European Journal of Physical Education and Sport Science
ISSN: 2501 - 1235
ISSN-L: 2501 - 1235
Available on-line at: www.oapub.org/edu

doi: 10.5281/zenodo.1042426 Volume 3 | Issue 11 | 2017

EFFECT OF EIGHT WEEKS EXERCISE ON BODY COMPOSITION AND SOME BLOOD VALUES IN WOMEN

H. Bayram Temur[1i], Merve Öztürker[1], M. Emre Karaman[2], Muzaffer Selçuk[1], Vedat Çinar[2]

[1]Yüzüncü Yıl University, Physical Education and Sports High School, Van, Turkey
[2]Firat University, Sports Sciences Faculty, Elazig, Turkey

Abstract:

Purpose: In this study, it was aimed to investigate the effect of eight weeks exercise on body composition and some blood values in women.

Methods: A total of 16 volunteer women with an age mean of 30,81 ± 9,44 years and an age mean of 159,44 ± 6,61 cm were participated in the study. Blood samples of the participants were taken at the health facility while they were hungry before starting the exercise program. After applying the eight-week and 3 days a week exercise program, blood samples of subjects were taken again. The results which obtained from the study were analyzed with the SPSS 23.0 package program. In the analysis of the data, independent samples t test was applied to determine the difference between the groups.

Results: As a result of the analyzes, while no significant difference was found between glucose and urea, creatine, total crystallinity, pre-test and post-test values of direct crystallization ($p>0,05$), body weight, BMI, chest circumference, waist circumference, waist circumference / height ratio, baseline area, and uric acid were significantly different between the pretest and posttest measurements ($p<0,05$).

Conclusion: As a result of the study, it was observed that the eight-week exercise had differences in body weight, BMI, chest circumference, waist circumference, waist circumference, and baseline region and uric acid levels. It can be said that the exercise played an important role in the formation of this difference.

Keywords: exercise, women, body composition, glucose, creatine, urea

[i] Correspondence: email temurb@hotmail.com

1. Introduction

The effect of exercise on biochemical parameters has become an upcoming research area. It has been shown with the researches that exercise has positive effects on fat and carbohydrate metabolism, body weight, moderate decrease in fat deposits (Tran and Weltmen, 1985). It has also been known for a long time that exercise has positively influenced overall health status, increasing physical competence, and playing an active role in the prevention of diseases (Kujala et al 1990, Russel et al. 1995). Increased body weight is a serious risk for hypertension. It is gassed that, hypertension is a risk factor for cardiovascular diseases (Judith et al. 2003). While aerobic and resistance exercises lead to increased lean body mass and decreased body fat percentage, it has been suggested that dietary programs applied with exercise are more effective in fixing body composition (Schwingshackl et al. 2014).

Physical activity is an important function of living systems. It affects hematological and biochemical parameters as well as many systems. In humans, adaptation to exercise can play an important role in adaptation of cardiovascular activity and regulation of physiological response such as physical, physio, depending on the type, severity and duration of the exercise, there may be changes in hematological and biochemical parameters logical balance, like many other factors in hematological and biochemical levels (Arslan et al. 1997, Baltacı et al. 1998). During and after intense exercise there may be changes in hematological and biochemical values due to differences in the participant's training status, gender, age, environmental conditions and nutrition. Hematologic changes are observed in the athletes due to long-term exercises (Beydağı et al. 1993).

With this study, it was aimed to determine whether the Body Composition and Some Blood Values influenced by Eight-Week Exercise in Women.

