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Cardiovascular Risk Factors Among Lower Silesian Students of the Faculty of Medicine: Knowledge and Distribution

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A – research concept and design; B – collection and/or assembly of data; C – data analysis and interpretation; D – writing the article; E – critical revision of the article; F – final approval of article

Abstract

Background. Cardiovascular disease is a major contributor to the global burden of disease. Further reduction of cardiovascular mortality will require multidirectional prevention. Popularizing prevention measures requires the involvement of qualified and well-educated personnel. Before any modifications of educational programs it is necessary to assess the level of knowledge of future physicians.

Objectives. The aim of the study was to evaluate medical students' knowledge of cardiovascular (CV) risk factors. The paper presents the outcomes of a study investigating the knowledge of CV risk factors and the prevalence of those risk factors in the study population.

Material and Methods. The study was conducted between 2007 and 2012 and the study population was comprised of 1406 students (497 men and 909 women) from South and South Western Poland. A survey designed by the authors, based on the Framingham survey, was used for the interviews.

Results. The students correctly identified 4.38 ± 0.91 CV risk factors. The most frequently listed risk factors for cardiovascular diseases were a lack of physical activity and a fat-rich diet. The study participants who identified CV risk factors more or less accurately do not follow the recommendations aimed at prevention. Awareness, even relatively high awareness, does not correlate with a healthy lifestyle. Extreme examples of this are people who are aware of the negative effects of cigarette smoking but continue to smoke.

Conclusions. The study revealed an insufficient level of awareness of CV risk factors among medical students (*Adv Clin Exp Med* 2016, 25, 2, 341–347).

Key words: young adults, risk factor awareness, CVD risk factors, CVD risk assessment.

Cardiovascular disease is a major contributor to the global burden of disease [1]. It poses a significant public health challenge to the whole of Europe, including Poland. Cardiovascular diseases have been the main cause of death in Poland since 1960 [2]. Moreover, they are the leading cause of premature mortality – in 2012 they were responsible for 26.9% of all deaths among people aged below 65 years [3]. Cardiovascular-related deaths increased rapidly in Poland during the communist era [2], but the reason for this was never clear-

ly established. The rate of cardiovascular mortality in Poland is still higher than in the European Union [4, 5]. However, the great socioeconomic changes in Poland lead to sudden sharp falls in cardiovascular mortality from 1991 onwards, which was the fastest decline worldwide [5, 6]. Some aspects of this decline have previously been analyzed. Zatoński et al. suggest that this decline was parallel to major shifts in food consumption, as the Polish population showed a growing interest in vegetable oils [6]. Bandoz determined that over half of the

recent reduction in mortality was associated with favorable changes in major cardiovascular risk factors [5]. Only one third of the decrease in CV mortality was attributable to modern treatments [5, 6].

These data demonstrate how greatly changes in lifestyle influence cardiovascular mortality. Studies by Aung [7], Ahmed [8] and Ijzeleberg [9] also point to the significant role of prevention in the reduction of cardiovascular mortality. Appropriate prevention is definitely a cheaper and more effective means than direct intervention or pharmacological treatment of reducing cardiovascular mortality.

Further reduction of cardiovascular mortality will require deliberate action on the part of health care personnel. Physicians and auxiliary staff should be able to effectively define the basic cardiovascular risk factors and subsequently introduce cost-effective methods of modifying behaviors that are potentially hazardous to their patients' health. Such methods should include fighting nicotine addiction [9], reducing alcohol consumption [10], modifying one's diet [11] and increasing beneficial physical activity [9, 12]. The authors believe that such an approach is the best possible way to prevent cardiovascular incidents.

Multidirectional prevention requires public awareness and qualified personnel. Therefore, the authors of this paper have begun a multistage project aimed at assessing public knowledge on the risk factors of cardiovascular diseases, and, later, on improving the methods of conveying knowledge in this field to future physicians. The first

stage was to assess the awareness of risk factors for cardiovascular diseases among medical students.

