Impact of Cardiovascular Disease Prevention Programmes on Lifestyle: Patients' Perspective

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Key Words: *cardiovascular disease, lifestyle, prevention program, primary healthcare.*

Summary. *The aim of the study was to assess the patients' perspective on the impact of cardiovascular diseases prevention programmes on their lifestyle changes.*

Material and methods. The study was performed at a primary healthcare centre in 2019. The inclusion criteria for participants were patient's age and gender (40–55 years for men and 50–65 years for women). In total, 108 patients participated in the study (response rate was 75.0%). The patients were divided in two groups: 1) patients who participated in a cardiovascular disease prevention programme, n = 60; and 2) patients who participated in a cardiovascular disease prevention programme and a cardiovascular disease prevention programme provided by the Public Health Bureau, n = 48. The questionnaire was developed by the authors. The Centre of Bioethics at the Lithuanian University of Health Sciences approved the study protocol, no. BEC-SL(M)-227.

Results. Patients who participated in the cardiovascular disease prevention programme provided by the Public Health Bureau changed their eating habits significantly in relation to those who participated in the cardiovascular disease prevention programme provided by primary healthcare specialists. Differences between the two groups of the participants were determined as follows: eating more vegetables (79.2% and 6.7%, respectively, P < 0.001), consumption of less sweets (72.9% and 31.7%, respectively, P < 0.001) and less salt (79.2% and 36.7%, respectively, P < 0.001), less fat food (89.6% and 46.7%, respectively, P < 0.001), and less pork meat (89.6% and 31.7%, respectively, P < 0.001).

More patients from the Public Health Bureau programme, compared with those from the cardiovascular disease prevention programme provided by primary healthcare specialists, started exercising (35.4% and 6.7%, respectively, P < 0.001) and became more physically active than earlier (39.6% and 5.0%, respectively, P < 0.001). The Public Health Bureau cardiovascular disease prevention programme stimulated patients to better balance their work and rest (45.8% and 16.7%, respectively, P < 0.001), spend more time for relaxation (50.0% and 21.7%, respectively, P = 0.001) and for leisure activities (50.0% and 23.3%, respectively, P = 0.003), and manage stress (50.0% and 25.0%, respectively, P = 0.007).

Conclusions. Cardiovascular diseases prevention programmes are helpful in changing lifestyle and nutritional habits through healthier food, higher physical activity, adequate work and rest balance, and decreased smoking and alcohol use.

Introduction

Cardiovascular diseases remain the leading cause of morbidity and mortality globally (1). In 2017, 56.1% of Lithuanian people died from cardiovascular diseases, accounting for 63.4% of deaths among women and 48.1% among men (2). Looking at trends in more specific causes of death, ischaemic heart diseases and stroke remain two most common causes of death in Lithuania, with mortality rates four and two times above the EU average, respectively (3). According to the data of the Institute of Hygiene of the Lithuanian Health Information Centre, the causes of death in the Lithuanian population have not changed for many years (4).

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Prevention strategies occur at the population level but must also engage individual adults to slow the development of atherosclerotic cardiovascular disease. The most important way to prevent atherosclerotic cardiovascular disease is to promote a healthy lifestyle throughout the life of an individual. Saeidi et al. (2015) investigated the status of psychological risk factors among cardiac patients' attitudes; the results showed that the patients believed the main cause of their illness to be behaviour risk factors (5). Another study (6) showed significant changes in cardiac risk factors after implementing the programme that included exercise, nutrition counselling and stress management. By living a healthy lifestyle, patients can keep blood pressure, cholesterol and blood sugar levels normal and have a lower risk of heart disease and heart attack. Imple-

mentation of a cardiac education programme helps to enhance knowledge and adherence to a healthy lifestyle among the patients even after 1 month of participation (7). Prevention strategies must include a strong focus on lifestyle optimisation (improvements in diet, physical activity, and avoidance of tobacco use and exposure to second hand smoke) to minimise the risk of future atherosclerotic cardiovascular disease events (1).

