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Ocena zbiorowego żywienia chorych na stwardnienie rozsiane i z urazowym uszkodzeniem rdzenia kręgowego, mieszkańców Domu Pomocy Społecznej

Streszczenie

Wstęp. Stwardnienie rozsiane to choroba przewlekła, egzogenna, nabyta, o wieloczynnikowym, złożonym pochodzeniu. Wiele prac potwierdza korzystny wpływ diety bogatej witaminę D, magnez oraz nienasycone kwasy tłuszczowe na zdrowie pacjentów.

Cel. Celem pracy była jakościowa i ilościowa ocena jadłospisów przygotowanych dla chorych na stwardnienie rozsiane i osób ze stwierdzonym urazowym uszkodzeniem rdzenia kręgowego.

Materiał i metoda. Badaniem objęto mieszkańców Domu Pomocy Społecznej dla Osób Niepełnosprawnych Fizycznie. Do badania wybrano dwie grupy: 13 kobiet z SM w wieku 38-64 lat i 13 mężczyzn z urazowym uszkodzeniem rdzenia kręgowego w wieku 30-64 lat. Ilościową ocenę sposobu żywienia przeprowadzono analizując dwa tygodniowe jadłospisy w oparciu o dane z tabeli składu i wartości odżywczych podstawowych produktów i typowych potraw oraz z wykorzystaniem kwestionariusza punktowej oceny jadłospisu wg Starzyńskiej oraz testu Bielińskiej z modyfikacją Kuleszy i innych.

Wyniki i dyskusja. Analiza wykazała zbyt wysoką wartość kaloryczną oferowanych jadłospisów, nadmierną zawartość białka, tłuszczu ogółem oraz składników mineralnych: sodu oraz fosforu, natomiast zbyt małą podaż WNKT oraz witaminy D.

Słowa kluczowe: stwardnienie rozsiane, żywienie, ocena żywienia zbiorowego.

Rating of food service in nursing home residents with MS and TSCI

Abstract

Introduction. Multiple sclerosis is a chronic, exogenous, acquired disease of diverse complex origins. Many works confirm the beneficial effect of a diet rich in vitamin D, magnesium and unsaturated fatty acids to patients' health.

Aim. The aim of this study was the qualitative and quantitative assessment of food prepared for patients with multiple sclerosis (MS) and those with known traumatic spinal cord injury (TSCI).

Material and methods. The study comprised residents of the Nursing Home for Physically Disabled Persons. There were selected two study groups: 13 women with MS aged 38-64 and 13 men with traumatic spinal cord injury aged 30-64 years. Quantitative assessment of the diet was carried out by analyzing two weekly menus based on data from the table of composition and nutritional value of basic products and typical dishes and the questionnaire assessing diet by Starzynski as well as the test by Bielińska modified by Kulesza and others.

Results and Discussion. The analysis showed too high caloric value of the offered food, excessive protein content, total fat and minerals: sodium and phosphorus, while too little supply of polyunsaturated fatty acids and vitamin D.

Key words: MS, nutrition, rating of food service.

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INTRODUCTION

Multiple Sclerosis (MS) is a disease of diverse complex origin. Both the age of incidence and the disease foci are different. It occurs between 10 and 57th year of life and more often it affects women and people from moderate and cold climates [1,2]. It is a chronic disease, exogenous, acquired, and the clinical symptoms occur only many years after its actual start. It has a complex etiology, partly non-specific (early infection with one or more viruses, immunological and of genetic basis). In the course of the disease the incidence and severity of limb paresis increases; muscle atrophy occurs and there are migraine headaches present.

The gait is disturbed, ungainly, there are difficulties with balance, even in a sitting position; there is an intentional tremor. The disease has periods of remissions and relapses and the infections accelerate the progress of the disease [1]. It was shown that the consumption of products, such as sweets, alcohol, smoked meat and meat products, milk, coffee or tea, as well as gluten, are associated with a higher incidence of MS, although this was not fully confirmed [3]. It has been observed that diet rich in fish and fish products influences reduction in MS prevalence in women [4].

AIM

The aim of this study was the qualitative and quantitative assessment of food prepared for patients with multiple sclerosis and those with known traumatic spinal cord injury.

