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Assessment of knowledge on cardiovascular disease risk factors by postal survey in residents of Małopolska Voivodeship. Małopolska CArdiovascular PReventive Intervention Study (M-CAPRI)

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Abstract

Introduction. Education is a key tool in the prevention of cardiovascular disease (CVD). Education programmes require monitoring of their effectiveness.

Objectives. 1) to introduce postal screening for the assessment of knowledge on CVD risk factors (RFs) for the Polish population, 2) to assess this knowledge in adult residents of Małopolska Voivodeship, and 3) to assess whether knowledge on RFs is related to age, gender, place of residence, level of education and family history of CVD.

Materials and method. Anonymous questionnaires were posted to a random sample of 5,000 residents of Małopolska Voivodeship in Poland. Results were presented as proportions of participants who listed RFs correctly. A series of multiple logistic regression models was used to assess the associations of knowledge on RFs with the potential determinants.

Results. 1,126 completed questionnaires were returned. Over 35% of respondents could not list a single RF and 14 % listed only 1–2 RFs. About 40% named 3–5 and only 12% listed 6 or more RFs. About a half of the respondents listed incorrectly from 1–8 characteristics as being associated with higher risk of CVD. In the multivariate analysis, knowledge on RFs was not significantly associated with age. Level of education was the strongest determinant of knowledge. Male rural and small town residents had less knowledge, whereas women with a family history of CVD had more knowledge on some CVD RFs.

Conclusions. Using a postal questionnaire for the assessment of knowledge of CVD RFs in the population of Małopolska Voivodeship appeared to have serious limitations due to low participation in the study. Despite this, the results of the study indicate that knowledge on CVD RFs is insufficient. Female gender and higher education were related to more prevalent knowledge on RFs. Family history of CVD was related to better knowledge in women only. Male residents of rural areas and small towns had slightly less knowledge on CVD RFs.

Key words

cardiovascular disease, health knowledge, risk factors, postal survey

INTRODUCTION

During the last 20 years in Poland, mortality from diseases of the circulatory system have decreased by about 40%, and in 2010 the rate was 466/100,000 in women and 437/100,000 in men. However, this group of diseases, which includes all clinical manifestations of cardiovascular disease (CVD), is still the most common cause of death, and there is some evidence that it is a second cause of Potential Years of Life Lost (PYLL) in Poland [1, 2, 3].

Among the diseases of the circulatory system the most common cause of deaths was ischemic heart disease (IHD) – 45,832 deaths, and the second was cerebrovascular disease – 35,570 deaths, which accounted for 26.4% and 20.4% of all deaths due to the diseases of circulatory system, and 12.2% and 9.5% of deaths from all causes, respectively [1].

The largest impact on changes in mortality from CVD are the changes in exposure to risk factors (RFs) [4, 5, 6]. Changes in RFs, mainly through smoking and hypercholesterolaemia, accounted for 54% of the decrease in IHD mortality in Poland

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which occurred in 1991–2005 [7]. The Fifth Joint Task Force of the European Society of Cardiology and Other Societies on Cardiovascular Disease Prevention in Clinical Practice postulate that prevention methods which aim to reduce exposure to RFs, have the greatest potentials for controlling CVDs [4]. CVD prevention is based on two strategies: population strategy and high-risk strategy. Population strategy aims to the influence general population, i.e. both patients and healthy persons, regardless of whether they are at high or low risk. The high-risk strategy includes activities that identify people at high risk of CVD and provide them with appropriate care. Population strategy includes activities such as health promotion, health education, legislation, production, distribution and promotion of healthy food, facilitating access to sports and recreation activities, and improving access to medical diagnostics and treatment [4, 8, 9].

Education is particularly important component of high risk strategy and should be one of the main activities in every CVD prevention programme. At the population level, education requires monitoring of its effectiveness. To introduce monitoring, a method is needed which allows assessment of the knowledge on CVD risk and the possibility of its reduction. For the population studied, knowledge can be estimated by using various forms of screening survey ('door to door', out-patient clinic visits, telephone surveys, email surveys, etc.). Postal survey was used widely for this purpose [10, 11, 12, 13, 14, 15, 16, 17]. One of the disadvantages of this type of survey is low control over participation. However, many studies reached a participation rate of over 60%, and some studies even over 80% [13, 14, 15, 16, 17]. Despite the unquestionable advantage of postal survey, which is particularly important in countries with a low budget for research, it's simplicity and low costs, no attempts have been made in Poland to assess the state of knowledge on CVD prevention using this method.