2. Method

In this study, pre-test and post-test experimental study model was used. The study was conducted in the sports center for eight weeks. Body composition measurements and serum blood values are recorded and statistically evaluated and interpreted quantitatively. Sixteen voluntary women with a mean age of 30,81 ± 9,44 years were included in the study. A total of eight weeks of aerobic exercise program was applied for 3 days per week previously planned. In the exercise program with Plates movements were made, 50-60% of 25 minute running band, 25 minutes bike, 15 minutes bicycle, 15 minutes elliptic and 30 minutes on the dorsal hip, basin, abdomen, to tighten and strengthen. During the last 5 minutes of the exercise program, stretching

movements for cooling were performed. No diet program has been proposed for participations in the study. They were asked to continue their regular diet. Serum blood samples were taken 5 days before the exercise program started and 15 days after the exercise program was over by the health workers at the Batman public health center in the morning on an empty stomach. Blood samples were taken to the relevant biochemistry laboratory quickly, without waiting. Again, body composition measurements of participants were taken before and after the study.

The chest, waist and basal circumference were measured with a tapeline. When the subject is adjacent to the heels, hands and arms are in a vertical position in a standing position, the measurement was made by placing the appendix around the abdomen, horizontally and 5 cm below the waist. The baseline circumference was measured at the symphysis pubis level from the front while the subject was standing and at the maximal protrusion level of the hip muscles from the back (Zorba 2005). Measurements of the chest circumference were made while the subjects were in the standing position; arms were in the abduction position while the clavicle was passed through the fourth costume level and the scapula lower side at the back. Measurements were taken after normal breathing during normal breathing. The results obtained from the study were analyzed with the SPSS 23.0 package program. In the analysis of the data, independent samples t-test was applied to determine the difference between the groups.

3. Results

Table 1: Difference between Mean Pre-test and Post-Test Measure Values of Subjects and Level of Significance

Variables	N	Pre-Test	Post-Test	Mean Difference	t	p
		Mean ± Std.	Mean ± Std.			
Body Weight (kg)	16	83,62± 13,13	81,19± 12,84	2,43	3,290	,005
Waist circum. (cm)	16	107,87 ± 7,41	100,37± 6,46	7,50	7,833	,000
Hipline (cm)	16	114,50 ± 9,86	106,69 ± 7,16	7,81	8,043	,000
Chest (cm)	16	102,50 ± 3,79	102,50 ± 3,79	3,31	7,020	,000
BMI (kg/m²)	16	33,07 ±6,22	32,09 ±5,87	0,98	3,121	,007
Waist/height	16	0,68 ± ,05	0,63 ±,05	0,05	7,965	,000
Glucose (mg/dl)	16	91,56 ± 7,68	91,62 ± 7,38	-,06	-,027	,978
Urea (mg/dl)	16	22,06 ± 7,18	22,06 ± 7,18	1,44	,714	,486
Creatine (mg/dl)	16	,68 ± ,09	,68 ± ,12	,00	,000	1,000
Uric acid(mg/dl)	16	3,85 ± 1,70	3,35 ± 1,68	,50	3,552	,003
Total bilirubin (mg/dl)	16	,35 ± ,33	,35 ± ,22	,00	,000	1,000
Direct bilirubin (mg/dl)	16	,13 ± ,12	,11 ± ,08	,02	,899	,383
Albumin (g/dl)	16	3,85 ± 1,93	3,78 ± 1,89	,07	1,152	,267
Total protein(g/dl)	16	7,33±1,98	7,24±1,95	,10	1,519	,150

