

THE LEVEL OF KNOWLEDGE ON NUTRITION AND ITS RELATION TO HEALTH AMONG POLISH YOUNG MEN

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ABSTRACT

Background. Men are less than women interested in nutrition and health. Also low is their nutritional knowledge. More than 25% of men are unwilling to increase their knowledge about food and nutrition. The main sources of men's knowledge about lifestyle including nutrition consist of Internet, colleagues and family. The low level of knowledge about nutrition and health among men is worrying especially in the context of their incidence of chronic non-communicable diseases like cardiovascular disease, higher than in women.

Objective. The aim of the study was to determine the level of knowledge on nutrition and health among young men.

Material and Methods. The study included 107 men aged 19-34 years from different places and backgrounds in Poland. Men were selected by the snowball method. The study was conducted using an authors' validated questionnaire containing six types of closed questions (85 detailed questions in total). For statistical analysis Chi^2 test was used ($p \leq 0.05$).

Results. Almost 42% of men under the study were overweight or obese, and less than 1/4 declared high physical activity, most showed (on a 4-point scale) sufficient (45%) or low level (40%) of knowledge of nutrition and health. Younger respondents had higher knowledge than older ones. Very low was the respondent's awareness of an energy content of products, sources of high quality protein and amount of recommended vegetable and fruit consumption. The well-known were the reasons for civilisation diseases and the effect of dietary fibre. The internet was the main source of nutritional knowledge and health related information followed by: colleagues and family.

Conclusions. The majority of men presented sufficient or low knowledge about food, nutrition and their relation to health. Young men should be encouraged to participate in various forms of nutritional and health education. This would increase the chance to avoid civilisation diseases.

Key words: health and nutritional knowledge, sources of knowledge, young men

STRESZCZENIE

Wprowadzenie. Mężczyźni mniej niż kobiety interesują się zdrowiem i żywieniem. Mała jest też ich wiedza żywieniowa. Ponad 25% mężczyzn nie chce zwiększyć swej wiedzy o żywności i żywieniu. Głównymi źródłami wiedzy mężczyzn na temat stylu życia, w tym żywienia, są Internet oraz koledzy i rodzina. Niski poziom wiedzy żywieniowo-zdrowotnej jest niepokojący, szczególnie w kontekście występowania przewlekłych chorób niezakaźnych jak choroby układu krążenia, częściej niż u kobiet.

Cel. Określenie poziomu wiedzy żywieniowo-zdrowotnej młodych mężczyzn.

Material i metody. Badania obejmowały grupę 107 mężczyzn w wieku 19-34 lata, pochodzących z różnych miejsc oraz środowisk w Polsce. Mężczyźni zostali wybrani za pomocą metody „kuli śnieżnej”. Badania przeprowadzono metodą ankietową przy użyciu kwestionariusza autorskiej, zwalidowanej ankiety zawierającej 6 różnych pytań zamkniętych (w nich łącznie 85 pytań szczegółowych). Do analizy statystycznej użyto testu Chi^2 przy poziomie istotności $p \leq 0.05$.

Wyniki. Około 42% badanych mężczyzn miało nadwagę lub otyłość, a niej niż 1/4 deklarowała aktywność fizyczną; w 4-stopniowej skali większość wykazała dostateczną (45%) albo małą (40%) wiedzę żywieniowo-zdrowotną. Młodszy respondenci mieli większą wiedzę niż starsi. Respondenci wykazali bardzo małą świadomość na temat wartości energetycznej produktów, źródeł wysoko wartościowego białka oraz zalecanych ilości spożywania warzyw i owoców. Dobrze znali przyczyny chorób cywilizacyjnych oraz wpływu błonnika pokarmowego na organizm. Głównym źródłem wiedzy żywieniowo-zdrowotnej był internet, a następnie koledzy oraz rodzina.

Wnioski. Większość mężczyzn prezentowała dostateczną lub małą wiedzę o żywności i żywieniu oraz ich związkach ze zdrowiem. Młodzi mężczyźni powinni być zachęceni do udziału w różnych formach edukacji żywieniowej i zdrowotnej. Mogłoby to zwiększyć szanse ograniczenia przewlekłych chorób niezakaźnych.

