Beqa Gentiana, Elezi Abdullah, Elezi Gresa. The impact of powerful programed exercises on fitness, on body composition. Journal of Education, Health and Sport. 2019;9(8):950-961. eISNN 2391-8306. DOI http://dx.doi.org/10.5281/zenodo.3408563
http://ojs.ukw.edu.pl/index.php/johs/article/view/7438

The journal has had 5 points in Ministry of Science and Higher Education parametric evaluation. § 8. 2) and § 12. 1. 2) 22.02.2019.

The authors declare that there is no conflict of interests regarding the publication of this paper.

Received: 01.09.2019. Revised: 14.09.2019. Accepted: 15.09.2019.

THE IMPACT OF POWERFUL PROGRAMED EXERCISES ON FITNESS, ON BODY COMPOSITION

Name	Gentiana Beqa
Affiliation	University of Prishtina Faculty of physical education and sport
Country	Albania
Bio Statement	—

Name	Abdullah Elezi
Affiliation	University of Prishtina Faculty of physical education and sport
Country	Albania
Bio Statement	—

Principal contact for editorial correspondence.

Name	Gresa Elezi
Affiliation	University Clinical Centre of Kosova
Country	Kosovo
Bio Statement	—

Abstract

The definition of body composition refers to the constituents of the tissues that make up the body and is usually used to indicate the relative percentage of body fat and non-fat tissue. The health interest is the recognition of the relative amount of body fat relative to non-fatty body tissue and the distribution of body fat, with additional interest in changes in these components under the influence of physical exercise. The purpose of this study is to validate the effects of a fitness program with strength exercises on female body composition. The population sampled for this research was defined as female populations Mean age = 23.28 years, SD = 2.18. The test sample consisted of 25 women who for the first time expressed a desire to practice at the “Gettfit Center” fitness center in Prishtina. The calculation of body composition parameters was done with the measuring instrument “TANITA” BC-601. Are calculated: Body Weight (BWEG), Body Fat (BOFA), Muscle Mass (MAMU), Bone Mass (BOMA), Body Mass Index (BMIN), Daily Caloric Intake (DCIN), Metabolic Age (MEAG), Body Water (BWAT) and Visceral Fat (VIFA). Training sessions lasted 4 weeks with 1-12 workouts with 60% 1RM max loads, and 12 second 13 - 24 weeks training sessions with 80-85% 1RM loads, number of repetitions 8- 12. Quantitative analysis (Paired Sample T-Test) was applied to confirm the impact of the training treatment. The results show that exercise training for two months produced a significant positive effect at the level of p <0.0, in all parameters that determine body fat level and increase in muscle mass.

Key words: body composition; exercise programs; effects; women

Introduction

Motor skills within various physical, sports and recreational activities influence anthropological status of human by improving them. There are no anthropological abilities or characteristics, such as morphological and cognitive characteristics, cognitive, motor and functional abilities as well as social and health status that are not significantly influenced by organized physical activity (Beedie et al, 2000). Overweight has become a serious public health problem worldwide. Currently, over 35% of men and almost 40% of women are overweight or overweight (WHO. Obesity and overweight 2015). Although weight gain is observed at all ages in developed and developing countries, such an increase is most likely to affect people between the ages of 20 and 40 (Ng, et al., 2013). Overweight is associated with lower levels of quality of life (Trapp et al., 2008) with cardiovascular disease, hyperlipidemia, blood pressure (Durstine, et al., 2001), while, on the other hand, physical activity causes weight loss, improves cardiorespiratory capacity and reduces risk factors (Ross & Janssen, 2001). Components of physical fitness, according to many authors in the USA (Brick, 1996), are: (aerobic endurance), (muscular endurance), (muscular endurance), (flexibility) and (body composition). The American Aliance for Health, Physical Education, Recreation and Dance (AAHPERD) agrees. Group fitness programs are the most common form of physical exercise programmed for women in order to improve their health and improve their aesthetic appearance. Exercise fitness is one of the best programs for strengthening muscles in different parts of the body. Also such exercise programs also improve body weight and give the body aesthetic appearance. It integrates the core principles of strength training with aerobic interval training to help increase calorie intake, improve cardiovascular functional ability, and strengthen the whole body (Perez ande Greenwood-Robinson, 2009). Only exercises that are applied to strength training can be divided into primary or structural, secondary or additional, tertiary or isolated. The method of exercise and choice of exercises will depend on the number of batches of each exercise, the number of repetitions, and the length of break between the batch and exercises. One of the determinants of strength training that should not be neglected is symmetry, it means, the training process should include strength exercises for each muscle group. Asymmetry caused by training is often the cause of chronic orthopedic injuries and problems (Peterson et al., 2011). Strength training also leads to physiological changes in the body, one of the fundamental ones being hypertrophy, which is a consequence of changes in the number of myofibrils, capillary density, increased amount of protein, and total number of myofibrils (Bompa et al., 2009). The composition or composition of the body is one of the components of physical status and refers to the constituents of the tissues that make up the body and is usually used to indicate the relative percentage of fat and fat tissue (muscle tissue). For health and fitness, the main interest is to know the relative amount of body fat in relation to the body's muscular tissue and the distribution of fat in the body, with additional interest in changes in these components. Physical inactivity is one of the main causes of weight gain. In the elderly, weight gain is conditioned by slow walking speed and functional limitations. One of the most up-to-date methods for measuring body composition, the bioelectric impedance (BIA) method, is based on the knowledge that the electrical current passes faster through tissues that have a greater amount of water in their composition (Ostojić, 2005). Since the fatty tissue in its composition has less water, the body's resistance to electrical current is consistent with the amount of fat tissue in the body. Therefore, electrical resistance is the index of total body fat, and based on different formulas, the percentage of body fat and other body components is calculated. The purpose of this study is to validate the effects of a fitness program with strength exercises on female body composition.

