Assessing the awareness of Czechs, age 40+, on the link between lifestyle choices and risk factors for cardiovascular diseases.

Valérie Tóthová [1], **Sylva Bártlová** [1], **Ivana Chloubová** [1], **Helena Michálková** [1], **Věra Olišarová** [1], **Radka Prokešová** [2], **Lenka Šedová** [1], **Marie Trešlová** [1], **Věra Adámková** [3]

1 University of South Bohemia in České Budějovice, Faculty of Health and Social Sciences, Institute of Nursing, Midwifery and Emergency Care, České Budějovice, Czech Republic
2 University of South Bohemia in České Budějovice, Faculty of Health and Social Sciences, Institute of Humanities in Nursing Professions, České Budějovice, Czech Republic
3 Institute for Clinical and Experimental Medicine, Dpt. Preventive Cardiology, Prague, Czech Republic

Correspondence to:	Prof. Ph.Dr. Valérie Tóthová, Ph.D University of South Bohemia in České Budějovice, Faculty of Health and Social Sciences, Institute of Nursing, Midwifery and Emergency Care, U Výstaviště 26, 370 04 České Budějovice, Czech Republic E-MAIL: tothova@zsf.jcu.cz

Abstract

OBJECTIVES: Cardiovascular diseases constitute the main cause of disability and premature death worldwide. Those diseases will continue to endanger health unless the public understands clearly and completely which risk factors contribute to the development of these diseases and what they can do to avoid these risks. This article assesses the understanding of risk factors that can lead to the development of heart and vessel diseases.

METHODS: A non-standardized questionnaire was used for data collection. The respondents expressed their opinions on influenceable factors using a five-degree Likert scale. The research set included 1,992 respondents. Data were statistically analyzed using the SASD program, version 1.4.12. To calculate the level of dependence of the selected characteristics, the Wallis, and Spearman correlation coefficients were calculated. The goodness-of-fit $\chi 2$ was applied as well.

RESULTS: The results show that 66.8% of respondents go walking for at least 30 minutes on 5 or more days per week. Respondents from lower age groups reported significantly more ($p < 0.001$) walking. The comparison of mean values showed that Czech citizens aged 40 or more years express the highest agreement with the statement that they could prevent heart and vessel diseases by modifying their eating habits. The results further showed that 25.8% of Czech citizens smoked and that men smoked significantly more (29.6%) than women (22.5%). More than one-half (60.1%) reported drinking alcohol occasionally; the remaining respondents reported drinking alcohol 3–4 times a month or more often. Men reported drinking beer significantly more often ($p < 0.001$) than women, while women reported drinking wine significantly more often ($p < 0.001$) than men.

ORIGINAL ARTICLE

CONCLUSIONS: Respondents aged 40 or more years were aware of some, but not all, of the risk factors that can influence the development of cardiovascular diseases. They accepted that they could prevent heart and vessel diseases by modifying their eating habits, however, their opinions regarding exercise differed from professional recommendations. Two-thirds of the respondents stated that smoking could also influence heart and vessel diseases. The study suggests that primary care providers need to put more effort into educating their patients regarding steps that can be to influence their own health.

INTRODUCTION

Cardiovascular diseases (CVD) rank among the main causes of death not only in many developed countries but also in developing countries (Adámková, 2010). Bulava (2017) states that more than 50% of deaths are caused by such diseases. The extent of CVD, globally, is assumed to be on the rise, since the incidence of risk factors for cardiovascular diseases are increasing in previously low-risk countries. Writing *et al.* (2012) stated that despite encouraging progress in our knowledge on prevention, diagnostics, and therapy of atherothrombosis, cardiovascular diseases continue to be the main cause of disability and premature death globally. In 2010, 16.7 million deaths were attributed CVD, and estimates are that by 2030 the figure will rise to 23.3 million (Bansilal, Castellano, Fuster, 2015).

The Czech Republic (CZ) has not avoided these trends, where CVD constitute not only one of the main causes of death but also the main cause of hospitalization (Zdrav. ročenka, 2016). Cardiovascular diseases are closely related to smoking, as well as to obesity and type 2 diabetes. The Czech publication, *Zdraví 2020*, i.e., *"Health 2020"* released in 2014, predicts that the percentage of smokers in the population will not decrease, the number of persons suffering from type 2 diabetes will grow (80% of diabetics die of circulatory system diseases), and the proportion of obese persons in the population will increase.

