Selected dietary restrictions in patients with irritable bowel syndrome

Wybrane restrykcje dietetyczne u pacjentów z zespołem jelita drażliwego

Mariusz Jaworski

Warsaw School of Tourism and Hospitality Management

Wprowadzenie. Zespół jelita drażliwego (IBS) jest bardzo powszechnym zaburzeniem gastrycznym związanym z chroniczną biegunką lub zaparciami. Terapia IBS zależy od dominujących objawów chorobowych, takich jak: ból, zaparcia czy biegunka. Ważnym elementem terapii IBS jest terapia żywieniowa, która pomaga zredukować nasilenie objawów chorobowych IBS związanych z biegunką lub zaparciami.

Cel. Próba scharakteryzowania wybranych zachowań żywieniowych pacjentów z IBS.

Materiały i metody. Badanie zostało przeprowadzone w grupie 55 celowo wybranych respondentów (48 kobiet i 7 mężczyzn) w wieku 22-50 lat (26,8±7,25) ze zdiagnozowanym IBS. Głównym narzędziem badawczym był autorski kwestionariusz.

Wyniki. Najczęściej ograniczanymi przez pacjentów z IBS produktami spożywczymi były: mleko i przetwory mleczne (52%), dania smażone (62%) oraz produkty powodujące wzdęcia (np. groch, fasola, cebula) (66%). Byli także pacjenci, którzy ograniczali spożycie produktów zbożowych, warzyw, owoców, jajek, ryb, mięsa i wędlin z powodu lęku związanego z nasileniem objawów IBS.

Wnioski. Rezultaty badań sugerują, że pacjenci z IBS mogą mieć problem ze stosowaniem zbilansowanej dietą. W związku z tym, stosowanie poradnictwa dietetycznego powinno być promowane u tych pacjentów, które winno być jednym z ważnych elementów terapii medycznej w IBS.

Słowa kluczowe: *dieta, leczenie, produkty mleczne, zespół jelita drażliwego, poradnictwo dietetyczne*

Introduction. Irritable bowel syndrome (IBS) is the most common functional gastrointestinal disorder related to chronic diarrhea or constipation. The IBS therapy depends on the predominant clinical symptom such as pain, constipation or diarrhea. An important component of the IBS treatment is a nutrition therapy which helps reduce the severity of IBS symptoms associated with diarrhea or constipation.

Aim. An attempt to characterize the selected dietary behavior of patients with IBS.

Material & Method. The study was carried out in a group of 55 intentionally selected specific individuals (48 women and 7 men) aged between 22-50 years (26.8±7.25) diagnosed with IBS. The main research tool was an original questionnaire.

Results. The most commonly limited food products by IBS patients were milk and dairy products (52%), fried foods (62%), and products that may cause abdominal distension (e.g. peas, beans, broad beans, onions) (66%). There were some patients who decreased the consumption of cereal products, vegetables, fruit, eggs, fish, meat and sausages because of fear associated with an increase of IBS symptom.

Conclusion. The study results may suggest that the IBS patients could have problems with a balanced diet. Consequently, the use of dietary counseling should be promoted in these patients. Moreover, dietary counseling should be one of the most important part of medical treatment of IBS.

Key words: *diet, treatment, dairy products, Irritable Bowel Syndrome, Dietary counseling*

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Adres do korespondencji / Address for correspondence
dr n. o zdr. Mariusz Jaworski
Warsaw School of Tourism and Hospitality Management
ul. Stokłosy 3, 02-787 Warszawa
tel. 22 457 23 00, e-mail: jaworskimariusz1@gmail.com

Introduction

Irritable Bowel Syndrome (IBS) is the most common functional gastrointestinal disorder related to chronic diarrhea or constipation. In the case of this chronic disorder, the anatomic structure of the bowel is correct. There is no evidence of any functional disorders in this context [1, 2]. Accurate epidemiological data of IBS is not known, although it is estimated that it can affect up to 20% of the adult population [1]. In Poland, about 13% of adults suffer from IBS [2, 3]. In clinical practice, IBS is classified into the following four subtypes:

- IBS with constipation (IBS-C). Constipation can last from days to months, with interludes of diarrhea or normal bowel functioning. Stools are often hard and may be described as pellet shaped in at least 25% of the bowel movements, or Bristol Stool Form Scale 1-2.
- IBS with diarrhea (IBS-D) is characterized as a condition of at least 25% frequent loose stools of small and a moderate volume without abdominal comfort in at least 75% of stools or Bristol Stool Form Scale 6-7.

