ORIGINAL ARTICLE

# The effects of recreational cardio fitness programs on the body composition of young women

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Authors' Contribution: A – Study design; B – Data collection; C – Statistical analysis; D – Manuscript Preparation; E – Funds Collection

**Abstract**

*Background and Study Aim* Group fitness programs are a form of programmed physical exercises with the aim of improving health, aesthetic appearance, satisfying the motivation to preserve health and reduce body weight. The aim of this study was to determine the effects of an experimental cardio fitness program on the morphological status of female subjects aged 21.5 ± 3.5 years.

*Material and Methods* The experimental program was implemented over a period of three months (12 weeks), with a weekly frequency (3 x 20-60 min). Initial and final measurements were performed and Body weight, Body fat percentage, Body fat mass, Free fat mass, Body muscle mass, Body mass index and Basal metabolism rate were analyzed. All test subjects have their doctor's confirmation that they are healthy and can undergo training loads in a planned and clearly defined cardio program.

*Results* The exercise program on cardio equipment caused changes in all body composition parameters between the initial and final measurements t-test (except for muscle mass). The total average Body weight at the initial-final measurement (66.45 vs. 64.70kg; t= 5.225, p<0.000), which represents a difference of -1.75kg after the program.

*Conclusions* The assumption is that a controlled and monitored program with a special focus on nutrition would lead to even more precise results on the effects on body composition. Continuous application of the content of this program throughout the entire one-year macrocycle with a higher weekly frequency would certainly give even more significant results.

**Keywords**: fitness cardio program, body composition, evaluation.

## Introduction

Lack of physical activity (hypokinesia) is a major problem in the modern world, and as a reason to impose: psychic overload, static lifestyle and overeating. The population of the modern world in developed countries due to technological development is characterized by a lower degree of physical activity than ever before - even 2/3 of the population is not sufficiently physically active [1]. According to Prskalo [2] creating habits for proper use of leisure time devoted to exercise and movement becomes, from the point of view of Kinesiology, a primary educational task. Particularly noteworthy is the positive attitude towards physical exercise, without which a healthy lifestyle today and even more tomorrow's human is unthinkable. Public health of people and individuals is the most important resource in the modern world. The sugar epidemic and cardiovascular diseases are linked to the obesity epidemic. As obesity appears at younger and younger ages, it is to be expected that the proportion of people who have been obese for the number of years will increase and that those practicing a "sedentary lifestyle" will move less and less [3]. Modern and fast lifestyle, sedentary style, industrial development, the rapidly advancing technological advancements in the world have greatly facilitated this way of living in people, but, on the other hand, in man it caused a great an increase in a number of chronic diseases including diabetes mellitus (DM) and cardiovascular disease (CD) [4]. In the era of modern living, physical activity comes as a benefit to the organism. Physical activity also helps reduce obesity, positively affects people with mental difficulties, reduces the osteoporosis index and most importantly, we can conclude that it has a positive effect on insulin regulation in humans with diabetes. The benefits of physical activity for the prevention of DM and CD are multiple. Regular physical activity has been shown to help in the prevention treat non-communicable diseases, such as heart disease, stroke, diabetes disease, and breast and colon cancer [5-7]. It also helps prevent hypertension, overweight and obesity and can improve mental capacity, quality of life and well-being [8, 9]. American College of Sport Medicine-ACSM [10] recommends all healthy adults between


doi:10.15561/26649837.2023.0203

the ages of 16 and 65 years engage in moderate aerobic physical activity at least 5 times a week for a time of 30 minutes or intense aerobic physical activity at least 3 times a week. ACSM recommends in its physical activity guidelines:

- Moderate aerobic physical activity at least 150 minutes per week, 75 minutes of intense aerobic activity per week or a combination of both activities;
- Additional aerobic physical activity of 300 minutes per week, or 150 minutes of vigorous exercise per week, provides additional health benefits;
- Adults are recommended to be physically active with strengthening activities muscles of moderate or high intensity and include all major muscle groups twice a week, as these activities provide additional health benefits.

Health should be viewed in the broadest sense, not only as the absence of disease, but as the ability to adequately respond to the numerous challenges of everyday life through the social, psychological and physical dimensions. The awakening of awareness that health is the most important part of a quality life has made more and more people of different ages and both sexes engage in some kind of sports and recreational exercise. A person can use his/her free time to satisfy his/her needs for movement, through the application of various forms of physical exercise, and thus he can improve the functional abilities of his organism [11].