When the variables in Table 1 are examined before and after exercise, body weight pre-test mean values were 83.62 ± 13.13 kg and post-test mean values were 81.19 ± 12.84 kg. The waist circumference pre-test values mean was 107.87 ± 7.41cm, and the post-test measured value mean was 100.37 ± 6.46cm. The mean of pre-test measurements hipline circumference was 114,50 ± 9,86 cm, and the mean of the post-test measurements was 106,69 ± 7,16 cm. The mean of the pre-test measurement value of the chest circumference was 102.50 ± 3.79 cm, while the post-test measurement mean value is 99.19 ± 3.94 cm. The mean of BMI before exercise program was 33,07 ± 6,22kg / m² and it was 32,09 ± 5,87kg / m² after exercise program. The waist / height ratios before and after exercise were 68 ± 0,05 and 63 ± 0,05, respectively. The mean values of the first measurements of serum glucose from blood parameters were 91.56 ± 7.68mg / dl, and the mean values of the last measurements were 91.62 ± 7.38mg / dl. The mean of the first measured values of urea is 22,06 ± 7,18mg / dl and the mean of the last measured values is 20,62 ± 8,62mg / dl. The mean of creatinine pre-test value was 0.68 ± 0.09mg / dl and post-test value was 0.68 ± 0.12mg / dl. The mean value of uric acid first measurement was 3.85 ± 1.70mg / dl, and the mean value of uric acid last measurement was 3.85 ± 1.70mg / dl. The mean pre-test value of total bilirubin was 0,35 ± 0,33mg / dl and the mean post-test value was 0,35 ± 0,22mg / dl. The mean pre-test value for direct bilirubin was 0,13 ± 0,12 mg / dl, while the post-test value was 0,11 ± 0,08 mg / dl. The mean pre-test value of albumin was 3.85 ± 1.93 g / dl and the mean value of post-test was 3.78 ± 1.89 g / dl. The total protein amount was 7.33 ± 1.98 g / dl in the pre-test and 7.24 ± 1.95 g / dl in the post-test.

3. Discussion

The mean body weight measurement values before the exercise program was 83.62 ± 13.13 kg and the body weight measurement values after exercise program was 81.19 ± 12.84 kg of the participants which was statistically significant ($p<0,05$). Amano et al. (2001) reported in the study they made; the exercise program they were applied to 18 obese individuals for three months and three days per week showed a significant decrease in the resultant body weights. In another research, Çınar et al. (2017) found that six-week weight training reduced body weight. Again, Baştuğ et al. (2011) reported a significant reduction in body weight before and after exercise in their study with 80 female participants. Similar studies on the subject found that there was a significant decrease in body weight due to exercise programs (Patlar et al. 2005, Sarıkaya et al. 2016). Cengiz and Çınar (2014) have determined that there is no change in their weight in their study named the effect of an 8-week exercise program on some hematological parameters in sedentary men. Kılıç and Çinar (2016) have shown that there is no change

in their weight in the work they do on male boxing national team. It can be explained by the fact that carbohydrates as the first source of energy then fat is activated, which changes depending on the duration of physical activities (Fox et al. 1999).

The waist circumference of the subjects was 107,87 ± 7,41 cm before the exercise program, whereas these values were 100,37 ± 6,46 cm after exercise and a statistically significant result was obtained ($p<0,05$). Thompson et al. (2004) examined the relationship between the average number of steps per day and body composition in the study they conducted on women. According to the average number of steps per day, three groups revealed that the waist circumference values of the subjects were less than the average of 1000 steps per day. Although the findings of the study overlap with the findings of Thompson and colleagues, it is thought that the difference between our study and Russel et al.'s (1995) study is due to the fact that the mean age of the study group is much lower.

When the average values of the hipline measurements before and after the exercise program were taken into consideration, it was seen that the first measurement average was 114.50 ± 9.86 cm and the final measurement average was 106.69 ± 7.16 cm. and there is a statistically significant difference ($p<0,05$). It has been shown that the exercise has a positive effect on the measurement values of the hipline circumference in the studies which about the effect on the body composition (Thompson et al. 2004, Hornbucle et al. 2005).

When the average of the breast circumference measurement values of the women included in the study were examined before and after the exercise program, the mean value measured before the exercise program was 102,50 ± 3,79 cm and the measured value after the exercise program 99,19 ± 3,94 cm were statistically significant ($p<0,05$). The studies carried out in this regard support our findings (Babayiğit et al. 2002, Gökgül 2013).

