The exercise program called „omnibus” aerobics represents an exercise program specially designed to meet the needs of women for recreational exercise, as well as motivation to improve physical appearance and body weight regulation. „Omnibus” aerobics incorporates a variety of program content with the primary goal, in addition to local and general effects on the body; to make the exercise more interesting and accessible to trainees. The aim of this research was to determine the effects of implementing a specially designed group fitness program on selected morphological characteristics of the trainees.

The survey was conducted on the sample of female respondents (n = 10), aged 33.6 ± 6, who led sedentary lifestyle up to the start of application of the experimental program (less than 30 minutes of physical activity a week). The average height of women was 170 ± 6 cm and the average body mass at the initial measurement was 74.2 ± 12.73 kg.

The effects of the „omnibus” aerobics were observed in the area of morphologic characteristics and motor variables from the area of force. After the experimental program that lasted for six months, three times a week for an hour, there was a statistically significant change in most of the researched variables. Based on the results of the research, it can be concluded that a specially designed exercise program called „omnibus” aerobics leads to positive changes in body composition, as well as in selected motor variables from the area of force.

**Keywords:** RECREATION / GROUP FITNESS PROGRAMS / „OMNIBUS” AEROBICS / BODY COMPOSITION / WOMEN
years old (Oja & Tuxworth, 1995). However, their physical abilities are very moderate and the health is poor, so they are impeded to live full and independent life in the old age.

Health represents the ability to adequately respond to many challenges of everyday life and it is the precondition of the full realization of life potentials. One of the main tasks of recreational exercise is a positive impact on health, and therefore in the expert literature a compound health related fitness has been more frequently used (Oja & Tuxworth, 1995) – health-oriented fitness or a set of physical abilities in relation to good health in the broadest sense.

In addition to the health motives, the motivation of women for recreational exercise, the motives of physical appearance and regulation of body weight are significantly present (Stojiljkovic, 1994; Stojiljkovic, 1996). Body composition and physical appearance are changing under the influence of exercise. Strength development is generally accompanied by increasing muscle mass, while increased aerobic endurance is often accompanied by a reduction of subcutaneous adipose tissue (Stojiljkovic et al., 2005). Changes in body composition can be even more important, when the appropriate diet is applied along with the specially programmed exercise (Stojiljkovic, Djordjevic-Nikic and Macura, 2005).

Exercising for reducing the excess body weight and body fat is generally based on the use of cyclic aerobic activity combined with strength training. Cyclic aerobic activity such as walking and running are also the activities that are commonly used in the development of aerobic endurance, which is the most important physical ability of the health aspect.

The recommendations of recognized authorities such as the American College of Sports Medicine (1998), Astrand (1992), in exercise of healthy adults for improving cardiovascular health, can be expressed in short as four important tips: 1. **Type** of exercise: Because of the possibility of precise cyclic loads dosing aerobic activities like walking, running, etc. are recommended. 2. **Frequency** of exercise: The optimal frequency is three to six trainings a week. 3. **The scope** of activities: It is expressed in minutes, and the recommended dose for individual training ranges from 20/30 to 45/60 minutes. 4. **The intensity** of activities: It is expressed in relation to the maximum heart rate, and it is recommended that the heart rate in training is in the zone of 60-90% of maximum heart rate.

A sufficient amount of moderate intensity exercises (55-70% of max. heart rate) will have a favorable effect on body weight. There are limited scientific data to support the necessity of more intense exercise (> 70% max heart rate) in order to reduce and maintain body weight over a long period (Jakicic et al., 2001).

It is proven that the preservation of lean body mass (LBM), and thus preserving of resting metabolic rate (RMR) are the conditions for the preservation of reduced body weight (Lockwood et al. 2008; Stiegler & Cunliffe, 2006).

In the process of body mass reducing and improving body composition there are two main factors that can favorably affect the preservation or increase muscle mass, and these are the application of the resistance training (RT) and a diet in which the adequate protein intake is high (not below 1.5 g/kg of body mass) (Lockwood et al., 2008).

We can conclude that different forms of aerobic exercise are superior for reducing body mass, but a good combination and an adequate use of aerobic and resistance training should reduce body fat in addition to improving muscle strength and endurance, which is a special benefit that can lead to adaptation to a more active life style of sedentary and obese patients (Jakicic et al., 2001).

Adult female body is different from the male body in regard to the development of the skeleton and muscles, aerobic and anaerobic capacity and overall performance in physical activities. Given the smaller effect of anabolic hormones, women have less muscle mass and exhibit a lower strength and endurance. On the other hand, women have more pronounced mobility and agility; and have a better sense of rhythm (Popovic, 1998).

