

Life style and cardiovascular risk factors among students of Wrocław postgraduate schools

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Abstract: Introduction. Cardiovascular risk factors include independent factors such as advanced age, male gender, family history and modifiable risk factors including cigarette smoking, arterial hypertension, lipid disturbances, diabetes mellitus, obesity, dietary habits and stress. In contrast, fruit and vegetables consumption, moderate alcohol consumption and physical activity are cardioprotective factors. **Objectives.** The aim of the study was to analyze the lifestyle of students from universities of the city of Wrocław in the aspect of cardiovascular risk factors. **Patients and methods.** The studies were performed in 240 students of nature faculties from four public universities and one nonpublic postgraduate school. Mean age of participants was 21.5 ± 1.5 years. A special questionnaire prepared by the authors was used during the study, and the participants filled it anonymously. **Results.** Among the participants 17.4% claimed to use a special diet. Overweight or obesity were declared by 10.3% of the students but it was proved only in 7.7%. Smoking habit was reported by 23.9% of the participants. Students gave the correct answers to questions on diet in 47.7% of cases. **Conclusions.** Life style and diet habits of the students from Wrocław universities do not basically differ from the pattern presented by a statistical Pole and it should be modified. In order to improve the present epidemiological situation it is necessary to include problems of preventive medicine in teaching programs in all Polish universities.

Key words: cardiovascular system, risk factors, students

INTRODUCTION

Cardiovascular disorders remain the main cause of premature death in Europe [1]. In Poland cardiovascular disorders caused 26,300 deaths in 2006, i.e. 29% of all death cases among the productive age population [2]. Cardiovascular mortality had abruptly increased in the ninth decade of the 20th century. In the same time in Western European countries cardiovascular mortality had been already decreasing. In the last decade 25–30% reduction in cardiovascular mortality is observed in Poland [3], but it still remains to be 2.5 times higher than in Western European countries according to the World Health Organization Regional Office for Europe [4]. Maintaining the current reduction rate of premature death, Poland will not achieve the 2001 European Union ratio before 2018 [5]. The unfavorable situation in Poland correlates with

the lifestyle of an average Pole. Among cardiovascular risk factors there are independent risk factors (age, male gender, family history) and dependent factors of the 1st grade, i.e. smoking, hypertension, lipid disorders, diabetes, and dependent factors of the 2nd grade, i.e. overweight, improper dietary habits and stress [6,7]. All those factors, commonly occurring in combination, are a serious health problem in the whole population because of acceleration of atherosclerosis which is one of the main lifestyle diseases of the 21st century [8]. Cardioprotective factors are fruit and vegetable consumption, small alcohol consumption and physical activity. As it was showed, risk factors control and cardioprotective lifestyle changes allow decreasing mortality and morbidity, especially in non-diagnosed individuals [9,10].

The goal of this study is to analyze the lifestyle of students from Wrocław universities and postgraduate schools focused on the prevalence of cardiovascular risk factors in that population.

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PATIENTS AND METHODS

The population analyzed consists of 240 students of Wrocław universities and postgraduate schools (165 women and

Table 1. Characteristics of the groups studied

	WU students group I (n = 44)	WUT students group II (n = 49)	WUEL students group III (n = 48)	MU students group IV (n = 50)	USP students group V (n = 49)	Statistically significant differences between subgroups (p <0.05)
Subjects ^b	44	49	48	50	49	NS
Faculty total number ^b	186	152	198	226	196	NS
Faculty number analyzed ^c	23.7	32.2	24.2	22.1	25.0	NS
Age ^a (years)	21.8 ±0.6	21.8 ±2.0	22.6 ±1.4	21.8 ±2.0	20.3 ±1.0	NS
Height ^a (cm)	169.36 ±8.21	171.34 ±8.94	170.89 ±8.73	175.58 ±8.79	166.61 ±4.58	NS
Body mass ^a (kg)	56.72 ±8.39	66.06 ±14.09	63.63 ±11.19	66.31 ±12.29	55.67 ±7.03	NS
BMI ^a (kg/m ²)	20.73 ±2.07	22.21 ±3.07	21.62 ±2.67	21.37 ±2.71	20.08 ±2.29	NS
Gender ^b (M/F)	5/29	20/29	15/31	23/27	0/49	II–V, III–V, IV–V
History of cardiovascular diseases ^c	0	0	0	0	0	NS
Family history of cardiovascular diseases ^c	13.7	12.8	14.8	17.2	17.8	NS