Cardiovascular diseases are, in general, the consequence of a combination of several risk factors that are either influenceable or non-influenceable. As Rosolová *et al.* (2013) states, cardiovascular diseases based on atherosclerosis are preventable although each of us has a different tendency to develop CVD, which is determined by the heritability of different risk factors and diseases. Most causes of premature clinical manifestation of cardiovascular diseases are known and highly influenceable using goal-directed preventions (Doležel & Jarošová, 2015). The prevention of cardiovascular diseases is a lifelong process that needs to involve all individuals within the affected population (Rosolová, 2013). Lišková (2013) states that prevention means not only preventing diseases but also staying healthy. For that reason, it is very important to pay particular atten-

tion to preventive actions. Research results show that an unhealthy lifestyle, including smoking, bad eating habits, lack of exercise, and chronic stress can lead to CVD (Rosolová, 2013; Kramer *et al.*; 2008, Olišarová *et al.*, 2018). An awareness of the above-stated risk factors is very important for making good health decisions (Bergman *et al.*, 2011). Lifestyle modification, which can be achieved by better education relative to health and lifestyle choices, can reduce the occurrence of cardiovascular diseases. Rovný (2011) states that better health education, aimed at supporting and protecting health, expands knowledge, shapes attitudes and habits, and can change individual behaviors. Health education is an integral aspect of primary prevention (Doody and Doody 2012). It is important that individuals are aware of which risk factors can impact their health, as such, it is important for them to have better health awareness, relative to these risk factors, and take greater responsibility for their own health (Bergman *et al.*, 2011).

One of the partial goals of the research project was to assess, in the population over 40 years of age, the understanding of risk factors that can lead to the development of heart and vessel diseases. Attention was paid to the areas of exercise, nutrition and eating habits, smoking, and alcohol consumption.

MATERIAL AND METHODS

Data were collected with the help of a non-standardized questionnaire, focused not only on demographic data but also on the assessment of education of the assessed group, but also on ascertaining their opinions on factors influencing the development of heart and vessel diseases. Respondent opinions on influential factors were assessed based on agreement or disagreement with specific statements on individual risk areas. The respondents expressed their opinions using a five-degree Likert scale with the following choices: strongly agree, agree, neutral, disagree, or strongly disagree.

Data collection was carried out using a network of professional interviewers from the Institute for the Study of Health and Lifestyle, using a standardized, structured (face-to-face) interview of each study respondent. The interviews were conducted in April 2016.

During the field research, 2306 respondents were approached; 314 (13.6%) refused to participate in the study. In total, 1,992 respondents aged 40 or more years took part in a structured interview. The parameters for respondents selection were determined based on data from the Czech Statistical Bureau, valid as of 31-12-2014. The selection set was structured to correspond to the structure of Czech citizens from the perspective of regions, genders, and ages. The above-stated features were defined as representative features.

A statistical data analysis was carried out using the SASD (Statistical Analysis of Social Data) program, version 1.4.12. The 1st classification degree and the contingency tables for selected indicators of the 2nd

classification degree were processed. Within the first classification degree, the absolute and relative frequencies, as well as the mode, median, average, scatter, and standard deviation were calculated. For each characteristic, an estimate of scattering and standard deviation were determined; the range and interval estimate of the mean value was 0.05 and the interval estimate of scattering was 0.05. To calculate the level of dependence of the selected characteristics, the Wallis, Spearman correlation coefficients were calculated. The goodness-of-fit $\chi 2$ was applied as well; in these cases, the Yates correction was applied if there was an insufficient number of sightings. Finally, the independence tests **were calculated** at the following levels of significance, $\alpha = 0.05$, $\alpha = 0.01$, and $\alpha = 0.001$.

RESULTS

The data showed that walking played a key role in respondents exercise activities. The majority of respondents (66.8%) reported walking at least 30 minutes, 5 or more days per week, while 33.2% reported no daily walking. The analyses based on the second degree of classification identified several statistically significant connections between socio-demographic characteristics and the walking frequency. At a significance level of $p < 0.001$, respondents from lower age groups reported walking every day significantly more often, the frequency of walking decreased with increasing age and was the lowest in the highest age group (80 or more years). The frequency of walking was also significantly ($p < 0.001$) related to the marital status of the respondent. Singles reported going for daily walks significantly more often, while widowers went for daily walks significantly less often. Respondents from big cities (above 100,000 inhabitants) reported going for daily walks significantly less often than respondents from smaller localities ($p < 0.05$). A statistically significant connection ($p < 0.001$) between walking frequency vs. employment was demonstrated as well. Employed respondents went for daily walks more than respondents who had retired.

Only 38.4% of respondents engaged in other sporting activities in addition to walking. Our analysis showed that engagement in other sporting activities was significantly influenced by the respondent's gender ($p < 0.05$), age ($p < 0.001$), education ($p < 0.001$), marital status ($p < 0.001$), size of the locality of residence ($p < 0.01$), and profession ($p < 0.001$).