Methods

All anthropological features and abilities, environmental characteristics, similarities and differences, both within a sample of test subjects and between different test samples, must be measured and evaluated in different ways, using different techniques and measuring instruments. This research has a longitudinal character. The methods used are empirical, experimental, statistical, comparative and bibliographic-speculative. The population sampled for this research was defined as female populations Mean age = 23.28 years, SD = 2.18. The test sample consisted of 25 females who for the first time expressed a desire to practice at the "Gettfit Centet" fitness center in Prishtina. Women registered for the first time at the "Gettfit Center" fitness center in Prishtina have expressed a desire to be part of the experiment in this research. Before being subjected to fitness programs with forceful exercises, the testers have been given the consent of their physician to be in good health. The calculation of body composition parameters was done with the measuring instrument "TANITA" BC-601. All values obtained were obtained after the parameters as body height, year and gender were recorded in the "TANITA" apparatus, while the other parameters of the body components were obtained from the "TANITA" apparatus model BC-601. Respondents at the inner edges of the barefoot apparatus placed the soles of the feet on separate metal parts of the scales. After the signal is released for measurement, the current flows through the body and analyzes the following parameters: Body Weight (BWEG), Body Fat (BOFA), Muscle Mass (MAMU), Bone Mass

(BOMA), Body Mass Index (BMIN), Daily Caloric Intake (DCIN), Metabolic Age (MEAG), Body Water (BWAT) and Visceral Fat (VIFA)

Table 1. Reflection of the exercises that the respondents did during the first 4 weeks of 1-6 training and 7-12 training 60% 1RM max loads, and the second 4 weeks 13 - 24 weeks, 80-85% 1RM loads, number of repetitions 8 -12. (Jukić & Marković, 2005)

Exercises – Monday, Wednesday, Friday	Training 1-6	Training 7-12	Monday Training	Wednesday Training	Friday Training
1. Abdominal Machine 2. Lower back 3. Shoulder press 4. Uper back 5. Chest press 6. Lat pulley 7. Biceps curl 8. Lat pulley 9. Pec deck 10. Uper back 11. Smith 12.Leg curl	2 series 15-20 repetition 1 min rest between series	3 series 15-20 repetition 30sec rest between Series	1. bench press 2. incline benc press 3. knneling chinning and dipping machine 4. peck deck 5. Smith 6. lying leg curl 8. abdominal machine 9. (lower back	1. Knneling chinning and dipping machine 2. Uper back) 3. Knneling chinning and dipping machine) 4. Lat pulley 5. Biceps curl 6. Lat puley 7.Abdominal fleksor	1. Shoulder press 2. Uper back 3. Smith **4.** Standing dumbbell lateral raises 5. Leg extension 6. Seated leg press 7. Lower back

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). For the assessment of the difference between two dependent groups in arithmetical averages, the t-testing (Paired Sample T-Test) has been applied.

