

NUTRITIONAL ASSESSMENT IN POLISH MEN WITH CARDIOVASCULAR DISEASES

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ABSTRACT

Background. Cardiovascular disease is the most common cause of death in Poland, where many factors have been found responsible such as obesity, smoking cigarettes and a lack of physical activity. Amongst these are also nutritional determinants, which principally include the amount and types of dietary fatty acids consumed, coupled with low intakes of antioxidant-rich fruit and vegetables.

Objectives. To assess nutrition in male subjects suffering from cardiovascular disease.

Materials and methods. Subjects were 95 men with cardiovascular disease aged 30-90 years. Nutrition was assessed by weighed food records over 3 days. The calorific dietary intake, as well as the proportions of calories derived from dietary protein, carbohydrates and fat were also calculated; this included vitamins and minerals.

Results. Only 18% subjects had a normal Body Mass Index (BMI); the rest falling into the overweight or obesity ranges. The average dietary calorific daily intakes were abnormally low at 1582 kcal/person, however the proportions of fat and protein making up this value were too high; respectively at 36% and 19%. The average daily consumption per person of cholesterol, fibre and vegetables were respectively 251 mg, 19 g and 608 g. A significant number were deficient in dietary minerals (eg. calcium, potassium and magnesium) as well as vitamins; especially A, B₁ and B₂.

Conclusions. Persons suffering from cardiovascular disease require a diet with sufficient calories for their body needs. It is also vital that the dietary sources of energy are properly balanced between protein, carbohydrates and fats as well as having appropriate intakes of both vitamins and minerals (eg. calcium, magnesium and potassium).

Key words: *cardiovascular diseases, nutrition, body mass index, BMI*

STRESZCZENIE

Wprowadzenie. Choroby sercowo-naczyniowe to najczęstsza przyczyna zgonów w Polsce. Na rozwój tych schorzeń wpływa wiele czynników, m.in.: otyłość, palenie papierosów czy brak aktywności fizycznej. Spośród czynników żywieniowych do najważniejszych przyczyn należą ilość i rodzaje kwasów tłuszczowych, zbyt niskie spożycie błonnika pokarmowego oraz owoców i warzyw, a przez to przede wszystkim witamin antyoksydacyjnych.

Cel. Celem badań była ocena sposobu żywienia grupy mężczyzn z chorobami sercowo-naczyniowymi.

Materiał i metody. Badanie przeprowadzono wśród 95 mężczyzn z chorobami sercowo-naczyniowymi w wieku od 30 do 90 lat. Oceny sposobu żywienia dokonano na podstawie 3-dniowego bieżącego notowania. Obliczono wartość energetyczną całodziennych racji pokarmowych badanych a także udział białek, węglowodanów i tłuszczu w dostarczaniu energii. Określono także wielkość spożycia wybranych składników mineralnych i witamin.

Wyniki. Zaledwie u 18% badanych stwierdzono prawidłową wartość wskaźnika masy ciała (BMI), u pozostałych osób stwierdzono nadwagę lub otyłość. Podaż energii z całodzienną racją pokarmową była zbyt niska i wynosiła średnio 1582 kcal/os/d, a udział tłuszczu (36%) i białka (19%) w dostarczaniu energii był zbyt wysoki. Średnie spożycie cholesterolu, błonnika oraz owoców i warzyw wynosiło: 251 mg/os/d, 19 g/os/d oraz 608 g/os/d. Znacząca liczba osób badanych spożywała niewystarczające ilości składników mineralnych (głównie wapnia, potasu i magnezu) oraz witamin (przede wszystkim A, B₁ i B₂).

Wnioski. Szczególną uwagę wśród osób z chorobami sercowo-naczyniowymi należy zwrócić na prawidłowe spożycie energii oraz udział energii z białek, węglowodanów i tłuszczu w diecie, jak też na prawidłowe spożycie składników mineralnych takich jak Ca, Mg i K oraz witamin, w tym antyoksydacyjnych.