The main guidelines emphasise the need to identify individuals with a high cardiovascular risk and to offer them a primary prevention action plan. In Lithuania, in order to achieve this goal, the state has issued the Programme for the Screening and Preventive Management of the High Cardiovascular Risk Individuals, carried out since 2006 (8). The programme aimed at estimation and management of cardiovascular risk factors in seeking to reduce acute cardiovascular events related to individual morbidity and mortality, and to slow down the progression of sub-clinical atherosclerosis into overt cardiovascular disease. Additionally, the programme aimed at increasing the number of newly identified cases of diabetes, metabolic syndrome and the latent course of atherosclerosis related diseases, as well as at decreasing hospitalisations for treatment of arterial hypertension and coronary heart disease. A prevention programme consists of two steps: 1) initial risk assessment at dedicated primary care centres, i.e., primary prevention units; and 2) examination of patients with a high and intermediate risk of cardiovascular diseases at the specialised prevention units.

One of the main tasks of personal and public healthcare in Lithuania is strengthening the responsibility of each person for his or her own health. Collaboration across multiple sectors is needed to foster healthcare system transformation, although effective and sustainable collaboration is challenging (9).

In order to improve the quality and accessibility of public healthcare services to each citizen of the country, the Ministry of Health of the Republic of Lithuania has encouraged local authorities to establish public health bureaus (PHB). The main functions of these bureaus include the coordination of implementation of municipal public health programmes, monitoring trends in health condition changes of the municipal population, support and coordination of public health education and encouragement of the community involvement in solving public health problems (10).

In Lithuania, the evidence that highly effective public health interventions are actively pursued is limited at all levels. At the local level, the responsibility for public health mainly lies with municipalities, which are encouraged to set up and run public health bureaus. However, municipalities are for the most part free to choose the activities they implement and decide on their level of effort. No framework is in place to help to ensure that local-level stakeholders implement evidence-based interventions or are accountable for the progress of the results (as opposed to implementation activities alone). Overall, many public health efforts are geared towards small initiatives, which are insufficiently evaluated. Most interventions, such as information sessions on harmful alcohol use or benefits of healthy diet at the public health bureaus are assessed in terms of process indicators, such as a number of participants, and not focused on outcomes (11).

Lithuanian patients' awareness about the cardiovascular diseases prevention programme was analysed (12–14) together with the awareness about healthy lifestyle (15). In addition, the associations between eating habits and blood cholesterol concentration were determined (16). The results revealed that most Lithuanian inhabitants were well informed about available cardiovascular diseases prevention programmes. Kutkiene et al. (2018) reported on the cardiovascular risk assessment of dyslipidemic middle-aged adults without overt cardiovascular disease over the period of 2009–2016 in Lithuania (17). Almost two thirds of dyslipidemic middle-aged Lithuanian adults without overt cardiovascular disease had three or more risk factors of the other cardiovascular diseases. Importantly, the nurse's role in implementation of the cardiovascular prevention programme was discussed in the research (18–19). It was concluded that nurses could apply a theoretical model for successfully training patients with an increased level of cholesterol by changing their health habits and helping to maintain the acquired behaviour, and to recognise high-risk situations. All these measures encourage patients to be more initiative in changing lifestyle and maintaining new habits (18). Personal motivation to participate in disease prevention activities is one of the main stimulus for successful completion of the programme; thus, the assessment of the subjective patients' perspective about the impact the programme has on lifestyle changes is important.

The aim of the study was to assess the patients' perspective on the impact of cardiovascular diseases prevention programmes on their lifestyle changes.

Methods

Study Design and Sample. The study was performed at a primary healthcare centre in Elektrėnai (town in Lithuania). The data were collected during 2019.

According to the legislation (8), patients at risk of cardiovascular diseases could participate in the prevention programme if they are 40–55 years old for men and 50–65 years old for women. In this study, age and gender, as stated in the above mentioned legislation, were chosen as inclusion criteria. The exclusion criteria were patients with cardiovascular diseases such as myocardial infarction, unsta-

ble angina, transient ischemic attack, stroke and peripheral artery thrombosis.