MATERIAL AND METHODS

The study was conducted in December 2009 and July 2010, by analyzing two seven-day diets (diet I and diet II) developed in the nursing home. Among the residents of the nursing home two most numerous groups were distinguished with regard to age, sex and illness. The average age was 49 years, and half of the 26 patients were women with multiple sclerosis at the age 38-64 years, and the rest were men with spinal cord injury at the age of 30-64 years. The average weight for women was 54 kg and for men 69 kg.

All subjects were included in the rehabilitation program carried out at the nursing home.

Quantitative rating of diet was based on data from the table of the composition and nutritional value of basic products and typical dishes [5]. The obtained results took into account a reduction coefficient by the inevitable losses (i.e., remains on plates and table and kitchen waste) and the so-called technological losses of vitamins: vitamin A-25%, thiamin-20%, riboflavin-15%, vitamin C-155%. Mean values were compared to the nutritional standards for safe levels of consumption for men and women aged 26-60 years, performing light work. For qualitative assessment of nutrition method, a dietary questionnaire was used according to Starzyńsks and Bielińska's test with the modification by Kulesza and others [6]. Interpretation was made according to standardized scoring.

Nutritional assessment of patients was carried out by measuring the anthropometric characteristics: height and weight. On their basis BMI was determined for each of the subjects, and then compared with the WHO standard and classification of Ferro-Luzaii modification [6].

RESULTS

It follows from the analysis of two weekly menus that the average energy intake was 2759 kcal, and the average number of proteins, fats and digestible carbohydrates in the diets, respectively: 109 g, 116 g and 319 g (Table 1). The average daily cholesterol in food rations was at the level of 497 mg. The content of unsaturated fatty acids in the diet I and II was approximately 13 g. It was found that the analyzed meals were characterized by fiber content at 29 g. There was a seasonal difference in the amount of food rations, with the natural increase during the summer. Average fluid intake was 1013ml (Table 1).

Nursing home residents received in their diet an average of 3,188 mg of sodium per day (Table 1). Potassium is present in an amount 4013 mg. Average amount of calcium in the food rations amounted to 950 mg, and 1627 mg of phosphorus. The supply of magnesium and iron level was: 355 mg and 16 mg , respectively(Table 1).

Fat-soluble vitamins in the diet were present in the amounts of: Vitamin A (beta carotene) – 2876 µg (3508 µg), vitamin D – 2,24 µg and vitamin E – 10.48 mg. Diets contained an average of the following amounts of vitamins: 1.44 mg of thiamine, 2.53 mg of riboflavin, 21.56 mg of niacin and 106 mg – of Vitamin C (Table 1).

According to the data presented in Table 2, all day energy supply exceeded the norm for women by about 62% and in men by about 26%. The amount of carbohydrates indicates the exceeded standards by 16% for women and covering the needs of men. The percentage of protein standards was at 155% for women and 145% for men, and the fat was 178% of the norms for women and 158% for men. The figures indicate oversupply of saturated fatty acids and monounsaturated fatty acids amounting respectively 324% and 109-165% for men and 420% and 142-214% for women. The level of implementation of the standards of polyunsaturated fatty acids ranged within 53-89% in men and 69-87% in women.

Based on these data it was found that the amounts of all minerals in the diet of the inhabitants of the nursing home exceed the daily need (Table 2, Figure 1). The greatest deviation from the norm was demonstrated by a supply of sodium – 554%, and phosphorus – 250% (for men) and 232% (for women) (Figure 1). Calcium, potassium and iron supply in the analyzed diets exceeded the standard, respectively, by about 19%, 15% and 44% in men and 13% in women. Only the average magnesium supply for men covered the need for this component and was 102%, while for women the average magnesium supply exceeded the norm by 27% (Figure 1).

None of the studied vitamins was present in food rations in amounts that meet the daily demand for a safe level of consumption. Implementation of standards for Vitamin A in men was 411%, and 479% in women (Table 2, Figure 2). The average supply of Vitamin C was at the level 177% of the norm, and of Vitamin E – 131% (Table 2, Figure 3). The amount of riboflavin was respectively: 115% of the implementation of the standards for men and 158% for women, and of niacin – 113% for men and 127% for women respec-

TABLE 1. Calorific value and the content of nutrients, selected minerals and vitamins in the two-week menus.