^a mean ±standard deviation^b number of individuals^c % of positive answers

Abbreviations: BMI – body mass index, MU – Medical University, NS – not significant, UCP – University College of Physiotherapy, WU – Wrocław University, WUT – Wrocław University of Technology, WUEL – Wrocław University of Environmental and Life Sciences

63 men). The mean age was 21.5 ±1.5 years (women: 21.2 ±1.4 years, men: 22.0 ±1.8 years), height 170.83 ±8.49 cm (women: 167.61 ±5.42 cm, men: 180.69 ±6.75 cm), weight 61.87 ±11.82 kg (women: 56.41 ±7.04 kg, men: 76.52 ±9.39 kg), and body mass index (BMI) 21.05 ±2.75 kg/m² (women: 20.06 ±2.23 kg/m², men: 23.43 ±2.54 kg/m²). Myocardial infarction, peripheral artery obstructive disease, lipid disorders, hypertension and diabetes were not reported in the group analyzed. Subgroup analysis is presented in Table 1.

The analysis was performed among the 2nd year students of natural science in four main universities in Wrocław, i.e. the Wrocław University (Department of Natural Sciences, faculty: Biotechnology and Biology), the Wrocław University of Technology (Faculty of Fundamental Problems of Technology: Biomedical Engineering, Optical Engineering), the Wrocław University of Environmental and Life Sciences (Faculty of Veterinary Medicine), the Wrocław Medical University (Faculty of Medicine) and the non-public postgraduate school – University College of Physiotherapy (Faculty of Cosmetology). Intentional selection was used. The analyzed subgroups could not differ statistically significantly with regard to age, height, weight, BMI, and cardiovascular and metabolic disease history.

The anonymous questionnaire designed by authors was used in the study. The questionnaire included questions about dietary style, diet limitations, physical exercises; stimulants use, i.e. tobacco, alcohol and coffee, knowledge about the diet role in cardiovascular diseases origins, current medical condition, medical

history, family and social history. The study was performed by the authors, collaborating research workers and trained medical students who assisted with questionnaire completing and explaining necessary risk factors definition. Smoking was defined as at least 1 cigarette smoked per day, alcohol consumption as at least 25 g of ethanol consumption (in any form) more than once a month, and the diet regimen as a conscious restriction in some food products because of health reasons.

Statistical analysis was performed with the STATISTICA 6.0 (StatSoft Polska, Kraków). Results were presented as mean value (x), standard deviation (SD) and percentage values. Because of non-normal distribution of parameters the differences between mean values were tested with nonparametric tests for unpaired variables – the Mann-Whitney U test or the ANOVA Kruskal-Wallis test. Statistical differences were assessed using post-hoc tests. Differences between percentage values were tested with the disparity test. Values of p <0.05 were considered statistically significant.

RESULTS

Dietary habits and dietary regime

Among the students analyzed 17.5% reported diet restriction. Salt restriction was declared by 48.8%, while 56% de-

clared fat limitation. Among those reduced fat consumption, 2.9% limited plant-based fat, 66.0% animal fat and 31.1% both plant and animal fat. The majority of the population tested indicated butter to be the preferred fat type (63.1%). Only 22.6% of the population tested consumed fish meals at least twice a week, 67.2% consumed fish meals once a week and 10.2% less than once a week.

Abnormal body mass and physical activity

Overweight or obesity was declared by 10.3% of students. It was confirmed in 7.7% (BMI >25 kg/m²). In the polled group 50% declared to be able to count their own BMI. The study showed that 63.6% did not know that BMI = 27 kg/m² corresponds with overweight; 62% – that BMI = 33 kg/m² corresponds with obesity and 79.3% was wrong in defining the upper normal BMI limit. Physical activity was declared by 98.4% of students, and physical activity in leisure time defined as exercising for at least 30 minutes – by 15.9% of students. Among the analyzed population 11.4% maintained everyday physical activity; 25.5% – 3–4 times a week; 45.7% once or twice a week and 16.3% less than once a week. The respondents declared swimming (30.1%), jogging (28.6%), cycling (27.0%) and body building (14.3%) as the preferred kind of physical activity.