Patients were invited to participate in the cardiovascular diseases programme by a family physician if they belonged to the risk group by age and gender. Patients had a choice of participating in the cardiovascular diseases prevention programme provided at their healthcare institution and, additionally, attending the prevention programme provided by the Public Health Bureau. Conditions for both choices were the following:

1. Participation in the cardiovascular diseases prevention programme: all patients, had a blood test performed, and after the evaluation of blood test results, individual teaching was conducted by a family physician and a nurse about risk factors of cardiovascular diseases, their prevention and recommendations about risk factor management delivered during the visit at a primary healthcare centre (PHCC).

2. A family physician additionally recommended to attend the cardiovascular diseases prevention programme at the Public Health Bureau and to learn more about diseases prevention and control. The Public Health Bureau cardiovascular prevention programme is a 16-hour teaching programme free of charge. The Public Health Bureau programme has theoretical and practical training on the following topics: healthy lifestyle, risk factors and complications of cardiovascular diseases, nutrition, physical activity, and cardiovascular diseases, management of stress risk factors, individual recommendations. Patients could participate in this programme once a year. Patients learn theory in groups, have practical training, and are educated by different specialists: cardiologist, dietician, public healthcare specialist, phycologist and occupational therapist.

For this study, two groups of patients were selected: 1) patients who participated in the cardiovascular diseases prevention programme at a PHCC (n = 60), and 2) patients who beside cardiovascular diseases prevention programme at a PHCC also participated in the PHB cardiovascular prevention programme (n = 48). In total, 108 patients participated in the study with the response rate of 75.0%.

Study Organisation. One of the authors (ZV) collected data in the primary healthcare centre without interference in patients' treatment, diagnostics and nursing care procedures. Data collection for each patient lasted about 10–20 min. A pilot test was performed (n = 10) before gathering data. The data of the first patients' group (those who participated in the cardiovascular diseases prevention programme at a PHCC) were collected during 12 months after they agreed to participate in the programme. The data of the second patients' group were also collected within the same year, when the patients of this group additionally attended a 16-hour cardiovascular disease prevention programme at a PHB.

Study Instrument. A questionnaire was developed by the authors (SL, ŽV) with the aim to explore the perception of respondents about their life style changes because of the participation in the cardiovascular diseases prevention programme at a PHCC and the education programme at a PHB. The questionnaire was developed according to the content of prevention programmes and included the following lifestyle factors: eating habits, physical activity, smoking, drinking, work and rest balance.

Ethical Consideration. The study protocol was approved by the Centre of Bioethics at the Lithuanian University of Health Sciences, no. BEC-SL(M)-227.

Statistical analysis was carried out on SPPS version 17.0. The data were analysed using the χ^2 test and the z-test. Comparisons were made between the age groups. The difference was considered statistically significant when $P \leqslant 0.05$.

Results

General Characteristics of Patients. In total, 108 patients participated in the study. The mean age was 56.25 ± 5.01, and there were more women (79.6%, n = 86) than men (20.4%, n = 22). In the PHB programme, 83.3% (n = 40) of women and 16.7% (n = 8) of men participated. In comparison, 76.7% (n = 46) of women and 23.3% (n = 14) of men were enlisted in the cardiovascular diseases prevention programme at a PHCC.

Eating Habits. The patients were asked to indicate their eating habits after participating in the cardiovascular diseases prevention programme and in the additional programme at a Public Health Bureau. After education, the patients changed their eating habits: they started to consume more chicken meat (76.9%), eat more fruits (75.9%), eat more plant-based fat food (73.1%), more fish (68.5%), and more frequently prepare steamed food (69.4%). Comparison of the patients in different groups demonstrated that the eating habits significantly varied on many items. The patients after PHCC&PHB education, more often than the first group, changed their eating habits in relation to the consumption of vegetables (79.2% and 6.7%, respectively, $P < 0.001$), sweets (72.9% and 31.7%, respectively, $P < 0.001$), salt (79.2% and 36.7%, respectively, $P < 0.001$), fat food (89.6% and 46.7%, respectively, $P < 0.001$), pork meat (89.6% and 31.7%, respectively, $P < 0.001$). Two-thirds of the patients after PHCC&PHB education and one-third of the patients after PHCC education refused fast food (60.4% and 33.3%, respectively, $P < 0.001$). The second group of the patients more often used smaller portions (83.3% and 43.3%, respectively, $P < 0.001$) and started to control weight (87.5% and 43.3%, respectively, $P < 0.001$) than the first group of the patients (Table 1).