Material and Methods

The study was conducted between 2007 and 2012 at Wrocław Medical University's Faculty of Medicine (Wrocław, Poland). The study population comprised of 1406 students (497 men and 909 women) from South and South-Western Poland, all of the same nationality. The basic statistical parameters of the study group are presented in Table 1. Categorical variables are presented in Table 2. The study protocol was approved by Wrocław Medical University's ethics committee.

For the interviews, the authors designed a questionnaire based on the Framingham survey [13]. The questionnaire consisted of 27 questions grouped into three categories.

The first category was basic information about the education, background and history of the study participants. The students were asked about their height and weight, which were used to calculate their body mass index (BMI) by dividing the weight in kilograms by the squared height in meters. The following WHO criteria were used for classification: normal range was defined as BMI < 24.9 kg/m²; overweight as BMI 25–29.9 kg/m², and obesity as BMI > 30 kg/m² [14]. Based on available reports indicating the high reliability of the information provided by young people [15, 16], the authors did not perform their own measurements.

Table 1. Basic anthropometric characteristics of the study group

		N	Mean value	SD	p-value
Age (years)	T	1406	21.67	1.53	0.037
	F	909	21.61	1.43	
	M	497	21.79	1.70	
Height (cm)	T	1406	172.58	8.86	0.000
	F	909	167.88	6.06	
	M	497	181.19	6.37	
Mass (kg)	T	1406	65.23	12.41	0.000
	F	909	58.57	7.62	
	M	497	77.40	10.02	
BMI (kg/m ²)	T	1406	21.75	2.81	0.000
	F	909	20.76	2.34	
	M	497	23.55	2.70	

N – number of participants; T – total; F – females; M – males; SD – standard deviation.

Table 2. General characteristics of the study group

		Males	%	Females	%	p
Background	village	43	9.5	87	10.5	0.031
	town	5	1.1	29	3.5	
	city	403	89.4	713	86.0	
Mother's education level	primary	4	0.8	4	0.4	0.080
	occupational	24	4.8	66	7.3	
	secondary	126	25.4	263	29.0	
	higher	342	69.0	575	63.3	
Father's education level	primary	3	0.6	8	0.9	0.003
	occupational	56	11.4	132	14.7	
	secondary	94	19.1	229	25.4	
	higher	340	69.0	532		

The second category of questions investigated awareness of cardiovascular risk factors among the study population. The students were asked to name the five cardiovascular risk factors they consider the most serious.

The third category was about prevention, checking whether the students follow basic recommendations for a healthy lifestyle and physical activity. Prevention comprises and leisure-time physical activity and commuting activity (any physical activity – walking, riding a bike, running – aimed at commuting to the university or work and lasting at least 15 min). The minimal amount of healthy physical activity is any kind of aerobic physical activity burning more than 1000 kcal per week [17].

STATISTICA 10 PL software (StatSoft Inc., Tulsa, USA) was used for the statistical analysis. Both Pearson's and Yates' χ^2 tests were used; Student's *t*-test was also used for some of the analyses. The survey was repeated after a few weeks with 60 randomly chosen participants in order to assess the credibility of the answers given in the first survey. The statistical analysis did not determine any statistically significant differences between the students' initial and secondary responses.

Results

Awareness of Risk Factors

The students correctly identified 4.38 (standard deviation: ± 0.91) out of five cardiovascular disease (CVD) risk factors. On average, the women identified 4.43 (± 0.82) risk factors and men 4.83 (± 0.83). The difference between the sexes was not statistically significant ($p = 0.21$). There were

776 participants who correctly identified all five CVD risk factors; one person identified only one; and 21 could not identify a single one. The results are presented in Fig. 1.

