

## ASSESSMENT OF DIETARY INTAKE OF PATIENTS WITH IRRITABLE BOWEL SYNDROME

### OCENA SPOSOBU ŻYWIENIA PACJENTÓW Z ZESPOŁEM JELITA NADWRAŻLIWEGO

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**Słowa kluczowe:** *sposób żywienia, wywiad żywieniowy 24 h, zespół jelita nadwrażliwego*

#### ABSTRACT

*The dietary intake of patients with irritable bowel syndrome was assessed using 24-h dietary recall. The energy value and nutrient contents in the daily food rations were calculated by Nutritionist IV computer program with the Polish database. Differentiations in the Polish RDA coverage for energy and nutrients were observed in the studied group. Fat, saturated fatty acid, phosphorus and also vitamin A, E and C contents were above the RDA in the patients' daily food ration. The majority of IBS individuals did not meet recommendations for carbohydrate intake. Calcium and copper intake was below the Polish RDA. The insufficient vitamin B<sub>2</sub> intake and excessive Fe supply have been shown in the male patients.*

#### STRESZCZENIE

*Na podstawie wywiadu 24-godzinnego oceniono sposób żywienia pacjentów z zespołem jelita nadwrażliwego. Wartość energetyczną oraz zawartość składników odżywczych w całodzienniej racji pokarmowej obliczono za pomocą programu komputerowego Nutritionist IV z polską bazą danych. Stwierdzono zróżnicowane pokrycie zapotrzebowania na energię i składniki odżywcze w badanej grupie. Całodzienna racja pokarmowa pacjentów dostarczała nadmierną ilość tłuszczu, nasyconych kwasów tłuszczowych, również zawartość fosforu oraz witamin A, E i C w diecie znacznie przekraczała bezpieczny poziom spożycia. Większość badanych pacjentów nie spożywała zalecanej ilości węglowodanów. Wykazano zbyt małą zawartość wapnia i miedzi w całodzienniej racji pokarmowej. W grupie badanych mężczyzn zaobserwowano niedostateczną podaż witaminy B<sub>2</sub> oraz nadmierną podaż żelaza.*

#### INTRODUCTION

Irritable bowel syndrome (IBS) is a common disorder of the gastrointestinal (GI) tract characterized by a chronic or recurrent symptom complex: abdominal pain and/or bloating associated with disturbed bowel habits: constipation or diarrhea, or both. IBS accounts for 30-50% of all GI disorder cases [12]. The potential etiological factors of IBS include visceral hypersensitivity, stress, bacterial infection and dysregulation of the brain-gut axis [10]. A diet has also been considered to play a role in the pathogenesis of IBS. Several mechanisms for food-induced symptoms have been suggested, such as food-intolerance, abnormal immune

reaction to food, altered colonic flora and alteration in GI physiology after eating [1].

In the IBS course emerges a risk of nutritional imbalance and malnutrition, because patients limit or eliminate (more or less reasonably) specific food products and meals, which are a good source of nutrients and follow the repetitious diet. The chronic character of the disease and lack of effective treatment methods potentiate the risk of malnutrition.

In the previously published work concerning dietary habits of IBS patients we have shown some dietary mistakes which can result in an inadequate intake of important food components [11].

The aim of this study was to assess the dietary intake of patients with IBS using 24-h dietary recall method.

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## MATERIAL AND METHODS

63 IBS patients (34 females and 29 males) at the age of 19 – 75 hospitalized in Department of Gastroenterology and Hepatology of Wrocław Medical University were included in the study. The mean age in the female (F) group was  $48.9 \pm 16.1$  and BMI averaged  $23.7 \pm 4.2$ . In the male (M) group the mean age and BMI amounted to  $49.1 \pm 16.7$  and  $25.9 \pm 4.6$ , respectively. The dietary intake of patients was assessed using dietary recall from the last 24 hours before the study. The energy value and the content of nutritive components in daily food rations were calculated by Nutritionist IV (First Data Bank, USA), a computer program with the Polish database. The results obtained for the individuals engaged in the study were compared to the population weighted recommended daily allowances (RDA) in Poland [15]. Moderate or low physical activity was assumed for

the patients on the strength of a declared kind of work and physical exertion frequency during free time. The percentage of RDA coverage for energy and nutrients by the patients was calculated. The following recommendations for energy supply from fatty acids have been adopted in this study: saturated fatty acids (SFA): 8% of energy intake, polyunsaturated fatty acids (PUFA): 7%, and monounsaturated fatty acids (MUFA): 15%. The intake of 30 g dietary fiber per day has been found to be recommended in this study.