Smoking and alcohol consumption

In the analyzed population the proportion of smokers was 24.0%. Mean value of the nicotinic index (cigarettes per day × years of regular smoking) was 33.2. Regular smoking was declared by 68.2% of smokers and 31.7% declared occasional smoking. Moreover, 57.1% admitted that never smoked and 64.1% frequently remained in the company of smokers. In the population analyzed 11.4% of students declared not to consume alcohol at all. Among those who consumed alcohol, 73.7% declared small amounts of alcohol consumption and 26.3% – moderate amounts. No one declared alcohol abuse. Regular alcohol consumption was declared by 3.1%. Preferred kinds of alcohol-containing drinks in the group analyzed were beer (61.4%) and wine (28.0%).

Nutrition education

In questions concerning nutrition education the average of correct answers was 47.1%. According to 41.8% of answers low-molecular unsaturated fats have antiatherogenic activity, according to 84.2% salt results in high blood pressure, according to 21.7% high high-density lipoprotein (HDL) plasma levels protect against atherosclerosis, and 40.7% claimed that vitamin C decreases risk of hypertension.

Comparison of gender groups

The comparison of gender groups showed that women, compared with men, comply significantly more frequently with any

dietary restrictions (women: 21.7%, men: 9.4%, $p < 0.05$), limited salt consumption (women: 53.5%, men: 30.2%, $p < 0.05$) and fat consumption (women: 62.8%, men: 35.8%, $p < 0.05$). The number of smokers was statistically significantly higher among men (women: 18.6%, men: 39.6%, $p < 0.05$). Smoking male students declared nicotine addiction significantly more often than women (women: 58.3%, men: 80.9%, $p < 0.05$). Moreover, the nicotinic index was significantly higher in men (women: 23.99 ± 9.84 , men: 45.58 ± 11.53 , $p < 0.05$). Overall, men answered correctly to 49.4% and women to 46.0% of questions regarding rational nutrition. Complete results for women and men are presented in Table 2.

Comparison of dwelling-place subgroups

The comparison of subgroups obtained by dividing analyzed group according to dwelling place showed that statistically significant lower proportion of country dwellers declared knowledge about the BMI definition (city: 51.4%, country: 38.4%, $p < 0.05$). However, the difference in actual familiarity with the definition between city and country dwellers was not statistically significant. City dwellers admitted significantly more often regular smoking (city: 74.4%, country: 57.1%, $p < 0.05$), whereas country dwellers showed a significant higher nicotinic index (city: 7.89 ± 3.16 , country: 84.49 ± 11.93 , $p < 0.05$). Moreover, city dwellers comparing with country dwellers showed statistically significant higher awareness of nutrition influence on health status, with the level of statistical significance of $p < 0.5$. Country dwellers answered correctly to 37.8% and city dwellers to 48.9% of questions in that part of the questionnaire. City-dwelling students compared with students coming from country regions more often answered correctly to questions considering salt effect on high blood pressure (city: 86.3%, country: 69.2%, $p < 0.05$) and association between HDL serum levels and atherosclerosis (city: 23.4%, country: 11.5%, $p < 0.05$). Complete results for country and city dwellers are presented in Table 3.

Comparison of school type subgroups

In the comparison of subgroups obtained by dividing analyzed group according to the school type statistically significant differences were showed:

- Medical University (MU) students more likely than Wrocław University (WU), Wrocław University of Technology (WUT), Wrocław University of Environmental and Life Sciences (WUEL) and University College of Physiotherapy (UCP) students, declared any dietary limitations (MU: 28.0%, WU: 11.4%, WUT: 12.2%, WUEL: 18.7%, UCP: 16.3%, $p < 0.05$) and salt consumption limitation (MU: 60.0%, WU: 45.4%, WUT: 42.9%, WUEL: 41.7%, UCP: 36.7%, $p < 0.05$)
- MU students more likely than WUT, WUEL and UCP students, and WU students more likely than WUT and UCP students defined correctly BMI index (MU: 44.0%,

Table 2. Cardiovascular risk factors in postgraduate Wrocław students depending on gender