Nutrients, minerals, vitamins and energy	The average value of menu I	Standard deviation [SD]	The average value of menu II	Standard deviation [SD]	Mean	Mean standard deviation
Caloric value [kcal]	2721.55	203.98	2796.16	285.03	2758.86	244.51
Proteins [g]	106.43	8.01	110.96	19.93	108.70	13.97
Fats [g]	111.62	8.14	119.74	16.60	115.68	12.37
Saturated fatty acids [g]	52.27	6.16	57.83	11.26	55.05	8.71
Monosaturated fatty acids [g]	38.60	4.44	41.89	6.72	40.25	5.58
Polysaturated fatty acids [g]	13.9	3.57	12.11	2.21	13	2.89
Cholesterol [mg]	502.03	185.00	492.79	192.82	497.41	188.91
Carbohydrates total [g]	349.22	50.70	347.00	59.37	348.11	55.04
Fiber [g]	27.50	7.40	29.88	7.66	28.69	7.53
Sodium [mg]	3348.47	555.65	3028.18	697.35	3188.33	626.50
Potassium [mg]	3873.16	570.15	4153.55	686.68	4013.36	628.42
Calcium [mg]	1001.12	192.18	898.65	178.82	949.89	185.50
Phosphorus [mg]	1651.21	158.70	1603.06	117.31	1627.14	138.01
Magnesium [mg]	357.94	35.83	353.51	50.52	355.73	43.18
Iron [mg]	17.35	9.29	14.24	1.39	15.80	5.34
Vitamin A [µg]	4301.91	5889.43	1451.34	816.71	2876	3353.07
Beta-karoten [µg]	4112.63	2572.72	2903.22	1790.67	3508	2181.70
Vitamin D [µg]	2.25	0.71	2.24	0.87	2.24	0.79
Vitamin E [mg]	10.70	3.05	10.27	2.16	10.48	2.60
Tiamin [mg]	1.47	0.33	1.41	0.24	1.44	0.28
Riboflavin [mg]	2.75	1.48	2.32	0.38	2.53	0.93
Niacin [mg]	21.55	10.25	21.57	4.53	21.56	7.39
VitaminC [mg]	103.98	35.65	108.01	51.37	106.00	43.51

TABLE 2. Daily demand and the implementation of standards for energy and nutrients, selected minerals and vitamins expressed in %.

Nutrients and energy	Daily demand		Mean proportion of implementation of the standard [%]	
	Men	Women	Men	Women
Caloric value [kcal]	2200	1700	125	162
Proteins [g]	75	70	145	155
Fats[g]	73	65	158	178
Saturated fatty acids [g]	Max 7% daily caloric demand		324	420
	17.1	13.2		
Monosaturated fatty acids [g]	Max 10-15% daily caloric demand		109-165	142-214
	24.4–36.6	18.8–28.3		
Polysaturated fatty acids[g]	Max 6-10% daily caloric demand		53-89	69-87
	14.6–24.4	11.3–18.8		
Cholesterol [mg]	Max.300	Max.300	165.80	165.80
Carbohydrates total [g]	350-410	300-360	84.90-99.46	96.70-116.03
Fiber [g]	approx. 30	approx. 30	97	97

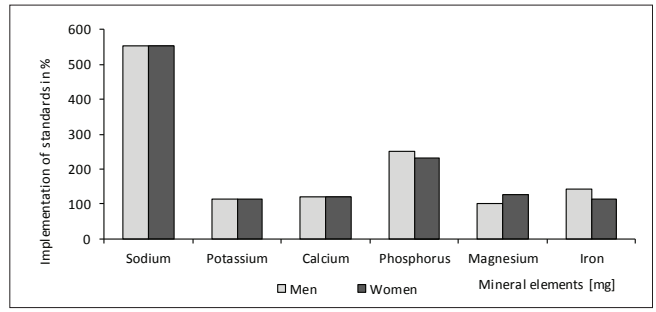

FIGURE 1. Proportional implementation of nutrition standards for minerals in the group of women and men.