Table 1. Patients' Distribution by Their Perceived Eating Habits after Participation in Cardiovascular Diseases Prevention Programmes

Eating Habits		Programmes, n = 108, n (%)		Total n (%)	χ^2, df, *P*
		PHCC n = 60	PHCC&PHB n = 48		
Eat more vegetables	Yes	4 (6.7)*	38 (79.2)	42 (38.9)	$\chi^2 = 59.59$, df = 2, $P < 0.001$
	No	50 (83.3)*	10 (20.8)	60 (55.6)	
	Not eat	6 (10.0)	0	6 (5.6)	
Eat more fruits	Yes	42 (70.0)	40 (83.3)	82 (75.9)	$\chi^2 = 2.59$, df = 1, $P = 0.107$
	No	18 (30.0)	8 (16.7)	26 (24.1)	
	Not eat	0	0	0	
Used less sugar	Yes	37 (61.7)	31 (64.6)	68 (63.0)	$\chi^2 = 2.91$, df = 2, $P = 0.233$
	No	23 (38.3)	15 (31.3)	38 (35.2)	
	Not use	0	2 (4.2)	2 (1.9)	
Eat less sweats	Yes	19 (31.7)*	35 (72.9)	54 (50.0)	$\chi^2 = 18.71$, df = 2, $P < 0.001$
	No	38 (63.3)*	11 (22.9)	49 (45.4)	
	Not use	3 (5.0)	2 (4.2)	5 (4.6)	
Use less salt	Yes	22 (36.7)*	38 (79.2)	60 (55.6)	$\chi^2 = 19.94$, df = 2, $P < 0.001$
	No	34 (56.7)*	8 (16.7)	42 (38.9)	
	Not use	4 (6.7)	2 (4.2)	6 (5.6)	
Eat less fat food	Yes	28 (46.7)*	43 (89.6)	71 (65.7)	$\chi^2 = 22.32$, df = 2, $P < 0.001$
	No	30 (50.0)*	4 (8.3)	34 (31.5)	
	Not use	2 (3.3)	1 (2.1)	3 (2.8)	
Eat more plant-based fat food	Yes	40 (66.7)	39 (81.3)	79 (73.1)	$\chi^2 = 3.52$, df = 2, $P = 0.172$
	No	15 (25.0)	8 (16.7)	23 (21.3)	
	Not use	5 (8.3)	1 (2.1)	6 (5.6)	
Eat steamed food more frequent	Yes	41 (68.3)	34 (70.8)	75(69.4)	$\chi^2 = 0.12$, df = 2, $P = 0.938$
	No	18 (30.0)	13 (27.1)	31 (28.7)	
	Not use	1 (1.7)	1 (2.1)	2 (1.9)	
Refused fast food	Yes	20 (33.3)*	29 (60.4)	49 (45.4)	$\chi^2 = 45.33$, df = 2, $P < 0.001$
	No	40 (66.7)*	4 (8.3)	44 (40.7)	
	Not use	0	15 (31.3)	15 (13.9)	
Eat less pork	Yes	19 (31.7)*	43 (89.6)	62 (57.4)	$\chi^2 = 37.64$, df = 2, $P < 0.001$
	No	26 (43.3)*	5 (10.4)	31 (28.7)	
	Not use	15 (25.0)	0	15 (13.9)	
Eat more chicken	Yes	44 (73.3)	39 (81.3)	83 (76.9)	$\chi^2 = 1.58$, df = 2, $P = 0.452$
	No	12 (20.0)	8 (16.7)	20 (18.5)	
	Not use	4 (6.7)	1 (2.1)	5 (4.6)	
Eat more fish	Yes	40 (66.7)	34 (70.8)	74 (68.5)	$\chi^2 = 1.65$, df = 2, $P = 0.436$
	No	20 (33.3)	13 (27.1)	33 (30.6)	
	Not use	0	1 (2.1)	1 (0.9)	
Eat more low fat milk products	Yes	31 (51.7)*	34 (70.8)	65 (60.2)	$\chi^2 = 7.30$, df = 2, $P = 0.026$
	No	28 (46.7)*	11 (22.9)	39 (36.1)	
	Not use	1 (1.7)	3 (6.3)	4 (3.7)	
Use smaller portions	Yes	26 (43.3)*	40 (83.3)	66 (61.1)	$\chi^2 = 18.38$, df = 2, $P < 0.001$
	No	25 (41.7)*	7 (14.6)	32 (29.6)	
	No differ	9 (15.0)*	1 (2.1)	10 (9.3)	
Begin control weight	Yes	26 (43.3)*	42 (87.5)	68 (63.0)	$\chi^2 = 22.36$, df = 2, $P < 0.001$
	No	30 (50.0)*	5 (10.4)	35 (32.4)	
	No differ	4 (6.7)*	1 (2.1)	5 (4.6)	

