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EFFECT OF THE CARDIO RESPIRATOR ACTIVITY IN THE FRAME OF THE BENEFIT IN SOME BIOCHEMICAL PARAMETERS

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Abstract
The study was intended to determine changes in lipid and blood glucose levels prior to and after the application of the cardio-respiratory program. Twenty-five 20-30 year old women have been tested and willingly admitted to be part of this research. At the beginning and after the completion of the cardiovascular program these biochemical parameters were determined in the sample of the testes: Glucose in the blood (GLBL), Lipoproteins High-density lipoprotein in the blood (HDLBL), Lipoproteins Low-density lipoprotein in the blood (LDLBL) , Triglycerides in the blood (TGBL). After determining the biochemical values at the beginning of the survey, the subjects were subjected to a quarterly cardio-respiratory program with a total of 36 sessions of 60 minutes. The cardio-respiratory program has included running at 50-70% intensity. For the calculation of the results obtained from the measurements of biochemical values, the basic statistical parameters have been calculated. For the assessment of the difference between two dependent groups in arithmetical means, the t-testing (Paired Sample T-Test) has been applied. The results obtained after statistical processing show that the 50-70% intensity quarterly cardio-respiratory program has had a significant effect on the normalization of lipid and blood glucose levels.

Key words: females, physical activity, biochemical variables, t-testing

Introduction

Cardio-respiratory ability is the ability of the body to accept and carry oxygen throughout the body without interruption depending on the body's energy demand. Cardio-respiratory activity is extremely important for every individual; positively affects overall health, reduces the risk of more common diseases such as heart disease, diabetes, high blood pressure and others. As cardio-respiratory capacity increases, aerobic ability as an ability of an organism to generate energy by aerobic metabolic processes (oxidation of carbohydrates and fatty acids), also increases, consequently powering our organism for physical activity (Hajmer, 2010). The size of aerobic capacity depends on the functional condition of all the organic and metabolic systems involved in oxygen transport and its use for generating the energy required for physical work (Medved et al., 1987). The present research rise the question of by how much, changes in lipoprotein metabolism induced by aerobic physical activity and diet regime lower cardiovasculary disease risk. Most of these authors believe that functional capabilities (cardio-respiratory activity, cardio-respiratory endurance) are the most important indicators of health care (Nikolic, 2003; Mišigoj-Duraković et al., 1999). The functioning of systems that are responsible for functional capabilities can not be seen separately from the functioning of all human body systems. Therefore, looking at the cybernetic aspect, it is known that the human

organism is considered a complicated, self-regulating and dynamic complex system because it consists of a number of related subsystems (cardiovascular, respiratory, nervous, etc.), self-regulating because they can independently adapt to physical activity and it is dynamic because it may change its condition under the influence of external factors (Malacko, 1982; Blagajac et al., 1991). Exactly, the ability of adaptation of these systems is an important factor for proper planning and programming of physical activities. Every physical activity causes complex biochemical, physiological and psychological reactions that are interlinked in the body. As a result of adapting the body to work loads, it is mainly thought of the ability of the organism to perform a physical activity with a certain volume and intensity (Matveev & Meerson, 1984It has been proved that with the right programming of various forms of physical activity, one can achieve the transformation of certain dimensions of the psychosomatic status of the human being. With programmed exercise, we can also determine the management of the human body's transition from the current starting state to the desired final state, through exercises, or by applying appropriate models of physical activity programs. Purposeful physical activities in the form of fitness, well programmed, prevent energy accumulation in the body in the form of fats (Guyton, 1996). Adipose tissue (fat) is very important in regulating energy balance, meeting energy requirements during physical activities and normal metabolism. The excess of adipose tissue (when the intake of fat is greater than the fat consumption, „outtake“) is subcutaneously deposited in different parts of the body, with a great likelihood to also affect elevation of lipid levels in the bloodstream. This condition may be a high risk factor in the manifestation of many diseases, especially in the cardiovascular system. The purpose of the research is to investigate and determine changes in some biochemical (lipid and glucose) parameters in the blood after application of cardio-respiratory activity to women.

Methods

The population from which sample is taken for this research is defined as the population of women aged 20 to 30 years. The test sample consists of 25 women who for the first time have expressed the desire to practice at the fitness center "Gettfit Center" in Pristina. Women registered for the first time at the fitness center "Gettfit Center" in Pristina have expressed the desire to be part of the experiment in this research. Before undergoing cardio-respiratory treatment, the tested have received the consent of the physician that they are in good health. For the goal of this research, evaluation of some biochemical parameters in the blood these variables have been applied: Glucose in the blood (GLBL), Lipoproteins High-density lipoprotein in the blood (HDLBL), Lipoproteins Low-density lipoprotein in the blood (LDLBL) Triglycerides in the blood (TGBL). The biochemical parameters applied in this research and their reference blood values are presented in Table 1.