To monitor the respondents' opinions on influenceable factors, were offered 12 statements they could use to express their attitudes. A comparison of the mean values for the statements served to determine the degree of importance assigned by the respondents to the individual influenceable risk factors relative to exercise (see Table 1).

A comparison of mean values showed that Czech citizens aged 40 or more years express the highest agreement with the statement that *exercise improves their physical fitness* and they disagreed most with the statement that *exercise is too time-consuming to them*.

The analysis of influenceable risk factors regarding eating habits included the weekly consumption of fish, the daily consumption of fruits, the daily consumption of vegetables, and daily fluid intake.

As for weekly consumption of fish, more than 1/5 (21.4%) reported zero weekly consumption. On average, 51.2% ate fish once a week, 18.6% ate it twice a week, and the remaining 8.8% ate fish three or more times a week. Higher fish consumption was reported by those aged 50–69 years; significantly lower consumption was reported by those aged 80 years or more ($p < 0.05$). The weekly consumption of fish was also significantly influenced by the respondent's education

Tab. 1. Assessment of influenceable risk factors relative to exercise – a comparison of mean values (N = 1992)

Item	Mo	Me	$\bar{x}$	s^2	s
1. Exercise reduces my feeling of stress and tension.	2	2	2.242	1.119	1.058
2. Exercise is too time-consuming for me.	2	3	3.268	1.347	1.160
3. Exercise helps me prevent heart and vessel diseases.	2	2	2.067	0.906	0.952
4. Exercise helps me improve my physical fitness.	1	2	1.806	0.852	0.923
5. Exercise helps me improve my mental fitness.	2	2	2.114	0.956	0.978
6. Exercise allows me to have more contact with my friends.	2	2	2.645	1.532	1.238
7. Exercise helps me reduce my blood pressure.	3	3	2.564	0.980	0.990
8. It is difficult for me to find a suitable exercise.	3	3	3.081	1.451	1.205
9. My family members support my exercise.	2	2	2.320	1.274	1.287
10. Exercise improves the quality of my sleep.	3	2	2.425	1.139	1.067
11. Exercise helps me reduce fatigue.	3	3	2.703	1.236	1.112
12. Exercise improves my self-image.	3	2	2.444	1.132	1.064

Mo = modus; Me = median; $\bar{x}$ = arithmetic means; s^2 = dispersion; s = standard deviation

($p < 0.001$). The lowest weekly consumption of fish was reported by those with elementary educations, while the highest consumption is reported by those with university educations. Weekly consumption of fish was also significantly related to the size of the locality of residence. Inhabitants of big cities (above 100,000 inhabitants) report *no consumption of fish* significantly more often ($p < 0.05$).

As for the daily consumption of fruit, less than 1/10 (9.7%) citizens reported *no daily consumption*. Almost one-half (46.2%) of the respondents ate at least 1 portion of fruit per day; 29.4% ate 2 portions per day, and the remaining 14.7% ate 3 or more portions of fruit per day. The daily consumption of fruit was significantly influenced by the respondent's gender. It was unambiguous ($P < 0.001$) that women consumed significantly more fruit than men. There was also a statistically significant relationship ($p < 0.05$) between fruit consumption and the respondent's age. Respondents aged 50–59 years consumed significantly less fruit on a daily basis, while those aged 60–69 years reported higher daily fruit consumption. A significant relationship between daily fruit consumption vs. marital status and fruit consumption vs. size of the locality of residence were also found. Interestingly, married individuals reported eating two portions of fruits per day significantly more often ($p < 0.001$) than those living with a partner. Additionally, inhabitants of big cities (above 100,000 inhabitants) reported *no daily fruit consumption* significantly more often ($p < 0.001$) than those living in smaller cities.

The data showed that 48.5% of respondents ate at least 1 portion of vegetables per day, 27.8% ate 2 portions per day, 14.0% ate 3 or more portions of vegetables per day, and the remaining 9.9% reported *no daily consumption of vegetables*. Women consumed vegetables significantly more than men ($p < 0.001$).

Within the analysis of influenceable risk factors relative to nutrition, respondents were offered 7 statements to assess the respondents' attitudes toward nutrition and its role in their lives. The respondents expressed their opinions using a standard five-degree scale, which was described above.

The level of importance attributed to the individual influenceable risk factors relative to nutrition was determined based on a comparison of the mean values (see Table 2).