OBJECTIVES

The aims of the study were:
1) to introduce postal screening for the assessment of knowledge on CVD RFs for Polish population;
2) to assess this knowledge in adult residents of Małopolska Voivodeship;
3) to assess whether knowledge on RFs is related to age, gender, place of residence, level of education and family history of CVD.

MATERIALS AND METHOD

The presented study was carried out as part of a baseline observation in the project 'Małopolska CArdiovascular PReventive Intervention Study (M-CAPRI)'.

The study sample comprised 5,000 men and women aged 18 years or older, selected by simple random sampling from the registry of Małopolska Voivodeship residents. The sample selected had very similar distribution by gender and age with the population of the Małopolska Voivodeship. A standard questionnaire was sent by post to the participants of the study, and included a letter from the Voivodeship Specialist for Cardiology which explained the rationale of the study. Participants were asked to anonymously complete the questionnaire and return it in the enclosed addressed envelope. Participants did not bear the costs of posting. Knowledge of CVD RFs was assessed by using a set of two questions which was a modification of the questionnaire used in the study on the effectiveness of the National Programme of Primary Prevention [18]. The first question allowed assessment of whether a respondent was familiar with the term 'risk factor' (RF); the second was an open question in which the participant was asked to list all known RFs. The answers were coded using a standard coding system. Results were presented as percentages of correct answers by gender, age group, education (primary, secondary, university degree), place of residence (Krakow, town, village), and by family history of CVD. Percentages were age-standardized using weights calculated for the sample selected. Significance of the differences in proportions was assessed by chi^2 test. A series of multiple logistic regression models was used to assess the associations of knowledge on each RF separately with the potential determinants. In these models, each participant's age was entered as a continuous variable. Education, place of residence and family history of CVD were all entered as categorical variables. Statistical significance was accepted at the level $p < 0.05$. All analyses were conducted with Statistica PL ver. 10.

RESULTS

Participation in the study is presented in Table 1. Of the 5,000 people to whom the questionnaire was sent, 1,150 replied. 24 questionnaires were returned blank or with missing data on gender or age. Finally, the analysis included 1,126 persons (22.5% of the initial sample) aged 18–79. Participation was higher among women compared to men, 26 % and 19 %, respectively ($p < 0.001$). Both in men and in women, participation was higher in the older age groups (p for trend <0.001).

Table 1. Participation in the study by sex and age group

Age	Women			Men			Total		
groups	N	n	%	N	n	%	N	n	%
18–19	95	17	17.9	111	13	11.7	206	30	14.6
20–24	267	60	22.5	271	42	15.5	538	102	19.0
25–29	268	49	18.3	280	28	10.0	548	77	14.1
30–34	269	47	17.5	269	36	13.4	538	83	15.4
35–39	249	59	23.7	237	36	15.2	486	95	19.5
40–44	216	56	25.9	236	36	15.3	452	92	20.4
45–49	185	49	26.5	193	32	16.6	378	81	21.4
50–54	209	47	22.5	224	40	17.9	433	87	20.1
55–59	258	71	27.5	219	53	24.2	477	124	26.0
60–64	216	85	39.4	203	50	24.6	419	135	32.2
65–69	154	69	44.8	123	53	43.1	277	122	44.0
70–74	131	44	33.6	85	36	42.4	216	80	37.0
>=75	23	10	43.5	9	8	88.9	32	18	56.3
Total	**2540**	**663**	**26.1**	**2460**	**463**	**18.8**	**5000**	**1126**	**22.5**
p for trend			*<0.001*			*<0.001*			*<0.001*

N – No. of residents of Małopolska Voivodeship to whom questionnaires were sent
n – No. of residents of Małopolska Voivodeship who returned questionnaires which were accepted for analysis