Słowa kluczowe: wiedza żywieniowo-zdrowotna, źródła wiedzy, młodzi mężczyźni

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INTRODUCTION

Men are not especially interested in nutrition. The main source of their knowledge about healthy lifestyle including nutrition consists of: internet, colleagues and family [10], magazines and newspapers. Many respondents suggested a TV advertising [3]. Men are less than women interested in their looks and health, which may be related to engaging in more frequent risky behaviours such as eating fatty meats and sausages, fried foods, smoking cigarettes and drinking alcohol [11]. The higher the level of nutritional knowledge of persons over 20 years of age, the lower the intake of total fat, saturated fat, cholesterol, sodium and sugar, and more dietary fibre [2].

Men's knowledge of human health and nutrition is much more limited than the knowledge of women. The same is true for boy's knowledge versus their female colleagues [13, 16, 18]. The low level of nutritional knowledge and lifestyle related diseases are represented by lack of knowledge of recommendations for vegetable and fruit consumption (21% correct answers), fat (35%) and salt intake (15%), alcohol consumption (34%), the need of physical activity (55%), reduction of smoking (44%) and conduct regular lifestyle, including eating meals (35%) [18].

Men suffering from cardiovascular diseases have a greater knowledge of health and human nutrition [2]. Less than 15% of Italian teenagers did not know that fat provides the largest amount of energy [16].

The exception is a group of students enrolled for the teaching profession [12] and clients of shops selling organic and less processed food [6]. Much greater awareness shows respondents in the UK [13]. However, the knowledge of men is significantly lower than women. Contrary to the Polish study in the UK men know dietary guidelines (2/3 good response), but also sources of macronutrients (protein, fat, carbohydrate), fiber, salt and saturated fatty acids. In Poland more than ¼ of men are unwilling to increase their knowledge about food and nutrition [10].

Men with the BMI greater than 25, and over 40 years old (respectively 74% and 63%) are more interested in the relation between nutrition and health [9]. A similar dependence of the knowledge on the age was found in Australia, where men above 34 gave significantly more correct answers than younger respondents. To avoid false information about nutrition and other lifestyle factors affecting health, it is recommended to use reliable sources of knowledge, which include scholarly and popular science books. Meanwhile men get information about nutrition primarily from the mass media: television, radio, popular magazines and more recently the Internet [10].

According to GUS [8]), Poland in terms of the number of male deaths from cardiovascular disease is in 19th place among the EU countries (437 deaths

per 100 thousand). The death rate for people from other countries such as Switzerland, France, Spain, Netherlands, Norway, Denmark, Portugal, Italy, United Kingdom and Greece are much lower (from 124 to 208 deaths per 100 thousand). Similar death rate from cardiovascular disease has the Czech Republic (424), and much higher: Hungary, Romania, Estonia, Lithuania, Belarus, Bulgaria, Russia and Ukraine (from 535 to 980 per 100 thousand). Polish men live on average 4.5 years shorter than in the EU [19].

One way to reduce the occurrence of non-communicable chronic diseases, including cardiovascular disease, is to educate people that the wrong lifestyle, including nutrition, poses a serious threat to their own health. Therefore, the aim of this study was to determine the level of nutritional and health knowledge in a selected group of young men.

MATERIAL AND METHODS

The study included 107 men from the originally selected by the snowball method 125 men (each person randomly selected for the study, recommended several more people). Respondents were aged 19 - 34 years old and were from different places and backgrounds. The study was conducted in 2013 using a questionnaire consisting of six types of closed questions (containing a total of 85 detailed questions), in the form of test of knowledge concerning chronic infectious diseases, their causes and risk factors, nutrition, nutrient sources in the diet and nutritional recommendations.