## RESULTS AND DISCUSSION

The diet of IBS patients should provide appropriate energy and nutrient amounts according to the dietary recommendations for healthy population. The results of the dietary intake assessment in our survey has been recorded in Figures 1 and 2. The participation of

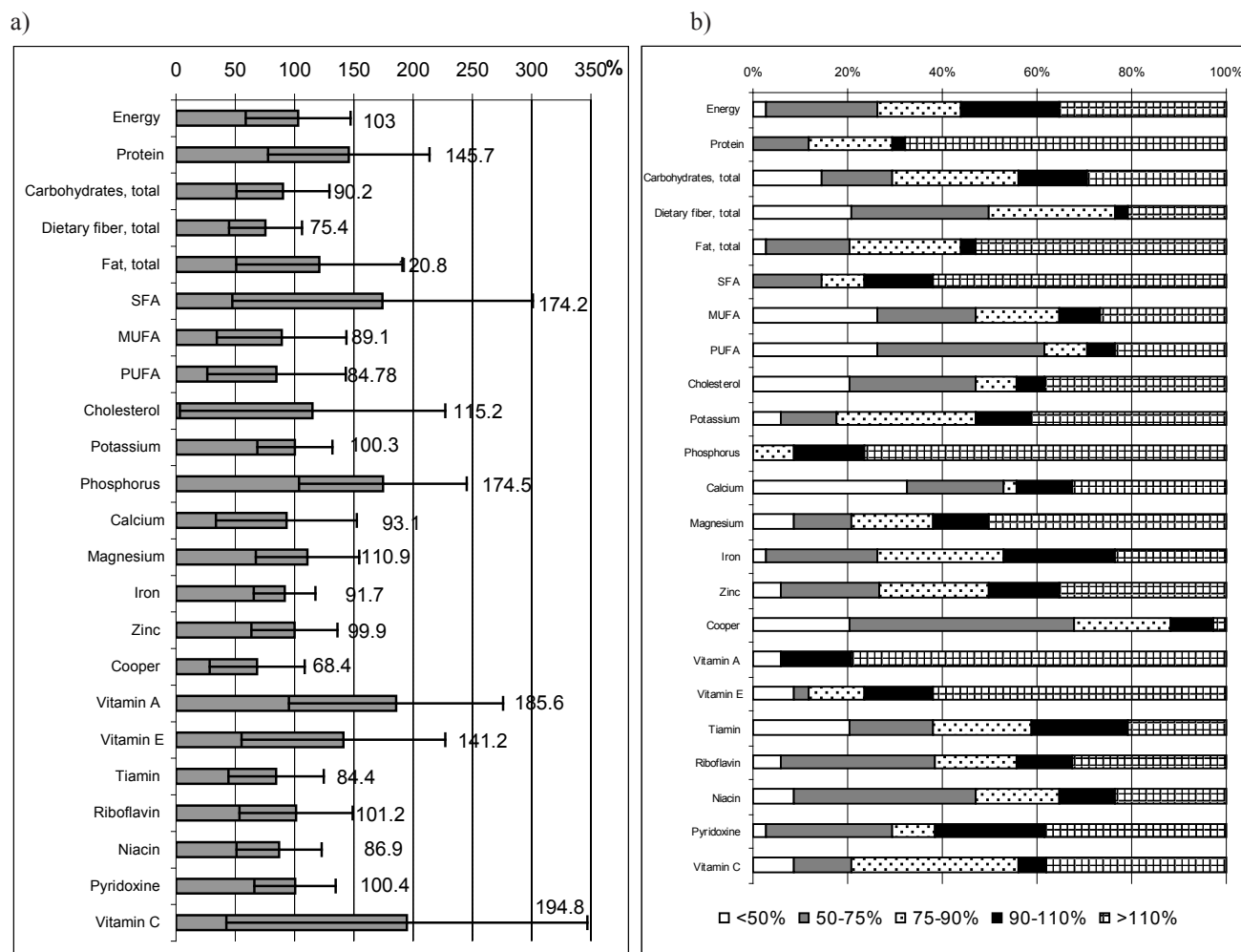


Fig. 1. The RDA coverage of food components and energy from daily food rations by females with IBS:  
 a) the coverage of RDA's for food components and energy - mean values and standard deviations;  
 b) the percentage of patients with different RDA coverage  
 Pokrycie zapotrzebowania na energię i składniki odżywcze (bezpieczny poziom spożycia) w całodziennych racjach pokarmowych kobiet z zespołem jelita nadwrażliwego:  
 a) pokrycie zapotrzebowania na energię i składniki odżywcze – wartości średnie i odchylenia standardowe;  
 b) udział procentowy w grupie pacjentek o różnym pokryciu zapotrzebowania