- Mixed IBS (IBS-M) is defined as hard or lumpy stool in at least 25% of the bowel movements and loose or mushy stools in at least 25% of the bowel movements using Bristol scale 1-2 for constipation and scale 6-7 for diarrhea.
- Unsubtyped IBS: insufficient abnormality of stool consistency to meet criteria for IBS-C, IBS-D, or IBS-M in the absence of antidiarrheals or laxatives [4].

Irritable Bowel Syndrome is diagnosed based on the International Classifications of Diseases (ICD). In this classification, IBS belongs to the other diseases of the intestines [5]. Nevertheless, the Rome IV criteria are often used in clinical practices. These criteria were developed in 2016. The Rome IV Diagnostic Criteria for Irritable Bowel Syndrome includes the symptom onset greater than 6 months prior to the diagnosis, with the above criteria fulfilled for the past 3 months. The most important Rome IV criteria is '*Recurrent abdominal pain, on average, at least 1 day/week in the last 3 months, associated with two or more of the following criteria: 1) related to defecation; 2) associated with a change in frequency of stool and 3) associated with a change in form (appearance) of stool*' [4].

It should be noted that Rome IV Diagnostic Criteria emphasizes that the best management for functional gastrointestinal (GI) disorders requires a biopsychosocial approach. This approach takes the following into consideration: 1. early life influences: genetics, culture, environment; 2. psychosocial factors: stress, personality, psychological state, coping, social support and 3. physiology: motility, sensation, immune function, microflora, food, diet [4].

The therapy depends on the predominant clinical symptom, such as pain, constipation or diarrhea. Nutrition therapy is an important component of the IBS treatment which helps reduce the severity of IBS symptoms associated with diarrhea or constipation. It should be emphasized that there are scientific reports which have clearly stressed that the use of proper nutrition therapy can help reduce the symptoms of IBS [6-8]. In this context, it is important to regulate the dietary intake of fiber and prebiotics [7, 8].

The effectiveness of different diets in nutrition therapy of IBS are currently analyzed in literature. For example, there is a review which describes the effectiveness of an Immunoglobulin G-Based elimination diet. This review showed that a diet excluding foods, which could increase IgG antibodies, caused a 10% reduction in IBS symptom severity scores. Food products which have a lot of IgG antibodies include: barley, corn rice, rye, wheat, milk, beef, chicken, pork. Moreover, in the same review, the authors showed a positive effect of a low fructose/fructan diet and a very-low-carbohydrate diet. What is interesting, the very-low-carbohydrate diet has a specific energy percent of calories. Fifty-one percent of calories are from fat, 45% are from proteins, and 4% are from carbohydrates. In a standard diet, fifty-five percent of calories are from carbohydrates. It was shown that this specific energy restriction could have a positive effect in the reduction of the severity of IBS symptoms. Food products rich in fructans include: wheat, artichokes, onions, asparagus, chicory, garlic and leek [7]. Nevertheless, these diets are not recommendations for IBS nutrition therapy. This review highlights the need for further research in this subject.

In the literature, it is noted that patients with IBS may try to limit the consumption of certain food products. It is associated with the fact that IBS patients think that the consumption of these food products may contribute to the severity of IBS symptoms. In this context, a high level of fear of the severity of disease symptoms plays a key role in this situation.

Aim

Therefore, the aim of the study was an attempt to characterize the selected dietary behavior of patients with IBS. The following were analyzed among the dietary behavior:

1. the frequency of 'fasting';
2. decreased consumption of some product groups such as: milk and dairy products, eggs, cereals and cereal products, vegetables, fruit, citrus fruit, meat and sausages, fish, fried foods, products that may cause abdominal distension (e.g. peas, beans, broad beans, onions). Groups of food products were selected based on the literature review.

In relation to the aim of the presented study, the following research question was formulated: '*How often are the following food products (e.g. milk and dairy products, eggs, cereals and cereal products, vegetables, fruit, citrus fruit, meat and sausages, fish, fried foods, products that may cause abdominal distension {e.g. peas, beans, broad beans, onions}) limited by patients with irritable bowel syndrome?*'.

Material and method

The study was carried out in a group of 55 intentionally selected specific individuals (48 women and 7 men) from 22 to 50 years old (26.78±7.25 years old) diagnosed with IBS. The intentional selection of specific individuals means that patients who met the inclusion criteria for the study population participated in study. The inclusion criteria included: 1. diagnosed IBS; 2. age of 18 years or older; 3. informed consent to participate in the study. All respondents gave their informed consent. The exclusion criteria included: 1. lack of diagnosed IBS; 2. age under 18 years; 3. no informed consent to participate in the study.