About 36 % of respondents could not list a single CVD RF, 14 % listed only 1–2 RFs correctly and 39% named 3–5 factors. Only 12% listed 6 or more RFs, including 3 persons who listed the maximum of 9 RFs. In addition, 46% of respondents listed incorrectly 1–8 characteristics as being associated with higher risk of CVD. Smoking was the most commonly recognized RF (46% of respondents), followed by chronic stress (37%), low physical activity (36%), poor diet (34%) and obesity (33%). Hypertension was mentioned less frequently, (27%) and only 13% of respondents mentioned high level of total blood cholesterol. Knowledge on LDL-cholesterol was much lower – only 3% of respondents indicated it as CVD RF, and only a few persons mentioned low concentration of HDL-cholesterol. Diabetes and alcohol consumption were recognized even less frequently than high cholesterol (11% each). One person mentioned that lack of vaccination against influenza may increase CVD risk.

The percentage of respondents who had knowledge of the CVD RFs is shown in Tables 2 and 3 by age, gender, education, place of residence and family history of cardiovascular disease. Compared to men, women were more likely to indicate hypertension (31.5% and 21.2%, respectively; p<0.001), high cholesterol (15.7% and 8.6%, respectively; p<0.001), obesity and overweight (36.2% and 29%, respectively; p <0.05) and low physical activity (39.4% and 32.4%, respectively; p <0.05). In men, knowledge of CVD RFs was not associated with age. In women, there were significant differences in knowledge on obesity, unhealthy diet, low physical activity and chronic stress by age group, although no clear trend with age was found.

There were significant differences in knowledge on RFs by education, with the highest proportion of participants who had knowledge in the group with university education. Urban males (residents of Krakow and small towns) had better

Table 2. Percent of persons having knowledge on CVD risk factors by gender and age group

CVD risk factors	Women						Men					
	Age group				Total		Age group				Total	
	18–34	35–54	55–79	P	%	Age standardized %	18–34	35–54	55–79	P	%	Age standardized %
Hypertension	28.3	36.0	30.1	NS	31.5	31.5	17.6	22.9	22.0	NS	21.2	20.7
High level of TC	14.5	17.1	15.4	NS	15.7	15.6	4.2	8.3	11.5	NS	8.6	7.6
Diabetes	12.7	14.2	9.7	NS	11.9	12.3	5.0	8.3	10.5	NS	8.4	7.7
Obesity or overweight	38.7	41.7	30.5	<0.05	36.2	37.2	23.5	34.0	28.5	NS	28.9	28.6
Unhealthy diet	37.6	42.2	28.3	<0.01	35.1	36.3	30.3	36.1	29.5	NS	31.7	32.2
Alcohol	15.0	9.5	11.8	NS	11.9	12.2	8.4	10.4	10.0	NS	9.7	9.5
Smoking	47.4	48.3	40.9	NS	44.9	45.7	38.7	50.7	42.5	NS	44.1	44.0
Low physical activity	43.4	46.4	31.5	<0.01	39.4	40.8	26.9	36.1	33.0	NS	32.4	31.8
Chronic stress	36.4	51.2	30.5	<0.001	38.6	39.6	34.5	33.3	34.5	NS	34.1	34.1

Table 3. Percent of persons having knowledge on CVD risk factors by level of education, place of residence and family history of CVD