The WHO [12] emphasized in its annual report from 2012 that mortality, morbidity and disability associated with chronic non-communicable diseases are responsible for more than 60% of mortality in the world, and that unhealthy diet and lack of physical activities are the main risk factors for those diseases. In 2019, there were an estimated 351.7 million able-bodied people (20-64 years) with diagnosed or undiagnosed diabetes [13]. That number is expected to rise to 417.3 million by 2030 and to 486.1 million by 2045. According to the estimates of the American diabetes association, the 2017 annual cost of diagnosed diabetes is 327 billion dollars (American Diabetes Association, 2020). According to the International Diabetes Federation IDF (2019) it was estimated that in 2019 the incidence of diabetes in adults is the lowest in the 20-24 age group (1.4% in 2019). Where adults aged 75-79, the incidence of diabetes is 19.9% in the 2019 year, and it is predicted to increase to 20.4% by 2030 and 20.5% by 2045. It is slightly lower in women aged 20 to 79 than in men (9.0% compared to 9.6). Females differ from males in a large number of physiological parameters, including physical activity. This especially applies to endurance sports such as running, cycling, rowing or swimming. The NSCA (National Strength and Conditioning Association) has provided a summary of research related to women's strength training, which is reflected in the following.

- Women can improve fitness, athletic performance and reduce the chance of injury through strength training.
- Physiological responses to weight training are similar in men and women.
- Women should use the same exercises and performance technique as men in weight training.
- There is no significant difference between the sexes in the ability to generate force per unit cross-sectional area of the muscle. Men show greater absolute strength than women due to higher body mass, greater amount of muscle compared to fat tissue and increased testosterone in the body.

Physical exercise allows women in their mature years to control their body weight, and thus prevent the possibility of various diseases of the heart and blood vessels, as well as injuries to the locomotor apparatus [11]. Before starting any physical activity, it is of crucial importance to determine the initial state of the person who wants to engage in physical exercise. In addition to determining the initial condition, there are three important components of each training, namely progressivity (gradual increase in load during the time spent in exercise), continuity (regular physical activity) and a professional (creator and leader of the entire training process). According to Mandarić [14] group fitness programs are a form of programmed physical exercise for women with the aim of improving health and improving aesthetic appearance. The goal of these programs for women is to satisfy the motives for maintaining health, improving physical appearance and reducing body weight. When it comes to the female population, more and more of them exercise because they feel better, the tension is less, they are functionally and emotionally more capable, and thus more operational, more resilient in numerous jobs, family activities and many other obligations. Group fitness programs by structure, belong to the polystructural cyclic activities and have a positive effect on the anthropological characteristics and abilities of both women and men [15]. Some of the group fitness programs can be realized and can be selected in relation to the content of the activity. Group fitness programs differ from other exercise programs in that they act on human feelings, motivation, cheer up, and also help to perform physical movements with extreme dexterity and precision [16].

Aerobics, as a form of physical exercise, aims to master muscle functions, to acquire the ability of gradual and increasingly stronger innervation, and to improve the functional abilities of the cardiovascular and respiratory systems. Energy consumption in aerobics depends on the form and intensity with which it is carried out. Aerobic of lower intensity or aerobic weakness of the participation of large muscle groups of the legs and a slower rhythm, conditions lower energy consumption (4-5kcal/min), in contrast to aerobics, which requires a large expenditure of energy, high intensity, which conditions energy consumption (about 11 kcal/min.). McCord [17] determined the impact of a program of low-intensity aerobics on the reduction of subcutaneous fat tissue and the improvement of functional abilities. At the end of 12 weeks in the work mode (3 x 45 min. per week) at 75-85% of VO2max, significant changes in the improvement of the cardiorespiratory apparatus and body composition were determined. Changes in morphological and motor measures, that is, the potential differential effects of the STEP program and High-Low aerobics, is the subject of research by [18]. The program consisted of 25 training sessions (3x60 min. per week). In the area of morphological characteristics (skin folds), statistically significant differences were found between the initial and final measurements.

