566. <https://doi.org/10.3390/nu11071566>
- [35] Varjú, P., Gede, N., Szakács, Z., Hegyi, P., Cazacu, I.M., Pécsi, D., Fábıán, A., Szepes, Z., Vincze, Á., Tenk, J., Balaskó, M., Rumbus, Z., Garami, A., Csopor, D., & Czimmer, J. (2018). Lactose intolerance but not lactose maldigestion is more frequent in patients with irritable bowel syndrome than in healthy controls: A meta-analysis. *Neurogastroenterol and Motility*, 31(5), e13527. <https://doi.org/10.1111/nmo.13527>
- [36] McKenzie, Y.A., Bowyer, R.K., Leach, H., Gulia, P., Horobin, J., O’Sullivan, N.A., Pettitt, C., Reeves, L.B., Seamark, L., Williams, M., Thompson, J. & Lomer, M.C.E. (2016). British Dietetic Association systematic review and evidence-based practice guidelines for the dietary management of irritable bowel syndrome in adults (2016 update). *Journal of Human Nutrition and Dietetics*, <http://info:doi/10.1111/jhn.12385>

- [37] Dionne, J., Ford, A.C., Yuan, Y., Chey, W.D., Lacy, B.E., Saito, Y.A., Quigley, E.M.M., & Moayyedi, P.A. (2018). Systematic Review and Meta-Analysis Evaluating the Efficacy of a Gluten-Free Diet and a Low FODMAPs Diet in Treating Symptoms of Irritable Bowel Syndrome. *The American Journal of Gastroenterology*, 113(9), 1290-1300. <https://doi.org/10.1038/s41395-018-0195-4>
- [38] Marsh, A., Eslick, E.M., & Eslick, G.D. (2015). Does a diet low in FODMAPs reduce symptoms associated with functional gastrointestinal disorders? A comprehensive systematic review and meta-analysis. *European Journal of Nutrition*, 55(3), 897-906. <https://doi.org/10.1007/s00394-015-0922-1>
- [39] Eswaran, S., Chey, W.D., Jackson, K., Pillai, S., Chey, S.W., & Han-Markey, T. (2017). A Diet Low in Fermentable Oligo-, Di-, and Monosaccharides and Polyols Improves Quality of Life and Reduces Activity Impairment in Patients With Irritable Bowel Syndrome and Diarrhea. *Clinical Gastroenterology and Hepatology*, 15(12), 1890-1899.e3. <https://doi.org/10.1016/j.cgh.2017.06.044>
- [40] Koochakpoor, G., Salari-Moghaddam, A., Keshteli, A.H., Esmailzadeh, A. & Adibi, P. (2021). Association of Coffee and Caffeine Intake with Irritable Bowel Syndrome in Adults. *Frontiers in Nutrition*, 8:632469. <https://doi.org/10.3389/fnut.2021.632469>
- [41] Guo, Y.B., Zhuang, K.M., Kuang, L., Zhan, Q., Wang, X.F., & Liu, S.D. (2015). Association between Diet and Lifestyle Habits and Irritable Bowel Syndrome: A Case-Control Study. *Gut and Liver*, 9(5). <https://doi.org/10.5009/gnl13437>

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