Closed-type questions were of true-false type, single or multiple choice, cafeterias (rank products by increasing the energy value), assigning responses. Imprint survey included 13 questions (e.g. age, height and weight, place of residence, education, type of occupation, physical activity, family history, and smoking cigarettes). The questionnaire was revised after the pilot study. The respondents were assured anonymity. To determine the level of the respondent's knowledge the following criteria were applied: high level of expertise - 75% of good answers, sufficient - between 74.9% and 50%, low - 49.9% to 25% and insufficient less than 25%. There were also simpler division to insufficient knowledge less than 50% of good answers and sufficient - more than 50% of correct answers.

For statistical analysis the R program was used (version 3.01 - 64-bit, χ^2 test was used at a significance level of $p \leq 0.05$).

RESULTS AND DISCUSSION

Among the 107 participants 80 (74.8%) were 19-25 years old and remaining were 26 to 34 years (mean age - 24.5 ± 2.9). 57% of respondents (tab. 1)

had a proper BMI value (18.5 - 24.9). But 42% were overweight or obese. Similar proportion was found in the study among Greek students [5], in contrast to the Dutch, in which overweight and obesity was present in only 20% of men [17]. As many as 88% of men suffering from cardiovascular disease are overweight or obese [1].

77% of men in the study lived in cities of over 100 thousand inhabitants, and only (10%) in rural areas (Table 1). 55% of the respondents lived with family remaining group lived alone with a partner or colleagues in almost equal proportions.

Table 1. The characteristics of the study group

Features / differentiators	Value/size (n)	Response rate (%)
BMI		
Mean \pm standard deviation	24,4 \pm 3,8	
< 18.5 (underweight)	1	0.9
18.5-24.9 (correct body mass)	61	57.4
25-29.9 (overweight)	35	32.8
30-34.9 (obesity)	10	8.9
Place of residence		
City above 100,000	82	76.6
City below 100,000	14	13.1
Village	11	10.3
Flat		
By himself	14	13.1
With family	59	55.1
With wife/ husband; partner	18	16.8
With colleagues, friends	16	15.0
Education		
Basic / vocational	6	5.6
High school	29	27.1
Higher/ university	72	67.3
Type of occupation		
Studies	37	34.6
Works	45	42.0
Works and studies	23	21.5
Unemployed	2	1.9
Job type		
Physical	10	9.3
Mental	80	74.8
Mixed mentally-physical	17	15.9
Using diet		
Yes	17	15.9
Disease in the families of the respondents		
No	29	27.1
One disease	35	32.7
More than one disease	43	40.2
Physical activity		
Low	18	16.8
Moderate	64	59.8
High	25	23.4
Cigarette smoking		
Yes	51	47.7
Yes now and in the past	27	25.4
Now yes, no - in the past	24	22.4
No now, no in the past	43	40.3
No now, yes in the past	13	11.9

Over 2/3 of respondents had higher education (or incomplete higher education). Slightly more than 1/3 of respondents were students, most of them worked (64.2%), and more than 1/5 of these who work also studied. Almost three-quarters of respondents performed mental work (Table 1). The vast majority (84%) of respondents did not use any special diets (Table 1). Among those who were on a diet (10 people out of 17) were on a slimming diet, 6 patients were on a special body builder diet and one man wanted to gain weight. Our results were similar to the previously obtained by Łaszek et al. [12] in which 16% of students apply diet - especially low energy diet.

Among all surveyed young men 3 suffered from cardiovascular disease. Two of them had hypertension and in one of thrombosis and arterial embolism. All respondents with cardiovascular disease have cases of hypertension in the family. The cases of cardiovascular disease were rare due to the young age of the respondents (19 - 34 years). On the other hand, the study *Waśkiewicz et al.* [18] show almost 8 time higher incidence of the hypertension (15.9%) for men aged 20 -34 years.

In families of men under the study hypertension was present (59 respondent's family, 55.1%), diabetes (30 respondent's family, 28%), cancer (21 respondent's family, 19.6%), cancers (21 respondent's family, 19.6%), infarction, stroke (21 respondent's family, 19.6%), arteriosclerosis/ hypercholesterolemia (8 respondent's family, 7.5%) and NCS (ischemic heart disease) (2 respondent's family 1.9%).