Some research [19] analyzes the impact of aerobics programs on the transformation of anthropometric characteristics, motor and functional abilities of girls up to 18 years of age. The obtained results confirm the multifunctional impact of aerobics on defined spaces. The obtained results confirmed the multifunctional impact of aerobics on defined spaces. Sulemana et al. [20] examined correlations between physical activity and BMI among girls aged 14-17 years. The results showed that there is a significant inverse correlation between the level of total daily physical activity and BMI and a statistically significant relationship between extracurricular activities and BMI. In McTiernan et al. work [21] it was proven the possibility to influence the reduction of body weight and certain segments of body circumference through physical exercise. Confirmation that aerobic physical activity can affect the reduction of body weight, i.e. nutrition in women aged 19 to 25 years has been proven in research [22] and other researchers have come to similar results.

Sarsan, Ardiç, Ozgen, et al. [23] found in their study that weight loss occurs after an aerobic exercise program. The recreational aerobic exercise, which is realized three to five times a week for 20 to 60 minutes, can contribute to quantitative and qualitative changes in certain variables of morphological characteristics [4, 24, 25]. These changes are primarily related to their reduction, so it can be stated that the realized model of regular recreational aerobic exercise led to positive changes in the subjects of the experimental group. Viskić-Štalec et al. [26] investigated the impact of the aerobics program on the morphological characteristics and motor skills of the subjects of the experimental group (conducted the aerobics program) and the control group (conducted the physical and health culture program). The results show that the experimental group, compared to the control group, achieved better results in motor tests (agility, strength, flexibility) and functional abilities with a reduction in body weight and skinfold measurements. The authors concluded that the existing programs of physical and health culture should be valued and supplemented with programs that cause better transformational effects. The relationship between the environment and variables of the recreational environment with physical activity and BMI in a sample of 98 adolescents is the subject of Kligerman et al. study [27]. In a linear regression, the pedestrian-friendliness index within 0.5 miles of home was associated with minutes of physical activity (moderate to vigorous), explaining about 4% of the variation. Different approaches to measuring physical activity and obesity in young people have led to different studies with completely conflicting results [28], from no to a very strong relationship between physical activity and obesity. Significant differences were obtained in the level of activity determined among girls whose weight category was determined by BMI (but not among boys) and between groups divided according to body fat deposits for boys and girls.

Madić et al. [29] were compared with the results of different methods for assessing body composition on a sample of 100 young women (BIA, BMI and assessment of subcutaneous fat tissue). The results of the research showed that all three applied variables for the assessment of body fat have high values, but, nevertheless, it is concluded that the variables for the assessment of body fat Body mass Index (BMI) and the total amount of body fat estimated by bioimpedance (BIA) have higher projections, whereby the first one was slightly superior, while the third variable - the coefficient of total body fat (FAT) - had a slightly lower projection on the common object of measurement. On a sample of 80 female subjects from the University of Novi Sad, Čokorilo et al. [30] measured fat tissue, body mass, and skin folds with the aim of determining differences. After the successfully implemented program in which the progressive load model was used, there was a decrease in the measured variables of the experimental group compared to the control group. Body mass decreased by 1.8kg on average, the average value of the upper arm crease decreased by 3.6mm, the abdominal crease decreased by 3mm on average and the upper leg crease value decreased by 8.1mm.

Šarić [31] performed the valorization of an experimental aerobics program lasting three months and defining its adaptive potential in adult inactive test subjects who, for a period of three months, performed an aerobics program with 36 training units (3x 60 min. per week). The subjects were measured in the initial, transitive and final state with 6 anthropometric measures: height, mass, fat tissue, body mass index, waist circumference, and hip circumference, as well as with 1 variable of functional abilities VO2 max. The results of the t-test for dependent samples showed that there were significant changes under the influence of the appropriate aerobic program in all measurement variables, except for the variable - hip circumference. Ljubojević et al. [32] examine the effects of an eight-week Zumba fitness program on changes in the body composition of women on a sample of 12 recreational women with 24 training sessions. Before and at the beginning of the Zumba fitness program, body mass, percentage of fat tissue, amount of fat tissue (kg), lean mass and total amount of water in the body were measured. The results showed that there were statistically significant changes in the reduction of body mass, the percentage of fat tissue, the amount of fat tissue (kg). Although the values of lean mass and the total amount of water in the body increased after the program, they were not statistically significant. The Zumba fitness program has proven to be a very effective means of exercise aimed at reducing fat tissue in women. Hadžić et al. [33] determined the value of the experimental program (high - low aerobics) and its impact on the viability of the motor skills with a high school student. The results clearly indicate that the statistically significant positive changes in the transformation of the evaluated motor skills at the final measurement are in favor of the experimental group compared to the control, which supports the effectiveness of applied programs highlow aerobics.