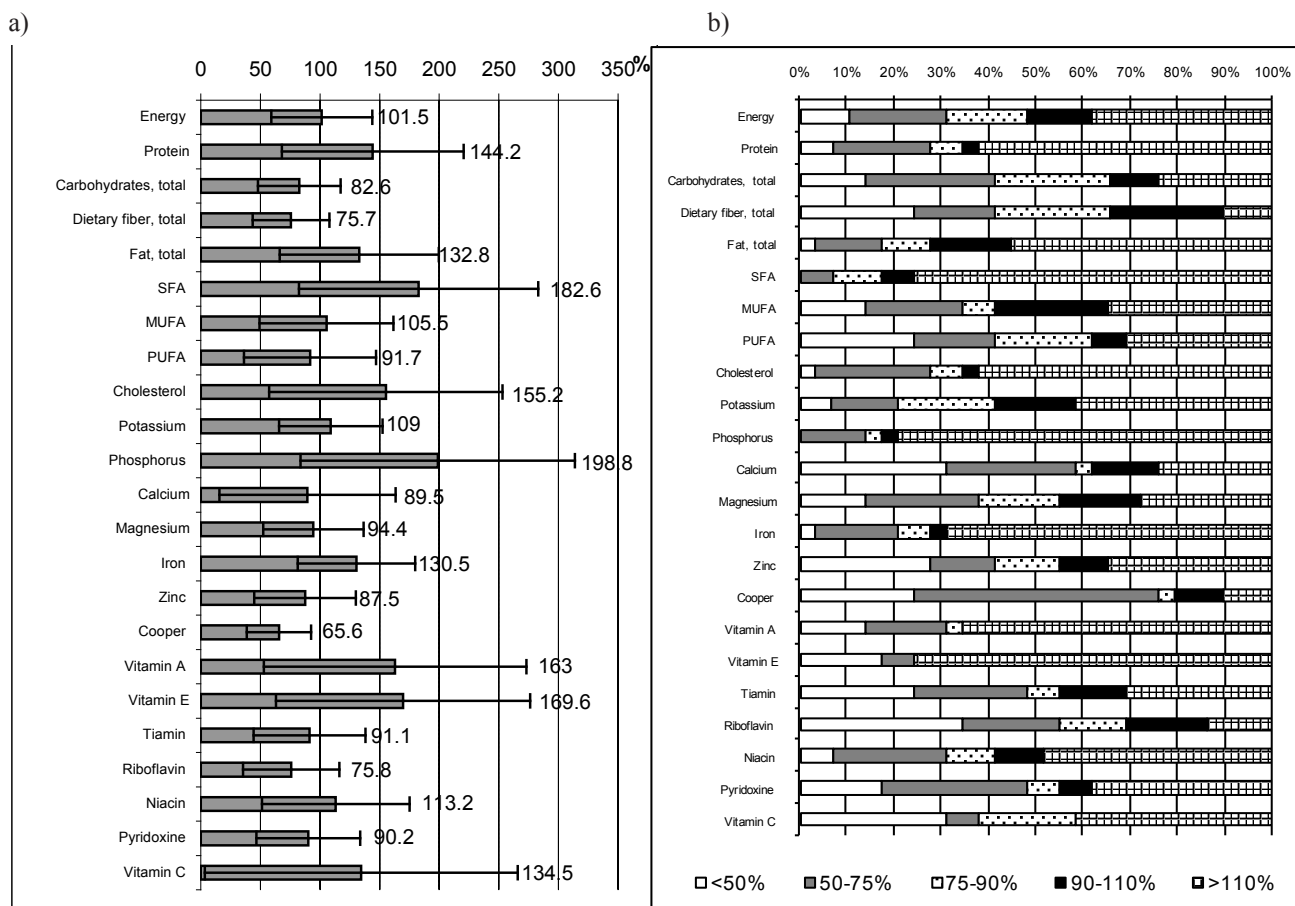


Fig. 2. The RDA coverage of food components and energy from daily intake by males with IBS:  
 a) The coverage of RDA's for food components and energy - mean values and standard deviations  
 b) The percentage of patients with different RDA coverage  
 Pokrycie zapotrzebowania na energię i składniki odżywcze (bezpieczny poziom spożycia) w całodziennych racjach pokarmowych mężczyzn z zespołem jelita nadwrażliwego:  
 a) pokrycie zapotrzebowania na energię i składniki odżywcze – wartości średnie i odchylenia standardowe  
 b) udział procentowy w grupie pacjentów o różnym pokryciu zapotrzebowania