Having parents in the medical profession did not correlate with a significantly higher number of correctly identified CVD risk factors (mean value 4.44 ± 0.83 among participants with parents in the medical profession vs. mean 4.39 ± 0.82 among those without). The father's educational level did not affect the frequency of correct responses, whereas having a mother with only primary education corresponded to a lesser number of correctly identified CVD risk factors ($p = 0.005$). Neither the place of residence prior to commencing studies (city, town, village), nor a family history of cardiovascular diseases correlated with the number of correctly identified CVD risk factors.

The most frequently listed risk factors for cardiovascular diseases were a lack of physical ac-

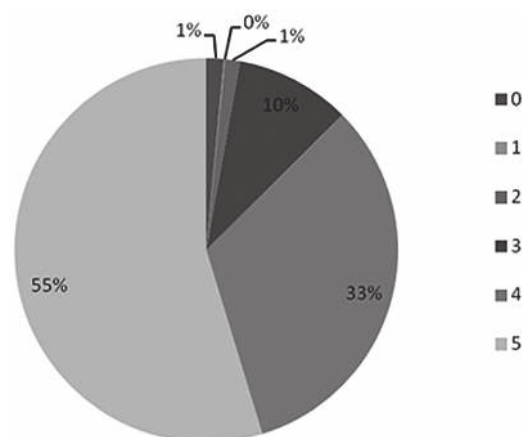


Fig. 1. Number (1–5) of cardiovascular risk factors named by students

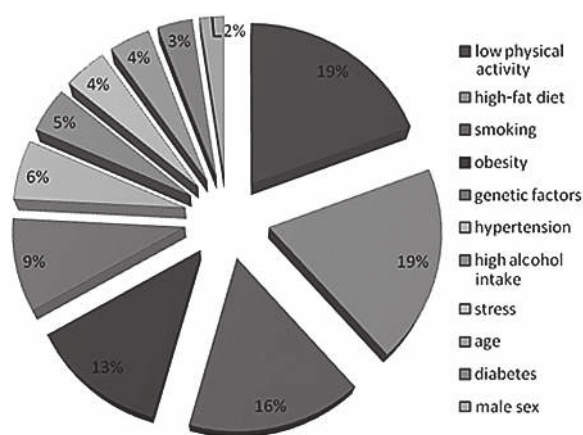


Fig. 2. Frequency of cardiovascular risk factors named by Polish students

tivity and a fat-rich diet. The students also listed cigarette smoking, obesity, genetic factors and hypertension. Complete data are shown in Fig. 2.

The Prevalence of CVD Risk Factors in the Study Population

Among the participants, 279 students, including 158 women, stated that they smoke cigarettes. On average, the students smoke 7.71 cigarettes per day and have been doing so for 3.71 years. Thus, most of the smoking students (mean age 21.95 years) became addicted to nicotine in high school, just after reaching maturity. Detailed data are presented in Table 3. There were 168 participants with a higher than average body mass, including 18 subjects suffering from obesity. No statistically significant dymorphic differences were observed in terms of BMI ($p = 0.53$). Only 675 students declared attempting to adhere to healthy dietary recommendations, e.g. reducing the amount of animal fats consumed or following the Mediterranean diet (Fig. 3). Most of the participants declaring adherence to dietary recommendations were women ($p < 0.0001$).

The vast majority of the students in the study commute by either public or private transport;

Table 3. Medical students and cigarette smoking

	Mean – f	Mean – m	p-value
No. of smokers	158	121	0.002
No. of non-smokers	751	376	0.002
Average duration of smoking (years)	3.47	3.45	0.952
No. of cigarettes per day	6.52	9.16	0.001

m – males; f – females.

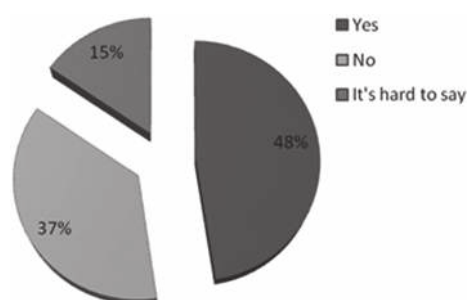


Fig. 3. Do students maintain a healthy diet?