Previous studies confirm the health impact of different models of physical exercise on modifications of the body composition, morphological and motor abilities. It is a fact that physical activity significantly impacts the consumption of energy, leads to energy deficit which contributes to reduction in body weight [34]. A significant segment is dosing the load, for it is in close correlation with the exercise outcome, i.e., lost weight and changes in body composition [35, 36]. Body composition represents relative values of muscles, fat, bones and other anatomic components that contribute to the total body weight of a man. Percentage of body fat increases with age and it is more pronounced among the female than male population [37].

Application of certain group fitness programs brings significant changes in body composition, because the application of certain movement structures is a significant anabolic stimulant for the body [38]. Due to the extent, intensity and character of the applied group fitness programs and constant muscle contractions, the biggest changes are reflected in the change of muscle mass and body fat percentage. According to Elmahgoub et al. [39] and Stasiulis et al. [40] group fitness programs are an efficient tool for the control and reduction of body weight and positive changes in body composition. The current study is based on a selected model of the cardio program and its transformational capacities on the body composition of female recreational athletes. The aim of the work is to determine and the valorize quantitative effects of the modelled experimental cardio program on the body composition of women.

The current study is based on a selected model of the cardio program and its transformational capacities on the body composition of female recreational athletes. The aim of the work is to determine and the valorize quantitative effects of the modelled experimental cardio program on the body composition (BC) of young women.

## Material and Methods

*Participants*

The sample of respondents included in the current research consisted of 12 female persons, aged 21.5±3.5 years, who recreationally engage in some form of physical activity. All test subjects have their doctor's confirmation that they are healthy and can undergo training loads in a planned and clearly defined cardio program.

*Research Design*

To assess the physical status of the test subjects, seven parameters were measured to define the body composition:

1. Body weight - BW (kg),
2. Body fat percentage - BFP (%),
3. Body fat mass - BFM (kg),
4. Free fat mass - FFM (kg),
5. Body muscle mass- BMM (kg),
6. Body mass index - BMI (kg/m$^2$)
7. Basal metabolism rate - BMR (KCal)

*Experimental design study*

Convenience sampling was performed. Body weight and Body composition (BC) were assessed with the Bioelectrical Impedance Analysis (BIA) using a body composition analyser (TANITA TBF-300A, JAPAN), in accordance with the measurement protocol. The participants were informed in detail about the nature of the study and investigational procedures, and all the participants have voluntarily given their consent to be the part of this study. Prior to the survey, each respondent signed a consent form to participate. During the testing, the air temperature was between 18°- 22°C The measurements were according to the procedures in the Helsinki declaration.

*Statistical analysis*

The statistical program SPSS 19.0 was used to process the data obtained from the initial and final measurement of Body composition (BC). The basic statistical parameters were calculated and the differences between the arithmetic means of the initial and final measurements were determined by the T-test for small dependent causes.