Table 1. Biochemical parameters and reference values

Variables	Abbreviations	Levels in the blood-mmol/l.
Glucose in the blood	GLBL	3,5 – 6,1
Lipoproteinet High-density lipoprotein in the blood	HDLBL	1.03 – 1.55
Lipoproteinet Low-density lipoprotein in the blood	LDLBL	2.60 – 4.10
Triglycerides in the blood	TGBL	1.70 – 2.3

The group of women involved in the research as an experimental group has undergone a 3-month training program with cardio-respiratory exercises with an intensity of 50-70% of the heart rate (Table 2). The heart rate intensity is calculated: 220 - year old; HR (Heart rate) = (Maximum HR - HR frequency of heart in peace) x 70% + HR (frequency of heart in peace) for recreation (Macura, 2008). For the implementation of the cardio-respiratory program in the experimental group, the Insportline in Condi T40 was used as a quality treadmill. Advantage of the treadmill Insportline in the Condi T40 is heart rate measurement with the help of a chest strap. For the processing of the data, basic statistical parameters were applied, minimum score (Min) maximum score (Max) arithmetical mean (Mean) standard deviation (Std.Dev), measure of asymmetry distribution (Skewness) degree of homogeneity of distribution (Kurtosis) and coefficients of variation (CV). For the assessment of the difference between two dependent groups in arithmetical averages, the t-testing (Paired Sample T-Test) has been applied.For processing of the data, basic statistical parameters were applied, minimum score (Min) maximum score (Max) arithmetical mean (Mean) standard deviation (Std.Dev), measure of asymmetry distribution (Skewness) degree of homogeneity of distribution (Kurtosis) andcoefficients of variation (CV). For the assessment of the difference between two dependent groups in arithmetical averages has been applied t-testing (Paired Sample T-Test).

Table 2. Cardio-respirator fitness program

Cardio-respirator fitness program						
Running						
	The first day		Other day		Third day	
Sunday	Minutes	Intensity	Minutes	Intensity	Minutes	Intensity
1	40 (4x10) 3p	50	40 (4x10) 3p	50	40 (4x10) 3p	50
2	40 (4x10) 3p	55	40 (4x10) 3p	55	**4**0 (4x10) 3p	55
3	50 (5x10) 3p	60	50 (5x10) 3p	60	50 (5x10) 3p	60
4	60 (6x10) 3p	60	60 (6x10) 3p	60	60 (6x10) 3p	60
5	60 (3x20) 3p	65	60 (3x20) 3p	65	60 (3x20) 3p	65
6	60 (3x20) 3p	65	60 (3x20) 3p	65	60 (3x20) 3p	65
7	60 (3x20) 3p	65	60 (3x20) 3p	65	60 (3x20) 3p	65
8	60 (3x20) 3p	70	60 (3x20) 3p	70	60 (3x20) 3p	70
9	60 (3x20) 3p	70	60 (3x20) 3p	70	60 (3x20) 3p	70
10	60 (3x20) 3p	70	60 (3x20) 3p	70	60 (3x20) 3p	70
11	60 (2x30) 3p	70	60 (2x30) 3p	70	60 (2x30) 3p	70
12	60 (2x30) 3p	70	60 (2x30) 3p	70	60 (2x30) 3p	70

Results

For each biochemical variable, (Glucose in the blood (GLBL), Lipoprotein High-density lipoprotein in the blood (HDLBL), Lipoprotein Low-density lipoprotein in the blood (LDLBL), Triglycerides in the blood (TGBL)) basic parametres of distribution, asymmetry as well as the homogeneity of each variable in the sample of 25 tested before the application of the cardio-respiratory program, were calculated (Table 3). Looking at the results presented in the table given in the measurement or initial state we can conclude that the values of the central parameters and the distribution of the biochemical variables show good sensitivity and we can conclude that the set of testers involved in the experiment is homogeneous at the initial measurement . The asymmetry test of all biochemical variables does not indicate a significant asymmetry. The asymmetric coefficient of the biochemical variable Glucose in the blood (GLBL) does not show a significant asymmetry (Skewness = 0.326), but indicates a "lean" of arithmetic mean towards higher results because the asymmetric coefficient is positive (epicuric). Asymmetric Coefficient in Biochemical Variability High-density lipoprotein lipoprotein (HDLBL) lipoproteins does not show a significant asymmetry (Skewness = -0.305) but indicates an arithmetic mean leaning towards lower results because the asymmetric coefficient is negative (hipokurtik).Asymmetric Coefficient in Biochemical Variability Low-density lipoprotein in the blood (LDLBL) does not show a significant asymmetry (Skewness = -0.168) but indicates an