PHCC&PHB – Primary Healthcare Centre and Public Health Bureau, PHCC – Primary Healthcare Centre.
*$P < 0.05$, comparing with PHCC&PHB.

Physical Activity. The patients were asked to assess changes of their physical activity patterns after their participation in cardiovascular diseases prevention programmes. The PHCC programme was more effective in encouraging the patients to start physical activity, and the PHCC&PHB education was a higher stimulus for the patients to start exercising. The patients after PHCC&PHB perceived themselves being more active after education than before it, compared with the patients after the PHCC education programme. Running was the least attractive physical activity for patients from both education groups (Table 2).

Smoking and Drinking. The patients subjectively assessed their smoking and drinking habits after cardiovascular diseases prevention education. There were no significant changes between two groups of the patients in relation to smoking habits. However, 25% of the patients from PHCC&PHB reported a decrease in alcohol consumption after the education (Table 3).

Work and Rest Balance. An important part in the cardiovascular diseases prevention programme content was dedicated to work and rest balance and stress management. More patients from the PHCC&PHB group, in comparison with the PHCC group, started to pay attention to planning of work and rest and spending more time for relaxation and leisure activities. More of these patients, in comparison with the other study group, reported a better emotional condition (68.3% and 27.1%, respectively, $P < 0.001$) and better sleep (55.0% and 25.0%, respectively, $P = 0.006$) after they completed PHCC&PHB cardiovascular diseases prevention education (Table 4).

Table 2. Patients' Distribution by Their Perceived Physical Activity Patterns after Participation in Cardiovascular Diseases Prevention Programmes

Physical Activity		Programmes, n = 108, n (%)		Total n (%)	χ^2, df, P
		PHCC n = 60	PHCC&PHB n = 48		
Begin physical activity	Yes	44 (73.3)*	9 (18.8)	53 (49.1)	$\chi^2 = 31.86$, lls = 2, $P < 0.001$
	No	13 (21.7)*	33 (68.8)	46 (42.6)	
	Was active	3 (5.0)	6 (12.5)	9 (8.3)	
Begin exercising	Yes	4 (6.7)*	17 (35.4)	21 (19.4)	$\chi^2 = 24.62$, lls = 2, $P < 0.001$
	No	53 (88.3)*	21 (43.8)	74 (68.5)	
	Was active	3 (5.0)*	10 (20.8)	13 (12.0)	
Begin jogging	Yes	6 (10.0)	5 (10.4)	11 (10.2)	$\chi^2 = 1.17$, lls = 2, $P = 0.557$
	No	51 (85.0)	38 (79.2)	89 (82.4)	
	Was active	3 (5.0)	5 (10,4)	8 (7.4)	
More physically active than earlier	Yes	3 (5.0)*	19 (39.6)	22 (20.4)	$\chi^2 = 24.26$, lls = 2, $P < 0.001$
	No	56 (93.3)*	25 (52.1)	81 (75.0)	
	Was active	1 (1.7)	4 (8.3)	5 (4.6)	

PHCC&PHB – Primary Healthcare Centre and Public Health Bureau, PHCC – Primary Healthcare Centre.
*$P < 0.05$, compared with PHCC&PHB.