Most men (60%) declared moderate physical activity, less than 1/4 high, and about 17% - low physical activity (Table 1). Different results were obtained Sochacka et al. [15], according to their study almost 58% of respondents had little physical activity and the others had moderate physical activity, none of the respondents declared large physical activity.

Approximately 48% of respondents (Table 1) are smokers. Quarter of smokers did not smoke in the past and the smaller proportion who is not smoking at present smoked in the past. Among 19-25 years old 42% of people smoke, which is more than the GUS data (31% among 18-24 years old). Even greater difference between our (52.9%), and GUS data (36%) are for 25 - 36 years old men. The proportion of participants in our study who smoked cigarettes was larger than in previous study (40%) [18]. Similar data were obtained of Greek smoking students (37.4%) [5]. Much lower is the proportion of smokers among the Dutch (6%) [17].

The level of nutritional knowledge of young men

The average percentage of correct true-false answers to 27 questions (Table 2) was $48.3 \pm 18.8\%$. Assuming the simplest criteria of knowledge measurement indicate the insufficient level of nutritional knowledge among

the subjects. At the same time large standard deviation shows of a wide variation of results. Men studied were aware of the impact of recreation and physical activity in the prevention of chronic non-communicable diseases and their causes and also the composition of potatoes ($\geq 75\%$ correct answers).

Quite good knowledge (by sufficient level 50% - <75% of good answers) of respondents concerned the milk composition, the relative cholesterol content in pork and eggs, the effect of fiber on the body, comparative biological value of legumes and meat protein, and frequency of fruit and vegetables consumption and the red meat, as well as carotene antioxidant activity and recommendations of salt consumption.

Very low was the respondents' awareness of an energy content of fats and carbohydrates confirmed by (98.1%) incorrect answers. Also were unable to correctly rank by the decreasing energy value 6 products (oil, butter, rice, potatoes, cottage cheese, and apples). Most common mistake was treating potatoes as a high-calorie product, after oil and butter (37.3% wrong answers) or more caloric than oil and butter (13.4%). It also worth noting the high proportion of "do not know" answers in the true-false questions concerning the recommendation limiting daily intake of cholesterol (Table 2), the impact of EFA on the development of the foetus and infant, comparative content of trans fatty acid in French fries, potato chips and in soft margarines.

Table 2. Distribution as indicated in the test type true-false (in %)

The claim	T*	F*	Don't know
Civilization diseases are chronic non-infectious diseases that are caused not only by poor nutrition, but also the stress and smoking	88.1	3	8.9
One way to reduce the risk of lifestyle diseases may be reduction of the unsaturated fatty acids intake	32.8	31.3	35.8
The same portions of fat and carbohydrates provide the same amount of calories	3.0	74.6	22.4
Rest and significant physical activity can prevent lifestyle diseases	91.0	3.0	6.0
Grapes contain significant amounts of simple sugars	46.3	10.4	43.3
The daily intake of cholesterol should be less than 300 mg	17.9	3	79.1
One should not consume more milk because it contains a lot of simple sugars	22.4	46.3	31.3
Saturated fatty acids lowers the cholesterol in blood	17.9	37.3	44.8
Ripe bananas contain mainly complex carbohydrates	43.3	23.9	32.8
B-carotene has beneficial antioxidant effect	50.7	8.9	40.3
EFA's may have an adverse effect on foetal and infant development	13.4	32.8	53.7
Starch is the main carbohydrate in potatoes	85.1	4.5	10.4
Fiber regulates digestion and can reduce blood cholesterol levels	74.6	6	19.4
The recommended daily intake of salt for an adult, a healthy person is 15g	11.9	50.7	37.3
Male 20-35 years old should eat 250-350g of fruits and vegetables / per day	59.7	8.9	31.3
The average value of the energy required for a man of moderate physical activity is 4000kcal	25.4	46.3	28.3
French fries and potato chips contain more trans fatty acids than the soft margarine	40.3	4.5	55.2
Boiled pork contains less trans fatty acids than the roasted one	38.8	11.9	49.2
In 100g of sirloin there is more saturated fatty acids than in 100g of sausages	23.8	29.8	46.3
In the loin (100 g) is more cholesterol than in 2 eggs (100g)	8.9	52.2	38.8
The consumption of cakes and biscuits should be limited, because they contain NKT and trans-fatty acids	25.4	37.3	37.3
Red meat with a high nutritional value should be eaten 4-5 times a week	25.4	53.7	20.9
The biological value of soy and beans protein is the same as meat protein	19.4	52.2	28.3
According to the recommendations the vegetables and fruits should be eaten 1-2 times a day	22.4	65.7	11.9
The recommended frequency of fish consumption is once per week	56.7	32.8	10.4
Milk contains certain amount of cholesterol and is the source of vit. B2 and calcium	71.6	8.9	19.4
Vitamin C is in legumes, vegetables and fruit	82.1	8.9	8.9

