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Zawartość wybranych biopierwiastków w całodziennej racji pokarmowej pielęgniarek

Streszczenie

Wprowadzenie. W społeczeństwie o najwyższym rozwoju cywilizacyjnym najczęstszą przyczyną chorób i śmierci stały się choroby wynikające z zaburzeń metabolicznych. Jedną z głównych przyczyn ich powstawania jest zbyt duże spożywanie wysokokalorycznych pokarmów zawierających tłuszcze i białka. W 1999 roku grupa ekspertów Światowej Organizacji Zdrowia wyszczególniła choroby przewlekłe powstające na tle wadliwego żywienia, są to między innymi choroby sercowo-naczyniowe, otyłość, nowotwory, cukrzyca. Personel medyczny, zwłaszcza pielęgniarki, jest szczególnie zobligowany do prewencji chorób związanych z nieprawidłowymżywieniem. To one głównie przekazują informacje na temat diety, dostarczają materiałów edukacyjnych o żywieniu w zdrowiu i chorobie i jeśli one same nie przestrzegają zasad prawidłowego żywienia, to jakość przekazywanych informacji może być niewystarczająca.

Cel. Celem pracy była analiza spożycia wybranych produktów oraz zawartości biopierwiastków (Ca, Mg, Fe, Zn) w dziennych racjach pokarmowych w odniesieniu do zalecanych norm.

Materiał i metody. Badania przeprowadzono w grupie 109 pielęgniarek pracujących w dwóch szpitalach województwa podlaskiego. Do ilościowej oceny żywienia zastosowano metodę wywiadu 24-godzinnego z dnia poprzedzającego badanie. Zawartość biopierwiastków: wapnia, magnezu, żelaza i cynku w całodziennej racji pokarmowej pielęgniarek obliczono przy użyciu programu komputerowego FOOD 2, opracowanego przez Instytut Żywności i Żywienia w Warszawie.

Wyniki. Posiłki większości pielęgniarek nie spełniały kryteriów prawidłowego żywienia. W badanej populacji zaobserwowano niskie spożycie produktów zbożowych, mleka i produktów mlecznych, ryb, ziemniaków oraz owoców i warzyw. Stwierdzono, że podaż badanych biopierwiastków u pielęgniarek z Podlasia była niska (głównie wapnia i żelaza) i niewiele różniła się od grup społecznych z różnych regionów Polski.

Wnioski. Nieprawidłowe żywienie pielęgniarek, mimo ich wiedzy, może niekorzystnie wpłynąć na prewencję chorób cywilizacyjnych.

Słowa kluczowe: edukacja, pielęgniarki, jakość żywienia.

The contents of selected bioelements in a daily diet of nurses

Summary

Introduction. In highly developed society metabolic disorders have become the most common cause of diseases and deaths. One of the main causes of developing the disorders is excessive consumption of high-calorie meals containing fats and proteins. In 1999 the group of experts of World Health Organization specified chronic diseases caused by inappropriate nutrition, for example: cardiovascular disorders, obesity, tumours, diabetes.

Medical staff, mainly nurses, are obliged to prevent illnesses caused by uncorrect nourishment. Nurses mostly communicate information about diet; they deliver literature about food during illness and good health. So if they don't abide by dietary rules, the quality of delivered information maybe inadequate.

Aim. The aim of the study was to analyse the consumption of selected products and the content of bioelements: Ca, Mg, Zn, Fe in daily meals with relation to recommended norms.

Material and methods. The research was carried out in a group of 109 nurses working in two hospitals of Podlaskie Province. The quantitative analysis of nourishment involved a method of 24-hour interview of the day preceding the research. The bioelements contents: calcium, magnesium, zinc and iron in their daily rations was calculated with computer program FOOD 2 prepared by institute of Food and Nourishment in Warsaw.

Results. The meals of most nurses didn't satisfy the standards of correct nourishment. In researched group eating of low cereal products, milk and its products, fish potatoes and also fruits and vegetables, was observed. The research showed that the supply of studied bioelements in nurses from Podlaskie is low, mostly concerned calcium and iron and was not much different from other social groups from other regions in Poland.

Conclusions. Incorrect nourishment of nurses, despite of their knowledge, may unfavourably influence the prevention of civilization – related diseases.