**Table 1.** Experimental cardio program (three-month duration)

| **I MONTH** | | | |
|---|---|---|---|
| **I week** | **II week** | **III week** | **IV week** |
| **1. training**: 15 minutes of cycling (heart rate 80% max F(H)). | **4. training**: 3 x 10 min. cycling, break 3 min., (heart rate 70% max F (H)). | **7. training**: 30 min. vožnje bicikla (puls 70% max F(H)). | **10. training**: 4 x 15 min. cycling, (heart rate up to 80% of max F(H)), break 3 min. |
| **2. training**: 10 minutes of cycling, break 3 minutes, 10 minutes (heart rate 70% max F (H)). | **5. training**: 2 x 15 min. cycling, break 3 min., (heart rate 75% max F (H)). | **8. training**: 2 x 20 min. cycling, break 3 min., (heart rate 75% max F(H)). | **11. training**: 1 x 35 min. cycling (heart rate 75 % max F(H)). |
| **3. training**: 20 min. cycling (heart rate 70% max F(H)). | **6. training**: 1 x 30 min. cycling continuously (heart rate 65% of max F(H)). | **9. training**: 30 min. cycling discontinuously, break 5 min., (heart rate 60% max F(H)), next 15 min. pulse 80% max F(H), last 10 min. pulse up to 70% of max F(H). | **12. training**: 1 x 25 min. cycling (heart rate up to 65% max F(H)). |
| **II MONTH** | | | |
| **I week** | **II week** | **III week** | **IV week** |
| **13. training**: 2 x 25 min. cycling (heart rate up to 80% max F(H)),<br>break 2 min. | **16. training:** 1 x 30 min. discontinuous cycling (first 5 min. pulse up to 60% max F(H), next 15 min. increase pulse up to 85% max F(H), 10 min. continuous (pulse up to 70 % max F(H)). | **19. training**: 1 x 30 min + 1 x 20 minutes of cycling (1 min. fast, 1 min. easy) heart rate up to 85% max F(H), 5 min. light rides pulse up to 65 % max F(H). | **22. training**: 1 x 30 min. cycling, heart rate up to 70 % max F(H). |
| **14. training:**<br>1 x 40 min. riding a bicycle<br>continuously (pulse up to 75 % max F(H)). | **17. training**:<br>3 x 20 min. bike rides (heart rate:<br>1. 75%<br>2. 85%<br>3. 80% max F(H)). | **20. training:**<br>2 x 30 min. cycling, break 3 min, heart rate up to 70 % max F(H). | **23. training**:<br>1 x 40 min., 10 min. pulse up to 65% max F(H) + 10 min. pulse 80% max F(H), then 10 min. pulse 75% max F(H), 10 min. pulse up to 65% max F(H). |
| **15. training:**<br>3 x 20 min., cycling (heart rate up to 75% max F(H)), break 3 min. | **18.training**:<br>1 x 45 min. continuous cycling (heart rate 75% max F(H)). | **21. training:**<br>1 x 50 min. continuous cycling, heart rate up to 75% max F(H). | **24. training:**<br>1 x 50 minutes of continuous cycling, heart rate up to 70 % max F(H). |
| **13. training**:<br>2 x 25 min. cycling (heart rate up to 80% max F(H)), break 2 min . | **16. training**: 1 x 30 min. discontinuous cycling (first 5 min. pulse up to 60% max F(H), next 15 min. increase pulse up to 85% max F(H), 10 min. continuous (pulse up to 70 % max F(H)). | **19. training**: 1 x 30 min + 1 x 20 minutes of cycling (1 min. fast, 1 min. slow) heart rate up to 85% max F(H), 5 min. light rides pulse up to 65 % max F(H). | **22. training**:<br>1 x 30 min. bike ride, heart rate up to 70 % max F(H). |
| **III MONTH** | | | |
| **I week** | **II week** | **III week** | **IV week** |
| **25. training**: 2 x 30 min. cycling, break 2 min. pulse up to 80 % max F(H). | **28. training**: 2 x 30 min. cycling, break 3 min., heart rate up to 70% max F(H). | **31. training**: 60 minutes of continuous cycling, heart rate up to 70% max F(H). | **34. training**: 1 x 50 minutes of discontinuous cycling, heart rate at 75% of max F(H). |
| **26. training**: 1 x 30 minutes of cycling, heart rate up to 70% max F(H). | **29. training:** 1 x 45 min. cycling, heart rate up to 70% max F(H). | **32. training**: 20 min. of discontinuous cycling (10 minutes easy, heart rate up to 65% max F(H), 10 minutes heart rate up to 70% of max F(H). | **35.training**: 1 x 30 min. of continuous cycling, heart rate 70% max F(H). |
| **27. training**:<br>1 x 50 min. discontinuous cycling (10 min. pulse up to 65% max F(H), 10 min. pulse 70% max F(H), 30 min. pulse 75 % max F(H). | **30. training**: 1 x 30 min. discontinuous cycling (5 min. heart rate up to 60% max F(H), 15 minutes: 1 min. fast, 1 min. slow, heart rate up to 80% max F(H), 10 minutes of continuous riding, heart rate 70 % max F (H). | **33. training**: 1 x 50 min. continuous cycling, heart rate 65% max F(H). | **36. training**: 1 x 45 min. continuous cycling, heart rate up to 65 % max F(H). |

## Results

The results contained in Table 2 and Figures 1, 2 present the effects of a three-month experimental cardio treatment on the body composition of twelve young women, where it is evident that there have been significant changes. The results of the t-test confirm statistically significant differences (changes) in 6 out of 7 parameters (85.71%) for the p=0.001 level, which are a consequence of the programmed experimental program.