Słowa kluczowe: *choroby sercowo-naczyniowe, sposób żywienia, wskaźnik masy ciała, BMI*

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INTRODUCTION

In Poland, cardiovascular disease is the principle cause of mortality; being consistent with an overall rate of 40% seen in the EU [5]. A multi-centre study, 'INTERHEART', has identified the following risk factors; hyperlipidaemia, smoking tobacco, hypertension, diabetes, stomach obesity and psychological determinants, together with those positive factors affording protection such as; moderate alcohol intake, regular physical activity and consuming appropriate amounts of fruit and vegetables [15]. Furthermore, the risk of cardiovascular disease is exacerbated by consuming abnormal amounts coupled with inappropriate types of fatty acids, and having low intakes of fibre, antioxidant vitamins as well as being obese and undertaking low levels of physical activity [8].

The study aims were to determine and assess the nutrition of a subject group of men with cardiovascular disease.

MATERIALS AND METHODS

The study had been performed during 2007-2008 on 95 male subjects (30-90 years old), recruited in one of Warsaw's hospitals suffering from coronary heart disease, arterial sclerosis or having previous episodes of cardiac infarction or stroke. The survey posed the following questions; age, level of education, extent of physical activity, height and weight; where in the latter

two cases, this applied to values recorded during the 3 day trial before subsequent assessment visits which were used to calculate the BMI. Data was obtained during two week days and one from the weekend. Portion sizes were based on a photograph album of relevant foodstuffs and dishes [12]. A computer programme and database 'ZYWIENIE' was used to determine daily calorific values in a given diet that also allowed the proportional contribution of calories derived from protein, fats and carbohydrates to be made as well as estimating the amounts of vitamins and minerals consumed [9]. The calculated totals were adjusted for technological and serving losses where individual results were referenced to various nutrition standards such as; the RDA (Recommended Daily Allowance) or AI (Adequate Intake) from 2012 [8], dietary recommendations made by the National Cholesterol Education Programme-Grade 2 (NCEP) regarding persons suffering from cardiovascular disease together with those of the Adult Treatment Panel III (ATP III) [13]. All subjects had been taking medicines as primary prevention measures. The presented studies were approved by the Bioethical Commission from the Cardiology Institute in Warsaw.

RESULTS AND DISCUSSION

The average age of the subjects with cardiovascular disease was 61 years of which 34% and 38% had higher or secondary education respectively; the remaining 28% were educated to primary or basic vocational levels. Low physical activity levels (PAL) were noted in over

Table 1. Intakes of foodstuff components, fruit and vegetables in male subjects, (n=95).

Foodstuffs/components	x	±	sd	median	min	÷	max
Calories [kcal]	1582	±	424	1514	933	÷	2678
Dietary fibre [g]	19	±	7	19	6	÷	39
Cholesterol [mg]	251	±	108	225	95	÷	569
Calcium [mg]	524	±	279	451	145	÷	1583
Phosphorus [mg]	1335	±	366	1277	656	÷	2313
Potassium [mg]	3485	±	1066	3473	1313	÷	6063
Magnesium [mg]	321	±	110	306	133	÷	640
Iron [mg]	10.7	±	3.1	10.2	4.8	÷	19.4
Copper [mg]	1.2	±	0.4	1.2	0.5	÷	2.1
Zinc [mg]	11.3	±	3.2	10.9	5.7	÷	20.1
Vitamin A [µg retinol]	747	±	360	700	120	÷	1867
Vitamin E [mg α-tocopherol equivalent]	12.3	±	4.6	11.8	4.7	÷	25.2
Vitamin C [mg]	58	±	35	51	6	÷	188
Vitamin B ₁ [mg thiamine]	1.3	±	0.5	1.2	0.5	÷	2.9
Vitamin B ₂ [mg riboflavin]	1.4	±	0.4	1.3	0.6	÷	2.4
Vitamin B ₆ [mg pyridoxine]	2.3	±	0.8	2.3	0.9	÷	4.9
Niacin [mg niacin equivalent]	21	±	7	20	9	÷	44
Fruit and vegetables [g]	608	±	389	547	55	÷	1945