Tab. 2. Assessment of influenceable risk factors relative to nutrition – a comparison of mean values (N = 1992)

Item	Mo	Me	$\bar{x}$	s^2	s
1. Food reduces my feeling of stress and tension.	2	2	2.404	1.238	1.113
2. By modifying my eating habits, I can prevent heart and vessel diseases.	2	2	2.031	0.766	0.875
3. By modifying my eating habits, I can improve my physical fitness.	2	2	2.118	0.821	0.906
4. Dietary restrictions can help me reduce my blood pressure.	3	2	2.388	0.925	0.962
5. It is difficult for me to find an expert who can advise me on eating habits.	3	3	3.158	1.292	1.137
6. My family members support me in following dietary recommendations.	2	2	2.171	0.972	0.986
7. Adequate diet helps me reduce fatigue.	2	2	2.332	0.934	0.966

Mo = modus; Me = median; $\bar{x}$ = arithmetic means; s^2 = dispersion; s = standard deviation

A comparison of the mean values showed that Czechs aged 40 or more years express the highest agreement with the statement that *they could prevent heart and vessel diseases by modifying their eating habits,* while the fewest respondents agreed with the statement that *it was difficult for them to find an expert who could advise them in the area of eating habits.*

Within the analysis of influenceable risk factors relative to smoking, the proportion of smokers over 40 years old in the Czech population was ascertained. Results showed that 25.8% of Czechs currently smoke. A statistically significant relationship ($p < 0.001$) between gender and smoking was identified. Men smoked significantly more often (29.6%) than women (22.5%). Respondents in the 40–49 years age group were significantly more likely to smoke ($p < 0.001$), while those above 70 years of age were significantly more likely to not smoke. Smoking was also related ($p < 0.05$) to the respondent's education; respondents with a university educations were significantly less likely to smoke. A statistically significant relationship between smoking and the respondent's employment was also found, respondents who were employed were more likely to smoke than those not employed ($p < 0.001$).

The respondents who reported to be smokers (N = 514) were further asked how many cigarettes per day they usually smoked; 16.5% reported smoking 1 to 5 cigarettes per day, 48.2% reported smoking 6 to 10 cigarettes per day, 30.0% reported smoking 11 to 20 cigarettes per day, and 5.3% reported smoking 21 or more cigarettes per day. The number of cigarettes smoked daily was significantly related to the respondent's gender ($p < 0.001$), education ($p < 0.05$), and employment ($p < 0.01$). Men smoked more cigarettes per day than women, those with an elementary education smoke more cigarettes per day than those with university educations, while those who were retired smoked the fewest cigarettes per day. Respondent-

smokers were asked additional questions to assesses their opinions regarding smoking and health. The previously mentioned standardized five-degree scale was used. The level of importance attributed to the individual influenceable risk factors relative to smoking was determined based on a comparison of the mean values (see Table 3).

The comparison of the mean values shows that Czech smokers aged 40 or more years expressed the most agreement with the statement that *smoking reduces feelings of stress and tension.* On the other hand, this same group disagreed most with the statement that *smoking restricted their social life.*

Tab. 3. Assessment of influenceable risk factors relative to smoking – a comparison of mean values (N = 514)

Item	Mo	Me	x̄	s²	s
1. Smoking reduces my feelings of stress and tension.	1	2	1.963	1.152	1.073
2. Smoking can impact heart and vessel disease.	1	2	1.990	1.150	1.072
3. Smoking restricts my social life.	4	4	3.514	1.452	1.205
4. Reducing or stopping smoking would help improve my physical fitness.	2	2	2.519	1.304	1.142
5. Reducing or stopping smoking would help improve my mental fitness.	3	3	3.084	1.326	1.151
6. Reducing or stopping smoking would help improve my social life.	3	3	3.183	1.363	1.168
7. It is difficult for me to find an expert who can help me reduce or stop smoking.	3	3	3.089	1.502	1.225
8. My family members support me in trying to reduce (stop) smoking.	2	2	2.387	1.385	1.177

Mo = modus; Me = median; x̄ = arithmetic means; s² = dispersion; s = standard deviation

As for influenceable factors relative to alcohol consumption, in the age group of 40 years or more, 14.8% were abstainers. While 60.1% reported drinking alcohol occasionally (less than 3-4 times a month); the remaining respondents reported drinking alcohol 3–4 times a month or more. Analyses based on the second degree of classification identified several statistically significant connections between socio-demographic features and alcohol consumption. A statistically significant relationship between gender and alcohol consumption was identified. Men were significantly more likely to consume alcohol 3–4 times per month, while women were significantly more likely to not consume alcohol at all or to consume it only occasionally ($p < 0.001$). Alcohol consumption was significantly higher ($p < 0.001$) among younger respondents (i.e., 40–59 years). In those 60 years or older, there was an increasing proportion of those who never consumed alcohol. A significant relationship between alcohol consumption and respondent education was also found. At a significance level of $p < 0.001$, respondents with elementary educations were the most likely to report life-long alcohol abstinence; the mediating effect of age is a possible explaination. Respondents with a secondary-school leaving exam or a university education were significantly more likely to report consuming alcohol 3–4 times per month. Alcohol consumption was also significantly ($p < 0.05$) influenced by the size of the respondent's locality of residence. Inhabitants of smaller localities (below 5,000 inhabitants) and of big cities (above 100,000 inhabitants) were significantly more likely to report daily or almost daily alcohol consumption. Additionally,

respondents who were employed or self-employed consumed alcohol significantly more often ($p < 0.001$).

