THE ROLE OF PHYSICAL ACTIVITY IN BALANCING DYSLIPIDEMIA

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Abstract

Lipid fraction disorders (Dyslipidemia) still remain the main risk-modifying factors for the occurrence of cardiovascular diseases (CVD) [1–4]. In recent years, with the increasing trend of population aging, the health status of the elderly, the development of social economy, lifestyle and diet of people have changed significantly, leading to an increase in the prevalence of hyperlipidemia year by year. According to statistics, about 39-48% of adults in the world are affected by hyperlipidemia, and the elderly are the group with the highest risk of hyperlipidemia. Hyperlipidemia can lead to serious complications such as atherosclerosis, coronary heart disease and stroke, and poses a serious threat to the life and health of the elderly. Hyperlipidemia is one of the common health problems of the elderly, and its main characteristic is the abnormal increase in cholesterol, triglycerides and lipid levels in the blood, which significantly increase the risk of premature atherosclerosis with a negative impact on the occurrence of cardiovascular diseases (CVD), cerebral, peripheral, etc. There are documented facts that hypolipidemic therapy (statins, fibrates, cholesteramine, colestipol) significantly affect the improvement of dyslipidemia, but in recent years a number of scientists have verified and documented that even moderate physical activities (25-30 minutes, only 5 days a week) such as: easy walking, light running, various sports, cycling, swimming, yoga, aerobic exercises can significantly affect body weight loss and the balance of lipid fractions (reduction of triglycerides, LDL-ch and increase of proatherogenic cholesterol-HDLch) [5, 6]. In our country, physical inactivity is responsible for 26-38% of CVD. The US Department of Health and Human Services [7] recommends guidelines for improving blood lipid profiles through physical exercise and a minimum expenditure of 1,000 kcal/week. In the century we are living in, for multifactorial reasons (oxidative stress, social problems, smoking, adiposity, physical inactivity) we have an increase and very high prevalence of CVD, diabetes, hypertension and hyperlipidemia. Therefore, based on the results, we prefer that physical activity (sports exercises, sports education) should be promoted through pamphlets, media broadcasts and guidelines compiled by experts not as a privilege, but as a necessity for the entire population. The purpose of the study: was to verify the impact of physical activities and exercises in a group of individuals within 12 months in reducing hyperlipidemia.
Material and methods: The study included a total of 80 patients (35 were females with a mean age of 54.00±4.00 years and 45 were males with a mean age of 55.70±3.50 years with CVD (condition after acute myocardial infarction, patients with diabetes, hypertension). The study also included 60 healthy individuals (25 females and 35 males) voluntary blood donors with an identical mean age of 55.800±3.80 years who served as a control group. All examinees (patients and control group) underwent lipid fractions (tCh, LDL-ch, TG and HDL-ch) examination every three months. The patients were divided into two groups: one group that had moderate physical activities of 25-30 minutes per week) and the other group without physical activities. Statistical processing: The obtained lipid values (Cht, HDLch, TG, LDL-ch) from patients randomized according to physical activity and the control group are presented in tabular form and processed graphs according to the mean values and standard deviation X±SD, the student's "t" test, the correlation coefficient, "r". Values for p ¡ 0.05 were considered as statistically significant. The results were processed with the SPSS V26 statistical program. Conclusion: in conclusion, from the obtained results, we can conclude that in the treatment of dyslipidemia, in addition to drug therapy, exercises, physical activity, aerobics, swimming, etc. significantly affect and it is more than necessary to increase the awareness of the population on the effects and beneficial roles of physical activities in the balance of lipid fractions and hyperlipidemia.

Keywords: physical activity, dyslipidemia, cardiovascular diseases.