The study procedure included a cross-sectional study with one single measurement. It was carried out in April 2016 in one medical care facility. Patients were invited to participate in the survey. In this study, the Pencil and Paper Interview (PAPI) method was used. The interviewer proceeded with a question after question according to the questionnaire and the respondent answered. The interviewer recorded the answers to the questionnaire. The patients were asked for consent to respond to several questions concerning their disease. The following data was collected:

- duration of IBS by using following question: '*How long have you suffered from irritable bowel syndrome (in years)?*';
- information about the pharmacological treatment by using following question: '*Are you currently taking any medications? If so, please specify*';
- information about the severity of IBS symptoms by using following question: '*Could you describe the beginning of IBS symptoms?*'. In this context, the respondents could choose one of the following options: very mild, mild, moderate, rapid, very rapid;
- information about IBS subtypes by using the following question: '*What type of irritable bowel syndrome do you have?*'. Respondents could choose one of the following options: IBS with constipation (IBS-C), IBS with diarrhea (IBS-D), Mixed IBS (IBS-M).

The patients participating in the study were described in terms of the duration of the disease. This duration was defined as a period of time between the IBS diagnosis and the patients' participation in the presented study.

The research tool, which allowed to verify this aim of study, was an original questionnaire. The questions were related to the frequency of undertaking some dietary behavior. The frequency of the use of 'fasting' by the IBS patients was analyzed by using the questions: '*How often do you use fasting because of fear associated with an increase of the IBS symptoms?*'. The respondents could choose one of the following responses: does not apply, occasionally, sometimes, often, very often.

In the next step, the IBS patients were asked for consent to respond to several questions concerning the frequency of an increased consumption of some product groups such as: milk and dairy products, eggs, cereals and cereal products, vegetables, fruit, citrus fruit, meat and sausages, fish, fried foods, products that may cause abdominal distension (e.g. peas, beans, broad beans, onions). For this reason, the following question was used: '*How often do you avoid the consumption of these products because of fear associated with an increase of the IBS symptoms?*'. The respondents could choose one of the following responses: I do not avoid, occasionally, sometimes, often, very often.

The study also included a qualitative analysis that analyzed the reasons for food restriction by using an open question: '*What was the reason for undertaking dietary restrictions?*'.

The database of obtained results from the questionnaire was prepared in Microsoft Excel 2010, and was analyzed by using SPSS 21.0. In all parts of the analysis, the default level of significance was set at $p=0.05$. The normality of the data was evaluated by using the Shapiro-Wilk test. As the outcome variables were not normally distributed, non-parametric statistical tests were applied. The Kruskal-Wallis tests were used to assess between-group differences. The percentage distribution of variables was analyzed in this paper.

Results

Characteristics of patients in terms of health data

The obtained patients' data showed that the shortest declared disease duration was 0.5 years, while the longest – 25 years. The mean disease duration was 4.5±4.3 years. Eight patients declared the disease duration up to two years. The most patients declared the disease duration between 3 and 5 years (n=24), and the duration of IBS between 6 and 10 years (n=20). Three patients declared the disease duration under 10 years.

It should be noted that 20% of the patients with IBS (n=11) declared that they regularly used medications and provided their names. Among the respondents there were patients who regularly used more than one medication. The medications (the active substance) in IBS patients were: Mebeverine (n=4), Trimebutine (3), Rifaximin (2), Lactobacillus plantarum 299v (1), Hyoscine (1), Metronidazole (1), Loperamide (1), Pantoprazole (1) and Simethicone (1). The patients were also characterized in terms of the severity of IBS symptoms. The largest percentage of respondents pointed out that the beginning of IBS symptoms was moderate (32%), a slightly fewer respondents evaluated this as rapid (30%) and even fewer as very rapid (20%). Only 4% of all respondents declared that the beginning of IBS was very mild, and 14% mild.

In the group of IBS patients, the IBS subtypes were also analyzed. The largest percentage of IBS patients was characterized by the mixed IBS (IBS-M) subtype (46%), while only 16% of the respondents declared IBS with constipation (IBS-C) subtypes, and the IBS with diarrhea (IBS-D) subtype was characteristic for 38% of the IBS patients.

Characteristics of patients in terms of nutrition data

The dominant percentage of IBS patients did not use fasting because of fear associated with the increase of IBS symptoms (52.7%; N=29). Nevertheless, about 47% of the IBS patients declared to undertake this activity sporadically (16.3%; N=9) or occasionally (31.0%; N=17). There were no statistically significant differences between the IBS subtypes in the case of frequency of fasting ($p>0.05$).