x ± sd – mean values ± standard deviation

one third of subjects, (PAL=1.6) whereas the remaining 64% did moderate amounts with a PAL of 1.75. According to the BMI, appropriate body masses were observed in only 18% subjects; in contrast to overweight (54%) and obesity (28%). In reply to the question on whether nutrition affects health, 63% answered positively, 18% disagreed and 19% simply didn't know. The average calorific values of daily diets were found to be low at 1582 kcal per person (Table 1), which were consistent with the findings of the WOBASZ study conducted on 639 men aged 60-74 with average dietary calorific intakes of 2015 kcal daily [11].

The dietary proportions of energy/calories derived from protein, fats and carbohydrate were abnormal, (Figure 1). For the former two, recommended values were respectively exceeded by 4% and 6%, whereas carbohydrates were 10% lower than recommended. The presented findings for protein and fats were approximately similar to other studies on the inhabitants of Warsaw [3, 14], but showed a greater abnormality compared to the WOBASZ study, although the contribution of fats to the total dietary calorific value remained around the same at 36% [11].

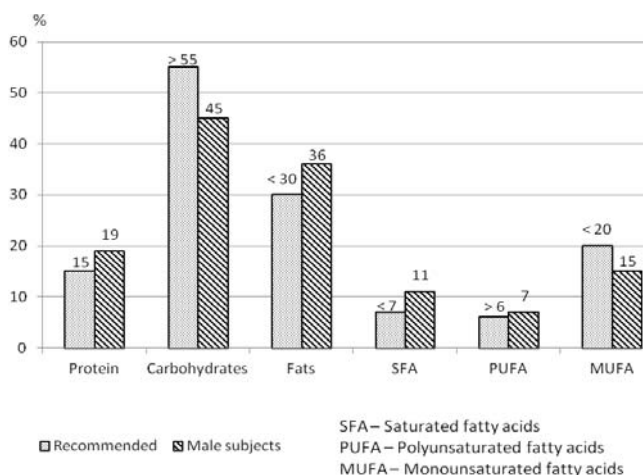


Figure 1. Proportions of calories derived from dietary protein, carbohydrates, fats, SFA, MUFA and PUFA of male subjects compared to recommended values [13]

Dietary saturated fatty acids (SFA) made up 11% of the calorific intake which is 4% higher than that recommended, however other studies showed even higher levels of 13.6% [18]. The proportion of saturated fatty acids to polyunsaturated (PUFA) and monounsaturated (MUFA) ones were nevertheless acceptable (Figure 1).

Daily consumption of cholesterol ranged between 95 to 570 mg per person, where the recommended daily dose of 200 mg was exceeded by 72% of subjects. The average daily intake of cholesterol was however 32 mg lower compared to the WOBASZ study on male subjects [11]. There was insufficient dietary fibre consumption in 81% subjects, ranging from 6 to 40 g daily per person; average being 19 g. Almost half the subjects ate average

608 g/person/day of fruit and vegetables that was more than the recommended amounts (400 g/person/day) (Table 1). The presented findings also demonstrated that the daily fruit and vegetable consumption was 210 g per person higher than the results of the WOBASZ study in subjects aged 20-74 years [16]. Many other studies demonstrate that higher fruit and vegetable consumption are linked to reduced cardiovascular disease risk [2, 6, 7].

Intakes of the vitamins and minerals studied were found to be inadequate. Calcium, potassium and magnesium intakes were found to be higher than reference/recommended levels in only 3-25% subjects compared to 37% and 40% for zinc and iron respectively, (Figure 2). Daily calcium intakes were nearly 100 mg per person lower than in a study on the inhabitants of Warsaw, with potassium and magnesium levels following a similar trend [4]. The observed consumption of calcium and potassium was much higher compared to the WOBASZ study; for magnesium this amounted to 59 mg daily per person more [17]. Dietary deficiencies of these aforementioned elements are also risk factors for developing cardiovascular disease, where they play important roles in prevention and treatment [10].