Women have a higher percentage of body fat, concentrated mostly in the chest and hips, and have less developed muscles for 33%. The bones are less dense, strong and heavy. Functionally, there are significant differences in heart and vessels system, the pulmonary ventilation, vital capacity and basal metabolism. Maximum aerobic capacity in adult women is 25% lower than in men. Heart rate in women is slightly higher than in men, and with identical load, women also exhibit higher heart rate compared to men (Popovic, 1998).
Nowadays, the most common form of recreational exercise for women aimed at satisfying motives to preserve health, improve physical appearance and body mass reduction are different group fitness programs, whose main goal is, through a continuous method of operation and defined extent of the resistance, the development of aerobic capacity together with meeting the aesthetic criteria of the subjects (Mandaric, 2005).

Group fitness training programs are programs whose principles of exercise are based on the principles of AEROBIC by Kenneth Cooper, i.e. the principles of physiology of physical exertion. In 1971 Jackie Soresen came up with the idea to, following the principles set by Kenneth Cooper; promote aerobic exercising accompanied with music, which in its structure contained dance steps (dance aerobics). From these days until now, millions of devotees of aerobics, primarily women, encouraged by the desire for beautiful appearance, health preservation and recreation, have exercised „dance”, „soft”, „step”, „slide”, „kick boxing”, „cardio-funk”, „aqua” aerobics using different musical styles (latin, disco, funk, hip-hop, afro, jazz, ethno, etc.) (Mandaric, 2007). All these different exercise programs are today classified in the group of the so called group fitness programs.

The topic of the research was to study the effects of group fitness programs for trainees engaged in this type of recreational exercise. The aim of the research is to evaluate the effects of a specially designed group fitness program on selected morphological characteristics and motor abilities of trainees.

**RESEARCH METHODOLOGY**

The experimental method was applied in the research, with initial and final measurement and experimental factor in the form of realization of omnibus aerobics program content, which lasted for six months. In this period, an experimental program was carried out for one hour three times a week, in the aerobics club “Spanac” in Nis.

**The research protocol**

For the research purposes, an original exercise program called „omnibus” aerobics was designed by the authors of this paper. Omnibus aerobics belongs to the aerobic group fitness programs, and is characterized by different program contents with the primary objective to affect the aerobic endurance, strength and mobility of trainees.

The „omnibus” aerobics program contains twelve different classes of aerobic exercise to music, while the each is performed only once in four weeks (the exercise frequency was 3 times a week, with a total of 12 hours for 4 weeks - one type of aerobic program during each class). The main reason for designing such a complex exercise program was the observation from the authors’ experience that the monotony which was common in trainees due to monotonous repetition of almost identical classes in the long run was one of the important reasons for leaving the group aerobic exercise programs. In order to successfully carry out the „Omnibus” aerobics program, it was necessary to have a universally educated expert, which in this case was one of the authors of this paper (K. Todorovic). In practice, it is possible that such a program with one group of exercisers is realized by several experts, and each would realize several classes per month by doing programs that he or she is best qualified for. Of course, different combinations of various programs of aerobic exercise are possible from those chosen in this paper.

Every class of „omnibus” aerobics is divided into introductory, main and final part. The main purpose of introductory part of the class is physiological introduction and preparation of a body for intense training during the main part of the class and it consists of preparation of those muscle groups that will be most involved in the main part of the class. The main characteristics include: working with a small range of motion, light stretching exercises, moderate pace of work and simple coordination exercises. The main part of class consists of aerobic part and the part for the exercise of power, and it varies according to program content that is applied in that class. The final part of the training is the same as the introductory; similar to every class in the content structure, and its
The main characteristic is gradual calming down the body by employing stretching exercises of the muscle groups that were most involved in the main part of the class, combined with breathing exercises and relaxation (Mandaric, 2003). In each following month, within the program content, the number of repetitions would increase, and partly also the number of exercises, steps, as well as parts of choreography.