Key words: education, nurses, quality of nutrition.

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INTRODUCTION

The social and professional structure and the related lifestyle have a considerable influence on the health of the population and may lead to differences in the state of health of the working population, as social, health and eating habits are typical of particular professional groups [1, 2]. Eating is one of the important pleasures in life and we choose the products which we like and avoid the ones that we dislike. However, it is often emphasised nowadays that inappropriate nutrition may lead to civilisation diseases. The main health hazards of the Polish population are cardiovascular diseases, obesity, neoplasms, the pathogenesis of which lies in nutritional factors. The world's economic development, faster pace of life, chronic shortage of time as well as high professional activity of women do not contribute to the preparation of proper home meals. Therefore, the nutritional standard nowadays is – on the one hand – highly processed food, such as convenience food, which is highly caloric and rich in animal fat, monosaccharides, sodium but deficient in vitamins, minerals and fibre or – on the other hand – fast food, which is easily accessible, inexpensive and requiring little preparation time [3, 4].

These days people do not pay enough attention to the norms of proper nutrition which clearly define the daily demand for energy and particular nutritional ingredients which should be consumed depending on age, sex, job, and physiological state. Other factors which play a very important role in proper nutrition are the number of meals during the day and the proper choice of food products which provide the organism with the sufficient amount of energy as well as all the necessary nutritional ingredients [5].

Nursing profession is dominated by women and since women are mainly responsible for preparing meals, it is nurses who should have as much information as possible on the standards of proper nutrition in order to implement them in their own households and also share this knowledge with patients.

The basic rule of proper nutrition is to satisfy the demand for energy, nutritional ingredients, vitamins and minerals. This rule is reflected by the well-known saying: 'Eat what you want if you have eaten what you should' [3].

In order to maintain normal life processes the human being should absorb daily a definite amount of energy, i.e. calories and about 60 nutritional ingredients. Nutritional ingredients, such as protein, fat, saccharides, vitamins and mineral salts play clearly defined functions in the organism. Another important element to make the organism function properly is fibre [6].

Proper nutrition means supplying the organism with such an amount of food that prevents both deficiency and surplus of nutritional ingredients. Therefore, we should take into consideration the actual demand of the organism which depends on age, sex, job and physiological states, such as pregnancy or lactation. Even small nutritional deficiency, especially concerning important substances, e.g. protein, vitamins or mineral salts, may precipitate ageing of the organism, impair its physical and mental efficiency or increase susceptibility to illnesses [5].

Minerals are considered indispensable in human nutrition. They should be supplied in food in appropriate proportions and quantities because the organism is not able

to synthesise them. Minerals are divided into macro- and microelements. The macro elements which are indispensable for humans are those whose daily demand exceeds 100 mg/person/day and they include: calcium, phosphorus, magnesium, sodium, potassium, chloride. Microelements, also called trace elements, indispensable for humans in quantities smaller than 100 mg/person/day include: ferrum, iodine, zinc, manganese, copper, cobalt, molybdenum, fluorine, selenium and chromium [7].

In terms of physiology of nutrition and the role played by minerals in biochemical processes, the range of nutritional norms and of the demand for these elements should be sufficiently wide. The deficiency of biologically important elements and the excess of toxic elements lead to disorders in metabolic processes. The content of macro- and microelements in the organism is influenced by such factors as: their content in the soil, in drinking water, in food from a given region, eating habits of a particular person or social group (vegetarians, Islamists) as well as the people's health status. The contents of minerals in food products and eating habits have an influence on the supply of bioelements in the daily diet; health – on the other hand – determines and influences the individual absorption of macro- and microelements by the organism. Both inadequate supply of minerals in the diet and poor absorption may result in nutritional deficiencies in particular people and whole social groups [7-9].

OBJECTIVES

The aim of this study was qualitative analysis of the diet of the nurses from Podlaskie voivodeship. The contents of selected bioelements (Ca, Mg, Fe, Zn) in daily food portions were also assessed. The second aim was to gather the nurses' opinions of their own eating habits.