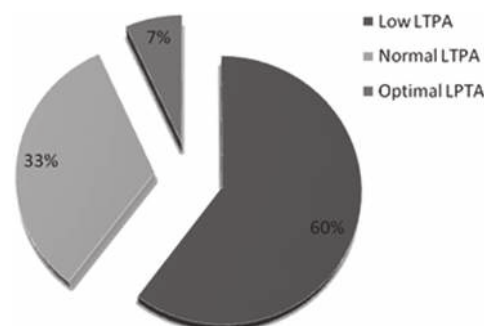


Fig. 4. Leisure-time physical activity among medical students

only 31% declared a commuting activity. These were more significantly more frequently men ($p < 0.0001$). Most of the students (847) did not fulfill the criteria for minimal healthy leisure-time physical activity (LTPA) (Fig. 4). Men reported significantly higher LTPA ($p = 0.003$). Their physical activity amounted to 1227.83 kcal/week, which fulfills the minimal requirement prescribed by Polish researchers [17]. The average LTPA of women amounted to 720.75 kcal/week.

Awareness vs. Avoidance of Cardiovascular Disease Risk Factors

Avoiding smoking, maintaining appropriate body mass, following the Mediterranean diet and an appropriate amount of healthy physical activity were identified as the basic, most significant factors promoting good health. The study showed that having a parent in the medical profession did not correlate with a statistically significant increase in the number of healthy behaviors among the participants. Similarly, the place of residence – city, town or village – did not correspond to any statistically significant differences in the participants' attitude towards a healthy lifestyle. Suffering from a cardiovascular disease caused a decrease in cigarette smoking ($p = 0.009$) and promoted maintenance of an appropriate body mass ($p < 0.0001$), but did not have a statistically significant effect on follow-

ing a healthy diet (NS) or maintaining an appropriate amount of beneficial physical activity (NS).

In the study group, awareness of the beneficial qualities of the Mediterranean diet corresponded to significantly higher consumption of fish, fruits and vegetables ($p < 0.0001$), but does not correlate with a statistically significant decrease in the number of people who are overweight or obese. Being aware of the negative effects of smoking corresponded to a significantly higher number of smokers ($p < 0.0001$). Thus, even though students are aware of the negative effects of cigarette smoking, they continue to smoke.

Discussion

Awareness of the basic modifiable risk factors for CVD among students of the Wroclaw Medical University, Faculty of Medicine is average. Most of the students (88%) properly defined four of the risk factors, which corresponds to the number of factors identified by adult patients over 40 years old who are not in any way connected with health care [18].

According to the comparative analysis of the available data, the results obtained in the present study are consistent with those of Wu et al. [19] and Shaikh et al. [20], who studied a population of nursing students and first year medicine students in China and Saudi Arabia, respectively. The level of awareness of Polish students is more alarming when compared with the results of Foster et al. [21], who reported that over 90% of the studied population of students from South Carolina correctly identified more CVD risk factors than the Polish study group. The better results of US students were also noted in a previous study: In 1992 Alien et al. [22] reported that US students and physicians can correctly name most of the basic CVD risk factors.

The most frequently listed CVD risk factors vary from study to study. Among the participants in the present study, the most frequently named CVD risk factors were a lack of physical activity and a fat-rich diet. Foster et al. [22] reported that the study participants listed obesity and smoking, and Shaikh et al. [20] listed psychosocial stress and high cholesterol levels. These factors were not frequently mentioned by the Polish study group. Bogdańska et al. [23], who assessed the risk awareness of 15-year-old Polish secondary school students, reported that the most frequently listed CVD risk factors were alcohol consumption, smoking, and stress at work. Medical students from Croatia listed obesity and high cholesterol levels as the most significant CVD risk factors; interestingly, they

considered a lack of physical activity as one of the least significant risk factors [24]. The reasons the respective lists are so different are unclear. The current authors suspect that differences in medical school curricula in the various countries, as well as environmental factors, may affect the level of awareness of the students. Moreover, the data analyzed in the present study indicates that there is a statistically significant relationship between the mother's level of education and the student's awareness of risk factors.