Omnibus aerobic program consists of the following program content:

1. **Choreographed aerobics** – a variety of dance choreography with specified music is performed and practiced.
2. **Jane Fonda’s workout model** – the exercises are performed without props (free exercise, dance steps, exercises of strength and mobility, followed by the sounds of currently popular music).
3. **Aerobics with weights** – weights (1 kg) are used during exercise in the main part of a class. The exercises for the upper body part (exercises for arms, shoulders, back and abdomen) are mostly carried out during this training.
4. **Aerobics with leg weights** – leg weights (0.5 kg and 1 kg) are used during workout in the main part of the class. The exercises for the lower extremities (legs and gluteus region) are mainly carried out during this training.
5. **Aerobics with balls** – for this type of aerobics the equipment which is used are big as well as small balls of 0.2 kg. The muscles of the whole body are strengthened and stretched with the help of the balls.
6. **Dance aerobics** - this form of aerobics includes more intense movements with music followed by free dance, as well as dance in pairs.
7. **Aerobics with yoga elements** – during this class the psychophysical harmony is obtained by breathing which is characteristic for yoga and by slow controlled movements from different initial yoga-specific positions.
8. **Stretching** – in the first part of the main part of the class, the 10-second isometric contraction movements are performed. In the second part of the class the stretching exercises are performed. Stretching the muscles of the whole body continues to the end of the class.
9. **Exercise program with elastic bands** – the exercises with elastic bands are performed in the main part of the class, before the aerobic part.
10. **Kick aerobics** - kickboxing elements are performed in the main part of the class. First, the movements are learned and improved, but later they are performed in a more explosive way, with specified music. The movements are mainly performed with hands.
11. **Tae-Bo** (with and without bags) – it is a program of aerobic exercise using elements of martial arts (strikes with hands and feet, postures).
12. **Folk aerobics** – during the folk aerobics classes the steps of folk dances of Serbia are practiced.

The experimental program lasted for 24 weeks, the classes were held three times a week (Monday - Wednesday - Friday), and the duration of a single class was 60 minutes. The classes were held in a hall of aerobics club “Spanac” in Nis, in the evening hours.

Prior to the implementation of the experimental program the initial measurement was conducted, and after 24 weeks the final measurement was done. Before joining the program each respondent was examined by a sports physician. None of the respondents included in the program reported, or was found any medical obstacles for participation in exercise program. None of the respondents had any other form of regular physical activity or participated in another experimental program in the course of program. None of the respondents used any supplements except for multi-vitamin/mineral, or significantly changed diet during the experimental program.

**The sample of respondents**

The sample of respondents consisted of adult females (n = 10), aged 33.6 ± 6, who, up to the start of the experimental program implementation led sedentary lifestyle (i.e. had less than 30 minutes of physical activity a week). All the respondents were informed prior to the research and voluntarily agreed to participate in it. The average body height of women was 170 ± 6 cm and the average body mass at the initial measurement was 74.2 ± 12.73 kg.
The sample of variables and the way of measurement

Starting from the set subject and the aim of the research, the following morphological characteristics were examined:

- Body height (BH);
- Body mass (BM);
- Body mass index (BMI);
- Waist circumference (WC);
- Hips circumference (HC);
- Waist/hips index (WHI);
- Thigh circumference (TC);
- Calf circumference (CC);
- Upper arm circumference (UAC);
- Chest circumference (ChC).

From the area of motor skills, motor variables from the area of force were tested as follows:

- Deep squat with feet parallel to shoulder width,
- Push-ups,
- Rise in sitting position with legs bent at the knee.

All measurements were performed on the same day in the morning. The anthropometric variables were measured according to the protocol of the International Biological Program, under the standardized conditions. Body height was measured on a calibrated stadiometer with rounding off to the nearest 0.5 cm, while the body mass was measured on a calibrated clinical scale with rounding off to the nearest 0.1 kg.

Within the main part of the class in the first week of the experimental program the training of the exercise was done firstly, followed by the power testing of several most important muscle groups, in order to dose the intensity of the part of training related to the development of force precisely. After the warming up, the respondents were doing the following exercises:

- Deep squat with feet parallel to shoulder width (Stojiljkovic et al., 2005);
- Pushup with hands placed wider than shoulder width, with support on the knees (Stojiljkovic et al., 2005);
- Rise in sitting position with legs bent at the knees at an angle of approximately 90° - the so called “sit-ups” (Oja & Tuxworth, 1995).

At the end of the experimental program, the final measurement of morphological characteristics and motor skills – the area of force was done.

Statistical data processing

All data collected by the research were analyzed using the descriptive and comparative statistics. From the area of descriptive statistics, the arithmetic mean (AM) as a measure of central tendency and standard deviation (SD) as a measure of dispersion were calculated. From the area of comparative statistics the one-way t-test for dependent samples was made in order to determine the statistical significance of differences between the initial and final measurement. For the variable “waist/hips index” a two-way test for dependent samples was done, because it was impossible to predict in which direction the changes would occur, i.e. whether greater reduction of waist of hips circumference would happen under the influence of exercising. The significance level was set at $p \leq 0.05 (*)$ and $p \leq 0.01 (**). The data obtained were processed using the statistical package Vassar Stats.