arithmetic mean leaning towards lower results because the asymmetric coefficient is negative (hipokurtik).. The Triglycerides in the Blood (TGBL) bioequivalence coefficient does not show a significant asymmetry (Skewness = 0.159), but indicates an arithmetic mean leaning towards higher results because the asymmetric coefficient is positive (epicuric). Variation coefficients of all biochemical variables (except Blood glucose in the blood) show that the obtained results are on average homogeneous because they pass the theoretical approximation of 15 that indicates a tendency to avoid normal distribution.

Table 3. Basic statistic indicators the initial state

Start	N	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis	CV
FGLUBL	25	5.10	7.00	5.9200	.47610	.326	.050	8.04
FHDLBL	25	.69	1.51	1.1532	.23007	-.305	-.864	19.95
FLDLBL	25	2.69	4.71	3.7496	.61920	-.168	-.943	16.51
FTRGBL	25	1.60	3.19	2.4632	.43236	.159	-.669	17.55

Table 4 shows basic static parameters to the dependent group of the testers in the final state, respectively, after the application of the cardio-respiratory program. The asymmetry test of all biochemical variables does not indicate a significant asymmetry. The asymmetric coefficient of the biochemical variable Glucose in the blood (GLBL) does not show a pronounced asymmetry (Skewness = -0.254), but indicates an arithmetic averaging at lower results because the asymmetric coefficient is negative (hypocritical). The asymmetric coefficient of the biochemical variable High-density lipoprotein in the blood (HDLBL) does not show significant asymmetry (Skewness = -0.715), but indicates an arithmetic averaging at the lowest results because the asymmetric coefficient is negative (hypocritical).Asymmetric coefficient in the biochemical variable Low-density lipoprotein in the blood (LDLBL) does not show a significant asymmetry (Skewness = -0.471), but indicates an arithmetic averaging at the lowest results because the asymmetric coefficient is negative (hypocritical).The Triglycerides in the Blood (TGBL) bioequivalence coefficient does not show significant asymmetry (Skewness = -0.279), but indicates an arithmetic averaging at the lowest results because the asymmetric coefficient is negative (hypocritical). Variation coefficients of all biochemical variables show that the obtained results are homogeneous because they do not exceed the theoretical approximation of 15. In determining the quantitative and qualitative differences between the initial and final measurements, statistical analysis (Paired Differences) has been applied to the dependent group for the subjects involved in the experiment.

Table 4. Basic statistic indicators the final state

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis	CV
FGLUBL	25	4.50	6.20	5.3680	.46522	-.254	-.633	8.67
FHDLBL	25	.99	1.70	1.4336	.17811	-.715	-.142	12.42
FLDLBL	25	2.49	4.31	3.5056	.55859	-.471	-1.009	15.93
FTRGBL	25	1.40	2.79	2.1832	.33475	-.279	-.040	15.33

Table 5 shows the differences between the initial condition (prior to the application of the cardio-repiratory program) and the final status (after the application of the cardio-repiratory program) to the group of women involved in the research. The difference between the Glucose in the Blood (GLBL) concentration before the cardio-respiratory program and the cardio-respiratory program is Mean Diff = 0.552 mmol / l, p <0.000. The difference between the Glucose in the Blood (GLBL) concentration before the cardio-respiratory program and the cardio-respiratory program is Mean Diff = 0.552 mmol / l, p <0.000. The difference between lipoprotein lipoprotein concentrations in the blood (HDLBL) prior to the application of the cardio-respiratory program and the application of the cardio-respiratory program is Mean Diff = -0.2804 mmol / l, p <0.000. The difference between Lipoprotein Low-density lipoprotein concentration in the blood (LDLBL) concentration before the application of the cardio-respiratory program and the application of the cardio-respiratory program is Mean Diff = -0.244 mmol / l, p <0.000. The difference between Triglycerides in the blood (TGBL) concentration before the application of the cardio-respiratory program and the application of the cardio-respiratory program is Mean Diff = -0.280 mmol / l, p <0.000.

Table 5. The difference between biochemical variables at the beginning and after the cardio-respiratory program.