The mean BMI value of the subjects before the exercise program was 33,07 ± 6,22 kg / m^2 and 32,09 ± 5,87 kg / m^2 after the exercise program, which is statistically significant ($p<0,05$). Amano et al. (2001) in a study in which they studied on aerobics exercises for 3 days and 30 minutes per week for 3 months to 18 obese subjects in order to investigate the effect of exercise on body composition, they reported that the body mass index mean was 27,3 ± 0,4 kg / m^2 after exercise. Baştuğ et al. (2011) reported a significant decrease in the mean BMI before and after exercise in their study. The findings of the study are consistent with the literature. The waist/weight ratio before and after exercise was 68 ± 05 and 63 ± 05, respectively, which was statistically significant ($p<0,05$). Similar studies with the subject stated that there was a significant decrease in waist / height ratio before and after exercise (Özenoğlu et al. 2016, Ahswell an Hsieh 2005). This data supports the findings of the study. Despite this decrease in

waist / height mean in our findings, it was found that women were more than 0.6, which is a level that should be taken into account in terms of cardiovascular diseases.

The normal serum level of glucose is 70-110 mg / dl. In our study, the serum glucose level of the subjects was 91,56 ± 7,68 mg / dl before exercise and 91,62 ± 7,38 mg / dl, after exercise. It was observed that there was no statistically significant difference between serum glucose values obtained before and after exercise (p>0,05). Gökgül (2013) stated that both the training of the plates and the cyclic training did not bring a significant change in the glucose level. Stevenson et al. (2005) reported that there was no significant change in glucose level after 60 minutes of exercise with 60% max VO2. In study conducted by Çınar et al (2008) on the athletes, glucose values increased with exercise but decreased to normal levels with resting. The use of glucose to make carbohydrate metabolism effective may depend on the type and duration of the exercise.

Normal serum level of urea is 19-49 mg / dl. In women included in the study, the mean serum urea level measured before the exercise program was 22.06 ± 7.18 mg / dL. The mean value of the obtained data was 20.62 ± 8.62 mg / dl after the exercise program and it was statistically significant (p<0,05). Koçyiğit et al. (2016) reported that the urea levels decreased after exercise in football players and increased in basketball players, in the study they designed on football players and basketball players by supplementing vitamin C. There was no statistically significant result in the study, although there was a decrease in blood urea values before and after the exercise program. The difference in the findings with evaluated by Koçyiğit et al. (2016) it is thought that the exercise they are doing may be due to the fact that the athletes are given vitamin C supplementation and the duration of the exercise is much shorter .

When we look at the serum creatinine level, we see that it normally varies from 0.7 mg / dl to 1.2 mg / dl. In the study, while the mean creatinine value determined before the exercise program was 0.68 ± 0.09 mg / dl, the mean value after the exercise program was 0,68 ± 0,12 mg / dl and it was statistically significant (p<0,05). In a study conducted, it was revealed that there is no significant difference in creatinine between both male and female groups who regularly do sports and do not (Gürsoy 2008). Serum creatinine levels and excretion of urine and creatinine are signs of muscle mass and are not significantly affected by the diet. The amount of creatinine in males is higher than females because males are indicative of muscle mass.

The normal range of serum level of uric acid is 3.4 mg / dl to 7.0 mg / dl. In the study, the mean values before the exercise program were 3.85 ± 1.70 mg / dl and the mean values after the exercise program were 3.35 ± 1.68 mg / dl and it was statistically significant (p<0,05). In one study, it was reported that there was a significant increase in the amount of uric acid at the 1st and 4th hours after submaximal exercise in the

distance runners and returned to normal after 24 hours (Edwards and Harrison 1983). Mashiko et al. (2004) designed a study on rugby players and reported that there was a significant decrease in uric acid levels before and after exercise with this study.

When the normal level of total bilirubin was examined, it was seen that it was between 0,0 mg / dl - and 1,2 mg / dl. In our study, The mean of the values measured before the exercise program was 0,35 ± 0,33 mg / dl, and the mean of the values after the exercise program was 0,35 ± 0,22 mg / dl, which was statistically significant ($p<0,05$). Gürsoy (2008) reported that there was no significant difference in bilirubin level between both male and female groups, as the result of a study comparing the blood parameters of the physical sports department students who do sports regularly and the medical students who do not regularly do sports. This data supports our findings.