RESULTS AND DISCUSSION

After 24 weeks of application of a complex group fitness program called “omnibus aerobics”, there was a statistically significant change in a majority of the observed anthropometric variables (Table 1). Body mass of the respondents was reduced by an average of 4.5 kg, which resulted in the reduction of BMI of 1.54. Body mass reduction as a consequence of the application of the experimental program led to a statistically significant reduction of all observed morphological characteristics of body circumference. The only variable that was not statistically significantly changed was the waist/hip circumference, which is logical since the average reduction of waist circumference and hip circumference is nearly equal (5.6 and 5.1 cm), by which their ratio remained almost the same.
The research results can be compared with the results of several studies, in which the effects of certain experimental exercise program on the morphological characteristics and motor abilities were specified.

The respondents (aged 31.1 ± 8.1, body weight 65.34 kg, n = 7), who exercised in the gym for at least six months 2-5 times a week, had BMI = 23.04 kg/m² (Makivić, Djordjević-Nikić, Macura, & Stojiljković, 2007), which was 1.03 kg / m² less than in our respondents. In addition, the respondents from the said research had achieved better results in motor variables from the area of force (51.43 versus 28.2 “sits-ups” and 22.71 versus 11.8 push-ups in our research),

24 weeks after the “omnibus aerobics” application, there was a statistically significant change in all monitored motoric variables from the area of force (Table 2). In all three exercises the number of correct repetitions to “termination” was increased many times. Since in all three exercises the load was one’s own body mass, which was reduced during the experimental program (4.5 kg averagely), this can partially explain such good results at the final measurement. The second cause that can be assumed (since we have no data about the amount of muscle mass) is that despite the reduced body mass as well as reduced circumferences at the final measurement, the amount of muscle mass was not only preserved, but slightly increased. This suggests that a decrease in body mass occurred primarily at the expense of reduced amount of body fat, which is certainly a positive effect of the experimental program.

### Table 1  Comparison of the results of morphological features at the beginning and the end of the experimental program

<table>
<thead>
<tr>
<th>Variable</th>
<th>initial (AM ± SD)</th>
<th>final (AM ± SD)</th>
<th>difference</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>BM (kg)</td>
<td>74.20 ± 12.73</td>
<td>69.70 ± 11.85</td>
<td>4.50</td>
<td>11.21</td>
<td>0.0001**</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>25.61 ± 3.87</td>
<td>24.07 ± 3.67</td>
<td>1.54</td>
<td>12.75</td>
<td>0.0001**</td>
</tr>
<tr>
<td>WC (cm)</td>
<td>88.3 ± 12.15</td>
<td>82.7 ± 11.09</td>
<td>5.6</td>
<td>6.84</td>
<td>0.0001**</td>
</tr>
<tr>
<td>HC (cm)</td>
<td>102.5 ± 6.49</td>
<td>97.4 ± 6.02</td>
<td>5.1</td>
<td>9.7</td>
<td>0.0001**</td>
</tr>
<tr>
<td>WHI</td>
<td>0.86 ± 0.10</td>
<td>0.849 ± 0.10</td>
<td>0.011</td>
<td>1.82</td>
<td>0.1021</td>
</tr>
<tr>
<td>TC (cm)</td>
<td>63.6 ± 6.08</td>
<td>60.5 ± 5.81</td>
<td>3.1</td>
<td>3.83</td>
<td>0.0020**</td>
</tr>
<tr>
<td>CC (cm)</td>
<td>39.8 ± 4.57</td>
<td>38.2 ± 3.23</td>
<td>1.6</td>
<td>2.75</td>
<td>0.0112*</td>
</tr>
<tr>
<td>UAC (cm)</td>
<td>31.8 ± 3.99</td>
<td>30.5 ± 3.92</td>
<td>1.3</td>
<td>4.99</td>
<td>0.0004**</td>
</tr>
<tr>
<td>ChC (cm)</td>
<td>102.8 ± 12.67</td>
<td>99.1 ± 11.05</td>
<td>3.7</td>
<td>4.25</td>
<td>0.0011**</td>
</tr>
</tbody>
</table>