As for the kind of alcohol preferred by Czechs aged 40 years or more, it was quite unambiguously beer (39.4%) and wine (37.9%). The proportion of beer and wine was relatively similar for the studied group. The kind of alcohol consumed was significantly influenced by the respondent's gender ($p < 0.001$) and age ($p < 0.001$), education ($p < 0.001$), marital status ($p < 0.001$), and employment ($p < 0.001$). Men reported drinking beer significantly more often and women reported drinking wine significantly more often. Respondents in the younger age category (40–49 years) consume spirits or other kinds of alcohol significantly more often and respondents in the 50–59 years age category reported consuming wine significantly more often.

Concerning education – the respondents who stated to be apprenticed consumed beer significantly more, while respondents with higher educations consumed wine more often. In categories employment and marital status there were not found any significant relationships.

DISCUSSION

Within primary and secondary prevention of heart and vessel diseases, a systematic, comprehensive, and multidisciplinary approach focused on lifestyle and influencing risk factors is needed (Doležel & Jarošová, 2015). As Bergman *et al.* (2011) states, heart and vessel diseases will keep endangering health unless the public understands, in a clear and comprehensive manner, how the risk factors contribute to the development of

the disease. Preventive activities cannot be limited to interventions carried out by healthcare workers; it is very important to involve individuals in such activities and to make them aware of which risk factors can influence the development of these diseases and what individuals can do to modify these health risks. Lack of exercise is one of the influenceable risk factors. Mitáš, Fröml (2011) highlighted that the experts recognizes that exercise is an important preventive factor in the area of non-infectious lifestyle diseases, to which heart and vessel diseases belong.

Exercise is effective in fighting overweight and obesity since it increases energy expenditure; additionally, it protects blood vessels and positively impacts blood pressure and cholesterol.

Our study assessed, among other things, respondent opinions on the influence of exercise on health. We found that 70.7% of respondents strongly agreed or agreed with the statement that *exercise can prevent heart and vessel diseases.* Respondents aged 50–59 years were the ones who agreed most with the statement. As for the gender of the respondents accepting this statement, women outnumbered men; as for education, those with a university education outnumbered those without. The results show that education influences our attitude toward health, with the specific knowledge of different risk factors that influence our health being very important. Interestingly, only 16.2% of respondents strongly agreed and 27.4% agreed with the statement that *exercise helps to reduce blood pressure*, indicating that respondents were poorly informed about the relationship between exercise and hypertension, which together with smoking, diabetes, and obesity, constitutes one of the most serious risk factors for ischaemic heart disease (Rosolová, 2013).

A statistically significant relationship was found between the size of the locality of residence and participation in other sporting activities. Respondents from the smallest localities (less than 1,000 inhabitants) participated in other sporting activities significantly less often than inhabitants living in larger cities. However, relative to walking, it was found that respondents from larger cities take daily walks significantly less often ($p < 0.05$). These results reflect the fact that distances between shopping and other destinations in big cities are farther from each other than in smaller towns and villages leading respondents living in big cities to opt for cars or other transport instead of walking. Walking was most common among respondents aged 40–49 years (72.5%), followed by respondents in the 50–59 years age group (70.4%). Walking among younger respondents may also have been related to their employment. Lack of walking, among those in larger cities, often motivates people to do other sporting activities, which was supported by our results; 55.8% of respondents aged 40–49 years participated in other sporting activities. Mitáš a Fröml (2011) found a significant relationship ($p < 0.001$) between the size of the respondent's locality of

residence and exercise, i.e., respondents from smaller localities had more total weekly exercise than respondents from larger cities. It should be mentioned (Rosolová, 2013) that sporting activities can be replaced by common daily activities such as fast walking, climbing stairs, household chores, or working in the garden.