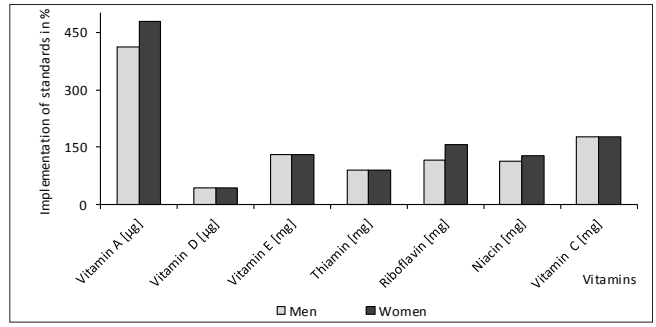

FIGURE 2. The degree of implementation of the nutrition standards for vitamins in women and men.

tively (Figure 2). The content of thiamine and Vitamin D in the diet did not cover normal daily demand and was respectively 90% and 45% of implementation of standards (Figure 2).

None of the studied vitamins was present in food rations in amounts that meet the daily demand for a safe level of consumption. Implementation of standards for Vitamin A in men was 411%, and 479% in women (Table 2, Figure 2). The average supply of Vitamin C was at the level 177%

of the norm, and of Vitamin E – 131% (Table 2, Figure 3). The amount of riboflavin was respectively: 115% of the implementation of the standards for men and 158% for women, and of niacin – 113% for men and 127% for women respectively (Figure 2). The content of thiamine and Vitamin D in the diet did not cover normal daily demand and was respectively 90% and 45% of implementation of standards (Figure 2).

Table 3 shows the distribution of the daily amount of energy in each meal. The mean results of the two weeks are similar. Breakfast accounted for 28.5% of the total amount of energy, lunch – 34.5%, tea – 14%, and dinner was at about 23% (Table 3).

TABLE 3. The distribution of the daily amount of energy in individual meals.

Meal	Week I	Week II	Mean of two weeks [%]
	Mean [%]	Mean [%]	
Breakfast	30	27	28.5
Lunch	34	35	34.5
Tea	13	15	14
Dinner	23	23	23

TABLE 4. Evaluation scores of menu by Starzyńska.

Discriminant	Week I	WeekII
The amount of meals per day planned on the menu		
4-5	5	5
3		
less		
Number of meals in which there are products that provide animal protein		
in all meals	5	5
in 75% meals		
in less number of meals		
Frequency of milk or cheese		
daily in 2 meals		
daily at least in 1 meal and in 50% of days in 2 meals	5	5
less frequently		
The frequency of vegetable or fruit		
daily at least 3 meals	2	2
daily at least 2 meals		
less frequently		
The frequency of fruit and vegetables in the raw form		
daily	5	5
in 75% days		
less frequently		
The frequency of whole meal bread, grouts and dry beans		
daily at least one of these products	0	0
in 75% of days one of the listed products		
less frequently		
Total	22	22

While analyzing diets I and II by the method of Starzyńska, the total of 22 points were obtained, which places the score at the level sufficient for both seasons. Frequency of offering fruits and vegetables was low in the diet as well as of whole meal bread, groats and legumes, both in the summer and winter week (Table 4).

In assessing the diets using Bielińska's test modified by Kulesza et al characterizing the different meals in combination with the principles of rational nutrition, errors were found in the composition of meals (Table 5). Lunches were arranged rationally in terms of the selection of foods from particular groups. The number of correctly composed dinners was at the level of 86%, and of the first breakfasts – at 57%. The second breakfast and afternoon teas were arranged incorrectly (Table 5).

TABLE 5. Bielińska's test modified by Kulesza et al.

Type of meal	Kind of meal	Percentage of meals depending on their qualitative composition				
		Breakfast		Lunch	Dinner	Tea
		I	II			
1	Carbohydrates or carbohydrates and fats	0	0	0	0	0
2	The same as 1 + products being the source of animal protein	14.28	0	0	0	14.28
3	The same as 1 + milk or dairy products	28.57	100	0	14.28	71.42
4	The same as 1 + products being the source of animal protein + milk or dairy products	0	0	0	0	0
5*	The same as 2 + fruits and vegetables	14.28	0	71.42	57.14	0
6*	The same as 3 + fruits and vegetables	0	0	14.28	0	0
7*	The same as 4 + fruits and vegetables	42.85	0	14.28	28.57	0
8	The same as 1 + fruits and vegetables	0	0	0	0	14.28
9	Fruits and vegetables	0	0	0	0	0

*5,6 and 7 – Rational meals

On the basis of analysis of the distribution of BMI values among the respondents, it was found that 15 individuals were placed within the norm (54% men and 69% women), Overweight was found in 7 patients (31% men and 23% women). In two people the first degree of obesity was confirmed, and in two – a chronic deficiency of energy.