Result

After gathering information on body composition parameters, and statistical processing, the interpretation of the results is in this order. Table 2 presents the basic statistical indicators of the parameters of body composition before training - the initial measurement.

Table 2. Basic statistical indicators of body composition parameters before exercise treatment - the initial state

Variables	N	Min	Max	Mean	Std. Dev.	Skew	Kurt
BWEG	25	56.1	81.7	66.768	6.5204	0.75	0.555
BOFA	25	30.8	47.2	36.088	4.0095	0.929	0.981
MUMA	25	34	47.1	40.896	3.09778	-0.245	0.856
BOMA	25	1.8	2.7	2.252	0.19175	0.14	1.386
BMIN	25	18.2	29	24.144	2.48128	-0.004	0.481
DCIN	25	1813	2428	2156.64	154.4617	-0.038	0.18
MEAG	25	30	43	36.12	3.46795	0.242	-0.248
BWAT	25	39.7	55	47.808	3.23392	-0.35	0.838
VIFA	25	2	7	3.92	1.32035	0.749	-0.165

Asymmetry test coefficients show that normal asymmetry is obtained for all body composition parameters, because by normal asymmetry of distribution of results we consider when the skewness values for the applied variables are in the range between +/- 1.00 (Malacko et al. al., 1997). The positive (epicuric) asymmetry of the values indicates that the distribution shifts to the right, which means that the frequency of the values is in favor of below-average values. The values of body composition parameters having positive asymmetry are: Body weight (BWEG), Body Fat (BOFA), Bone Mass (BOMA), Metabolic Age (MEAG), and Visceral Fat (VIFA). The negative asymmetry of the values indicates that the distribution shifts to the left, which means that the frequency of values is in favor of below-average values. The values of body composition parameters having negative asymmetry are: Muscle Mass (MAMU), Body Mass Index (BMIN), Daily Caloric Intake (DCIN) and Body Water (BWAT). The body composition curvature values of which are in the range between +/- 3.00, for those parameters we say they have a normal distribution curve (Malacko et al., 1997). Kurtosis actually talks about the extent to which values are centered around the arithmetic mean. If body composition parameters have a kurtosis value equal to "0" (zero), then we treat them to have an ideal distribution. Body composition measures having a kurtosis value in the range ± 3.00 say that they have normal distribution curves. We are dealing with the body composition parameters applied in this paper: body weight (BWEG) Kurt = 0.555, Body Fat (BOFA) Kurt = 0.555, Muscle Mass (MAMU) Kurt = 0.856, Bone Mass (BOMA) Kurt = 1.386, Body Mass Index (BMIN) Kurt = 0.481, Daily Caloric Intake (DCIN)

Kurt = 0.180, Metabolic Age (MEAG) Kurt = -0.248, Body Water (BWAT) Kurt = 0.838 and Visceral Fat (VIFA) Kurt = -0.165 . The normal curvature elongation curve of the negative sign (platokurtic) is obtained on two parameters of body composition: Metabolic Age (MEAG) Kurt = -0.248, and Visceral Fat (VIFA) Kurt = -0.165. Normal elongation distribution curve with positive sign (mesokurtic) was obtained on seven body composition parameters: body weight (BWEG) Kurt = 0.555, Body Fat (BOFA) Kurt = 0.555, Muscle Mass (MAMU) Kurt = 0.856, Bone Mass (BOMA) Kurt = 1.386, Body Mass Index (BMIN) Kurt = 0.481, Daily Caloric Intake (DCIN) Kurt = 0.180 and Body Water (BWAT) Kurt = 0.83. Table 3 shows the basic statistical indicators of body composition parameters after the training - the filial state. Asymmetry test coefficients show that normal asymmetry is obtained for almost all body composition parameters, except for the Metabolic Age (MEAG) variable Skew = -2.196, because with normal asymmetry distribution of results we consider when skewness values for the variables applied are in the range between +/- 1.00 (Malacko et al., 1997). The positive (epicuric) asymmetry of the values indicates that the distribution shifts to the right, which means that the frequency of the values is in favor of below-average values. The values of body composition parameters having positive asymmetry are: Body weight (BWEG), Body Fat (BOFA), Bone Mass (BOMA), Daily Caloric Intake (DCIN), and Visceral Fat (VIFA). The negative asymmetry of the values indicates that the distribution shifts to the left, which means that the frequency of values is in favor of below-average values. The values of body composition parameters having negative asymmetry are: Muscle Mass (MAMU), Body Mass Index (BMIN), Metabolic Age (MEAG), and Body Water (BWAT). The body composition curvature values of which are in the range between +/- 3.00, for those parameters we say have a normal distribution curve (Malacko et al., 1997). Kurtosis actually talks about the extent to which values are centered around the arithmetic mean. If body composition parameters have a kurtosis value equal to "0" (zero), then we treat them to have an ideal distribution. Body composition measures having a kurtosis value in the range ± 3.00 say that they have normal distribution curves. We are dealing with the following body composition parameters applied in this work: body weight (BWEG) Kurt = 0.185, Body Fat (BOFA) Kurt = 1.389, Muscle Mass (MAMU) Kurt = 0.506, Bone Mass (BOMA) Kurt = 0.948 , Body Mass Index (BMIN) Kurt = 0.140, Daily Caloric Intake (DCIN) Kurt = 1.847, Body Water (BWAT) Kurt = 0.019 and Visceral Fat (VIFA) Kurt = 0.673.