In the present study, the analysis of the prevalence of CVD risk factors among the study population determined that 17.38% of the female students and 24.5% of males smoke regularly. These results correspond to those reported by Poręba et al. [25], but the overall percentage of smokers is lower when compared to the cross-sectional National Multicenter Assessment of the State of Health of the Population (the WOBASZ study) conducted among Polish adults, in which the participants who admitted to cigarette smoking constituted 40.8% of men and 19.5% of women [26]. On the Arabian Peninsula, 13.79% of the studied students admitted to smoking regularly [20]; in Croatia 14% [24]; and in Great Britain 15.4% of men and 9.8% of women [27]. Interestingly, medicine students are well aware of the negative effects of smoking and yet continue to smoke. Therefore, activities and campaigns aimed at raising the awareness of adolescents who, according to the data from the current study, are the group that is most often initiated into smoking, should increase.

A second noteworthy CVD risk factor is low physical activity. The issue of insufficient LTPA concerns the entire population of Poland [12, 17, 25]. The result is a lack of awareness of the key influence physical activity has on the proper functioning of the cardiovascular system. The authors have come across many case histories where post-hospital recommendations for patients with coronary artery disease included reduction of physical activity and pacing oneself. Such recommendations are contrary to the current guidelines. The most probable cause of this inconsistency is a lack of proper awareness of the negative influence of low physical activity on the condition of the cardiovascular system. Even though the students in the current study agreed that LTPA is one of the key risk factors for CVD, they maintain a sedentary lifestyle, despite not being employed and having a lot of free time. The issue of insufficient LTPA is not limited to Polish students; studies from around the world report on very low physical activity among students [20–24, 27].

To conclude, the data from the present study indicate an insufficient level of awareness of CVD

risk factors among medical students. This is alarming, since being unaware of the modifiable CVD risk factors hinders early prevention of cardiovascular disorders. Moreover, the study participants who identified CVD risk factors more or less accurately do not follow the recommendations aimed at prevention. Awareness, even relatively high awareness, does not correlate with a healthy lifestyle. Extreme examples of this are people who are aware of the negative effects of cigarette smoking but continue to smoke.

Moreover, it is significant that students in the first years of medical studies, before starting clinical classes, stated that they had not yet been given any information on the risk factors for cardiovascular diseases. This means they can be viewed as representatives of a large population of young people who possess similar or even lower levels of knowledge. As a result, the primary prevention model proposed by Benjamin and Smitch [28], which is at the core of the entire prevention model for cardiovascular diseases and should provide the means to curb the current epidemic of cardiac diseases, is not functioning properly.

The current authors believe that if, upon commencing his or her career, a medical doctor is obese, a cigarette smoker, leads a mostly sedentary lifestyle and has an unhealthy diet, his or her effectiveness in convincing patients with CVD risk fac-

tors to change their behavior will be much lower. Therefore, an increase in promoting healthy activities at all stages of medical education is called for. It is also necessary to continue research to better analyze the current situation and to develop prophylaxis aimed at limiting the influence of CVD risk factors on the population. In the near future, the authors plan to compare the knowledge of medical students starting their studies with those completing their medical education. Assessing health education is a priority, since education aimed at healthy individuals has the greatest preventive influence against increasing incidence of cardiovascular disease.

Limitations

The study group included student who had not yet had contact with clinical classes and had not been presented with information about the harmful effects of smoking. This selection of study participants did not allow us to assess the impact of education on the reduction of smoking among students.

The authors concluded that knowledge of cardiovascular disease risk factors is low among medical school students who have not yet started clinical classes and does not correlate with a healthy lifestyle.

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