Table 3. Patients' Distribution by Their Perceived Smoking and Drinking Habits after Participation in Cardiovascular Diseases Prevention Programmes

Smoking and Drinking Items		Programmes, n = 108, n (%)		Total n (%)	χ^2, df, P
		PHCC n = 60	PHCC&PHB n = 48		
Smoke less	Yes	1 (1.7)	1 (2.1)	2 (1.9)	$\chi^2 = 0.03$, lls = 2, $P = 0.987$
	No	10 (16.7)	8 (16.7)	18 (16.7)	
	Non-smoker	49 (81.7)	39 (81.3)	88 (81.5)	
Use less alcohol	Yes	0	12 (25.0)	12 (11.1)	$\chi^2 = 16.98$, lls = 2, $P < 0.001$
	No	10 (16.7)	7 (14.6)	17 (15.7)	
	Not user	50 (83.3)*	29 (60.4)	79 (73.1)	

PHCC&PHB – Primary Healthcare Centre and Public Health Bureau, PHCC – Primary Healthcare Centre.
*$P < 0.05$, compared with PHCC&PHB.

Table 4. Patients' Distribution by Perceived Work and Rest Balance after Participation in Cardiovascular Diseases Prevention Programmes

Work and Rest Balance		Programmes, n = 108, n (%)		Total n (%)	χ^2, df, *P*
		PHCC n = 60	PHCC&PHB n = 48		
Begin to plan work and rest balance	Yes	10 (16.7)*	22 (45.8)	32 (29.6)	$\chi^2 = 23.72$, lls = 2, $P < 0.001$
	No	8 (13.3)*	15 (31.3)	23 (21.3)	
	No changes	42 (70.0)*	11 (22.9)	53 (49.1)	
Spend more time for rest	Yes	13 (21.7)*	24 (50.0)	37 (34.3)	$\chi^2 = 13.67$, lls = 2, $P = 0.001$
	No	37 (61.7)*	13 (27.1)	50 (46.3)	
	No changes	10 (16.7)	11 (22.9)	21 (19.4)	
Spend more time for leisure	Yes	14 (23.3)*	24 (50.0)	38 (35.2)	$\chi^2 = 11.96$, lls = 2, $P = 0.003$
	No	34 (56.7)*	12 (25.0)	46 (42.6)	
	No changes	12 (20.0)	12 (25.0)	24 (22.2)	
Manage stress	Yes	15 (25.0)*	24 (50.0)	39 (36.1)	$\chi^2 = 9.99$, lls = 2, $P = 0.007$
	No	32 (53.3)*	12 (25.0)	44 (40.7)	
	No stress	13 (21.7)	12 (25.0)	25 (23.1)	
Better emotional condition	Yes	11 (18.3)*	26 (54.2)	37 (34.3)	$\chi^2 = 19.56$, lls = 2, $P < 0.001$
	No	41 (68.3)*	13 (27.1)	54 (50.0)	
	No changes	8 (13.3)	9 (18.8)	17 (15.7)	
Better sleep	Yes	16 (26.7)*	24 (50.0)	40 (37.0)	$\chi^2 = 10.23$, lls = 2, $P = 0.006$
	No	33 (55.0)*	12 (25.0)	45 (41.7)	
	No changes	11 (18.3)	12 (25.0)	23 (21.3)	

PHCC&PHB – Primary Healthcare Centre and Public Health Bureau, PHCC – Primary Healthcare Centre.
*$P < 0.05$, compared with PHCC&PHB.

Discussion

This study showed that cardiovascular diseases prevention programmes are effective to change patients' lifestyle habits. The patients, especially those who participated in the additional education programme provided by the Public Health Bureau, understood the importance of healthy food and physical activity, realised negative effects of drinking and paid more attention to balancing work and rest. Direct contact with patients by providing information about cardiovascular diseases prevention and management produced the expected results (13).

To overcome the existing situation in cardiovascular morbidity among Lithuanian inhabitants, it is essential to improve the control of multiple risk factors that have an important role in cardiovascular pathology (17). Family physicians and community nurses recommend preventive measures (diet, physical activity, smoking cessation, cholesterol level and blood pressure decreasing medications) for patients to reduce the cardiovascular diseases risk despite of the patient's health condition and risk level. Focusing on smoking prevention, promotion of healthy nutrition and physical activity are the key points of the strategy that cannot be implemented without the significant contribution of the state authorities (20). The ongoing free of charge education programmes and activities in preventive medicine encourage people to focus on cardiovascular diseases risks and to be more committed to the modification of risk factors, personal lifestyle habits and non-pharmacological cardiovascular disease treatment.