MATERIALS AND METHODS

The questionnaire was completed by 111 nurses employed in Białystok and 108 nurses from SP ZOZ (Independent Public Health Care Unit) in Elk. The average age of the respondents ranged from 21 to 60 years. The women were divided into the following age groups: group I under 34 years old (n=55), group II between 35-44 years old (n=36) and group III over 45 years old (n=20).

For quantitative analysis of the diets the data from a 24-hour period of the day preceding the study were collected. In the study we assessed the consumption of corn products, milk and dairy products, meat, butter, sour cream and other fats, fish, potatoes, fruit and vegetables rich in vitamin C and fruit and vegetables rich in carotene. The food portions were assessed by means of "The album of products and dishes" [10].

The contents of bioelements such as calcium, magnesium, ferrum and zinc included in daily food portions of the nurses were computed by FOOD 2 program prepared by The Institute of Food and Nutrition in Warsaw. The obtained results were compared with safety norms (according to The Institute of Food and Nutrition in Warsaw) for people with moderate physical activity. Statistical analysis was done by means of t Student test with $p < 0.05$ regarded as statistically significant.

Reference values for nurses in the study:

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	19-25 years old	26-60 years old
CALCIUM	1100 mg/person/day	800 mg/person/day
MAGNESIUM	280 mg/person/day	280 mg/person/day
FERRUM	14 mg/person/day	14 mg/person/day
ZINC	10 mg/person/day	10 mg/person/day

RESULTS

In our study we made the qualitative analysis of the diets of nurses working in Podlaskie voivodeship.

The nurses' consumption of corn products was similar in all the studied age groups: 256.1 ± 125.25 (group II), 260.4 ± 184.41 (group I) and 283.3 ± 240.40 (group III). All of the women taking part in our study, irrespective of the age, consumed too little milk: on average less than one glass of milk a day. The consumption of dairy products was similar in all of the studied age groups. The consumption of meat and its products was higher in nurses from group I, i.e. under 34 years old than in women at the age 35-44 and these differences were statistically significant. Butter and sour cream were consumed in comparable amounts in groups I and II, whereas in group III the figure was slightly higher. The consumption of other fats was low (differences statistically significant). The lowest consumption of fish was noted in group I, three times higher in group III and four times higher in group II. The women from groups I and II ate about 130 g of potatoes and from group III – about 110 g. We noted statistically significant differences in the figures concerning the consumption of vegetables and fruit with vitamin C: 42.5 ± 85.0 (group II), 55.5 ± 111.88 (group I) and 56.3 ± 84.96 (group III). Statistically significant differences

were also observed in the consumption of fruit and vegetables with β -carotene in groups I and II. The consumption of other fruit and vegetables was approximately 200 mg/day in all the age groups.

The study estimated the contents of calcium, magnesium, ferrum and zink in daily food portions of nurses working in Podlaskie voivodeship.

Calcium

The study shows that mean calcium content in the diets of nurses was low. The lowest content was noted in the oldest group of women ($562.8 \text{ mg/day} \pm 289.72$) and the highest in the youngest women ($646.6 \text{ mg/day} \pm 370.62$). The vast majority of examined nurses had insufficient calcium supply and more than a half of the women had calcium supply at the safe level (Figure 1).

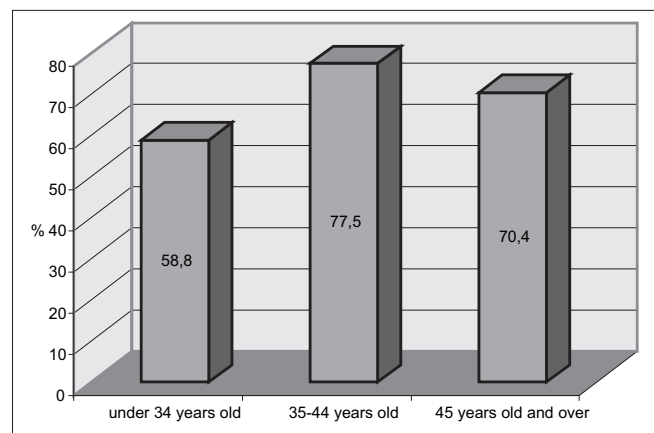


FIGURE 1. Percentage of realisation of calcium safety norm by nurses.

TABLE 1. The amount of selected products in nurses' daily food allowance.