Question	Men (n = 63)	Women (n = 165)	p
Diet restriction ^a	9.4	21.7	<0.05
Salt restriction ^a	30.2	53.5	<0.05
Fat restriction ^a	35.8	62.8	<0.05
including:			
plant ^b	10.5	7.2	NS
animal ^b	52.6	60.7	NS
plant and animal ^b	36.8	32.1	NS
Diet including fish products ^c	22.6	22.5	NS
Overweight/obesity (subjective) ^a	15.1	9.3	NS
Overweight/obesity (objective) ^d	11.5	4.6	NS
Familiarity with BMI definition (subjective) ^a	49.9	50.2	NS
Familiarity with BMI definition (objective) ^e	32.3	30.5	NS
Physical activity ^a	96.2	98.4	NS
Leisure time physical activity ^a	13.2	19.4	NS
Smoking ^a	39.6	18.6	<0.05
regular smoking ^f	80.9	58.3	<0.05
cigarettes/day ^g	9.65 ±3.14	5.97 ±2.75	NS
years of smoking ^g	4.62 ±1.35	4.02 ±1.65	NS
(cigarettes/day) × years of smoking ^g	45.58 ±11.53	23.99 ±9.84	<0.05
Exposure to passive smoking ^a	54.7	66.7	NS
Alcohol consumption ^a	90.6	88.4	NS
regular alcohol consumption ^h	6.2	1.7	NS
Antiatherogenic activity of UFA ^e	46.9	38.7	NS
Hipertensive activity of salt ^e	86.8	82.2	NS
Antiatherogenic activity of HDL ^e	30.0	22.5	NS
Hipertensive activity of vitamin C ^e	34.0	40.6	NS

^a % of positive answers^b % of positive answers in the group limiting fat consumption^c % of answers: "2 or more times a week"^d % of individuals with BMI > 25 kg/m²^e % of correct answers^f % of positive answers in the smokers group^g mean ± standard deviation in the smokers group^h % of positive answers in the group of alcohol consumers

Abbreviations: HDL – high-density lipoprotein, UFA – unsaturated fatty acids, others – see Table 1

WU: 36.4%, WUT: 24.4%, WUEL: 29.2%, UCP: 20.4%, p < 0.05)

- WUT and WUEL students more likely than MU students admitted smoking habits (MU: 18.0%, WU: 27.3%, WUT: 28.6%, WUEL: 29.2%, UCP: 26.5%, p < 0.05).

Moreover, in the smokers subgroup, students of MU had a lower nicotinic index than students of WU, WUT, WUEL and USP (MU: 18.88 ± 9.11, WU: 33.91 ± 14.90, WUT: 39.61 ± 17.88, WUEL: 41.86 ± 15.91, USP: 35.92 ± 16.76, p < 0.05).

In diet-related questions 62.0% of MU students, 45.9% of WUT students, 51.7% of WU students, 44.26% of WUEL students and 36.6% of USP students responded correctly. Statistically significant (p < 0.05) correct answers were more likely given by MU students than USP students, MU students than WUT students, WU students than USP students and WUT students than USP students. Complete results for subgroups according to the school type are presented in Table 3.

DISCUSSION

Analysis of the study results shows that lifestyle and dietary habits of students in Wrocław do not differ from the lifestyle of an average adult Pole. Cardiovascular risk distribution of the analyzed group resembles that of Poland's population. The majority of the analyzed student groups do not keep a diet. Those results are comparable with other studies. Consumption amount of the majority of basic health impacting nutrition products in Poland does not correspond to the recommended ration's level. The majority of Poles consume too little cereals, dairy, vegetables and fruits, and too much meat products [11]. In the scope of such a big meat products consumption the avoidance of fish products in diet can be surprising. Unfortunately, also in that case the results obtained in the analyzed student groups confirm the observed pattern. This habit results in previously noticed symptoms of deficiency of omega-3 polyunsaturated fatty acids, vitamin D and iodine, the substances derived from fish products, in the young generation [12]. Favorable aspects of dietary habits of students in Wrocław is an increase in the awareness of the salt and fat diet limitation need. About half of the respondents declared limitation of this products, which is a much better result than that obtained by Szuba et al. [13].