	Paired Differences			t	df	Sig. (2-tailed)
Variables	Mean Diff.	Std. Deviation	Std. Error Mean			
FGLUBLi – FGLUBLf	.55200	.24345	.04869	11.337	24	.000
FHDLBLi – FHDLBLf	-.28040	.07705	.01541	-18.195	24	.000
FLDLBLi – FLDLBLf	.24400	.10440	.02088	11.685	24	.000
FTRGBLi – FTRGBLf	.28000	.15811	.03162	8.854	24	.000

Discussion

With this work, we wanted to determine in what type the 50-70% intensity cardio-respiratory program affects the biochemical parameters in the blood, respectively in Glucose in the Blood (GLBL), Lipoprotein High-density lipoprotein in the blood (HDLBL) Lipoproteins Low-density lipoprotein in the blood (LDLBL), Triglycerides in the blood (TGBL). Also, we wanted to understand what is the minimum time for a woman to be involved in physical activity during the day, so that there is a change in lipid and blood glucose parameters. Training treatment for three months, three times a week by one hour of cardiovascular exercises based on the results obtained indicates that it affects the normalization of lipid and blood glucose levels. The blood glucose level at the beginning was 5.9200 mmol / l, after cardiovascular program 5.368 mmol / l, which means that an important statistically significant Mean Diff = 0.552 mmol / l was obtained. Unlike this research, the largest number of studies on the positive effect of physical activity in glucose control has been made in the population of patients with diabetes mellitus and metabolic syndrome.It is clear that physical activity in these patients regulates blood glucose levels and contributes to improving of insulin sensitivity (Nyholm, 1996, Zorzano, 1996; Behboudi et al., 2011). Many studies show that physical activity of people with good health increases the secretion of GLUT 4 (Glucose transporter type 4) transporter, necessary for glucose transport, thus increasing insulin sensitivity and reducing glycemia (Lippi et al., 2008; Behboudi et al., 2011). The results of this research also show that the group of women involved in the experiment after the cardiovascular program appears as the most homogeneous group in all biochemical variables of lipids in the blood. Lipoprotein Levels High-density lipoprotein in the blood at the beginning was 1.1532 mmol / l after cardiovascular program 1.4336 mmol / l, Mean Diff = -0.28040 mmol / l; Lipoproteins Low-density lipoprotein in the blood (LDLBL) in the blood at

the beginning was 3.7496 mmol / l, after the cardiovascular program 3.5056 mmol / l, Mean Diff = 0.24400 mmol / l; Triglycerides in the blood(TGBL) initially was 2.4632 mmol / l, following the cardiovascular program 2.1832 mmol / l, Mean Diff = 0.280 mmol / l; which means that an important statistical difference has been gained in all biochemical variables of lipids in the bloodstream after application of the cardiovascular program quarterly. Our research is consistent with many researches that show the positive effects of cardio-respiratory activity of medium intensity on the lipid level, among which the most important effect benefited in fat metabolism and lipoprotein lipoprotein high-density lipoprotein in the blood HDL (Turgut et al., 1999; Thompson et al., 2001, Boraita, 2004 Jovanović et al., 2005). Many authors in their research have shown the long-term effect of aerobic (cardio-respiratory) activity in increasing lipoprotein lipase activity and thus lower levels of cholesterol and triglycerides in the bloodstream in long-running sportspeople (Turgut et al., 1999, Watt et al., 2003, Boraita, 2004).Davis and Sar., (1992) have confirmed that the intensity of training determines the pathway of metabolism and organic matter for energy, which has a high impact on the lipid level of persons involved in physical activity. These authors showed significant changes in lipid parameters during the period of sports training in terms of significant increases in HDL cholesterol and LDL cholesterol reduction after 6 months of preparation.

Conclusion

The study has confirmed that significant differences have been gained between the two measurements in the group of women involved in the research before and after the implementation of the cardio-respiratory program that is a testimony of the positive impact of cyclic aerobic exercises on the level of lipid and glycemic values in the blood. Physical activities applied in a quarterly period three times a week, as a special program designed for the purpose of this paper, had positive effects on lipid and blood glucose levels and in the increase of lipoprotein levels High-density lipoprotein in the blood (HDL). Lowering the Low-density Lipoprotein and Triglycerides in the Blood level is a consequence of activating the fat metabolism of providing energy in performing physical activity for a duration of 40-60 min. with intensity 50-70%. We can conclude that properly programmed cardio-respiratory activity should be applied to women of all ages in order to prevent various diseases resulting from high levels of lipid in the bloodstream.

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