The prepared analysis showed that: milk and milk products (56.4%; N=31), fried foods (65.5%; N=36), products that may cause abdominal distension (e.g. peas, beans, broad beans, onions) (69.1%; N=38), and cereals and cereal products (40.0%; N=22) were the most common limited food products in IBS patients. The much less common limited products in IBS patients (N=55) were also vegetables (29.0%; N=16), citrus (34.5%; N=19) and other fruit (29.0%; N=16), meat and sausages (29.0%; N=16), eggs (29.0%; N=16), and fish (21.8%; N=12).

Nevertheless, there were some patients who decreased consumption of: cereal products, vegetables, fruit, eggs, fish, meat and sausages, because of fear associated with an increase in IBS symptoms. The detailed data is shown in Table I. The IBS patients with IBS-D statistically more frequently reduced milk intake than the rest of the analyzed groups – the patients with IBS-M and IBS-C ($H=9.97$; $p=0.02$). For other food products, no differences were found.

Characteristics of the reason for dietary restrictions

The qualitative analysis revealed that there were two main reasons for undertaking dietary restrictions by patients with IBS. The first reason concerned their own observations. The patients decreased consumption of food products which caused them discomfort or gastric problems. The second most important reason was information from the Internet, mainly blogs. It should be noted that only five patients decreased the consumption of selected food products after medical or nutrition consultations. The vast majority of patients had no dietary consultations.

Discussion

The presented results showed that patients with IBS restricted the consumption of foods such as milk and dairy products, as well as fried foods and food which may cause gas. Our results are consistent with other studies [9, 10]. For instance, there is an article which stressed that patients with IBS were more likely to report intolerance to dairy products and other foods than healthy individuals [11]. It should be stressed that milk and milk products contain sugar called Lactose. This sugar is digested by an enzyme called lactase in the small intestine. In human small intestine lactase breaks down lactose into two simpler forms of sugar, such as glucose and galactose. The problem starts when lactase does not work correctly. This is then referred to as lactase deficiency. In this situation lactose is not digested and absorbed in the human small intestine. For this reason, lactose is passed into the colon, and then bacterial fermentation produces gas, as well as short chain fatty acids, and many other products which can cause digestive symptoms [12, 13]. In clinical practice, digestive symptoms after the ingestion of dairy products are called 'lactose intolerance' (LI). The main symptoms of LI is bloating, abdominal discomfort and diarrhea [14]. The relationship between IBS and Lactose Intolerance is, in fact, uncertain. If the results are anything to go by, the scientists suggest a shared etiology involving both psychological (e.g. anxiety) and disabling gastro-

Table I. Frequency of avoiding certain food groups in IBS patients (N=55)
Tabela I. Częstość unikania niektórych grup produktów przez pacjentów z IBS (N=55)

Food groups /Grupy żywności	I do not avoid /Nie unikam	I avoid /Unikam	How often patients avoid this products? /Jak często pacjenci unikają tych produktów?			
			occasionally /okazjonalnie	sometimes /czasami	often /często	very often /bardzo często
milk and dairy products /mleko i produkty mleczne	24	31	3	7	11	10
cereals and cereal products /zboża i produkty zbożowe	33	22	9	6	6	1
vegetables /warzywa	39	16	8	4	4	–
citrus fruit /owoce cytrusowe	36	19	9	6	3	1
other fruit /inne owoce	39	16	8	4	4	–
meat and sausages /mięso i wędliny	39	16	8	4	4	–
eggs /jaja	39	16	8	4	4	–
fish /ryby	43	12	8	3	–	1
fried foods /produkty smażone	19	36	4	16	13	3
products that may cause abdominal distension (e.g. peas, beans, broad beans, onions /produkty wzdymające (np. groszek zielony, bób, cebula)	17	38	5	10	13	10

intestinal dysfunctions (e.g. altered gut transit, visceral hypersensitivity) [14, 15]. Some studies showed that there is a link between psychological state and stress with immune activation in the mucosa in the case of IBS patients. In this context, these psychological factors could alter disabling gastrointestinal motor and sensory functions [16-18].

