

Physical Activity and Reduction of Some Health Risk Factors

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ABSTRACT

During the past few years the cardiovascular diseases (CVD) are one of the main reasons for increased death rate in our country. The purpose of the research was to establish the effect of moderate physical activity on some risk factors regarding the cardiovascular system. The subject of the research were 32 female students. They were included in a 12-week physical activity program, consisting of individual sessions in aerobics, swimming, cycling, jogging following preliminarily developed individual programs in conformity with the physical fitness, preferences and interests of the participants, with prescriptions for the frequency, duration and intensity of the training sessions. We can underline that 12-week sessions with aerobic programs 5 times per week with duration 45 minutes and intensity 80-85% of the maximum heart rate lead to reduction in some of the risk factors leading to problems with the cardiovascular system.

Keywords: *Curiosity level, university, student*

INTRODUCTION

During the past few years the cardiovascular diseases (CVD) are one of the main reasons for increased death rate in our country. The main risk factors leading to cardiovascular incidents and death are age, heredity, regular smoking, alcohol abuse, high blood pressure, high cholesterol, diabetes, sedentary lifestyle, stress, etc. Some of these are too conservative and cannot be changed (age, family burden, heredity), but most of them could be changed by changing the lifestyle – nutrition and reduction of the body weight, increasing the physical activity, getting rid of harmful habits, etc.

The scientific literature gives a lot of data supporting the thesis that the indicated risk factors could be reduced to a significant degree by increasing the daily physical activity (Jerry, 1990, Leon & al., 1996, Дякова & Пеева, 1997, Powers & al., 1997, Peeva, 2002). Still, however, there are no accurate criteria of the intensity, duration, frequency and nature of the training sessions, which could lead to such a result.

The purpose of the research was to establish the effect of moderate physical activity on some risk factors regarding the cardiovascular system.

THE STUDY

The subject of the research were 32 female students (average age – 22.1 years) having a sedentary lifestyle who volunteered to participate in the experiment.

All participants filled in a questionnaire for health status and willingness to participate in the experiment.

They were included in a 12-week physical activity program, consisting of individual sessions in aerobics, swimming, cycling, jogging (by choice of the participants) following preliminarily developed individual programs in conformity with the physical fitness, preferences and interests of the participants, with prescriptions for the frequency, duration and intensity of the training sessions. Furthermore, each participant had to keep a personal diary

with the following data: body weight, resting heart rate, working heart rate, resting blood pressure, self-confidence. The diaries were checked periodically by the researchers.

Once a week group sessions were carried out, including work on a treadmill, bicycle ergometer, step, rowing training machine and aerobics. During the entire session the fitness instructor was monitoring for the proper execution of the exercises and for control of the heart rate every 10 minutes.

In the beginning and at the end of the experimental period the following parameters were measured: body weight, height, waist and hip girth, and based on them the ratio waist / hip and BMI were calculated. The additionally recorded data is the heart rate and the arterial blood pressure while resting, the lipid profile and a step-test for indirect determination of VO_2 max.

Each participant was asked to examine her lipid profile in a clinical laboratory.

In practice the entire training cycle was divided into two stages. During the first stage – the first two weeks – the frequency of the sessions was 3 times per week with duration of 30 minutes and intensity 50-60% of the maximum heart rate. following the program selected by the participants.

During the second stage the frequency was 5 times per week with intensity 70-85% of the maximum heart rate and duration 40-45 minutes.

A statistical analysis of the results was carried out with the use of SPSS software. The level of $p < 0.05$ was considered significant.

FINDINGS

On **Table 1** are represented the results from the conducted experiment. The reduction in the diastolic blood pressure (**fig. 2**) and the resting heart rate (**fig. 1**) and the increase in the maximum oxygen consumption (**fig. 5**) show improvement of the economy and effectiveness of the cardiac muscle and improvement of the fitness of the oxygen provision systems. which in turn leads to a lower risk of cardiovascular diseases. despite the fact that heart rate and maximum oxygen consumption do not pertain to the risk factors. Our results contradict the results of other authors, which do not find a change in the values of maximum oxygen consumption (Grants & al., 1992, Leon & al, 1996, Дякова, Пеева & Божкова, 2007). We should note, however, that the main characteristics of their training programs are different from ours – duration of 1 session – 25 minutes, frequency – 3 times per week, intensity – 60-70% of the maximum heart rate.

