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Prevention of cardiovascular disease and eating behavior in group of women and men aged 20 to 30 years

Małgorzata Dobrzyńska, Juliusz Przysławski

Department of Bromatology and Human Nutrition, Poznan University of Medical Sciences, Poland

ABSTRACT

Introduction. Proper nutrition and the use of preemptive care can prevent the development of cardiovascular diseases, which are the main cause of death in the world.
Aim. The aims of this study were to evaluate the nutritional habits, nutritional status, assessment of knowledge and use of nutritional prevention among group of women and men aged 20 to 30 years, living in Wielkopolska in the aspect of CVD risk.
Material and methods. In this study the method of 24-hour dietary recall to evaluate nutrition intake was used. To determine the nutritional status the anthropometric measurements (weight, height, waist) were taken, and BMI values were calculated. Assessment of knowledge and use of nutritional prevention in cardiovascular disease was performed by a questionnaire. The atherogenicity of the diets was evaluated using Keys score.
Results. The analysis of daily food rations showed differences between dietary guidelines and respondent diets, mainly in protein, fat, saturated fat and cholesterol intake. Tested prevention factors were well known in both groups. The exception involved the reduction of sodium intake in the diet. The use of preventive factors in daily routine differentiated treatment in groups. In the studied group men often exercised regularly, while women often limited intake of animal fats, cholesterol and simple sugars.
Conclusion. Inadequate nutrition (mainly incorrect saturated fatty acids (SFA), cholesterol and dietary fiber intake) and insufficient prevention care in the studied group may increase the risk of cardiovascular disease in the future.

Key words: prevention of cardiovascular disease, nutrition intake, nutritional status, eating intake.

Introduction

Improper dietary habits can significantly affect the development of civilization diseases, including cardiovascular diseases (CVD), which are one of the most common causes of death in the world [1]. Improper dietary behavior in childhood and during youth have a significant impact on the development of many diseases in adulthood, among other can lead to the development of obesity, diabetes, cancer and cardiovascular disease [2, 3].

Aim

The aim of this study was to assess the knowledge on the prevention of cardiovascular disease and to evaluate of eating intake, nutritional status and dietary habits in group of men and women aged 20 to 30 years living in Wielkopolska.

Material and methods

The study was performed between February and June 2012 on randomly selected 195 women and 184 men aged 20 to 30 years, living in Wielkopolska. Applied methods were based on a questionnaire, which consisted of three parts: the first part concerned the anthropometric measurements, the second was associated with the knowledge about prevention in cardiovascular diseases, while the third was used to determine the daily

intake of energy ingredients, sodium, dietary fiber and cholesterol. The nutritional status of the study group was based on the Body Mass Index (BMI). The eating intake were evaluated by the method of 24-hour dietary recall. The atherogenicity of the diets was evaluated using Keys score calculated by the following formula [4]:

$$Keys\ score = 1.35 \times (2 \times SFA\ \% - PUFA\ \%) + 1.5 \times (\sqrt{}\ ((cholesterol\ [mg] / 1000\ kcal))$$

where: SFA – saturated fatty acids, PUFA – polyunsaturated fatty acids.

The daily energy intake and content of selected nutrients in the diets were compared to the "Human dietary standards" issued by M. Jarosz and B. Bulhak-Jachymczyk. The amount of consumed food products were determined by the "Album of photographs of food products and dishes" issued by the National Food And Nutrition Institute [5, 6]. Analysis of the results was performed using the application prepared in MS Access. The statistical analysis was performed using Statistica 10 software. Normality was tested using the Shapiro-Wilk statistical test. Diet effects were analyzed using a Mann-Whitney U test, and dietary habits were analyzed using a Fisher's exact test ($p \leqslant 0.05$).

Results

The BMI values in the study group indicated: a normal weight ($18.5 \leqslant BMI < 25$ kg/m^2), however the values were higher among group of men (23.3 kg/m^2) than in the group of women (20.6 kg/m^2). Overweight ($25 \leqslant BMI < 30$ kg/m^2) was observed in 37% of men and 9% of women, while obesity ($BMI \geqslant 30$ kg/m^2) in 4% of men and 1% of women. The BMI values (less than 18.5 kg/m^2), which indicate underweight were observed in 14% of all surveyed women and 1% of men.

The median waist circumference was in the normal range and was successively for men: 89 cm and for women: 71 cm (**Table 1**).

The daily food intake of the study subjects showed discrepancies compared to the dietary guidelines. They focused on the intake of fat, dietary fiber, saturated fatty acids and cholesterol, particularly among males (**Table 2**).