CVD risk factors	Education				Place of residence				Family history of CVD		
	primary	secondary	university	P	rural	small town	Kraków	P	yes	no	P
						Men					
Hypertension	16.8	17.2	31.9	<0.01	17.0	22.3	25.9	NS	24.3	18.9	NS
High level of TC	6.4	4.5	16.3	<0.001	4.4	9.6	13.4	<0.05	10.3	7.4	NS
Diabetes	6.4	3.2	17.8	<0.001	4.4	6.4	17.3	<0.001	11.2	6.2	NS
Obesity or overweight	21.4	25.5	42.2	<0.001	30.3	36.2	44.4	<0.05	32.2	27.0	NS
Unhealthy diet	26.6	31.2	39.3	NS	30.7	37.6	38.9	<0.05	31.3	33.2	NS
Alcohol	8.7	9.6	11.1	NS	11.9	12.8	11.1	NS	9.8	9.8	NS
Smoking	38.2	42.7	51.9	NS	38.3	49.5	48.9	<0.05	47.7	41.4	NS
Low physical activity	20.8	32.5	46.7	<0.001	23.0	38.9	37.8	<0.01	35.0	31.2	NS
Chronic stress	27.8	30.6	47.4	<0.001	30.8	32.5	41.7	NS	36.5	33.2	NS
						Women					
Hypertension	14.4	32.6	40.6	<0.001	29.1	30.7	36.1	NS	34.9	27.6	<0.05
High level of TC	7.5	14.9	21.3	<0.01	14.9	15.1	17.2	NS	16.5	14.8	NS
Diabetes	6.2	11.5	15.8	<0.05	10.3	11.9	13.9	NS	13.2	10.3	NS
Obesity or overweight	17.8	32.6	50.4	<0.001	30.3	36.2	44.4	<0.01	38.1	34.1	NS
Unhealthy diet	19.2	31.8	47.6	<0.001	30.7	37.6	38.9	NS	37.3	32.8	NS
Alcohol	6.2	10.7	16.5	<0.01	11.9	12.8	11.1	NS	12.4	11.4	NS
Smoking	24.7	42.5	58.7	<0.001	38.3	49.5	48.9	<0.05	48.9	40.3	<0.05
Low physical activity	19.2	33.7	56.7	<0.001	36.0	42.2	41.1	NS	42.2	36.2	NS
Chronic stress	21.2	33.3	54.3	<0.001	33.3	44.0	40.6	<0.05	41.0	35.9	NS

knowledge on RFs than rural males. With the exception to overweight, smoking and chronic stress, differences in knowledge on RFs by place of residence were not significant in women. Family history of CVD was associated with knowledge on hypertension and smoking in women only (Tab. 3).

In the multivariate analysis, which included age, education, place of residence and family history of CVD, knowledge on RFs was not significantly associated with age, in both men and in women. In both genders, the most significant determinant of knowledge on RFs was the level of education. On average, women with university education were 3–5 times more likely to have knowledge on RFs, compared to women with primary education, and women with secondary education were 2–3 times more likely to have knowledge on RFs than women with primary education. However, the relationship was not significant for knowledge on diabetes and alcohol consumption. In men, a higher level of education was also associated with increased odds of knowledge on RFs. Nevertheless, compared to women, the relationship was weaker. Compared to men with primary education, men with secondary education had better knowledge on low physical activity only. Men with university education were more than twice as likely to have knowledge on high blood pressure, overweight and obesity, low physical activity and chronic stress, than men with primary education. Similar average estimates of the odds ratio were confirmed for high cholesterol and diabetes, but these relations were not statistically significant. In men, there was no significant relationship between having a university education and indication on unhealthy diet, high consumption of alcohol and smoking as RFs for CVD. In both genders, place of residence had little effect on knowledge on RFs. Significant results on diabetes and unhealthy diet were found only in men. Compared to male residents of Krakow, men living in small towns and villages knew less frequently that diabetes is an RF. Men living in villages were less likely than male residents of Krakow to know that an unhealthy diet is a CVD RF. In women, there was no significant association between place of residence and knowledge on RFs. Women with a family history of CVD were more likely to know that high blood pressure, unhealthy diet, smoking, low physical activity and chronic stress, increase the risk of CVD. Relation between family history of CVD and knowledge on other RFs was not significant. There was no significant association between family history of CVD and knowledge on CVD RFs in men. (Tab. 4).