Body weight (BW), as the largest carrier of the total variance of all parameters of body composition, recorded a lower value at the end of the experimental program of 1.75kg (66.45 vs. 64.70kg), where the recorded value was t =5.225; p=0.002 (Figure 1). This is a relatively good result and a consequence of the transformation of all other body parameters that are the result of the implemented cardio program and matches the aim of the study. The percentage of body fat (BF%) in the final measurement was reduced by 1.23% (27.88 vs. 26.65%) or BMF=1.02kg (19.42 vs. 18.74kg), where the evident difference t = 4.484 and statistically significant p=0.000. The lean body mass of the subjects increased (differs) by 0.21 kg (47.05 vs. 47.26kg) in the final measurement (t = -2.755; p=0.001). Linearly with lean mass, muscle mass (BMM) recorded a slight increase in the final measurement (44.65 vs. 45.22kg). However, there was no statistically significant difference (t = -1.771; p=0.104). The cumulative effect of all body parameters is the BMI value, which is part of the research area. It was reduced in the final measurement by 0.7 kg/m² (BMI 22.75 vs. 23.45)

**Table 2.** Differences between the initial and final measurements BC after the three-month cardio program

| Body composition parameters | | Mean±SD (min.-max.) | Mean I Mean F | T - value | Sig. (2-tailed) |
|---|---|---|---|---|---|
| BW (kg) | IN | 66.45±11.82 (50.00-86.90) | 1.75 | 5.225 | 0.000 |
| | FI | 64.70±11.18 (49.80-84.10) | | | |
| **BF (%)** | IN | 27.88±8.50 (15.40-39.10) | 1.23 | 4.484 | 0.001 |
| | **FI** | 26.65±8.11 (15.30-37.40) | | | |
| BFM (kg) | IN | 19.42±8.97 87.70-33.50) | 1.02 | 4.285 | 0.001 |
| | **FI** | 18.74±8.76 (7.60-33.10) | | | |
| **FFM (kg)** | **IN** | 47.05±3.15 (42.30-53.40) | 0.21 | -2.755 | 0.019 |
| | **FI** | 47.26±3.12 (42.80-53.70) | | | |
| **BMM (kg)** | **IN** | 44.65±3.01 (40.10-50.70) | 0.57 | -1.771 | 0.104 |
| | **FI** | 45.22±2.32 (40.50-51.00) | | | |
| **BMI (kg/m²)** | IN | 23.45±4.02 (18.40-31.20) | 0.7 | 6.009 | 0.000 |
| | **FI** | 22.75±3.84 (18.30-30.10) | | | |
| **BMR (Kcal)** | IN | 1460.33±119.72 (1302.0-1690.0) | -28.75 | -4.052 | 0.002 |
| | **FI** | 1489.08±134.83 (1298.0-1763.0) | | | |