macronutrients in energy supply in the patients' daily food rations was collected in Table 1. The mean energy intake in the studied IBS patient group was similar to the population weighted Polish RDA. However, only 13.8% F and 20.6% M patients provided adequate energy amounts in the daily food rations. Excessive intake of energy (>110% energy requirement) has been observed in over 35% patients (F and M). The consumption of large and high-calorie food portions can perturb digestion and absorption in intestine and also may lead to excessive fermentation in colon [3]. The enhanced energy supply accompanied by the reduced physical activity lead, moreover, to overweight and then to the overweight associated metabolic disorders.

The mean energy supply from protein was in accordance with the recommended range (10 – 15%): 14.2% (F) and 13.6% (M). However, more than 32% (F) and 27% (M) assessed daily food rations of patients supplied >15% energy from protein. Furthermore, the mean protein intake in the studied group averaged out at 146% (F) and 144% (M) RDA (safe limit, 0.8 g protein/kg

of body mass), respectively. Among the group over 66% F and 62% M patients consumed protein amounts exceeding 110% of the safe protein limit. The mean carbohydrate consumption in the studied IBS patients group met 90.2% (F) and 82.6% (M) of the estimated RDA, and the participation of carbohydrates in energy supply below recommended range (55 – 65%) has been found in the daily food rations of many patients engaged in this survey: 44.1% F and even 72.4% M. In the assessment of dietary habits of IBS patients we have observed that more than 60% of studied group added sugar to the beverages and preferred foods containing easily absorbed carbohydrates, such as white flour bakery goods, white rice and potatoes in the diet [11]. The IBS patients should provide adequate carbohydrate amounts of good quality, especially slowly absorbed polysaccharides, with exception of such monosaccharide as fructose and sugar alcohols, which aggravate symptoms of disorder [4].

The mean fat consumption assessed in the IBS patient group exceeded about 20% (F) and 33% (M) RDA

Table 1. Participation of macronutrients in energy supply of IBS patients

Udział energii z makroskładników w dietach pacjentów z zespołem jelita nadwrażliwego

	% energy from protein	% of patients with different energy coverage from protein			% energy from carbohydrates	% of patients with different energy coverage from carbohydrates			% energy from fats	% of patients with different energy coverage from fats		
		<10%	10-15%	>15%		<55%	55-65%	>65%		<25%	25-30%	>30%
IBS females	14.2	8.8	58.8	32.4	56.2	44.1	41.2	14.7	34.2	11.8	23.5	64.7
IBS males	13.6	6.9	65.5	27.6	48.8	72.4	20.7	6.9	39.2	3.4	10.3	86.2

and the majority of the group (ca. 65% - F, 86% - M) supplied more than 30% energy from fat in the daily food rations. This excessive fat intake was accompanied by the prevalent overconsumption of cholesterol and SFA. In the IBS group especially men, but to a lesser extent also women, provided large amounts of these nutrients in the daily food rations. The excessive cholesterol and SFA intake (>110% RDA) has been found in the predominant part of the studied group. The patients consumed unsatisfying amounts of food containing PUFA: about 60% (F) and 40% (M) patients met at the outside 50% of RDA for PUFA. The assessment of dietary habits revealed that the consumption of butter and butter containing spreads is a common custom in IBS patients [11]. The high-cholesterol and rich in SFA diet can negatively affect lipid profile of patients and lead to cardiovascular diseases. It also appears that plasma fatty acid and cholesterol profile may be disrupted in affective disorders, highly co-occurred with IBS. It has been proposed that an enhanced intake of n-3 PUFA can improve the IBS symptoms [7].

The mean RDA coverage of dietary fiber in the assessed daily food rations of patients amounted to ca 75% (F and M), and 50% of F group did not meet 75% of RDA. In the M group adequate daily intake of fiber has been shown in 24% of individuals and 41.3% of patients consumed fiber in amounts lower than 75% of RDA. The low frequency of vegetable, fruit and whole grain food consumption, which has been shown in the assessment of their dietary habits, caused insufficient dietary fiber intakes [11]. Soluble fiber appears to be beneficial, while symptom worsening is associated by many patients with products containing insoluble fiber: whole grain wheat products and wheat bran [2]. Fiber sources containing insoluble fiber are recommended only in constipation according to Rome III criteria for IBS treatment [8]. With the exception of acute diarrhea periods, IBS patients should include into their diet recommended quantities of well tolerable high-fiber foods or fiber supplements, such as soluble fiber derived from ispaghula [9].