Sapranaviciute-Zabazlajeva et al. (2017) found significant associations between the distribution of four major lifestyle habits (smoking, alcohol consumption, physical activity and nutrition habits) and psychological well-being of the person. Men in the higher psychological well-being group were more likely to be never-smokers and consumed alcohol less frequently. Similarly, individuals in the higher psychological well-being group were more physically active and reported healthier nutrition habits (21). Although younger urban community members in Lithuania demonstrate most of the health status indicators better than the older ones, they are less likely to report healthy lifestyle (22). These results suggest that cardiovascular disease preventive lifestyle should start to be promoted at an early age and become attractive already during childhood and adulthood.

Multiple observational studies have focused on the association of cardiovascular diseases mortality and dietary patterns, specifically, sugar, low-calorie sweeteners, high-carbohydrate diets, low-carbohydrate diets, refined grains, trans fat, saturated fat, sodium, red meat, and processed red meat (e.g., bacon, salami, ham, hot dogs, sausage) (1, 23). In our study, nutrition habits of the patients improved after

participation in the cardiovascular disease prevention programmes. Avoidance of fast food was significant for 45.4% of the participants; similar results were found in another Lithuanian study where 44.7% of participants excluded fast food from their daytime meal (12). Unfortunately, national studies continue to report that Lithuanians consume insufficient amounts of vegetables and fruits, the nutrition of the majority of the population is not favourable for health and does not comply with healthy nutrition recommendations (24). According to Luksiene et al. (2011), nutrition education efforts should focus on improving food diversity and should be targeted at lower educated, single, and older people in particular (25).

Numerous health benefits of regular physical activity have been well established (26), and physical activity is recognised as the cornerstone of maintaining and improving cardiovascular health (27). In Lithuania, 19.6% of adults practice low-intensity physical activity. Although over 80% of these individuals are sufficiently physically active, almost 50% of them engage in vigorous-intensity or moderate-intensity physical activity by doing hard physical work as part of their jobs (28). Our study confirmed that different cardiovascular disease prevention programmes motivate patients to start physical activity and to live more actively.

Stress is the most important psychological factor for cardiovascular health (5). Our results revealed that management of stress, time for leisure and activity, work and rest balance improve after education of patients. Patients need to know the importance of anti-stressful lifestyle and be informed about simple relaxation techniques.

This study evidenced that cardiovascular prevention programmes make a significant impact on patients' lifestyle from their own perspective. Even if patients are able to choose the preferred education at a primary healthcare centre or public health bureau, some barriers of the implementation of the health promotion programmes still exist. A recent study of Sedyte et al. (2019) revealed that inactivity of the municipality doctor and administration of primary healthcare institutions, ineffective work organisation of family physicians, insufficient coordination of a health promotion programme in primary health settings, poor patients' motivation and their negative attitudes towards the implementation of a health promotion programme are the main obstacles to reach expected changes (29). The primary healthcare and public health institutions must put more effort on effective and sustainable collaboration regarding disease preventive strategies. Family physicians and nurses should work in partnership with patients to assess their preparedness for sustained lifestyle improvements, identify potential barriers to change, and encourage them to achieve measurable goals and to monitor their progress continually (30).

A limitation of this study was a fact that due to the small sample size, the results of both education groups were not compared by gender. Other studies revealed that after the specific education women became more physically active than men and their nutrition habits were healthier (21).

Conclusions

Cardiovascular diseases prevention programmes provided at the primary healthcare level make significant changes of nutritional habits, physical activity, alcohol use, work and rest balance, and stress management, as perceived by patients. The advertisement and participation in such educational programmes should be accessible for patients despite their age, health status and existing cardiovascular risk factors. The subjective and objective measures of the positive effect of cardiovascular diseases prevention through education should be more transparent to motivate those individuals who are still sceptical towards such initiatives.

Statement of Conflict of Interest

The authors state no conflict of interest.

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