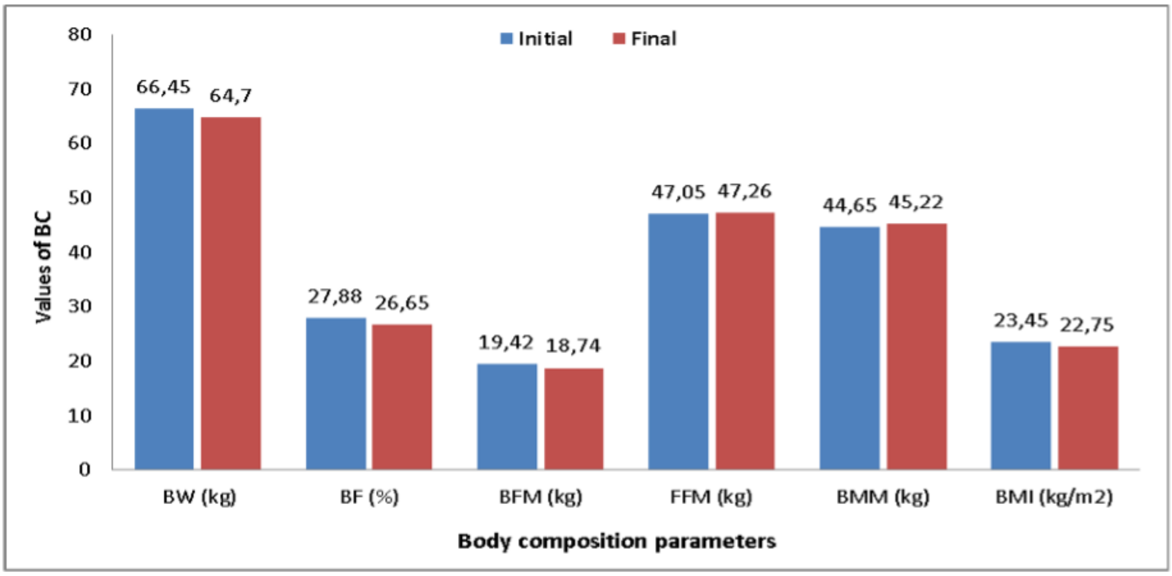


**Figure 1.** Differences between mean values in Body composition

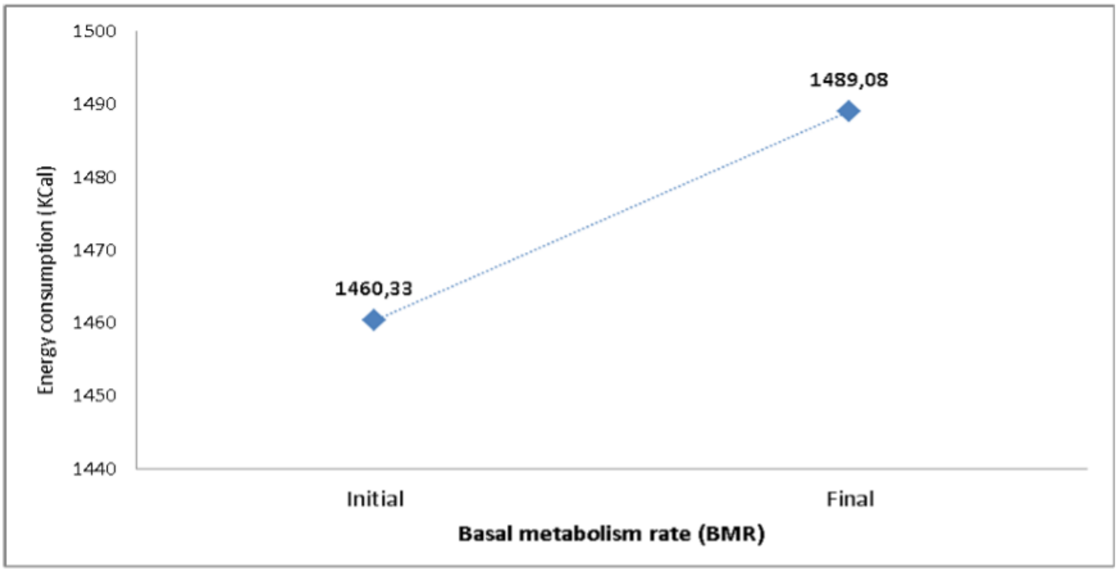


**Figure 2.** Effects of the cardio program on energy consumption (KCal)

where t= -6.009; p=0.000. Caloric consumption (BMR) after the final measurement showed a higher average consumption by 28.75 kcal for t = -4.052; p=0.002 (BMR=1460.33 vs. 1489.08) (Figure 2).

## Discussion

Hypokinesia, obesity and psychological stress are the biggest causes of illness and death in modern man. Insufficient and inadequate physical activity reduces the functional abilities of many organic systems, primarily cardiovascular and respiratory, and nervous tension leads to various mental illnesses. Such a condition leads to a decrease in people's working capacity and to the impairment of their physical and mental health [11]. Exercise is very important for adolescent girls, because training improves their morphological characteristics (physical status), which positively affects their psychological state. They have a better perception of their own body, reduce the possibility of entering into various crises, depression or eating disorders due to the application of various "instant" diets. The goal of physical activities and exercise in view of the above should be the development of the cardiovascular and respiratory systems on the one hand, and the muscular and skeletal systems on the other hand, thus increasing the level of health and quality of life, extending working and life expectancy, and delaying and slowing down the aging process. The most suitable activities for the development of the first system are cyclical activities, that is, activities where there is one closed movement structure that is continuously repeated. Group fitness programs of different duration, intensity and frequency are most often discussed. An important motive for the majority of recreational women to participate in such programs is shaping the body into a harmonious whole while reducing subcutaneous fat and body mass. AAHPERD [41] states the so-called components of physical fitness, including body composition.