Introduction

In recent years, hyperlipidemia has become a global health problem not only in the elderly but also in young people as a result of physical inactivity and the consumption of processed

foods that lead to adiposity and abnormal increases in cholesterol, triglycerides and lipid levels in the blood. Hyperlipidemia significantly increases the occurrence of premature atherosclerosis with an impact on the early appearance of atherosclerotic processes in the coronary, cerebral and peripheral arteries. In recent years, a meta-analysis showed that different forms of physical activity (PA) can reduce serum total cholesterol levels, LDL-cholesterol, triglycerides (TG) and increase HDLcholesterol levels (high-density lipoprotein cholesterol), therefore the effects and impact of physical activity on the regulation of lipid fraction levels in recent years has been receiving increasing attention. Moderate-intensity aerobic exercise has a significant impact on total cholesterol levels, LDL-ch (low-density lipoproteins), triglycerides, high-density lipoprotein cholesterol (HDL-ch) in patients with hyperlipidemia. In recent years, adiposity, dyslipidemia, physical inactivity, lifestyle and way of life, genetic predisposition, gender, socio-economic conditions all influence the high prevalence of cardiovascular diseases (CVD) as a consequence of hyperlipidemia. In recent years, experts have given an important role in balancing dyslipidemia with hypolipidemic therapy. An important role is given to physical activity for a minimum of 25 minutes only 5-6 days a week with a cardiac exercise intensity of 40-70% of cardiac and oxygen reserve-VO2 (maximum oxygen consumption) with aerobic exercises, walking, cycling, football, tennis, swimming, etc.) as the first step for balancing dyslipidemia [8, 9]. The recommended time for aerobic exercise is between 25-30 minutes, with moderate intensity at least 5 times a week [10–12]. It is recommended that exercise should be preferred in combination with aerobic exercise to improve physical condition, maintain body weight and eliminate oxidative stress, as well as to increase total caloric consumption, which leads to a decrease in LDL-cholesterol and TG concentrations and an increase in proatherogenic HDL-cholesterol [13–15]. In the occurrence of dyslipidemia and adiposity in the basic perceptions of the disease, physical inactivity plays an important role, therefore, through informational means (special television programs, electronic media, pamphlets or magazines) we must increase awareness throughout the population about the role of physical exercises in balancing hyperlipidemia. Physical inactivity worldwide is considered a fourth-degree risk factor for the occurrence of chronic and cardiovascular diseases as a consequence of early atherosclerotic processes manifested by the influence of hyperlipidemia.

Material And Methods

The study included a total of 80 patients (35 were women with an average age of 54.00±4.00 years and 45 were men with an average age of 55.70±3.50 years with CVD (condition after acute myocardial infarction, patients with diabetes, hypertension). The study also included 60 healthy individuals (25 women and 35 men) voluntary blood donors with an identical average age of 55.80±3.80 years who served as a control group. All examinees (patients and control group) underwent an examination of lipid fractions (tCh, LDL-ch, TG and HDL-ch) every three months within 12 months
(four measurements). Blood for examination was taken every three months at 8-9 am in a 12-hour fasting state and sent to the laboratory of the Tetovo Clinical Hospital for examination. The patients were divided into two groups: one group that had moderate physical activities of 25-30 minutes per week) and the other group without physical activities. From the total number of patients (N=80), moderate physical activities of 5-6 times a week for 25-30 minutes, 50 (females + males) preferred physical exercises, while 30 (females + males) patients did not prefer physical

exercises.
The average age of the patients for the female gender was 54.00±4.00 while for the male gender 55.70±3.50, the average difference according to age according to statistics is not significant p =
0.005, which indicates a homogeneous group of them (table and graph no. 1).

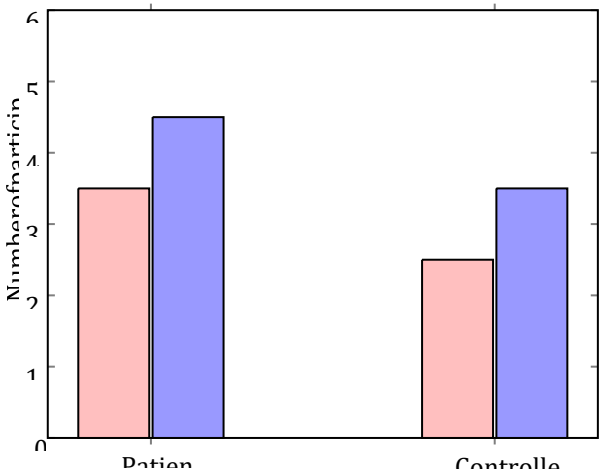
Statistical Processing: the obtained lipid values (Cht, HDL-ch, TG, LDL-ch) from the patients randomized according to physical activity and the control group are presented in tabular form and processed graphs according to the average values and standard deviation X±SD, the student's "t" test, the correlation coefficient, "r". Values for p ¡ 0.05 were considered as statistically significant. The results were processed with the SPSS V26 statistical program.