Table 1: Data for comparative analysis

| № | Parameters | I examination | | | II examination | | | Absolute growth |
|---------------------------|---------------------------------|---------------|------|------|----------------|------|------|-----------------|
| | | X | S | V % | X | S | V % | |
| Anthropometric parameters | | | | | | | | |
| 1 | Height (cm) | 165.8 | 4.8 | 2.8 | 165.8 | 4.8 | 2.8 | 0* |
| 2 | Body weight (kg) | 68.4 | 7.6 | 2.8 | 64.1 | 6.4 | 9.9 | -4.3* |
| 3. | BMI | 25.14 | 3.1 | 12 | 23.56 | 3.6 | 15 | -1.58* |
| 4. | Waist (cm) | 78.1 | 2.6 | 3.3 | 73.2 | 3.1 | 4.2 | -4.9* |
| 5. | Hip (cm) | 96.3 | 4.7 | 4.8 | 94.3 | 5.1 | 5.4 | -2.0* |
| 6. | Waist/hip | 0.81 | 0.5 | 61.0 | 0.80 | 0.4 | 50.0 | -0.01** |
| 7. | Body fat (%) | 24.1 | 5.52 | 22.9 | 22.03 | 3.91 | 17.7 | -2.08* |
| Functional parameters | | | | | | | | |
| 1. | HR (beats/min) | 74.4 | 4.3 | 5.7 | 70.8 | 3.2 | 5.5 | -3.6* |
| 2. | RR syst. (mmHg) | 120.0 | 12.0 | 10.0 | 121.0 | 11.0 | 9.0 | 1.0** |
| 3. | RR diast. (mmHg) | 84.0 | 9.0 | 10.7 | 81.0 | 10.4 | 12.8 | -3.0* |
| 4. | Total cholesterol (mmdl) | 109.1 | 39.0 | 35.7 | 106.0 | 40.0 | 37.7 | -3.1** |
| 5. | High density cholesterol (mmdl) | 69.0 | 15.0 | 23.8 | 69.0 | 15.0 | 23.8 | 0** |
| 6. | Low density cholesterol (mmdl) | 112.0 | 20.0 | 17.8 | 110.0 | 19.0 | 17.8 | -2** |
| 7. | VO_2 max (l/ min) | 2.27 | 0.32 | 14.0 | 2.31 | 0.26 | 11.2 | 0.04* |
| 8. | VO_2 max (ml/kg/min) | 33.1 | 3.29 | 9.9 | 36.0 | 35.2 | 9.8 | 2.9* |

* - Pt = 95 %, ** - Pt < 95 %

The body weight and composition are one of the serious factors leading to cardiovascular incidents and diseases. The reduction of the body weight (**fig. 3**), % Body fat (**fig. 4**) and BMI, which in the beginning were higher than the norm (%BF – 20 %; BMI - 19-24.9) and after the experiment were normalized (exception - %BF) confirms the statement that regular physical activity sessions (five times per week) of aerobic nature and intensity 80-85% of the maximum heart rate lead to positive changes in people leading a sedentary lifestyle (Bryneret & al., 1997, Дякова, Пеева & Николова, 1997, Miller & al., 1997, McCord & al., 1998, Peeva, 2002). We should not ignore the motivation of the participants to reduce their weight and % of body fat together with reducing other risk factors regarding the cardiovascular system.

In the values of the systolic blood pressure the ratio waist/hip and the lipid profile no statistically reliable differences were established.

Our results confirm the results of other authors, according to which in order to obtain significant changes in these parameters the training period must be longer than 12 weeks (Grants & al., 1992, Powers & al., 1997, Пеева, 2004, Дякова, Пеева & Божкова, 2007).

Another reason for the lack of changes in the systolic blood pressure is the fact that the average value of this indicator in the beginning of the experiment was within the normal limits. According to many authors in this case one should not expect a reduction in the values as a result of physical exercises and sports.

The lipids and the lipoproteins depend largely on the hereditary factors, the lifestyle (nutritional habits) and the habitual physical activity. The combination of low fat food and increased physical activity would definitely lead to reduction in the values of lipids and lipoproteins. In our case, however, the participants retained their nutrition habits during the experiment, which in addition were not controlled by the researchers.

The ratio waist/hip is reduced, but the difference is insignificant and statistically unreliable, compared to the results of other authors who find a significant reduction in this index with similar intensity and duration of the program (Jerry, 1990, Grants & al., 1992, Leon & al., 1996, Дякова, Пеева & Николова, 1997, Дякова, Пеева & Божкова, 2007).

The probable reason for the lack of a significant difference in our case is the normal initial level of this ratio.