Groups of products	Age groups		
	I group	II group	III group
	under 34 years old, n = 55	35-44 years old, n = 36	45 years old and over, n = 20
	Mean consumption mg/day \pm SD	Mean consumption mg/day \pm SD	Mean consumption mg/day \pm SD
Corn products	260.4 ± 184.41	256.1 ± 125.25	283.3 ± 240.40
Milk	$109.5 \pm 161.86^*$	$156.9 \pm 210.49^{**}$	$120.0 \pm 168.12^{*,**}$
Dairy products	125.2 ± 145.52	96.7 ± 105.59	118.0 ± 117.41
Meat and meat products	$179.9 \pm 137.76^*$	$121.5 \pm 77.11^*$	154.5 ± 107.63
Butter and sour cream	18.1 ± 27.29	19.3 ± 25.36	30.0 ± 40.39
Other fats (margarine, oil)	$2.9 \pm 7.56^*$	$0.4 \pm 1.84^{*,**}$	$5.2 \pm 10.45^{**}$
Fish	5.6 ± 19.89	20.0 ± 53.24	16.5 ± 51.02
Potatoes	$130.9 \pm 128.2^*$	$138.2 \pm 105.0^{*,**}$	$112.5 \pm 93.01^{*,**}$
Fruit and vegetables with vitamin C	$55.5 \pm 111.88^*$	$42.5 \pm 85.0^{*,**}$	$56.3 \pm 84.96^{**}$
Fruit and vegetables with β -carotene	$45.4 \pm 73.94^*$	$18.6 \pm 28.90^*$	47.5 ± 78.60
Other fruit and vegetables	199.5 ± 182.23	187.9 ± 154.9	221.3 ± 174.19

* – statistically significant differences between group I, II i III, $p < 0.05$.

** – statistically significant differences between group II i III, $p < 0.05$.

Magnesium

It was noted that mean magnesium content in daily food allowance of the nurses was high in all the age groups, which allowed the realisation of the norm in circa 100% in women from groups I and III and circa 90% from group II (Figure 2).

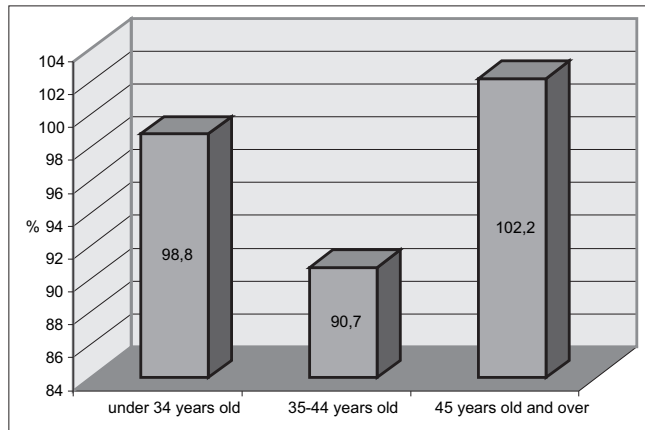


FIGURE 2. Percentage of realisation of magnesium safety norm.

Ferrum

The study showed that mean ferrum content in daily food portions of women from all the age groups was 10 mg and was below the norm. The realisation of the safety norm was achieved only by 73.7% of women under 34, by 66.6% of women between 35-44 and by 82.4% of women over 45 (Figure 3). In the vast majority of the respondents the intake of ferrum was below the safety level.

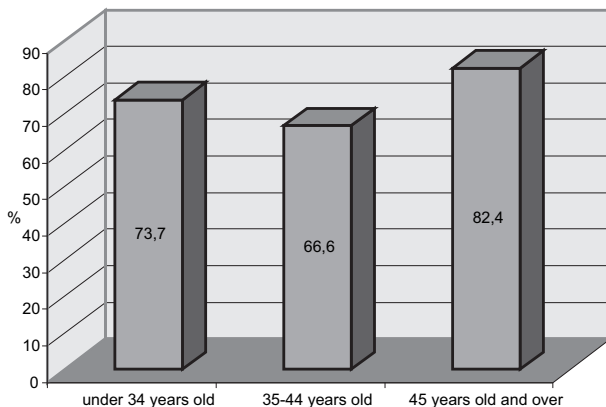


FIGURE 3. Percentage of realisation of ferrum intake at safety level.