Stejskal (2004) states that not only regular exercise but also modifications of eating habits are rank among the most efficient actions that can be taken to prevent heart and vessel diseases. Healthy rational nutrition helps in the prevention of atherosclerosis. A rational diet is one in which the daily energy intake has the following proportions of the three basic nutrients: 55–65% polysaccharides, 25–35% fats, and 15% proteins (Kastnerová, 2012, Rosolová, 2013). The daily diet should include a balanced proportion of nutrients (Briffa, 2000). Bad eating habits gradually lead to the development of heart and vessel diseases. As Machová and Kubátová (2015) state, eating habits are related to education; the higher the individual's education, the greater their awareness of the need for a high-quality, balanced diet. Our study also found a relationship between fish consumption and education ($P < 0.001$). The highest weekly consumption of fish was reported by respondents with a university education. Eating habits also appear to be related to gender; women follow the principles of healthy nutrition more than men (Machová, Kubátová, 2015). This was also confirmed by our study where we found that women consumed vegetables and fruits significantly more (P $p < 0.001$) often than men. Fruits, vegetables, fish, and other sea products rank among foodstuffs that unambiguously support the health of the heart and vessels. It is therefore desirable that such products be regularly included in the diet. Our study showed that the highest number of respondents, in all age categories and all types of education, only included these important foodstuffs in their diets once a day. Three or more portions of fruits were included in the diet of only 14.7% of respondents and the same number of portions of vegetables by only 14.0% of respondents. The WHO document *Diet, nutrition and the prevention of chronic diseases (2003)* recommends increased consumption of fruits and vegetables as a key part of healthy nutrition for prevention of chronic diseases. A meta-analysis by Wang *et al.* (2014) that included 16 cohort case studies (data sources: MEDLINE, Embase and Cochrane Library) provided further proof that higher consumption of fruits and vegetables (about 5 portions of fruits and vegetables per day) was related to a lower risk of mortality of all causes, particularly cardiovascular mortality.

Smoking or tobacco use is, together with high blood pressure, type 2 diabetes, and hypercholesterolemia one of the main preventable risk factors of cardiovascular morbidity and mortality (Graham *et al.*, 2007). The body responds to tobacco smoke not only by increasing heart rate, blood pressure, and oxygen consumption by the myocardium (which increases the heart's energy

expenditure); it also leads to a host of other negative phenomena like increased blood viscosity, easier penetration of thrombocytes, monocytes, macrophages, and lipoproteins into vascular walls, which accentuates atherosclerotic changes (Adámková, 2010). Králíková *et al.* (2013) states that in addition to its comprehensive effect on the development of atherosclerosis, smoking significantly impacts the development of acute thrombosis, which is often ignored, although it plays an important role in acute myocardial infarction in up to 50% of those under 50 years of age.

If a smoker is ready to stop smoking, an addiction treatment plan must be prepared, and family and friends must help, along with health care workers (De Backer, 2017). According to Rosolová (2013), stopping smoking is the most important economic measure in primary and secondary prevention of CVD, since it has an immediate and long-lasting effect in all age groups. It is therefore very desirable that educational activities help smokers become aware of all the risks associated with smoking and provide useful information regarding steps that can be taken towards stopping smoking. Motivations to stop smoking as well as triggers that lead to smoking play important roles as well (Slouka, 2017). In our research set, a quarter of respondents smoked, 6–10 cigarettes per day across all age groups. It was demonstrated that men smoked more than women ($p < 0.001$). Our results agree with the results of several studies; Sovinová and Csémy (2016), found that 24.1% of their sample set were smokers, which included 27.3% men and 21.1% women. According to the Eurobarometer from 2017, 26% of the inhabitants in European Union member countries smoked, which included 30% men and 22% women. The lowest number of smokers were in Sweden (7%) followed by Great Britain (17%) (Králíková, 2017). Many smokers reported not being aware that smoking endangered their health. Králíková *et al.* (2013) stated that the risk of fatal myocardial infarction is 3 times higher in smokers than in non-smokers; smokers are 7 times more at risk of damage to the arteries of the lower extremities, by ischemic and hemorrhagic brain stroke, and by subarachnoidal bleeding.

A study by Snaters *et al.* (2018) examined the prevalence of smoking and its relationship to cardiometabolic risk and related factors in adults with health handicaps. It was found that more than a half of these individuals (62.7%) had high blood pressure and 43.5% had central obesity (Snaters *et al.* 2018).

Several epidemiological studies have demonstrated that higher consumption of alcohol is related to higher total mortality of cardiovascular and non-cardiovascular causes (Rosolová, 2013; Klatský *et al.* 2003; Lucas *et al.* 2005; WHO, 2007). Schuckit (2000) stated that 25% of people with alcohol addiction will develop diseases of the heart and cardiovascular system. Klatský *et al.* (2003), Grønbaek *et al.* (1995) stated that moderate consumption is related to lower risk of total mortality, primarily thanks to the lower risk of ICHS. A slightly positive effect, relative to total mortality, can be observed in moderate consumers of alcohol, primarily middle-aged and elderly ones (Táborský *et al.*, 2010) compared with abstainers. O'Neill *et al.* (2018), using several longitudinal cohort studies, assessed the relationship between long-lasting trajectories of alcohol consumption and CVDs.