The late 1990s did not bring any expected improvement in epidemiological situation considering overweight and obesity. In 1993, according to the Pol-MONICA study overweight concerned 45.2% of men and 35.1% of women, and obesity – 22.4% of men and 29.0% of women. In 2002, according to the

Table 3. Cardiovascular risk factors in postgraduate Wrocław students according to the dwelling place

Question	City inhabitants (n = 214)	Country inhabitants (n = 26)	p
Diet restriction ^a	17.1	19.2	NS
Salt restriction ^a	47.4	42.3	NS
Fat restriction ^a	55.3	50.0	NS
including:			
plant ^b	2.8	3.8	NS
animal ^b	66.6	61.5	NS
plant and animal ^b	30.2	34.6	NS
Diet including fish products ^c	23.4	19.2	NS
Overweight/obesity (subjective) ^a	10.3	11.5	NS
Overweight/obesity (objective) ^d	7.8	7.5	NS
Familiarity with BMI definition (subjective) ^a	51.4	38.4	<0.05
Familiarity with BMI definition (objective) ^e	33.0	29.8	NS
Physical activity ^a	99.0	96.1	NS
Leisure time physical activity ^a	16.7	11.5	NS
Smoking ^a	23.2	26.9	NS
regular smoking ^f	74.4	57.1	<0.05
cigarettes/day ^g	2.87 ± 2.97	11.25 ± 7.78	NS
years of smoking ^g	2.75 ± 1.62	7.51 ± 4.32	NS
(cigarettes/day) × years of smoking ^g	7.89 ± 3.16	84.49 ± 11.93	<0.05
Exposure to passive smoking ^a	63.9	65.4	NS
Alcohol consumption ^a	88.1	96.1	NS
regular alcohol consumption ^h	3.0	3.8	NS
Antiatherogenic activity of UFA ^e	42.3	34.6	NS
Hypertensive activity of salt ^e	86.3	69.2	<0.05
Antiatherogenic activity of HDL ^e	23.4	11.5	<0.05
Hypertensive activity of vitamin C ^e	43.5	35.7	NS

^a % of positive answers^b % of positive answers in the group limiting fat consumption^c % of answers: "2 or more times a week"^d % of individuals with BMI > 25 kg/m²^e % of correct answers^f % of positive answers in the smokers group^g mean ± standard deviation in the smokers group^h % of positive answers in the group of alcohol consumers

Abbreviations – see Table 1 and 2

NATPOL III study those proportions came to 39.1%, 28.5%, 19.3%, 18.9% respectively, whereas according to the LIPIDOGram 2004 study the proportions came to 48.0%; 39.2%; 32.8%; 31.2% respectively [14-16]. About 10% of overweight and obese individuals in the presented study seem to confirm the constancy of the tendency. The proportion is statistically equal to comparable age groups in the NATPOL III study (23.8% of overweight and 8.9% of obese individuals younger than 40 years) or in the study concerning Lower Silesia adolescents (12.8% overweighted and obese individuals with the average age below 25 years) and to those obtained for the selected country population of Lower Silesia in 2005 [13,14,17]. Moreover, discrepancy between declared and actual overweight/obesity load was showed. Categorizing to overweight/obesity groups should be then performed according to BMI index and not to subjective individual's belief.

In the study presented low actual students' physical activity was showed. Almost all individuals declared physical activity, but the majority interpreted this by usual everyday activities. Physical activity in leisure time was declared by every seventh student. Regular, everyday physical training is characteristic of every tenth young Pole, which is twofold lower index than in the WOBASZ project. In 2005, everyday physical exercises for at least thirty minutes were declared by almost 27% of men and almost 23% of women [18]. The result of the NATPOL III study in 2002 was even more optimistic reaching 45.5% of participants [3]. In the recent years the positive increasing trend in the population physical activity observed in the 1990s seems to be stopping in Poland and in Europe as well [19,20]. That alarming situation seems to be evoked by related by respondents: lack of easy and cheap access to recreational facilities, an increase in the 'passive' free time spending customs and shortage of available free time. Moreover, the results seem to confirm the territorial diversity of physical activity levels in Poland. In the mentioned previously WOBASZ study the Lower Silesian rate was lower than that in Wielkopolska [18].