The median energy intake in the group of men was 2762 kcal/day, and in the group of women 2066 kcal/day, indicating a slight excess of energy in daily food rations in women (**Table 2**).

The protein intake in the studied group, regardless of gender was in the recommended range.

Median protein content in the analyzed diets was 108 g/day in group of men (15.8% of the dietary

Table 1. Anthropometric characteristic in the group of women and men

Parameter	Men Median (X ± SD)	Women Median (X ± SD)
Age (year)	24 (25 ± 5)	24 (25 ± 3)
Body weight (kg)	81 (81 ± 11)	57 (59 ± 10)
Height (cm)	181 (181 ± 7)	165 (167 ± 7)
Waist circumference (cm)	89 (89 ± 8)	71 (72 ± 9)
BMI (kg/m^2)	23.3 (24.6 ± 3.2)	20.6 (21.1 ± 2.9)

Table 2. Characteristic of daily food ratio in woman and man group

Parameter	Men			Women			p
	Median ($\bar{x}$ ± SD)	Q1	Q3	**Median** ($\bar{x}$ ± SD)	Q1	Q3	
Energy [kcal]	**2762** (2797 ± 890)	2142	3333	**2066** (2136 ± 618)	1669	2496	–
Carbohydrates [g]	**354** (372 ± 143)	260.8	466.1	**278** (293 ± 100)	223.7	350.5	–
Carbohydrates [% en.]	**54.1** (53.2 ± 10.4)	46.9	59.7	**55.0** (54.7 ± 9.3)	48.6	61.1	p = 0.248
Protein [g]	**108** (112 ± 37)	84	131	**81** (85 ± 27)	64	105	–
Protein [% en.]	**15.8** (16.5 ± 4.3)	13.0	18.9	**15.5** (16.4 ± 4.4)	13.4	18.9	p = 0.813
Fat [g]	**97** (101 ± 44)	67	130	**72** (77 ± 32)	54	94	–
Fat [% en.]	**31.9** (32.2 ± 9.2)	25.5	38.8	**30.8** (32.2 ± 8.7)	26.2	38.7	p = 0.982
SFA [% en.]	**11.7** (12.5 ± 4.7)	9.2	15.5	**11.5** (12.1 ± 4.5)	8.9	15.0	p = 0.416
MUFA [% en.]	**11.6** (11.9 ± 4.0)	9.3	14.4	**11.8** (11.9 ± 4.2)	8.6	14.2	p = 0.604
PUFA [% en.]	**4.2** (5.0 ± 3.1)	3.1	5.6	**4.3** (5.5 ± 3.3)	3.2	6.5	p = 0.110
Cholesterol [mg]	**378** (593 ± 540)	248.2	748.2	**291** (380 ± 274)	196.7	437.6	–
Dietary fiber [g]	**28** (28 ± 12)	19.2	35.2	**23** (25 ± 10)	18.0	29.0	–
Sodium [g]	**2.8** (3.0 ± 1.4)	2.1	3.8	**1.9** (2.1 ± 1.1)	1.3	2.7	–
Keys score	**44.0** (47.5 ± 16.9)	35.9	57.2	**43.9** (44.4 ± 16.3)	32.9	54.7	–

Q1 – lower quartile, Q3 – upper quartile, en – energy input
Mann-Whitney U test

energy) and 81 g/day (15.5% of the dietary energy) in group of women.

Carbohydrate intake in analyzed diets was 354 g/day (54.1% of energy) in men and 278 g/day (55%) in women, which indicates a slight deficiency of carbohydrates in the daily food rations in men.

The percentage of energy from fat in the diets in both studied groups was 30% which is slightly higher than the dietary guidelines.

Dietary saturated fatty acids (SFA) in both groups were higher than the recommended (up to 10% of energy intake). The percentage of energy from SFA in the diets was 11.7% in the men and 11.5% in the women. The percentage of energy from EFA in the diets was only 4.2% in men and 4.3% in woman.

The average daily intake of dietary cholesterol in food rations was statistically significant different between women and men ($p < 0.0001$). In the men group dietary cholesterol intake was 378 mg/day, but in the group of women 291 mg/day.

The dietary fiber intake with the diets was 28 g/day in men and 23 g/day in women.

The median sodium intake in the group of men was 2.8 g/day and in the women group was 1.9 g/day (**Table 2**).

The group of men consumed more liquids compared to the group of women. Respondents mainly consumed 1 to 1.5 liters of fluid per day in both groups (in group of men 34%, in group of women 45%) (**Table 3**).

Median of the Keys score in the respondents diets was similar to the values obtained in WOBASZ study conducted in 2005 (Multicentre Nationwide Study of the Polish population's Health) and was 44.0 for men and 43.9 for women.