DISCUSSION

Using a postal questionnaire sent only once to study participants, without any reminder, appeared to have serious limitations for the assessment of knowledge of CVD RFs in the population of Małopolska Voivodeship. Despite the random selection of the study sample, the low participation rate does not allow acceptance of the results as being representative for the general population. This

Table 4. Adjusted for covariates odds ratio for having knowledge on CVD risk factors by education, place of residence and family history of CVD

CVD risk factors	Education		Place of residence		Family history of CVD
	OR (95% CI)		OR (95% CI)		OR (95% CI)
			Men		
	Secondary[1]	University[1]	Rural[2]	Small town[2]	Family history of CVD[3]
Hypertension	1.04 (0.57–1.89)	2.26 (1.22–4.16)	0.90 (0.48–1.70)	1.03 (0.57–1.86)	1.37 (0.86–2.19)
High level of TC	0.61 (0.22–1.67)	2.35 (0.99–5.56)	0.50 (0.19–1.35)	0.94 (0.42–2.09)	1.23 (0.62–2.44)
Diabetes	0.43 (0.14–1.35)	2.21 (0.88–5.48)	0.36 (0.14–0.98)	0.39 (0.16–0.94)	1.94 (0.94–3.99)
Obesity or overweight	1.19 (0.70–2.04)	2.42 (1.38–4.24)	0.84 (0.47–1.48)	0.84 (0.49–1.44)	1.25 (0.82–1.90)
Unhealthy diet	1.03 (0.62–1.70)	1.28 (0.74–2.20)	0.53 (0.30–0.92)	0.80 (0.47–1.34)	0.90 (0.60–1.37)
Alcohol	1.02 (0.47–2.22)	1.15 (0.50–2.67)	0.73 (0.30–1.76)	1.03 (0.47–2.29)	0.93 (0.50–1.75)
Smoking	1.10 (0.69–1.74)	1.50 (0.90–2.51)	0.68 (0.40–1.15)	0.97 (0.59–1.61)	1.21 (0.82–1.78)
Low physical activity	1.78 (1.06–2.99)	3.22 (1.84–5.64)	0.88 (0.50–1.56)	1.56 (0.92–2.65)	1.11 (0.74–1.69)
Chronic stress	1.11 (0.68–1.83)	2.13 (1.24–3.63)	0.90 (0.52–1.56)	0.84 (0.50–1.42)	1.20 (0.80–1.79)
			Women		
	Secondary[1]	University[1]	Rural[2]	Small town[2]	Family history of CVD[3]
Hypertension	3.26 (1.87–5.69)	4.89 (2.74–8.74)	0.97 (0.63–1.50)	0.87 (0.56–1.34)	1.47 (1.02–2.11)
High level of TC	2.43 (1.15–5.12)	3.86 (1.80–8.24)	1.08 (0.62–1.87)	0.95 (0.55–1.65)	1.20 (0.76–1.90)
Diabetes	2.03 (0.89–4.66)	2.85 (1.23–6.61)	0.82 (0.44–1.52)	0.89 (0.49–1.62)	1.51 (0.90–2.53)
Obesity or overweight	2.18 (1.29–3.66)	4.36 (2.55–7.46)	0.69 (0.45–1.06)	0.79 (0.52–1.21)	1.39 (0.97–1.98)
Unhealthy diet	1.73 (1.04–2.87)	3.28 (1.95–5.53)	0.84 (0.54–1.29)	1.04 (0.68–1.60)	1.54 (1.08–2.20)
Alcohol	1.85 (0.83–4.15)	3.27 (1.45–7.37)	1.38 (0.73–2.59)	1.32 (0.71–2.47)	1.20 (0.72–2.00)
Smoking	2.10 (1.31–3.35)	4.03 (2.45–6.61)	0.82 (0.54–1.24)	1.15 (0.76–1.75)	1.72 (1.21–2.43)
Low physical activity	1.95 (1.18–3.23)	5.25 (3.10–8.87)	1.11 (0.72–1.71)	1.24 (0.80–1.90)	1.72 (1.20–2.46)
Chronic stress	1.72 (1.05–2.82)	4.19 (2.51–6.98)	0.97 (0.63–1.49)	1.35 (0.89–2.07)	1.51 (1.06–2.15)