The assessing of macroelement intake in the daily food rations of the studied IBS group showed inadequate coverage of RDA for calcium. Only ca. 12% F and 14% M patients met RDA for this element (90 – 110%

RDA) and above 30% of F and M daily food rations covered 50% or less RDA for calcium. The avoidance of milk and fermented dairy beverages, which account for excellent source of lightly absorbed calcium, has been observed in about 50% of IBS patients [11]. This custom can contribute to deficiency of this element, and thus lead to skeleton formation disturbances and osteoporosis. Milk and dairy products are one of the most frequently intolerable food in IBS patients, however the frequency of lactose intolerance in IBS seems to be similar to the healthy population [13]. The lactose intolerance enhances IBS symptoms because of stronger patient's reaction to the gas production in the bowel in comparison with healthy individuals [3]. IBS patients are advised to include into their diet the probiotic milk products, such as acidophilic milk, which are lightly digested and have reduced amount of lactose. In the newly published review on probiotic use in IBS treatment it has been suggested that *Bifidobacterium* strains can improve bowel habits of patients [14]. It has been found in our study that the daily food rations of IBS patients provided excessive amount of phosphorus. The mean value of phosphorus intake nearly doubled the RDA, and about three-fourth of patients provided above 110% of this element in the analyzed food rations. 37.8% (M) and 20.6% (F) of patients did not meet more than 75% of RDA for magnesium. The insufficient magnesium intake accompanied by excessive phosphorus and inadequate calcium supply may induce disturbances of mineral homeostasis and bone structure in patients. The mean Fe intake in the M patients amounted to ca. 130% of Polish RDA and 69% of M group supplied excessive quantities of Fe in the daily food rations (>110% RDA). The insufficient Cu supply in daily food rations has been shown: 20.5% F and 24.1% M patients met at the outside 50% RDA for Cu.

A very excessive intake of vitamin A and E has been recorded in the daily food rations of patients. About 80% of F individuals supplied vitamin A in quantities exceeding 110% of RDA, in case of M group such excessive intake has been observed in 65.5% of patients. The majority of patients exceeded RDA for vitamin E (ca. 62% F and 76% M individuals). The mean thiamin intake in the studied group was below Polish RDA and about one-fourth of M and one-fifth of F patients did



not meet more than 50% of RDA for this vitamin. The insufficient mean supply of riboflavin has been observed in M patients and 34.5% of the daily food rations of M individuals covered 50% or less RDA for this vitamin. The mean RDA coverage for niacin in F patients was below Polish RDA and the largest percentage of F group (38.2%) supplied this vitamin in the daily food rations in range of 50 – 75% of RDA. Nearly a half of the M patient group (48.3%) provided >110% of RDA for niacin. A large vitamin C intake has been shown especially in F and to a lesser extent in M patients, however 31% of individuals did not meet more than 50% of RDA for vitamin C in M group.

The obtained results corresponded to a high degree with the study on the RDA coverage for nutrients in the daily food rations of 40- and 50-year-old inhabitants of Wrocław [5, 6]. Similar or even higher inadequacies in carbohydrate, fiber, SFA, PUFA, P and Ca intake were observed in the IBS group as compared to the 40- and 50-year-old individuals. Although the mean energy intake in the IBS group covered nearly 100% of RDA, in contrast to the insufficient energy supply by the studied 40- and 50-year women and men, the considerable overdose of fat in the daily food rations of IBS patients have been shown, which had been observed to a lesser extent in the Wrocław's population groups at the age of 40 and 50.

## CONCLUSIONS

In conclusion, differentiations in the Polish RDA coverage for energy and nutrients in the daily food rations were observed in the studied IBS group. Although protein and some vitamin intake met or exceeded Polish RDA, the insufficient energy intake from carbohydrates and overconsumption of fat and also SFA were the major dietary mistakes which can lead to lipid profile disturbances. Moreover, the observed deficiency of calcium in the patient nourishment and also riboflavin in M group indicate that the avoidance of milk and milk products shown in previous work concerning dietary habits of IBS patients leads to inappropriate intake of these nutrients. Thus, dietary advice seems to be necessary to help IBS patients in composing a balanced diet.

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