The total number of examiners =140

Patients tot. N°=80		Group controller N°=60	
F=35	M=45	F=25	M=35
54.00 ± 4.00	55.70 ± 3.50	55.80 ± 3.80	55.80 ± 3.80

Results

From table number 3, a statistically significant difference is observed for p¡0.001 in all lipid fractions for CHt, TG, LDL-ch, HDL-ch and the ratio between LDL/HDL between patients without physical exercise and with physical exercise of 25-30 minutes 5-6 days a week within 12 months in which balanced lipid values were manifested with a decrease in ChtT, TG, LDL-ch, LDL/HDL ratio and an increase in HDL-ch. The LDL/HDL ratio is a very good indicator in determining the degree of dyslipidemia, and is a highly relevant indicator in determining the positive role during physical activities.



Group

	Females	Males

Fig1. Number of participants by group and gender. For Patients (N=80): Females=35, Males=45; for Controllers (N=60): Females=25, Males=35.

Discussion

In recent years, dyslipidemia, diabetes, obesity, hypertension and others remain the most important modifiable risk factors at a global level for the occurrence of cardiovascular diseases (CVD). Dyslipidemia is clinically defined by the presence of more than one abnormality of lipid fractions (high total cholesterol levels, high LDL-cholesterol levels, high TG levels, and reduced HDLcholesterol levels [16]. Physical activity (PA) demonstrates cardiometabolic benefits and affects the balance of lipid fractions, which can be classified both according to the field (professional, leisure time) and according to low, light, moderate and vigorous intensity. Low AF is associated with poor cardiovascular outcomes and improvements in hyperlipidemia compared to the results of individu-

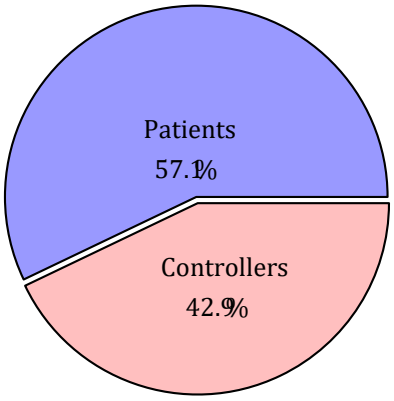


Fig. 2. Division of participants by group (total N=140). Patients: 57.1%, Controllers: 42.9%.

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TABLE 2. Presentation of the values obtained for total cholesterol (CHT), TG, HDL-ch, LDL-ch from the examined patients (without exercise and with physical exercise of 25–30 minutes within 5–6 days of the week) over a period of 12 months and the control group.

Parameter	**Sex Patients (no exercise) N=30 Patients (exercise) N=50 Controls N=60**				
2*CHT (mmol/l)	F	7.40±1.90↑	5.10±0.50 ↓	4.30±	1.20
	M	8.20±1.60↑	5.80±0.40 ↓	1.23±	0.70

2*TG (mmol/l)	F	3.70±0.90↑	1.90±0.50 ↓	1.62±	0.50
	M	3.80±0.70↑	1.80±0.20 ↓	2.90±	0.80
2*HDL-ch (mmol/l) F	1.10±0.40↓	1.17±0.70↑↑	1.62±	0.50	
M	1.10±0.70↓	1.35±0.40↑↑	1.50±	1.00	
2*LDL-ch (mmol/l) F	4.80±0.80↑	3.60±0.60↓	2.90±	0.80	
	M	4.90±1.00↑	3.50±0.20 ↓	1.50±	1.00
2*LDL/HDL	F	3.00±2.00↑	1.70±1.00 ↓	1.50±	1.0
	M	3.10±1.40↑	1.80±0.80 ↓		

als with moderate or vigorous activity, as also emphasized by the American Heart Association, the American College of Cardiology and the American College of Sports Medicine [17–20]. Nearly 2035% of the population is physically inactive and does not engage in sports, but is at higher risk for CVD compared to individuals who are physically active during the day and engage in at least 25-30 minutes of sport, aerobics, swimming, walking, football, basketball, gymnastics. Physical activity,