DISCUSSION

The assessment of nutrition for the disabled patients with multiple sclerosis and traumatic spinal cord injury has

revealed dietary errors of quantitative and qualitative character. The average caloric value of meals exceed calorie requirements significantly, especially in females (2.796.16 kcal supply to 1.700 kcal standard), which is particularly important in the context of body mass index of the research group. This is a worrying result in connection with the common symptoms that accompany overweight and obesity, i.e., a faster fatigue, a greater load of the joints, heart, vascular system, increased levels of cholesterol. These are risk factors for hypertension, myocardial infarction, stroke, diabetes and gallstones. Positive energy balance is particularly unfavorable for patients. Obesity is common in people with multiple sclerosis. Too much weight and the eating habits based on consuming a few large meals a day can worsen the fatigue syndrome, causing complications such as decubitus ulcers and thrombosis, as well as aggravate existing problems [7].Our study shows in the research group a fairly common occurrence of overweight (31% of men and 23% women); 1st degree obesity did not appear among women, while it affected about 8% of men. The barrier to practicing any physical activity due to motor disorders in patients with MS and the simultaneous excess of energy in the form of consumed calories, adversely affects the health of patients [8]. The intake of cholesterol identified in the study, more than twice exceeding the recommended standard (highest supply – 808 mg) and accompanying the above factors, is particularly disturbing. The degree of implementation of the standards for fats is as high as 180% for women and 142% for men, and their amount is about 35 and 37% of the total amount of energy. In the nutritional standards, due to the documented relationship between the consumption of fats (especially of saturated fatty acids) and the development of degenerative diseases such as atherosclerosis, obesity, insulin-dependent diabetes and hypertension, the recommended amount of fat intake was lowered to 25-30% of energy needs [9] .It is known that excessive intake of fat, especially containing large amounts of saturated fatty acids and trans-isomers (occurring mainly in the hardened margarines), leads to acceleration of atherosclerosis, obesity, and favors the formation of tumors.

The analysis of menus showed over-normative protein content. Similar results were presented by Gacek [10]. In the analysis of menus in the nursing home in Krakow the author showed that average daily protein consumption in the winter season was 106 g and during the summer season – 97 g. But Ilow et al [11], when assessing the nutrition in Lower Silesia, showed an excessive amount of protein in the diet higher than the norm by about 11%. In own studies, an adequate level to cover demand for carbohydrates was proved, which in women ranged from 97-116% and in men 85-99% of the norm. Similar observations were made by Gacek [10] She showed that the recommended standards for consumption of carbohydrates were covered satisfactorily (on average 101-112%), whereas the total consumption of carbohydrates in the study of Ilow et al [11] and in Klebaniuk et al [12] was insufficient, and in both studies it was covering the standards in about 70%. Considering the amount of total fat and fatty acids, errors were found in the analyzed diets. There was too high content of total fat and saturated and monounsaturated fatty acids with low amounts of polyunsaturated fatty acids. It is believed that an excess of saturated fatty acids in the diet can affect the stability of the myelin sheath, cause platelet aggregation and hypoxia in the central nervous system [4]. In addition, thirty-five-year clinical studies conducted by Swank and Goodwin [13] in the Montreal Neurological Hospital have shown that limiting the supply of saturated fatty acids to 10-15 g/day resulted in easing the symptoms of MS, had an effect on improving the patients' well-being and longer life expectancy. The polyunsaturated fatty acid deficiency has a negative effect on the nervous system and inflammatory processes occurring in the body. It has been shown that administration of higher doses of linoleic acid in patients less disabled with MS can reduce the number of relapses, and their length and intensity [14].

When analyzing the content of vitamins in the diets, particular attention is drawn by low vitamin D supply – lower than half of daily demand. It is essential to the functioning of the skeletal system (by regulating calcium – phosphate metabolism) and necessary in the process of calcium transport, as well as it strengthens the immune system [2,15]. And the test results confirm that taking vitamin D reduces the incidence of multiple sclerosis and the progress of the disease. The mechanism by which vitamin D affects the MS is associated with immune functions [16]. It should be remembered that persons with disabilities (especially living in nursing homes) spend little time outdoors, and rarely have contact with the sun, which significantly reduces the endogenous synthesis of vitamin D (about 80% of the vitamin the body derives from cutaneous synthesis). For people with disabilities whose bones are less nourished due to the lower physical activity (deficient bone loading), too little amount of Vitamin D in the diet may have a particularly negative impact.