Most of respondents assessed their eating habits as "good" (65% of women and 55% of men), only 3% of men and 2% of women assessed them as "bad" (**Table 3**).

Knowledge about preventive factors was similar in both groups (**Table 4**). Significant differences were observed in implementing preventive factors in daily life. The group of women often restricted animal fat, dietary cholesterol and monosaccharide intake in their diets. The group of studied men often exercised regularly, but for those with overweight it was still insufficient (**Table 4**).

Table 3. Characteristic group with regard to selected dietary habits – the percentage of total sample

	Men	Women
The number of meals consumed		
< 3	5%	3%
3	30%	19%
4	36%*	36%
5	24%	38%*
6	2%	4%
> 6	2%	0%
The regularity of meals consumed		
Always	18%	19%
Often	51% *	57%*
Rarely	19%	17%
Irregularly	12%	7%
The amount of liquid consumed		
< 1 liter	4%	11%
1–1.5 liter	34%*	45%*
1.5–2 liter	30%	36%
2–2.5 liter	20%	5%
> 2.5 liter	11%	3%
Assessment of their eating habits		
Very good	10%	5%
Good	55%*	65%*
Average	32%	29%
Bad	3%	2%

** The highest percentage in the study group*

Table 4. Knowledge of selected risk factors of cardiovascular disease in woman and man group – the percentage of total sample

Factor	Men			Women		
	1	2	3	1	2	3
Cessation or not smoking	2%	31%	67%*	4%	26%	70%*
Regular exercises	1%	35%	64%	2%	56%*	43%
Maintaining a healthy weight	4%	33%	63%*	2%	31%	67%*
Stress reduction	9%	53%*	38%	8%	53%*	38%
Reduction of sodium intake	43%*	29%	27%	27%	29%	44%*
Reduction of cholesterol intake	11%	52%*	37%	7%	30%	63%*
Reduction of animal fat intake	12%	61%*	28%	8%	37%	55%*
Reduction of sugar intake	20%	47%*	33%	8%	46%*	46%*

1 – do not know, 2 – know but do not apply, 3 – know and apply
** The highest percentage in the group*

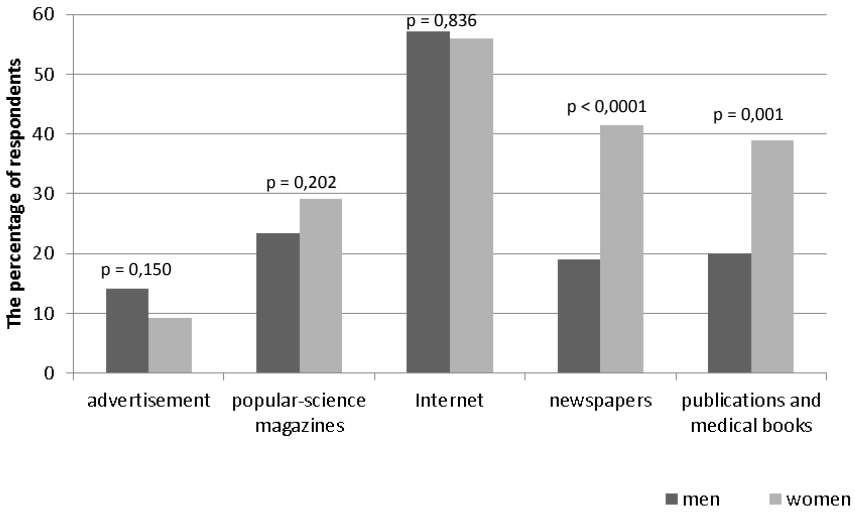

Figure 1. The main source of information on nutrition in woman and man group [%]. Fisher's exact test

The reduction of salt consumption was not known as a risk-reducing factor among respondents, 43% of men and 27% of women did not know that reducing sodium intake may reduce the risk of cardiovascular disease (**Table 4**).

The well-known preventive factor in both groups was maintaining a healthy weight, 63% of men and 67% of women strived to maintain a healthy weight. It was evident also in anthropometric measurements, mean BMI value and waist circumference conformed to the norms [5].

Cessation and not smoking were well-known preventive factors. Both groups, 67% of men and 70% of women did not smoke cigarettes and were aware that smoking increases the risk of heart diseases.

Main source of information about food and nutrition was the Internet (55.9% of women and 57.1% of men). The statistically significant difference was between the acquisition of nutritional knowledge from newspapers ($p < 0.0001$), and medical publications ($p = 0.001$). Women read medical publication and newspapers about nutrition more often than men (**Figure 1**).