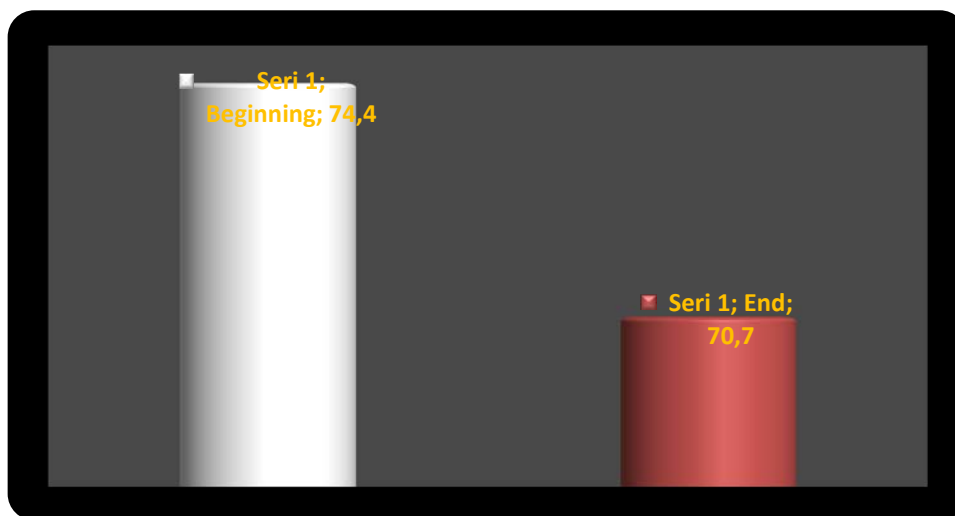


Fig. 1 Heart rate (beats/min)

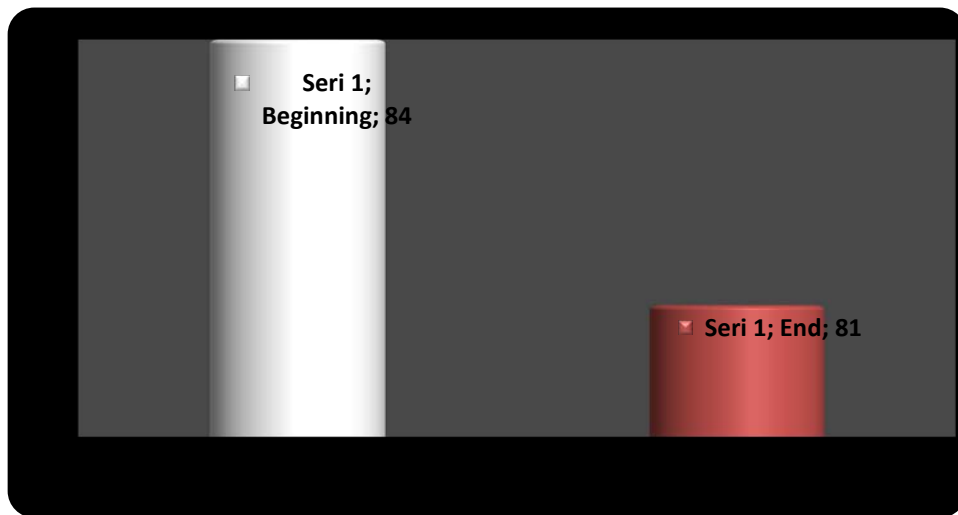


Fig. 2 Blood pressure - diast. (mm/Hg)

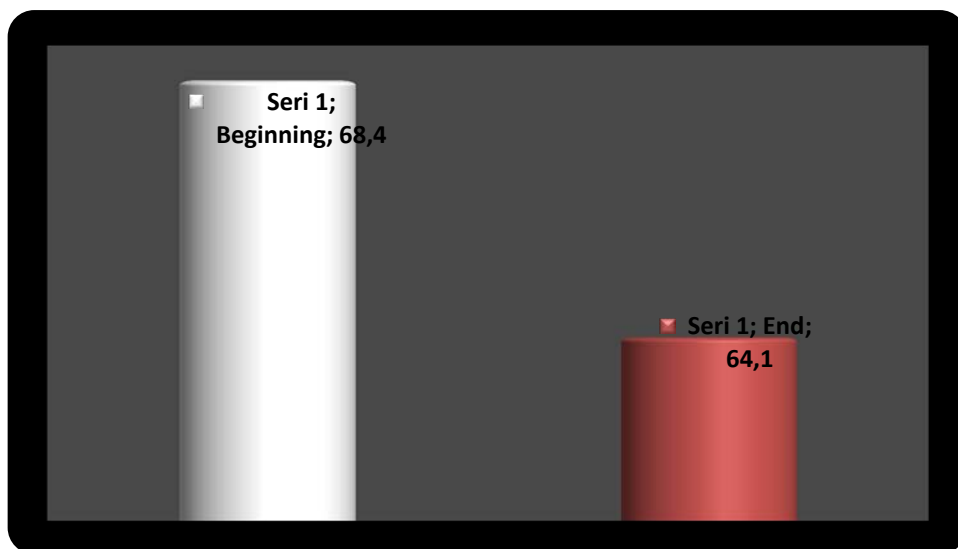


Fig. 3 Weight (kg)