The content of retinol in the diets developed for the residents of nursing home exceeded four times the norm and was 2876 μg. The excess of retinol accumulated in the liver is harmful, and the toxic dose for adults is more than 15.000 μg, but there is no evidence of toxic effects of the excess of carotenoids; beta-carotene content in the analyzed diet of the nursing home residents is 3508 μg. Other vitamins (vitamin E, vitamin C, riboflavin, niacin) in the analyzed diets were supplied in excess of their daily requirements. Adequate supply, especially of antioxidant vitamins, is particularly important in the context of oxidative stress. In the inflammatory conditions free radicals are formed in the body, which are then inactivated by antioxidants. Brain and spinal cord are particularly sensitive to oxidative stress that occurs when an excess of chemically reactive forms of oxygen is present, so it's important to provide in the diet of patients with multiple sclerosis and those with traumatic spinal cord injury, an appropriate amount of antioxidants, which include, among others vitamin C and E, carotenoids and flavonoids [17]. By following a diet rich in natural antioxidant substances, derived e.g. from fruits and vegetables you can delay the neurodegenerative diseases of the brain, as well as improve the health status of patients. Polyphenols present in fruits, vegetables, cereals and tea have higher neuro-protective effect than antioxidant vitamins, and therefore it is recommended to use a more varied diet, rich in all the food groups, rather than antioxidant vitamins supplementation alone. Their supply is important in Alzheimer's and Parkinson's

disease or memory disorders [17]. The presence of selenium – a component of enzymes degrading free radicals, is also important. The content of selenium in plant products depends greatly on the place of production, and therefore it is difficult to determine its content in the diet. Whole grains, fish, sesame seeds and coconuts are rich in selenium [18].

The analysis of the supply of vitamins has also been studied by other authors. Similarly to our study, the authors: Stawarska, Tokarz, Kolczewska [19] showed too little vitamin D supply in the diet of older people, associated in some Warsaw social associations (women – 52%, men – 56%) and vitamin C (women – 52%, men – 56%), while they reported excessive vitamin A supply (women – 223%, men – 186%). In the case of vitamin E, women were found to have its deficiency in the diet (89.5%) and in men – oversupply (124%). The assessment of nutrition carried out by Gacek [10] among the residents of nursing home in Cracow showed a high supply of vitamin A in winter. In summer it fluctuated around normal. The amount of vitamin C was satisfactory in both seasons. The study conducted by Szponar et al [20], concerning the consumption of nutrients in the diets of households in Poland indicates a low consumption of vitamin C, which is disadvantageous because of its contribution in the production of collagen and hormone synthesis [15]. On the other hand, according to a study by Nadolna and Kunachowicz [21], consumption of vitamins A and E in the diet of blue-collar workers and white-collar workers and with average annual income, was lower than recommended. Klebaniuk and coauthors [12] also reported vitamin deficiencies in studies on models of human nutrition in the elderly in the nursing home in Krasnik. These studies have shown vitamin A supply at about 63%, and of vitamin C – 60% of daily demand. In a study conducted by Dybkowska et al [22] among the adult residents of Warsaw, the level of vitamin A and E was found consistent with dietary recommendations, whereas vitamin C level was too low. Only the amount of vitamin B1 in food rations can be considered correct.