CONCLUSION

The results of our study showed that Czechs, aged 40 or more years, are only aware of some of the risk factors that influence cardiovascular diseases. The respondents appeared to understand that heart and vessel diseases could be prevented by modifying their eating habits, but their but their understanding of the positive effects of exercise on CVD falls short of that which is recognized by health professionals. Two-thirds of the respondents agreed that *smoking influences heart and vessel diseases.* It is therefore very important to pay greater attention to educational activities in primary care since changes in lifestyle can only be achieved through proper education relative to health risks and the role of lifestyle changes in preventing or slowing the development of cardiovascular diseases. People must be well-informed in these areas and they must become aware of how they can influence their own health through the lifestyle choices they make.

ACKNOWLEDGMENT

REFERENCES

1 Adámková V (2010). Civilizační choroby – žijeme spolu (Lifestyle diseases – we live together) (In Czech)]. Praha: Triton.
2 Bansilal S, Castellano JM, Fuster V (2015). Global burden of CVD: focus on secondary prevention of cardiovascular disease. Int J Cardiol. 201 (Suppl 1):S1-7. doi: 10.1016/S0167-5273(15)31026-3.
3 Bergman HE, Reeve BB, Moser RP, Scholl S & Klein WMP (2011). Development of a comprehensive heart disease knowledge questionare. Journal of Health Education, **42**(2): 74e87.
4 Briffa J (2000). Zdravě jíst [(Healthy eating) (In Czech)]. Praha: Ikar.
5 Bulava A (2017). Kardiologie pro nelékařské zdravotnické obory [(Cardiology for non-medical health care disciplines) (In Czech)]. Praha: Grada.
6 De Backer G (2017). Prevention of cardiovascular disease: recent achievements and remaining challenges. E-Journal of Cardiology Practice. **15**(13) - 09 Aug 2017.
7 Doležel J, Jarošová D (2015). Analysis of clinical practice guidelines for cardiovascular disease prevention. Kontakt. **17**(2): 96-102.
8 Doody CM, Doody O (2012). Health promotion for people with intellectual disability and obesity. Br J Nurs. **21**(8):460, 462-465.
9 Graham I, Atar D, Borch-Johnsen K, Boysen G, Burell G, Cifkova R, et al. (2007). European guidelines on cardiovascular disease prevention in clinical practice: executive summary. Eur J Cardiovasc Prev Rehabil. **14** (Suppl 2):S1-113.

10 Grønbaek M, Deis A, Sørensen TI et al. (1995). Mortality associated with moderate intakes of wine, beer or spirits. BMJ. **310**: 1165–1169.

11 Joint WHO/FAO Expert Consultation (2003). Diet, nutrition and the prevention of chronic diseases. World Health Organ Tech Rep Ser. **916**:1–149.

12 Kastnerová M (2012). Poradce zdravého životního stylu [(Healthy life style advisor) (In Czech)]. České Budějovice: Nová Forma.

13 Klatsky AL, Friedman GD, Armstrong MA, Kipp H. Wine, liquor, beer, and mortality. Am J Epidemiol. **158**(6): 585-595.

14 Králíková E, et al. (2013). Závislost na tabáku: Epidemiologie, prevence a léčba [(Tobacco addiction: Epidemiology, prevention and therapy) (In Czech)]. Břeclav: Adamira.

15 Králíková E (2017). Kuřáci žijí o 10 let méně (Smokers live 10 years less). Statistika & my. [online] 07/08/2017. [cit. 2018-08-21]. Available at: http://www.statistikaamy.cz/2017/08/kuraci-ziji-o-10-let-mene/ (Czech).

16 Kramer KM Newton KM, Sivarnjan Froelicher ES (2008). Cardiovascular risk factors. Philadelphia: Lippincott, Williams & Wilkens.

17 Líšková M (2013). Výchova ke zdraviu v kontexte ošetřovateľstva – retrospektiva a perspektiva (Education towards health in the context of nursing – retrospection and perspective) (In Slovak)]. Nitra: Univerzita Konštantína filozofa v Nitre, Fakulta sociálnych vied a zdravotníctva.

18 Lucas DL, Brown RA, Wassef M, Giles TD (2005). Alcohol and the cardiovascular system research challenges and opportunities. Journal of the American College of Cardiology. **45**:1916–1924.

19 Machová J, Kubátová D (2015). Výchova ke zdraví [(Education towards health) (In Czech)]. Praha: Grada.

20 Mitáš J, Fröml K (2011). Pohybová aktivita dospělé populace České republiky: přehled základních ukazatelů za období 2005-2009 [(Exercise of adult population of the Czech Republic: summary of basic indicators for 2005-2009) (In Czech)]. Tělesná kultura, **34**(1): 9-21.