The serum normal level of direct bilirubin ranges from 0.00 mg / dL to 0.50 mg / dL. The mean values before exercise program and after exercise program in study were 0,13 ± 0,12 mg / dl and 0,11 ± 0,08 mg / dl, respectively. The difference between these values was found to be statistically insignificant ($p>0,05$).

The value of albumin in healthy individuals ranges from 3.4 to 4.8 g / dl. In the study, the mean pre-test value was 3.85 ± 1.93 g / dl and the mean of the measured values after exercise program was 3.78 ± 1.89 g / dl. The difference between these values was found to be statistically insignificant ($p>0,05$). Edwards and Harrison (1983) reported that they found an increase in albumin values in their study. Arslan et al.(1997) reported that there was no significant difference between the control group and athletes but that the Albumin values of basketball players were significantly different from both basketball players and control groups in a study they designed on comparing 16-year-olds athletes and control groups. Mashiko et al. (2008) in a study of rugby players, they found that there was no significant difference in Albumin values before and after camping.

As a last parameter, the normal range of total protein content ranges from 6.4 to 8.3 g / dl. It was determined that the average of measured values before exercise program was 7,33 ± 1,98 g / dl and the mean value of measured values after exercise program was 7,24 ± 1,95 g / dl. In another study, they found that there was no significant difference in total protein in blood samples 24 hours before and 24 hours after exercise (Walsh et al. 1999). However, they noted that the amount of total protein in the blood samples taken 5 minutes after exercise was significantly different. It was reported in a study that there was no significant difference in total protein amount of Rugby player's blood samples which is taken before and after the twenty days of camping period (Mashiko et al. 2004).

The results of the study showed that after eight weeks of exercise there were differences in body weight, BMI, chest circumference, waist circumference, waist

circumference, baseline and uric acid levels. As a parallel of the obtained results we think that regular exercise in women will have positive consequences on health markers and lead to an improvement in community health and quality of life.

References

1. Amano M, Kanda T, Maritani T. (2001).Exercise Training and Autonomic Nervous System Activity in Obese Individuals, Medicine Science in Sports Exercise, 33(8): 1287-1291,
2. Arslan, C., Bingölbalı, A., Kutlu, M. & Baltacı AK. (1997). Influence of Volleyball and Athletics Sport on Hematological and Biochemical Parameters of Girls, Journal of Physc. Ed. Sport Sci., 2: 28 –34
3. Ashwell, M., Hsieh, S.D. (2005). Six reasons why the waist-to-height ratio is a rapid and effective global indicator for health risks of obesity and how its use could simplify the international public health message on obesity. International Journal of Food Sciences and Nutrition, 56(5), 303-307.
4. Babayiğit, G. Zorba, E. İrez, S.G. Ve Mollaoğulları, H. (2002), The Effect of 8 Week Step Studies on Some Physiological and Anthropometric Values in 25-31 Years Old Women. 7th International Sports Science Congress 27–29 October.
5. Baltacı A., K., Moğulkoç R., Koç S., Özmerdivenli R. (1998). Plasma Proteins and Serum Zinc, Calcium, Phosphorus Levels with Some Hematological Parameters in Young Girl Athletes Journal of Gazi Physical Education and Sport Sciences 3; 2.
6. Baştuğ G., Akandere M., Yıldız H. (2011). The Effect of Aerobic Exercise on Body Composition and Physical Identification Values of Sedanter Young Women Journal Of Sports And Performance Researches 2:2
7. Beydağı, H., Çoksevim, B., Temoçin, S. & Akar, S. (1993). Effect of Acute Submaximal Exercise on Leukocytes in Sports and Non-Sports Subjects, Journal of Sports Medicine, 28: 52– 62
8. Cinar V, Akbulut T, Sarikaya M. Effect of Zinc Supplement and Weight Lifting Exercise on Thyroid Hormone Levels. Indian J Physiol Pharmacol 2017; 61(3) : 232–236
9. Cinar V, Nizamlıoğlu M, Polat Y, Mogulkoc R, Baltaci AK (2008)..The Effect Of Magnesium Supplementation On Glucose And Insulin Levels Of Sportsmen And Sedanter, . Pak J Pharm Sci. 2008 Jul;21(3):237-40.
10. Edwards, RJ. Harrison, MH. (1983). Changes In Hematocrit, And In Hemoglobin Concentration, During Treadmill Running. J. Physiol. 334,51-53.