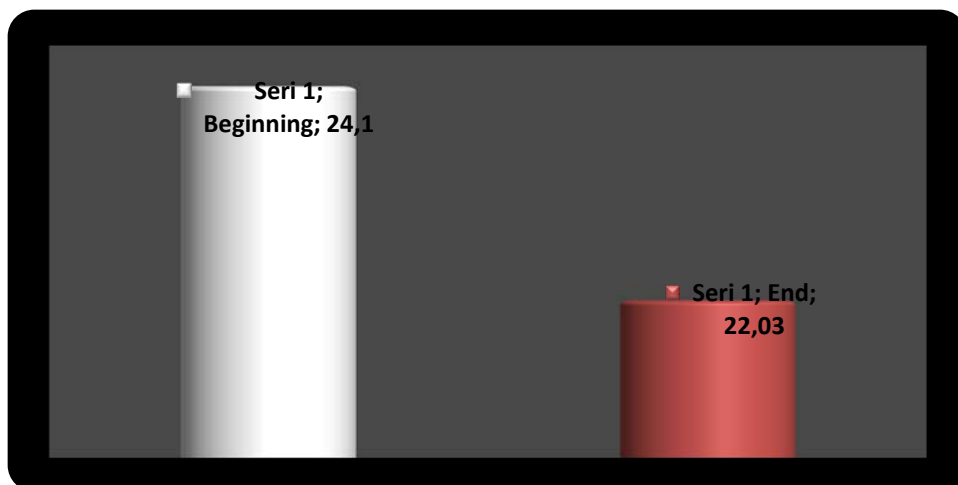


Fig. 4 Body fat (%)

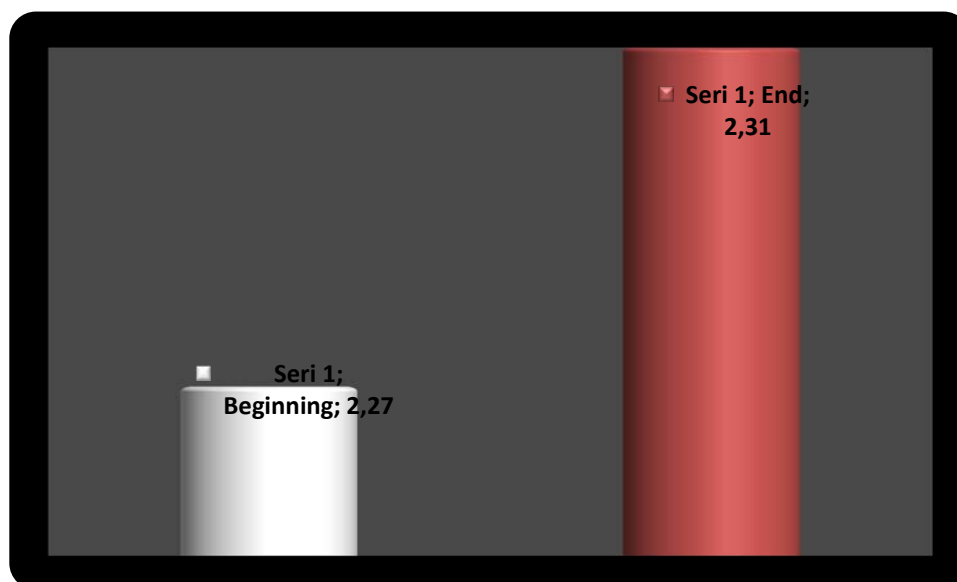


Fig. 5 VO₂ max (l/min)

CONCLUSIONS

In conclusion we can underline that 12-week sessions with aerobic programs 5 times per week with duration 45 minutes and intensity 80-85% of the maximum heart rate lead to reduction in some of the risk factors leading to problems with the cardiovascular system, namely – diastolic blood pressure, body weight, % body fat and BMI. Although the resting heart rate and the maximum oxygen consumption are not risk factors. their positive changes could play a significant role in the reduction of the risk of cardiovascular diseases and for improvement of the health status of the participants. For reduction of the lipids and the lipoproteins it is necessary for the physical activities to be combined with a low animal fat diet and significant changes in the systolic blood pressure could be achieved after a longer period.

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