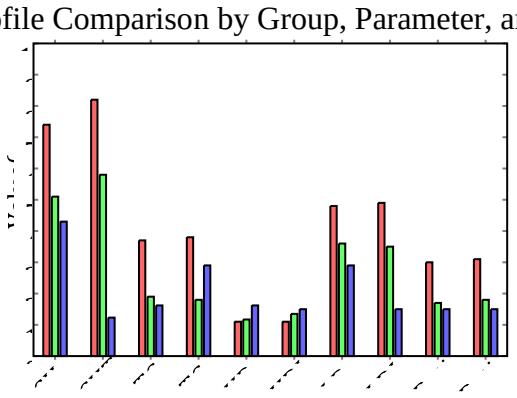

Fig. 3. Lipid profile comparison. CHT = total cholesterol, TG = triglycerides, HDL = HDL cholesterol, LDL = LDL cholesterol, Ratio = LDL/HDL. F = Females, M = Males.

	Patients no exercise	Patients with exercise	Controls

gym exercises or running 25-30 minutes a day for 30-40% reduce the risk of ischemic heart disease, diabetes, hypertension, cerebral stroke, depression and keep body weight under control including adiposity. Physical exercises (light exercises to strengthen muscles, brisk walking 30 minutes a day, reducing fats and increasing fruit and vegetable consumption), sports and physical culture play an important role in managing stress. The contextual mechanism by which exercises affect the regulation of lipid and apolipoprotein profiles is very diverse and is closely related closely related to the activity of the enzyme Lipoprotein Lipase (LPL) and transfer proteins [21]. It is well known that active athletes have a 25-30% higher HDL value compared to individuals without physical activity [22]. There is verifiable evidence that after the first month after acute myocardial infarction, in patients who have been suggested by doctors for physical exercise (physical activity developed every day, exercises, walking, jogging up to 30 minutes, five days a week), the concentration of the HDL-ch subfraction increases - HDL2 [23]. Physical activity increases the activity of Lipoprotein Lipase (LPL is an enzyme that breaks down triglycerides circulating in the bloodstream) which are attached to very low density lipoproteins (VLDL) and chylomicrons traveling through the bloodstream, directly reducing TG concentrations and increasing HDL-ch concentrations. Numerous studies have proven that excessive activity and increased physical activity (in athletes) increases the level of antigen-lecithin-cholesterol-acetyl-transferase (LCAT), which transfers fatty acids from lecithin to cholesterol more quickly, directing them during the formation of HDL. In the first trimester, we verified a decrease in the values of total cholesterol (ChT), triglycerides (TG) and LDL-ch, while an increase in HDL-ch of 15-19% and a decrease in atherogenicity in the ratio: Ch/HDL-ch were verified, and after 6 months, physical exercise 25-30 minutes every day for 6 days a week significantly reduced the values of total cholesterol, LDL-ch and TG and the concentration of HDL-ch was also increased. In conclusion, it should be recommended that modification of food, flavonoid nutrition, lifestyle, use of fish oil, intensive physical exercises (aerobics, swimming, cycling, running, walking speed, tennis, football, volleyball, basketball, gyms, etc.) remain the most preferred ways to regulate and normalize high values of hyperlipidemia (hypercholesterolemia but in severe cases, medications are also recommended hypolipidemic - statins, fibrates, niacin, cholestyramine, colestipol).

Conclusion

In conclusion, it can be proposed and suggested as a primary and preventive measure to increase the level of awareness in the population through media, electronic broadcasts, printed pamphlets, special television programs on the role of physical activity, physical exercises, with the sole purpose of preventing the occurrence of premature atherosclerotic processes and atherosclerotic manifestations of CVD. In conclusion, from our work we can conclude that people who are physically active and involved in sports, exercising at least 25-30 minutes every day within 5-6 days of the week, have a lower risk of developing CVD, diabetes, arterial hypertension and clearly have benefits and positive effects in balancing dyslipidemia.

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