* = p ≤ 0.05;  ** = p ≤ 0.01

### Table 2  Comparison of the results of motor tests at the beginning and the end of the experimental program

<table>
<thead>
<tr>
<th>Variable</th>
<th>initial (AM ± SD)</th>
<th>final (AM ± SD)</th>
<th>difference</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Squats</td>
<td>5.4 ± 0.84</td>
<td>18.1 ± 2.56</td>
<td>-12.7</td>
<td>-17.02</td>
<td>0.0001**</td>
</tr>
<tr>
<td>Pushups</td>
<td>2.3 ± 0.67</td>
<td>11.8 ± 3.77</td>
<td>-9.5</td>
<td>-8.5</td>
<td>0.0001**</td>
</tr>
<tr>
<td>Raise in sitting position</td>
<td>5.1 ± 0.99</td>
<td>28.2 ± 2.2</td>
<td>-23.1</td>
<td>-47.94</td>
<td>0.0001**</td>
</tr>
</tbody>
</table>

* = p ≤ 0.05;  ** = p ≤ 0.01
although in our research the respondents increased the number of correct repetitions to “termination” many times, which must be satisfying. Better results listed in the above mentioned research were expected because the respondents were performing exercises for the abdominal muscles during all trainings in the gym, as well as exercises with weights. Lower BMI and better results in motor variables from the area of force at respondents who train in the gym can be explained by longer participation in physical training, more frequent number of trainings during the week (2 – 5 times), longer duration of a training session (80 to 100 minutes), as well as a specific training program, which was different in its content from the program content of “omnibus” aerobics (it included more power exercises).

Before and after six weeks of training aimed primarily at reducing body fat, seven obese black women were tested (aged 21 ± 1). At the beginning and the end body weight (76.8 ± 12.5, versus 75.0 ± 12.0 kg) and body fat percentage (initially 33 ± 4%, and finally 31.7 ± 3.9 %) were measured, and the differences were statistically significant (Szmedra, Lemura & Shearn, 1998). The recorded changes in body mass were lower than in our research (body mass decrease of 1.8 kg versus 4.5 kg in our research), while the percentage of body fat is relatively little reduced, which could be explained by a greater length of our experimental procedure.

The research which was conducted on the sample of 30 female respondents aged 30-45, who voluntarily participated in the aerobic program which lasted for five months, with 2 trainings per week, showed significant quantitative changes in the area of some morphological and motor variables (Fuckar, 1997). In the aforementioned research the difference in the body mass between the initial and the final measurement was 4.25 kg, while in our research it was 4.5 kg, indicating that the recorded changes of body mass are almost identical. Statistically significant changes were observed in the assessment of motor variables from the area of force (sit-ups, pushups, squats), as well as in our research.

Under the influence of ten-week-long dance aerobic program, that was realized three times a week for 50 minutes, on the sample of 29 female respondents aged 25-30, statistically significant changes in the area of morphological characteristics and functional abilities were perceived (Eickhoff, Thorland & Ansorge, 1983). The results of the above mentioned research suggest the reduction of the body mass index of 1.2 kg/m² which is 0.34 less than in our research. The results show that aerobic programs of exercising with music, regardless of the duration of the program, have statistically significant impact on body mass reduction of the female respondents.

After analyzing the results of our research, it can be concluded that the “omnibus” aerobics had a positive impact on body composition and motor abilities of respondents.

**CONCLUSION**

The exercise program called “omnibus” aerobics, which consisted of twelve different program content exercises to music, was designed by the author of this paper in order to prevent monotony that occurs in trainees due to repetition of almost identical classes over a longer period, which is one of the important reasons for leaving the group led aerobic exercise programs.

After six months of implementation, the program “omnibus” aerobics led to statistically significant changes in monitored variables from the area of morphological characteristics and motor abilities of respondents.

Of individual morphological characteristics the following were significantly reduced: body mass of respondents, waist, hip, thigh, calf, and upper arm and chest circumferences. The reduction in body weight and measured circumferences has caused the statistically significant reduction of BMI (body mass index) of 1.54 kg/m². In the area of motor variables (the area of power), statistically significant changes were observed for all monitored variables (squats, pushups, rise in a sitting position), in which the multiple increase in the number of correct repetitions to “termination” was noticed.

On the basis of the research results, it can be concluded that the “omnibus” aerobics, i.e. the use of different program content (according to music, usage of props, movement structures) of which it is made, results in positive changes in body composition, as well as in selected motor variables from the area of force.
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Received 14.3.2010.
Accepted 20.12.2010.