According to nutrition therapy in IBS, the patients have to avoid consumption some food products, especially milk and milk containing products such as: ice cream, cream cheese, cheese, cottage cheese, yogurt, ice milk, cream soups, butter, pudding, whipped cream, cream, cheesecake, chocolate, pastries [10-14]. What is interesting, the results of this study showed that IBS patients also decreased their consumption of vegetables and fruit, especially citrus fruit. Limiting the consumption of these foods can cause serious macronutrient and micronutrient (vitamins and minerals) deficiencies. It should be pointed out that many vitamins and minerals in fruit and vegetables participate in numerous metabolic processes necessary for the normal functioning of the body. Therefore, the IBS patients should not restrict the vegetable and fruit consumption. Nevertheless, special attention should be paid to the vegetables and fruit which could decrease the IBS symptoms. In the context of fruit and fruit juice, the IBS symptoms could be induced and aggravated by the consumption of: apples, apple juice or cider, citrus fruit, orange juice, tomatoes, tomato juice, etc. In the case of vegetables, the following are not recommended: cabbage, broccoli, cauliflower, corn, legumes (beans, lentils, chili, etc.), onions, peppers. It should be noted that raw fruit and vegetables may induce considerable symptoms. Small amounts of cooked (boiled or canned) fruit and vegetables are tolerated better [9, 10, 19].

The analyzed IBS patients also limited the consumption of products that may cause abdominal distension. These include: broccoli, Brussel sprouts, sprouts, cabbage, cauliflower, corn, leeks, onions. Gas and bloating are caused by a fermentation process in the intestines. This process is associated with bacterial fermentation in the gastrointestinal tract. Because of this fermentation process, gas and bloating caused by foods and beverages can be delayed for many hours [20, 21]. In our study, the IBS patients reduced the consumption of these foods because of fear associated with an increase of IBS symptoms. These results are consistent with other studies [6, 7, 9-13]. About 32% of IBS patients reduced the consumption of meat. This is important in the context of dietetic recommendations for the IBS patients. According to those, red meat (for example: steak, hamburger, sausage, bacon, prime rib), and spicy marinades or gravies frequently cause problems. Instead of red meat, other food which contains animals protein such as: plain chicken, turkey, ham, or fish, is well tolerated. If recommendations are anything to go by, it is important not to use sauces and spices with food which contains animal protein to avoid an increase in IBS symptoms. In context of nutrition therapy in IBS, the patients should completely avoid products such as: sauces, stews, soups, Chinese food, fast foods, fried foods, spiced foods, barbecued foods, and pizza [6, 7, 19]. Additionally 32.0% of IBS patients declared that they limited the consumption of fish. This is a serious problem as fish is a good source of polyunsaturated fatty acids, including omega-3 fatty acids. The study showed that Omega-3 FAs are anti-inflammatory. The benefits of the dietary consumption of ω-3 FAs have been demonstrated in many disorders, e.g. in: dyslipidemia, atherosclerosis, hypertension, vascular reactivity, inflammatory diseases, neurological/neuropsychiatric disorders, eye diseases and osteoporosis [22, 23]. It should be noted that IBS is not less common in Japan and other countries with a high fish consumption as compared to the Western countries [22]. However, the benefit of ω-3 FAs for IBS requires more clarification by prospective studies [22, 24]. In the context of nutrition therapy in IBS, plain-broiled fish without sauces is recommended, as well as tuna fish without mayonnaise. It is important to analyze the reasons for undertaking dietary restrictions by patients with IBS. Our qualitative analysis showed that there are two main reasons for undertaking dietary restriction by patients with IBS – patients' own observations and information from the Internet. What is interesting, the vast majority of patients had no dietary consultation. This study showed that the patients were undertaking dietary restrictions without consulting with a dietician or doctor. It would be interesting to further analyze the reasons for not using dietary counseling by these patients. Our results highlight the need to prepare appropriate nutritional education for the IBS patients. The observed food consumption restrictions may be due to the lack of adequate nutritional knowledge. This can aggravate the patients' anxiety about their own health and their sense of helplessness. Consequently, this leads to food restrictions which may not be consistent with the current recommendations.

It is worth acknowledging the limitations of the presented study. These include: 1. The study group consisted of purposefully selected patients; 2. The lack of prior research studies on the topic; 3. Single measurement variables without the possibility of analyzing the change over time. Despite these limitations, the results of this study provided very important information for a better understanding of IBS patients' expectations in the context of dietary counseling during medical treatment.

Conclusion

The presented results suggested that the IBS patients very often cut down on food consumption, especially milk and dairy products. A significant percentage of IBS patients also avoid the consumption of: cereal products, vegetables, fruit, eggs, fish, meat and sausages. The results of this study may suggest that the IBS patients could have problems with a balanced diet. Consequently, dietary counseling should be promoted in the IBS patients. Moreover, dietary counseling should be one of the most important parts of the medical treatment of IBS.

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