*T-true, F-false

In their study people living in the city showed a higher awareness of the impact of nutrition on health than residents of rural areas. The number of correct answers did not depend significantly on education of the respondents or their places of residence, while it was dependent on age - younger gave more correct answers than 26-34 years old. The opposite results on the dependence of knowledge on place of the residence were reported by *Poręba* et al. [14]. In their study people living in the city showed a higher awareness of the impact of nutrition on health than residents of rural areas.

When asked about sources high quality proteins only 6% of respondents gave complete proper answers (among the 16 listed products only 8 were highlighted properly). The common errors were dismissing poultry and rennet cheese as a protein source (respectively 44.8% and 65.7%), as well as recognition of soybeans and beans as a source of balanced protein (respectively 50.7% and 28.3%). Different test results were obtained in Cadet Officers' College of the Air Force in Deblin, because nearly 64% of respondents correctly classified as sources high in protein content meat and meat products, milk and dairy products (46.6%) [7].

Not a single men participating in the study know the sources of dietary fibre and was able to select 6 products which are the source of fibre out of 12. While whole wheat bread was correctly identified by 83.6%, and sunflower seeds by 67.2%, but already dried apricots by 50.3% and 47.8% of respondents indicated nuts, kiwi and cucumber respectively 16.4% and 13.4%. Similar test results received *Bronkowska* et al. [4] - 31% of respondents were unable to identify products that contain fiber. In turn, 62.1% of the surveyed cadets knew that wholemeal bread is a source of fiber, 58.9% indicated as such a source legumes, and only 33% of fruits and vegetables [7].

Respondents showed limited knowledge of products containing relatively large amounts of cholesterol, trans fatty acids, saturated fatty acids and unsaturated (the mean percentage of correct answers was 27.5%), as well as the content of vitamins E and C (on average 34.3% correct answers). The most men (68.6%) knew that significant quantities of cholesterol is present in eggs, 34.3% knew that cholesterol is present in pork, while only 17.9% of respondents knew of its presence in giblets.

Only 34.3% of respondents knew that the fish contain unsaturated fatty acids, and even somewhat less (31.3%), that they are present in fish oil. Subjects confuse products in which there are saturated fatty acids with those containing unsaturated fatty acids, and vice versa. 61.2% and 59.7% respectively knew that vitamin E is in substantial quantities in sunflower oil and salmon. Almost half (49.7%) of respondents properly identified that vegetable sprouts are rich in

vitamin C, but a very small proportion of respondents knew that this vitamin is in peppers and white cabbage (in both cases, 11.9% of respondents) and black currants (only 4.5% right answers). In earlier study [7] results show that only 1/5 of men, less than in our study (1/3), knew that pork meat contains a lot of cholesterol, but showed higher product knowledge providing saturated and unsaturated fatty acids. Statistically significant correlation was found between knowledge about the sources of vitamins E and C and education of the respondents.

Respondents presented a sufficient level of knowledge about the effects of salt (sodium), cholesterol, and vitamin E on the body and a low level on the impact of vitamin C (Table 3).