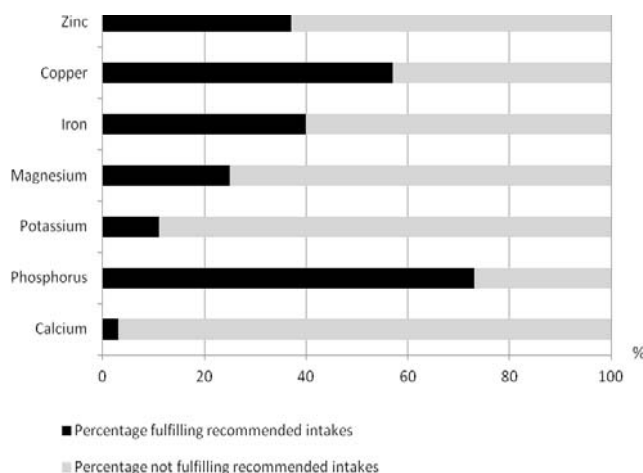


Figure 2. The proportions of male subjects fulfilling adequate dietary intakes according to recommended values.

The fewest subjects with higher than recommended vitamin intakes were found for vitamin A (21%) and vitamin B₁ (28%); for the other vitamins studied, the numbers constituted 40 to 61%, (Figure 3). The observed daily vitamin A intake was over 300 µg per person lower than in studies conducted on the inhabitants of Warsaw [14, 17], whereas observed vitamin E levels were substantially higher, whilst vitamin C intakes were similar in all instances. The consumption of the antioxidant vitamins (A, C and E) is especially significant in those subjects with a history of cardiovascular incidents where a reduction of harmful free radicals can thus be achieved [1].

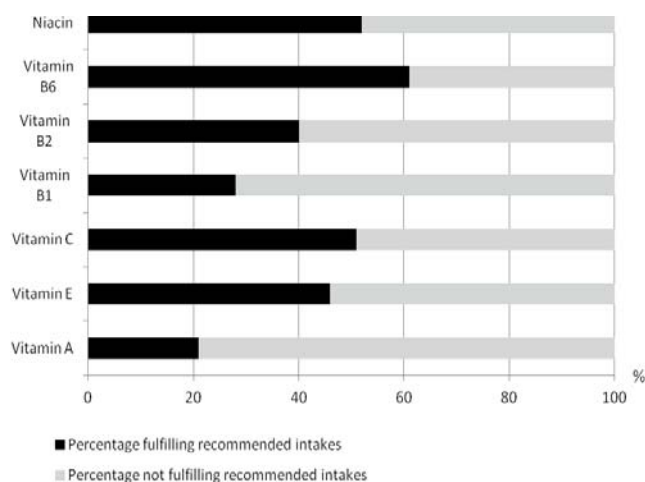


Figure 3. The percentage of men fulfilling recommended intakes for vitamins

CONCLUSIONS

1. Subjects with cardiovascular disease consumed nutritionally inadequate diets where a rather high BMI was observed in 82% cases.
2. The daily diet of the studied males, demonstrated insufficient calorie intake and that the proportions of calories derived from protein, fats and carbohydrates were unbalanced.
3. Even though fruit and vegetable consumption was significantly higher than recommended levels, dietary fibre intake was insufficient.
4. Deficiencies in mineral intakes were observed in significant numbers of subjects (mainly calcium, potassium and magnesium) as well as for vitamins A, B₁ and B₂.
5. Consuming a nutritionally adequate diet for preventing cardiovascular disease forms an important part for decreasing its risk. It is therefore necessary to ensure that the dietary intake of calories is sufficient and that this is correctly balanced between the food derived from sources of protein, fats and carbohydrates. In addition, there should be adequate intakes of minerals such as calcium, potassium and magnesium together with the antioxidant vitamins.

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Conflict of interest.

The authors declare no conflict of interest.

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