The goal of the current study was to determine and evaluate the quantitative effects of a modelled three-month experimental cardio program (Table 1) on the physical status of young women, aged 18-25 years. The obtained extracted results confirm significant differences in most body composition parameters between the two measurements (85.71%). It is mainly about the reduction of fat tissue and body weight, in contrast to muscle mass, which showed a slight increase (Table 2, Figure 1). Based on the descriptive parameters for the assessment of body composition, as one of the fitness components, it can be concluded that our female subjects have different values between the initial and final measurement BF% (27.88 vs.26.65%) and BW (66.45 vs.64.7kg), which is the product of the implemented cardio program. Total BF (%) is lower at the final compared to the initial measurement, which corresponds to a normal distribution for the given population [42, 43]. High-intensity load programs lead to a faster reduction in body composition, slight increase to energy consumption (Figure 2), which results in reduction in total body weight. The intensity of the load during the program has a beneficial effect on fat loss in all parts of the body [44, 45].

A possible decrease in muscle mass in our sample would not be a good indicator of the program's effects, since the goal was to decrease the percentage of body fat and body weight. The basic intention of the programs in which the body composition is corrected is related to the reduction of fat, and at the same time the maintenance or increase of muscle tissue. Every person, no matter how low the BMI index is, must have a certain percentage of fat in the body, because fat is necessary for life. Without fats, certain vitamins and minerals cannot be absorbed in the body, hormones cannot be produced, but fats also have important reproductive functions. Energy is stored in fats, fats regulate body temperature, and in addition to the above, they are responsible for many other mechanisms in the human body. Fats in the body are stored in the subcutaneous fat tissue, and in addition, fat deposits also have a protective function around the internal organs [46]. Our sample has the so-called "healthy level" of fat in both measurements which is consistent with the unified table results.

Health should be seen not only as the absence of disease, but as the ability to adequately respond to the numerous challenges of everyday life through the social, psychological and physical dimensions. According to Anderson et al. [47] women who are moderately physically active compared to women who sit all the time, have a lower rate of carcinomas and better functioning of the immune system (more leukocytes and increased concentration of immunoglobulins), less depression and better mental abilities, speed, higher IQ, more persuasiveness, spontaneity and enthusiasm, better attitude towards oneself and better acceptance of oneself, stronger bones, increased bone density, increased bone mass and increased ability of bones to withstand mechanical stress and fractures. The experimental three-month cardio program led to significant changes in the body composition parameters (Table 2; Figure 1,2) of our sample, which is in accordance with the results of previous studies [17, 18, 19, 24]. In our study, the body mass of the subjects, as the main representative of body composition, was reduced by 1.75 kg in the final measurement, it is identical to the results of the study by [30], which is an indicator of a well-implemented cardio program and its positive effects that are valued through the obtained results. The results are another important confirmation that directed aerobic, cardio activity can affect the reduction of body weight, which supports earlier research [26, 31, 32] on the same sample or of a similar age who found that weight loss occurs after a program of aerobic exercises, which are performed three to five times a week for 20 to 60 minutes, which can contribute to quantitative and qualitative changes in individual body composition variables.

## Conclusions

This experimental research was conducted on a sample of 12 (twelve) women of recreational age of 21.5±3.5years. The program lasted 3 months with a frequency of work (3x20-60min. per week). Based on the results of the T-test for dependent samples, there were statistically significant changes caused by the three-month experimental program on the sample of female recreational athletes. Changes were found in all variables except muscle mass, which was expected considering that the goal of the program was to reduce body fat parameters and reduce the body weight of the test subjects. The assumption is that a controlled and monitored program with a special focus on nutrition would lead to even more precise results on the effects on body composition. Continuous application of the content of this program throughout the entire one-year macrocycle with a higher weekly frequency would certainly give even more significant results.

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Cite this article as:

Vrcić M, Pavlović R, Kovačević E, Solaković S, Hadžimuratović S. The effects of recreational cardio fitness programs on the body composition of young women. *Pedagogy of Physical Culture and Sports,* 2023;27(2):112–122.
https://doi.org/10.15561/26649837.2023.0203



Received: 28.01.2023
Accepted: 01.03.2023; Published: 30.04.2023