The situation in reference to cigarette smoking remains still unsatisfactory also. Although some success in smoking cessation was observed in the recent years, nicotine addiction still remains the main cardiovascular risk factor. According to WOBASZ project, nicotine addiction affects 42% of men and 25% of women, according to the NATPOL III study 43.5% of men and 27.5% of women younger than 40 years, according to Nowak et al. 41.4% of country inhabitants and according to the BOLD study 34% of men and 22% of women in the Malopolska population [3,21-23]. The results of about 25% of smoking students, about of 50% of those declaring not to

Table 4. Cardiovascular risk factors in postgraduate Wrocław students according to the school type

Question	WU students group I (n = 44)	WUT students group II (n = 49)	WUEL students group III (n = 48)	MU students group IV (n = 50)	USP students group V (n = 49)	Statistically significant differences between subgroups (p < 0.05)
Diet restriction ^a	11.4	12.2	18.7	28.0	16.3	I–IV, II–IV, III–IV, IV–V
Salt restriction ^a	45.4	42.9	41.7	60.0	36.7	I–IV, II–IV, III–IV, IV–V
Fat restriction ^a	54.5	49.0	52.1	58.0	51.0	NS
including:						
plant ^b	0	4.2	4.0	0	0	NS
animal ^b	66.7	62.5	64.0	69.0	60.0	NS
plant and animal ^b	33.3	33.3	32.0	31.0	40.0	NS
Diet including fish products ^c	20.4	24.4	20.8	28.0	20.4	NS
Overweight/obesity (subjective) ^a	13.6	14.3	8.3	10.0	10.2	NS
Overweight/obesity (objective) ^d	2.3	13.4	10.9	8.0	4.2	NS
Familiarity with BMI definition (subjective) ^a	52.3	44.9	47.9	54.0	47.0	NS
Familiarity with BMI definition (objective) ^e	36.4	24.4	29.2	44.0	20.4	I–II, I–V, II–IV, III–IV, IV–V
Physical activity ^a	97.7	98.0	100.0	98.0	100.0	NS
Leisure time physical activity ^a	18.2	16.3	18.7	16.0	14.3	NS
Smoking ^a	27.3	28.6	29.2	18.0	26.5	II–IV, III–IV
regular smoking ^f	69.1	64.3	71.4	66.7	69.2	NS
cigarettes/day ^g	8.81 ± 3.75	7.15 ± 2.94	9.58 ± 2.37	5.67 ± 1.38	8.87 ± 2.84	NS
years of smoking ^g	3.85 ± 72	5.54 ± 1.97	4.37 ± 1.56	3.33 ± 0.67	4.05 ± 1.36	NS
(cigarettes/day) × years of smoking ^g	33.91 ± 14.90	39.61 ± 17.88	41.86 ± 15.91	18.88 ± 9.11	35.92 ± 16.76	I–IV, II–IV, III–IV, IV–V
Exposure to passive smoking ^a	63.6	63.3	66.7	58.0	67.3	NS
Alcohol consumption ^a	88.6	85.7	87.5	88.0	91.8	NS
regular alcohol consumption ^h	2.6	2.4	4.8	2.3	2.8	NS
Antiatherogenic activity of UFA ^a	54.5	38.8	37.5	78.0	20.4	I–II, I–III, I–V, II–IV, II–V, III–IV, IV–V
Hipertensive activity of salt ^e	81.8	81.6	83.3	90.0	81.2	NS
Antiatherogenic activity of HDL ^e	22.7	22.4	20.8	32.0	14.3	III–IV, IV–V
Hipertensive activity of vitamin C ^e	47.7	40.8	35.4	48.0	30.6	I–II, I–V, II–IV, III–IV, IV–V

^a % of positive answers^b % of positive answers in the group limiting fat consumption^c % of answers: "2 or more times a week"^d % of individuals with BMI > 25 kg/m²^e % of correct answers^f % of positive answers in the smokers group^g mean ± standard deviation in the smokers group^h % of positive answers in the group of alcohol consumers

Abbreviations – see Table 1 and 2

smoke ever and almost three fourths of the exposed to passive smoking, are similar to all-Poland population results. The proportions for respective groups do not differ from data collected 2–3 years ago. That can confirm a decreasing trend showed in the present study. The public attention should still be focused on the smoking issue and the projects like “Program of smoking effects reduction in Poland” in collaboration with oncologists should be continued; also nicotine addiction cessation should be the priority in cardiovascular diseases prophylaxis. Moreover, widespread alcohol consumption among young people might be alarming. Less than 90% of respondents declared alcohol consumption. This proportion is higher than reported in papers available for different population and social status categories. The majority of individuals in this group consume moderate amounts of alcohol (no more than 1 drink a day), which may sound optimistic since there is shown that moderate alcohol amounts lead to a decrease in the prevalence of metabolic syndrome and reduce cardiovascular risk [8].