Table 3. Basic statistical indicators of body composition variables after exercise training with force training - the final state

	N	Min	Max	Mean	Std. Dev	Skew	Kurt
BWEG	25	51.4	77.5	62.42	6.7545	0.596	0.185
BOFA	25	21.5	39.5	30.8	3.749	0.19	1.389
MUMA	25	34	50.8	43.34	4.05627	-0.639	0.506
BOMA	25	1.8	2.6	2.236	0.18682	0.176	0.948
BMIN	25	16.7	27.3	22.58	2.54967	-0.028	0.14
DCIN	25	1813	2724	2276.16	180.4997	0.262	1.847
MEAG	25	14	36	30.84	4.66976	-2.196	6.458
BWAT	25	39	55.2	47.78	3.89337	-0.501	0.019
VIFA	25	1	6	2.96	1.17189	0.59	0.673

The curve with expressed distribution elongation (leptokurtic) was obtained at the parameter Metabolic Age (MEAG) Kurt = -6.458. Normal elongation distribution curve with positive sign (mesokurtic) was obtained on eight body composition parameters: body weight (BWEG) Kurt = 0.555, Body Fat (BOFA) Kurt = 0.555, Muscle Mass (MAMU) Kurt = 0.856, Bone Mass (BOMA) Kurt = 1.386, Body Mass Index (BMIN) Kurt = 0.481, Daily Caloric Intake (DCIN) Kurt = 0.180, Body Water (BWAT) Kurt = 0.838 and Visceral Fat (VIFA) Kurt = 0.673.

Table 4 shows the differences between the tested body composition variables pre- and post treatment with fitness exercises. Processing of results by Paired Samples Test analysis shows that in body composition variables: Body weight (ABOWE) with a difference between initial and final mean = 4.35kg; sig = 0.000, Body Fat (BOFA) with a difference between initial and final mean = 5.29%; sig = 0.000; Muscle Mass (MAMU) with a difference between initial and final mean = 4.35%; sig = 0.000, Body Mass Index (BMIN) with a difference between initial and final condition Mean = 1.56%; sig = 0.000, Daily Caloric Intake (DCIN) with a difference between initial and final state Mean = 119, 52 Cal; sig = 0.000, Metabolic Age (MEAG) with a difference between initial and final mean = 5.28%; sig = 0.000, Metabolic Age (MEAG) with a difference between initial and final mean = 5.28%; sig = 0.000, Visceral Fat (VIFA) with a difference between initial and final mean Mean = 0.96%; sig = 0.000 a statistically significant difference was obtained between the initial condition and the final condition P <0.01.

Table 4. Difference between arithmetic averages of body composition variables pre- and post-force training

Variables	Mean	Std. Dev	Lower	Upper	t	df	sig
BWEGI – BWEGF	4.35	0.93	3.96	4.73	23.38	24	0
BOFAI – BOFAF	5.29	2.6	4.21	6.36	10.17	24	0
MUMA – MUMAF	-2.449	2.31	-3.39	-1.49	-5.29	24	0
BOMAI – BOMAF	0.02	0.06	-0.01	0.04	1.28	24	0.21
BMINI – BMINF	1.56	0.34	1.42	1.7	23.07	24	0
DCINI – IDCINF	-119.52	117.23	-167.91	-71.13	-5.09	24	0
MEAGI – MEAGF	5.28	3.9	3.67	6.89	6.77	24	0
BWATI – BWATF	0.028	4.35943	-1.77	1.827	0.032	24	0.97
VIFA – VIFAF	0.96	0.61101	0.708	1.212	7.86	24	0

In Bone Mass (BOMA) variable with a difference between initial and final mean = 0.02%; sig = 0.21 and Body Water (BWAT) with a difference between initial and final state Mean = 0.28%; sig = 0.97 no statistically significant difference was obtained between initial and final condition $p > 0.05$.