21 Olišarová V, Tóthová V, Šedová L, Bártlová S, Chloubová I, Michálková H et al. (2018) Education in the area of heart and vessel diseases for 40+ citizens. Cor et Vasa. doi: 10.1016/j.crvasa.2017.12.002.

22 O'Neill D, Britton A, Hannah MK, Goldberg M, Kuh D, Khaw KT, Bell S (2018). Association of longitudinal alcohol consumption trajectories with coronary heart disease: a meta-analysis of six cohort studies using individual participant data. BMC Med. 2018 Aug 22; **16**(1):124.

23 Rosolová H, et al. (2013). Preventivní kardiologie [(Preventive cardiology) (In Czech)]. Praha: Axonite.

24 Rovný I, et al. (2011). Vybrané kapitoly z veřejného zdravotníctva I. Terminológia. Koncepcia odboru. Legislatíva. Zdravotný stav. Determinanty zdravia. Manažment [(Selected chapters from public health care I. Terminology. Concept of the discipline. Legislation. Health condition. Determinants of health. Management) (In Slovak)]. Bratislava: Vysoká škola zdravotníctva a sociálnej práce sv. Alžběty (Banská Bystrica: PRO).

25 Schuckit MA (2000). Drug and Alcohol Abuse: A Clinical Guide to Diagnosis and Treatment. New York: Kluwer Academic/Plenum Publishers.

26 Slouka D (2017). Vedení a marketing malých zdravotnických zařízení (Management and marketing of small health-care facilities). Praha: Grada (Czech).

27 Sovinová H, Csémy L (2016). Užívání tabáku v České republice 2015 (Use of tobacco in the Czech Republic 2015). SZÚ. [online] [cit. 2018-08-21]. Dostupné z: http://www.szu.cz/uploads/documents/czzp/zavislosti/Uzivani_tabaku_2015.pdf (Czech)

28 Snaterse M, Jorstad HT, Minneboo M, Lachman S, Boekholdt SM, Ter Riet G, Scholte Op Reimer WJ, Peters RJ. Smoking cessation after nurse-coordinated referral to a comprehensive lifestyle programme in patients with coronary artery disease: a substudy of the RESPONSE-2 trial. Eur J Cardiovasc Nurs. 2018 Aug 20:1474515118795722. doi: 10.1177/1474515118795722. [Epub ahead of print] PubMed PMID: 30122068.

29 Stejskal P (2004). Proč a jak se zdravě hýbat (Why and how to move healthy). Břeclav: Presstempus (Czech).

30 Stewart J, Manmathan G, Wilkinson P (2017). Primary prevention of cardiovascular disease: A review of contemporary guidance and literature. JRSM Cardiovasc Dis. 2017 Jan 1;6:2048004016687211. doi: 10.1177/2048004016687211. eCollection 2017 Jan-Dec. Review.

31 Táborský M, Ošťádal P, Petřek M, Heinc P, Václavík J, Lazarová M, Vítovec J (2010). Máme v současné době dostatek důkazů o kardioprprotektivním efektu konzumace mírného množství vína na kardiovaskulární onemocnění? [(Do we have sufficient proofs of the cardioprotective effect of consumption of moderate amount of wine on cardiovascular diseases?) (In Czech)] Kardiol Rev Int Med, **12**(4): 192-196.

32 Wang X, Ouyang Y, Liu J, Zhu M, Zhao G, Bao W et al. (2014). Fruit and vegetable consumption and mortality from all causes, cardiovascular disease, and cancer: systematic review and dose-response meta-analysis of prospective cohort studies. BMJ. 349: g4490.

33 WHO (2007). Prevention of Cardiovascular disease. Guidelines for assessment and managament of cardiovascular risk [online] [cit. 2018-08-25]. Dostupné z: http://www.who.int/cardiovascular_diseases/guidelines/Full%20text.pdf

34 Writing C, Smith SC, Jr., Collins A, Ferrari R, Holmes DR, Jr., Logstrup S, McGhie DV, Ralston J, Sacco RL, Stam H, Taubert K, Wood DA and Zoghbi WA. (2012). Our time: a call to save preventable death from cardiovascular disease (heart disease and stroke). Glob Heart. **7**: 297-305.

35 Zdraví 2020. Národní strategie ochrany a podpory zdraví a prevence nemocí [(Health 2020. National strategy of protection and support of health and prevention of diseases) (In Czech)] (2014). Praha: Ministerstvo zdravotnictví České republiky.

36 Zdravotnická ročenka 2016 (Medical Yearbook 2016) (2017). Zdravotnická statistika ČR. ÚZIS ČR (Czech).