The indicated in our study contents of iron (for women) and magnesium (for men) can be considered correct. The appropriate amount of magnesium in the diet of people with multiple sclerosis is particularly important in relation to the beneficial effect of magnesium therapy in the myocardial infarction and cardiac arrhythmias as well as its neuroprotective activity in experimental cerebral ischemia and after cranio-cerebral trauma. The theory relating multiple sclerosis with bad mineral metabolism of the body points to the importance of magnesium in the etiology of this disease [23]. Based on analysis of ten-day diets, Gacek [10] reported oversupply of iron in both men and women. But Klebaniuk [12] showed that the food rations in the nursing home in Krasnik contained scarce amount both of iron and calcium. As in Klebaniuk's studies, Stawarska, Tokarz, Kolczewska [19] in their research carried out among older people who are members of selected Warsaw social associations, reported insufficient supply of selected minerals. In the study the standard on potassium, calcium, magnesium, zinc and copper has not been undertaken The results of own research are worrying because they indicate the excess of sodium, which is more than five times larger than the minimum level of consumption and the amount of phosphorus representing approximately 250% of the norm in the analyzed menus. Sodium level is not included in the recommended by the European Guidelines for Nutritional Care of Adult Renal Patients (EGNCARP) level of 1800-2500mg per day [24]. Sodium intake observed in patients with ESRD in the study by Gajewska and Chodkowski exceed an average of more than twice the minimum level of consumption [25]. Our analysis does not include quantities of salt added to foods, which may constitute 50-60% of the sodium in the diet. Excessive consumption of certain minerals, including sodium and phosphorus, can be life-threatening to patients treated by dialysis and kidney transplantation. It should be noted that it is not easy with the dietary recommendations for specific medical conditions to be on a diet that restricts certain components, while not causing a shortage in others [9].

A common problem of people with MS is the disorders of the urinary bladder, colon and rectum. Limited mobility affects the intestinal function, causing a tendency to chronic, persistent constipation occurring in up to 93% of patients. Such individuals should take plenty of fluids, but on the other hand, going to the toilet might be not comfortable for them. Similar problems concern persons with traumatic spinal cord injury with severe disabilities. The analyzed diets, unfortunately, are characterized by a low proportion of fluid – about 1 liter. However, you can assume that the patients themselves supplement these deficiencies.

Qualitative assessment of diet showed too sparse consumption of whole meal bread, grouts, dried leguminous vegetables and, subsequently, fruits and vegetables. Low consumption of these products directly translates into a relatively low content of dietary fiber in the analyzed menus. In the analyzed diets, an adequate, but close to the minimum amount of dietary fiber supply having an important role in these diseases, was stated. Dietary fiber lowers blood cholesterol levels – by binding and excretion of bile acids it stimulates the liver to synthesize the new acids which are using cholesterol. In addition, the dietary fiber makes passage of food content in the intestines easier, which is especially important in people suffering from constipation [26]. Gacek [10] showed that the consumption of dietary fiber in the nursing home in Cracow was adequate and covered the demand (average 28.4 g of fiber per day). A different score was obtained by Wądołowska and Cichon [28], who reported significant fluctuations in the intake of fiber: 3.3 g – 33.5 in men and 4.2 g – 31.2 in women. Not enough fiber in the diet was reported by Ilow et al [11]. Fiber in the diet of selected groups of the population of Lower Silesia covered the needs only in 62.7% (i.e. approximately 17.5 g) [11].

According to the obtained results the percentage of energy from each meal was considered correct, but the list of products from different groups in different meals was wrong. Using the Bielińska's method, rationality of meals eaten during the day is evaluated. Second breakfasts and afternoon teas were evaluated low. The irrationality of meals consisted in supply of carbohydrates alone or carbohydrates and fats, and these components were the main elements of the teas and second breakfasts. Improper nutrition is a quite common phenomenon for all population groups. It is generally manifested by inadequate frequency of nutrition, improper contribution of particular groups of food products, poor quality

and the number of meals, irregular consumption and their nutritional monotony [6].

Rating of nutrition is especially important for those patients, thus it appears to be important to follow the nutritional instructions specific to individual diseases.

CONCLUSIONS

1. Confirmed by the research too high energy content in the suggested diets in relation to a group of persons with the indicated over-normative BMI, may be the cause of the development of overweight, obesity and other metabolic diseases in patients with MS and people with traumatic spinal cord injury.
2. The results indicate the imbalance of fundamental nutrients content; an excessive intake of fat and protein was confirmed.
3. The supply of dietary fiber in the analyzed food rations was rated as normal.
4. There was too little vitamin D supply in the diet of patients with MS. Vitamins A, E, C, B2, PP were supplied in amounts many times exceeding the standard requirements.
5. The content of iron (for women) and magnesium (for men) in the analyzed CRP can be considered correct. The supply of sodium exceeds five times the daily demand, while the supply of phosphorus – more than twice.
6. Modifications of diets consisting in increased consumption of foods rich in fiber, and limiting the supply of high-fat products, especially rich in saturated fatty acids, might have a positive impact on proposed nutrition of the nursing home residents

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