Discussion

Based on the results obtained, it can be concluded that all body composition variables, in the first measurements, before the start of the three-week exercise training for two months and in the second measurements, after the end of the exercise program in the fitness had normal asymmetry and no deviation from normal distribution. Such results indicate that the body composition variables obtained through the TANITA apparatus are suitable for such research and are also a good prerequisite for further statistical processing. In further elaboration, the results of the evaluation (Table 4) show that the process of fitness training produced statistically significant improvements in all measured variables except for the variables of Bone Mass (BOMA) and Body Water (BOMA). BWAT) $p < 0.05$. We obtained a statistically significant difference at the significance level of 0.01 in seven variables of body composition: Body weight (ABOWE), Body Fat (BOFA), Muscle Mass (MAMU), Body Mass Index (BMIN), Daily Caloric Intake (DCIN) , Metabolic Age (MEAG), Metabolic Age (MEAG), Visceral Fat (VIFA).

The results obtained after a two-month training regimen with strength training show that we have a reduction in Body Weight (ABOWE) and the body components most dependent on this variable such as: Body Fat (BOFA), Body Mass Index (BMIN) and Visceral Fat (VIFA). Effect of exercises applied during first 4 weeks of 1-6 training and 7-12 exercises with 60% 1RM max loads, and 12 second 13 - 24 weeks training sessions with 80-85% 1RM loads, number of repetitions 8-12 . (Jukić & Marković, 2005) has led to positive changes and significant reduction in body fat. The results obtained regarding the impact of force exercises on body fat reduction are inconsistent with some research by other authors (Willis et al., 2012), which point out that force exercises alone, without combination with other motoric exercises is not an efficient method of reducing body fat.

This research has shown that duration of experimental treatment, intensity and extension of execution produced a positive effect on increasing muscle mass in females and that this effect was statistically significant. Research by some authors conducted over a long period of time has yielded statistically significant changes in muscle mass in the female population and the results were in line with expectations, meaning that there was a statistically significant increase in muscle mass under the influence of force exercises. (Bottero et al., 2013).

Increased Daily Caloric Intake (DCIN) metabolism after exercise is consistent with the addition of enzymes to produce energy during physical activity and to meet energy needs. Exercise training with force training did not affect the positive changes in the variables: Bone Mass (BOMA) and Body Water (BWAT) and no statistically significant difference was found between the initial and final states. Surely the two-month period of strength training in fitness has been short enough to have a positive effect on the minerals in the bone and the amount of water in the body. Body composition analysis provides useful information that can be used to distinguish when a person is "underweight", when he has "no fat", and when a person is "overweight" and when he has "a lot of body fat." ". Body composition in males and females as well as in athletes is of great interest to sports physicians, coaches, educators of physical education, and athletes themselves, as it is known that low levels or small percentages of fat in the structure of body composition and body building is desirable in women, but also in many sports, both aesthetically and the creation of a so-called "athlete's body" in various sports such as "body - building" or sports gymnastics as well as in sports related to body movement in the opposite direction to ground gravitation (running, jumping). On the other hand, muscle mass improves athletic performance in activities that require muscle strength and endurance but also in those that require high aerobic fitness.

Conclusion

Overweight not only in women but also in men of all ages is a global epidemic that poses a serious threat to population health. Research is increasingly focusing on finding ways to prevent this epidemic and finding more effective methods to reduce body fat. The results of this study showed that an organized and planned fitness program with strength exercises can bring about significant changes and improvements in body composition in women. In addition to the practical application of fitness programs with the exercises that women applied, they also received useful information that influenced their motivation and habits for systematic physical exercise. Of course, we can conclude that three exercises per week with strength exercises are enough to improve bodybuilding, especially fatty substances, that excessive amounts are a permanent risk for many cardiovascular diseases. Adaptation to exercise means a change in lifestyle, in all areas of life for better health. This research has also shown that longitudinal character research is irreplaceable compared to transversal character research which requires high motivation on the part of the tested people.

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