Zinc

The study of nutritional habits of women in Podlasie revealed that zinc supply in daily food portions of nurses was similar in all the surveyed groups. Women under 34 years old and over 45 realised the safety norm of zinc consumption in circa 100% and women from group II in 89% (Figure 4).

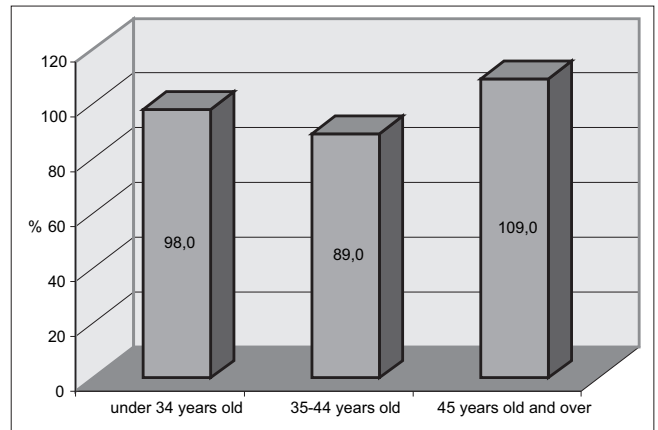


FIGURE 4. Percentage of realisation of zinc intake at safety level.

More than a half of the respondents from all the studied age groups described their eating habits as irrational (Table 2).

TABLE 2. Self evaluation of eating habits of respondents.

Do you eat rationally?	under 34 years old		35-44 years old		45 years old and over	
	n-55	%	n-36	%	n-20	%
YES	22	40.0	16	44.4	10	50.0
NO	33	60.0	20	55.6	10	50.0

DISCUSSION

The proper nutrition from the earliest years of our lives is the basis of a good state of health of the adult population. Inappropriate nutrition is a serious and widespread problem in Poland, although presumably a part of those who eat inappropriately does not feel the consequences as yet. The danger of inappropriate nutrition lies in the fact that some disorders are not noticeable in early stages but then appear in the form of civilisation diseases.

The quantitative analysis of the menus revealed that the most frequent nutritional error made by the nurses was inadequate consumption of milk, dairy products, fish, vegetables and fruit containing vitamin C and β-carotene.

Milk is the main source of calcium in the diet. The deficiency of calcium is highly likely to have a detrimental effect on health, resulting in rickets in children and osteoporosis in adults [8, 11].

In our study we observed that the nurses consumed insufficient amounts of milk. A higher average consumption of milk and its products in the daily food allowance was noted in the group of students from different regions of Poland [12, 13].

Fruit and vegetables are low-energy products, containing small amounts of carbohydrates, very little protein, trace amounts of fat and considerable amounts of water, fibre and minerals. It is worth emphasising that raw fruit and vegetables have the highest nutritional value. Boiling, stewing or frying lead to the loss of nutritional ingredients. Therefore, it is vital to eat most fruit and vegetables in the form of raw salads which have the highest nutritional value (there is no thermal processing in the preparation).

The difference in consumption of fruit and vegetables rich in vitamin C and carotene in the daily food portions of the studied nurses was statistically significant. The mean consumption of fruit and vegetables with vitamin C in age group I was 55.5 mg/day, in group II – 42.5 mg/day and in group III – 56.3 mg/day. On the other hand, the average amount of fruit and vegetables with carotene in the daily diet of women at the age of 35-44 was two times lower than the amount of these products in the diet of women from the remaining age groups. The nurses from Podlasie ate daily less fruit and vegetables with vitamin C and carotene than the students from Wrocław and Warsaw [12, 13].

Corn products are a good source of energy for the human organism. The content of nutritional ingredients in corn products depends on the degree of grain processing. The whiter flour and bread are and the more finely-grained cereals, the fewer bioelements and other ingredients they contain. The highest nutritional value is attributed to the so-called 'coarse grain' corn products, i.e. coarse grain cereals, wholemeal bread. The qualitative analysis of the menu showed that in the studied population the nurses from the age group 45 and above had the highest intake of corn products (white bread, wholemeal bread, pasta, rice and cereals). Other authors in their works observed that the intake of corn products in the daily food allowance was lower than in our studied groups [12, 13].