Discussion

It is well known that main cause of civilization diseases is an unhealthy lifestyle. Lack of physical activity, excessive animal fat and sugar in the diet lead to increase in weight, increase body fat and contribute to occurrence of CVD.

These studies wanted to emphasize the important role of prevention against cardiovascular diseases.

The results of this study confirm earlier statements which documented an increase in the frequency of poor dietary habits in Polish young people.

The reported dietary intake and selected parameters of nutritional status studied correlate to preemptive care.

Analysis of BMI value, which is the most commonly used parameter to differentiate normal body weight from underweight, overweight and obesity [6] indicate the increased tendency to excess body weight in male and propensity to weight deficiency in women.

However, this has not been confirmed in waist circumference were the results were lower than the limit values. The correct values for this parameter should be less than 94 cm for men and less than 80 cm for women [7].

It is worth noting, that the higher values of this parameters can significantly contribute to increase the risk of coronary heart disease in the future [8]. In particular, in the group of men where the prevalence of overweight was significantly higher than in women.

Daily energy intake in the studied group of men and women, after adjustment by age, body weight and physical activity should be 2700 kcal/day for men and 1900 kcal/day for women [5]. In the study an excessive intake of energy was observed only in woman group although in the group of men prevalence of overweight and obesity was more common compared to the woman group. This could be due to the fact that women ate the meals more often and regularly during the day.

According to the current dietary guidelines, the proportion of energy components should be: 55–75% from carbohydrates, 10–15% from protein and 15–30% from fats [5].

The daily food intake of the study subjects showed discrepancies in dietary fiber, fat, saturated fatty acids and cholesterol intake, particularly among males.

The increase in the consumption of dietary fiber which was observed in woman group negatively correlated with the occurrence of diseases of the cardiovascular system. However, the recommended intake of dietary fiber in the daily food rations equals 20–40 g/day. In prevention of cardiovascular disease it is recommended to take in even 30–45 g/day dietary fiber [5, 8].

The higher fat and dietary cholesterol intake in the men group was associated with increased consumption of butter, cheese, chicken eggs and cream. In addition, increase the intake of SFA was due to increased consumption of sweets.

The recommended daily intake the discussed value should be no more than 10% of energy for SFA, about 8% of energy for PUFA and cholesterol should be lower than 300 mg/day [5, 8, 9].

In the prevention of cardiovascular disease it is important to reduce sodium intake in the diet, which should not exceed 5 g per day [8]. The average sodium intake in the group of men was correct. This element in the diet was within the normal range, although the dietary questionnaire did not include additional salting, which is the major source of sodium in the diet [10, 11]. The study analyzed only the sodium content of food.

Median of the Keys score in the respondents diets wae similar to values obtained in WOBASZ study conducted in 2005 where Keys score was respectively 41.8 for men and 41.1 for women [12].

Most of respondents assessed their eating habits as "good", mostly unaware of dietary mistakes.

An important factor in determining the correct nutritional dietary behavior is the appropriate level of nutritional knowledge. Increase in the level of knowledge about nutrition and prevention of lifestyle diseases in the population may help to reduce the incidence of these diseases. It is therefore important to promote knowledge, as well as to asses the level of knowledge in population [2].

To counteract the occurrence of cardiovascular disease it is necessary to include among others factors: maintaining a healthy weight, regular exercise, reducing the intake of animal fats, cholesterol, sugars and sodium, and cessation or not taking up smoking [8, 13, 14].

The preventive factors were well known in both study groups. Significant differences were observed in animal fat, dietary cholesterol and monosaccharide intake which was confirmed in their regular daily diet. For this reason, the proper emphasis should be put on proper nutrition among men.

Unawareness of the salt reduction in regular diet, which greatly contributes to reducing the risk of cardiovascular disease seems to be closely related to hypertension, which is one of the most common health problems in Polish population. In addition, the study revealed a positive trend for the reduction of smoking cigarettes in young people (aged 20 to 30 years).

Conclusions

Excessive content of total fat, SFA and cholesterol in the diets and insufficient intake of PUFA and dietary fiber may be the cause of increased risk of the CVDs in this group in the future.

The insufficient knowledge about nutrition in the studied group may cause increased risk of the CVDs in the future. It is important to promote national knowledge to raise social awareness of the dangers related to the lifestyle.

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Correspondence address
Małgorzata Dobrzyńska
Department of Bromatology and Human Nutrition
Poznan University of Medical Sciences
42 Marcelińska Street, 60-354 Poznań, Poland
email: mdobrzynska@ump.edu.pl