Table 3. Knowledge of the effect of various nutrients in the body

Nutrient	Good answers (%)
Salt (sodium) (increase the chance of hypertension)	59.7
Cholesterol (contribution in atherosclerosis)	74.6
Vitamin E (prevents atherosclerotic processes)	52.2
Vitamin C (prevents atherosclerotic processes)	46.3

Using the criteria of the division of knowledge into 4 levels, 44.9% of respondents were classified to a group of sufficient level of knowledge (Figure 1). Low level of knowledge reached 40.3% of respondents, 10.3% the insufficient level, and the high level only 4.5% of respondents.

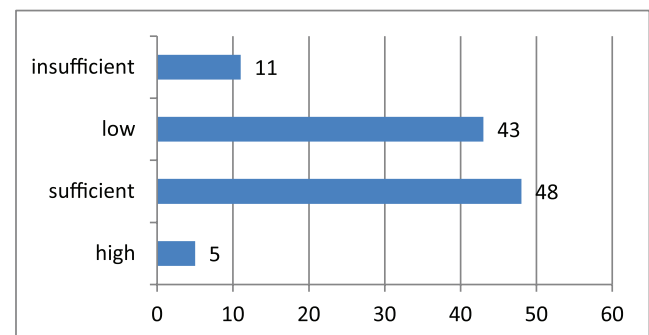


Figure 1. The level of nutritional and health knowledge of respondents (in number of correct answers)

Sources of nutritional knowledge of respondents

According to the declarations of the respondents the most common source of nutritional knowledge was the internet (Table 4) following by colleagues and friends and the family. To the least frequently used knowledge source was advertisement which, was classified as "other sources" by 10% of respondents.

Table 4. Sources of nutritional knowledge among respondents*

Source	Answers (%)
Internet	67.2
Colleagues, friends	64.2
Family	61.2
TV	40.3
School	23.9
Popular science magazines, books	22.4
Doctor / dietician	19.4
Radio	16.4
Popular magazines	14.9
Another	10.4

*the sum is higher than 100% because more than one answer could be picked by the respondents

It is worth noting that the advertisement was not selected as the sources of knowledge to choose from. There is therefore a high probability that if advertisement would be given it would be chosen by a much larger part of respondents. As relatively less popular sources of information respondents mentioned colour magazines, radio and physicians/ nutritionist's advice. Although the nutrition information on the product were not mentioned in the questionnaire almost 1/3 (32.8%) of respondents drew attention to the information on food packaging and read them.

Respondents with higher or incomplete higher education significantly more than people with lower education payed attention and read the nutrition information. Over 11% of men never been interested in nutrition information. Also in earlier studies the internet has been determined as the main source of nutrition information by over 70% of the Polish Air Force Academy cadets. At the same time doctors/ nutritionists counselling was determined to be not very popular source of information for cadets [7]. The reason may be that doctors do not always communicate nutritional knowledge to patients or do it incorrectly. It is even worse but patients with hypertension instead of listening to the doctors read articles in glossy magazines [4].

Our study confirm previously obtained results, which showed that for men the family is the main source of information about nutrition (58.1%). The family is the main sources especially for young 20-29 years old of which 75% use the information obtained from the family [10]. Men also benefit from the advice of extended family members (47.3%), colleagues, and friends (36.6% of responses), as well as the information in the package labelling on food products (35.5%). Although such information was not identified as a source of the knowledge by the respondents.

CONCLUSIONS

1. The majority of men presented sufficient or low knowledge about food, nutrition, lifestyle, and their relation to health. This is particularly worrying due to relationship between lifestyle, especially diet, and the occurrence of hypertension and other cardiovascular diseases, type 2 diabetes and certain types of cancer in young men and in men of older age.
2. The internet was the main source of nutritional knowledge and health related information followed by: colleagues, friends and family.
3. Young men should be encouraged to participate in various forms of nutritional and health education. This would increase the chance for improving their lifestyle, including nutrition, and thus health now and in the future.

Conflict of interest

The authors declare no conflict of interest.

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