Meat and its products belong to food products which are regularly consumed; therefore, rarely are diets deficient in meat. A high consumption of meat results from our eating habits [14].

The highest consumption of meat and its products was observed in group I (179.9 mg/day), lower – in group II (121.5 mg/day). A higher consumption of meat was observed by Iłow in the studies conducted among students from Wrocław [12].

Potatoes are also consumed in Poland in relatively big amounts. They constitute the main component of meals and can be served as separate dishes or as a side dish. Potatoes contain considerable amounts of carbohydrates, due to which they have a high energy value, small amounts of protein and minerals (K, Mg, Fe, Zn and others).

The consumption of potatoes in the studied groups of nurses (I, II, III) was: 130.9 mg/day, 138.2 mg/day, 112.5 mg/day, respectively. Szewczyński et al. in their studies showed a higher consumption of this product [13].

Minerals play a significant role in our lives, being an important foundation basis of the organism on the one hand, and a metabolism regulator – on the other hand [6].

The analysis of the obtained data indicated calcium deficiencies in daily food portions of the nurses in all the studied age groups.

The studies conducted in primary schools in Warsaw in the years 1989-1999 showed that more than 50% of adolescents had less than 600 mg of calcium in their diets. The Institute of Food and Nutrition in Warsaw conducted a study on the content of calcium in average daily food portions in selected social groups of adults and observed calcium deficiencies in all the studied groups. Rutkowska et al. in their studies noted a lower intake of calcium in the studied group of women [15]. Low consumption of calcium was also observed in other studies but with higher values than in the analyzed group of nurses [12].

The studies of nutrition habits reveal that supply of magnesium in daily food allowance of nurses from Białystok and Elk was high in women from all age groups. The daily consumption of magnesium by women under 34 years old was sufficient in 98.8%, by women aged 34-44 in 90.7% and 102.2% for women over 45 years old. The magnesium supply in the diet of the above mentioned groups approximated safety level, similarly to people from other parts of Poland [15]. It is worth noting that average daily food allowance in the USA contains 252 mg of magnesium per day; in the UK – 250 mg of magnesium per day; in Germany – 235 mg of magnesium per day [16].

Another analysed ingredient in the menu of nurses was ferrum, whose intake was below the norm. The biggest ferrum deficiency was noted in the nurses from group II – 94.4%. Similarly to our results, other authors also observed a low intake of this element [12, 17]. The intake of ferrum in daily food portions in students, physical workers and white-collar workers from other regions of Poland was higher than in our respondents [13, 15].

In our study we also attempted to analyse the intake of zinc. More than a half of nurses had too low intake of this element. The highest content of zinc in the diet was noted in group III and the lowest – in group II. A similar consumption of zinc was observed by Iłow et al. [12], whereas Rutkowska et al. in their studies noted a higher consumption of zinc [18]. In Western Europe the mean content of zinc in the diet was 12.4 mg/day; in the USA and Canada – 12.2 mg/day; in the countries of Eastern Europe – 10.8 mg/day; in South Asia – 7.6 mg/day [12]. Despite the fact that the mean content of zinc in daily food allowance of nurses was sufficient to realise the norm at the safety level, as many as 45% of women over 45 and 41.8% of women between 35 and 44 consumed this bioelement below the norm.

The surveyed nurses were asked to evaluate their diets. More than a half of the respondents regarded their nutritional habits as irrational.

Every person is responsible for their health – they ought to improve it and protect it from the negative influence of environmental and social factors. Everybody should be aware of what is detrimental to health and what leads to diseases. One of the factors determining our state of health is proper nutrition and a healthy person is the basis of a healthy society.

CONCLUSIONS

1. Our respondents should be advised to increase the consumption of products containing calcium and ferrum.
2. Nutritional deficiencies, such as a low consumption of milk, dairy products, fish, fruit and vegetables with vitamin C and β -carotene, require a change of eating habits of our respondents.
3. Inappropriate nutrition of nurses may have a bad influence on the prevention of civilisation diseases.
4. There is a need to deepen the knowledge of medical staff about the consequences of inappropriate nutrition.

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