[1] reference group – primary education
[2] reference group – residents of Kraków
[3] reference group – no family history of CVD

applies especially to the younger age groups, but participation of about 40%, which occurred in respondents aged over 60, is also unsatisfactory. The inhabitants of Malopolska Voivodeship were not ready to cooperate in research which could provide knowledge to allow the making of strategy to control CVD (the leading cause of death) more effective. Although efforts were undertaken to limit the influence of disparities in participation between the age groups by using a standardization procedure, respondents differed from the population of Malopolska Voivodeship in the distribution by education group and place of residence (urban vs. rural) [1]. In some studies in which a postal survey was used in other countries, the participation rate was also low [10, 11, 12], but in many other studies participation exceeded 60% or even 80% [13, 14, 15, 16, 17]. However, in the latter studies, one or more reminder or other techniques were used to increase the response rate. The use of such techniques was not possible in the presented study due to the anonymous participation. However, it is unlikely that application of such methods would have increased participation to a level which would assure that the results could be regarded as representative for the general population. Despite this, in future studies, resignation from anonymous data collection could be considered, but it seems that there is a need to develop other, more reliable methods than postal survey for the assessment of knowledge on health problems in Poland.

The applied questionnaire allowed verification of the level of knowledge on CVD RFs on a high level of operability, i.e participants were asked to list RFs without giving them several possible answers to chose from. It is obvious that the percentage of people who listed RFs correctly was lower than that obtained in studies in which respondents could select correct answers from a pre-prepared list of RFs. However, it is still possible that the estimates obtained are lower than the true numbers for the general population of Małopolska Voivodeship. The results of the WOBASZ and POLKARD projects in which the method of direct interview was used and higher participation rates were achieved, indicated that the knowledge on CVD RFs is more prevalent. In the WOBASZ project, in which the knowledge on CVD RFs was not assessed at a high level of operability, over 60% of respondents correctly identified that heart attack and stroke are main complications of hypertension [19]. However, it should be noted that besides the outcomes on hypertension, knowledge on CVD prevention among respondents of the WOBASZ study were rated critically, similar to findings from some Polish and foreign studies in which the knowledge was examined among the general population [20, 21]. In the POLKARD study, conducted in patients of 66 general practice clinics and in which questionnaire similar to our study was used, the percentages of patients who indicated RFs correctly were also higher, with the sole exception of diabetes [18]. The differences between the presented results and the results of the POLKARD study can also be explained by the fact that clinic patients have hypertension or hypercholesterolemia more frequently, and more often have a history of myocardial infarction or stroke, compared to the general population [22]. The current results are similar to those obtained in a study of adults at a young age – The CARDIA Study in the USA, where knowledge on CVD RFs was assessed at a similar level of operability [23].

Despite limitations in the interpretation of the presented results due to low participation, there is the intriguing finding that more than one-third of the respondents could not name a single RF, and depending on the RF, only 1% – 46% of respondents could name them correctly. The information that RFs which are modifiable and require qualified medical assistance, such as hypercholesterolaemia, hypertension and diabetes, were rarely listed seems worrying. On the other hand, stress was mentioned quite often as CVD RF, a finding that should be interpreted critically. It is unlikely that more than one-third of respondents could have accurate knowledge about the risks of chronic psychosocial stress corresponding with the present state of knowledge [24]. Assigning importance to the role of 'stress' can be considered rather as a factor which deflects attention from the essential problems of prevention, similar to the other characteristics listed incorrectly as CVD RFs by 46% of respondents. Although the percentages of people who had knowledge on RFs should be interpreted with the considerable reservations, including all concerns mentioned above, the results on determinants of knowledge on CVD RFs seem to be more reliable. Observations on the relation between the knowledge on CVD prevention and education or the family history of cardiovascular disease, was also found in other studies, including Polish studies [19, 25, 26, 27]. Also, it is plausible that more educated people have better knowledge on RFs and that women with a family history of CVD are more likely to experience counseling on CVD RFs, as well as that men from Krakow tend to have more knowledge than men from small towns and villages. As a consequence, it is possible that the differences in the knowledge on CVD RFs may contribute to health inequalities by gender, place of residence and social status, which were broadly reported earlier [28].

CONCLUSIONS

Using a postal questionnaire for the assessment of knowledge of CVD RFs in population of Małopolska Voivodeship of Poland appeared to have serious limitations due to low participation in the study. Despite this, the results of the study indicate that knowledge on CVD RFs is insufficient. Female gender and higher education were related to more prevalent knowledge on RFs. Family history of CVD was related to better knowledge in women only. Male residents of villages and small towns had slightly less knowledge on CVD RFs.

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