More optimistic are results regarding the students’ awareness of the nutrition role in cardiovascular diseases. According to Szeremeta, in 2000, 91% of Poles 15–25 years old did not realize antiatherogenic activity of low-molecular unsaturated fatty acids, 75% regarded carbohydrates to be the main source of energy, 53% was not able to identify the average recommended calories number and 50% did not realize the role of salt in the blood pressure increase [24]. The proportion of almost 50% of correct answers regarding healthy nutrition questions achieved in our study in the background of cited data might confirm the evident effects of promotional activities provided in recent years. However, dissimilar results from other recent studies by the authors, i.e. from the village of Boguszyce in 2005, showed that improved trend should be assessed with caution and further studies should be considered [13]. The limitation of the present study is the fact that the questionnaire included too few questions on this issue.

The results concerning the BMI definition understanding are not evaluated. Despite using the BMI prevalence in everyday practice, no studies regarding the understanding of definition in the population were implemented. The discrepancy between declared and actual understanding how to calculate the BMI (18% in the entire group, 17% of men, 20% of women, from 10% in MU students to 26% in UCP students) seems to show the need for further education and promotional activities concerning that issue.

The comparison of the results in men and women seems to confirm a common opinion regarding women as those being more aware of diet habits and smoking more rarely and smaller amounts of cigarettes than men. The education of city inhabitants still remains broader than that of country inhabitants. Moreover, the life style of city and country inhabitants does not differ in general.

In the face of available studies this fact might seem surprising [25,26]. The reason for the presented results may be the low number of country inhabitant groups in this study (only 10% of the entire group). Discussing the differences be-

tween subgroups according to the school profile the comparison with any previous data is not possible because of lack of them, so concluding about any trend is difficult. Even sketchy analysis of correct answers shows more limited knowledge about healthy nutrition of nonpublic school students (USP) compared with their public postgraduate schools peers. The presumption of broader knowledge on that issue of specialized medical school (MU) students and school with broad educational profile (WU) students than technical school (WUT) students was also confirmed. However, no significant differences were shown in lifestyle and diet habits between different school students. Except very few, like MU students, the rest lead equally unhealthy lifestyle as compared to the rest of Poland’s population.

The results achieved in the current study do not differ from the previous data on the Polish population, but also, what should be emphasized; confirm European and world trends [4,19].

Those positive trends in cardiovascular disease epidemiology demonstrated in Poland are more dynamic in Western Europe and United States, according to the IMPACT, WHO MONICA and EUROASPIRE III study [1,27].

The study has some limitations. One of them is a small number of analyzed groups and subgroups separated according to different criteria. Although the criteria of statistical significance were fulfilled, i.e. the groups were homogenous and larger than 30 persons; they were too small to enable to draw conclusions for the general population [28]. One of considerable limitations is lack of a control group in the general population. Results were compared with those from studies by other authors in other Poland regions, with the population average age older than in our study. Another important limitation is a subjective type of questions, which is not possible to be eliminated completely in epidemiological studies.

Despite those limitations, the study seems to be the basis (since it is the original one) for further studies showing trends in subpopulations analyzed and, in the face of modifying postgraduate educational program, may help to evaluate effects of those changes. As it was mentioned, parallel analysis of other postgraduate school student groups was not performed. Moreover, the study may be helpful in the evolution of cardiovascular epidemiology assessment in the population of 20–25 years of age.

In summary, integrated educational programs in Poland in recent years, the National Program POLKARD, the 4000 cities Project [29,30], evoke an apparent progress in epidemiology of cardiovascular diseases. However, the progress is still insufficient. The epidemiology of cardiovascular diseases is therefore suggested to be introduced in educational programs of all Polish undergraduate and postgraduate schools. Since the awareness of healthy lifestyle principles was incoherent with everyday lifestyle provided, the trainers should be high qualified and should possess high educational and stimulative skills to evoke putting the principles into effect. Those activities should cover the youngest population possible to introduce

beneficial habits. That seems to be particularly important, because lifestyle of the young generation is going to result in the health problems of the adult population in the future.

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