11. Fox, E. L., Bowers, R. W. and Foss, M. L. (1999) Physiological Foundations of Physical Education and Sports. Translation Cerit. M., Bağırgan Publications, Ankara. P: 346-363.
12. Gökgül B. Ş. (2013). Effect of Eight-Week Circular Exercise and Pilates Exercises on Some Physical Features and Blood Lipids in Women. Niğde University, Institute of Social Sciences, Department of Physical Education and Sports, M.Sc. Thesis. Niğde
13. Gürsoy Ş. (2008). Effect of Exercise on Total Antioxidant Capacity and Serum Lipid Profile in Regular Sports Students. İnönü University Health Sciences Institute PhD. Thesis, Medical Biochemistry Department, Malatya
14. Hornbucle LM, Bassett DR Jr. Pedometer – determined walking and body composition variables in African – American women Med Sci Sports Exerc. 2005;37: 1069 -74.
15. Judith E. Neter, Bianca E. Stam, Frans J. Kok, Diederick E. Grobbee, Johanna M. Geleijnse, (2003). Influence of Weight Reduction on Blood Pressure A Meta-Analysis of Randomized Controlled Trials, Hypertension November
16. Kılıç Y., Cinar V. (2016). The Effect of 8 Week Traınıng Program on Physıcal and Anthropometric Characterıstıcs of Teen Male Natıonal Boxıng Team. Annals of" Dunarea de Jos" University of Galati-Fascicle XV: Physical Education and Sport Management. Galati University Press.Volume:2 Romania
17. Koçyiğit Y., Aksak M. C., Atamer Y., Aktaş A. (2016) The effect of vitamin C application on liver enzymes and plasma lipid levels in footballers and basketball Klinik ve Deneysel Araştırmalar Dergisi / Journal of Clinical and Experimental Investigations 2011; 2 (1): 62-68 players.
18. Kujala U.M., Alen M. Huhtanıemı I.T. 1990: Gonadotrophin-Releasing Hormone And Human Chorionic Gonadotrophin Tests Reveal That Both Hypothalamic And Testicular Endocrine Functions Are Suppressed During Acute Prolonged Physical Exercise. Clin Endocrinol 33: 219-225.
19. Mashiko T, T Umeda, S Nakaji, K SugawaraJ (2004). Effects of exercise on the physical condition of college rugby players during summer training camp Sports Med;38:186–190
20. Özenoğlu, A, Uzdil, Z, Yüce, S. (2016). "The Effect of Stand Alone Exercise on Anthropometric Measurements and Body Composition in Women". Samsun Journal of Health Sciences 1
21. Patlar S, Cinar V, Çakmakçı O, Şahan H. (2005). The Effect of 8 Weeks Regular Exercise and Nutrition Program on Weight Loss in Sedentary Women., Atatürk University Journal of Physical Education and Sports High school, 7:2.Erzurum.

22. Russel R. I., Pratt M., Blair S. N., Haskel W.L., Macera C. A., Boun-chard C.: (1995) Physical Activity and Public Health. JAMA 273: 402-407,
23. Sarikaya M., Cinar V., Selçuk M (2016). Examination on the effect of the training program implemented during preparation period on the physical characteristics of tennis players. International Journal of Sport Studies, 6(10).
24. Schwingshackl, L., Dias, S., Hoffmann, G. (2014). Impact of long-term lifestyle programmes on weight loss and cardiovascular risk factors in overweight/obese participants: a systematic review and network meta-analysis. Systematic Reviews, 130(3),1-13.
25. Cengiz Ş., Ş., Cinar V. (2014). The Effect of 8-Week Core Exercises on Some Hematological Parameters in Sedentary Females Turkish. Journal of Scientific Research. Vol., 1 (1), 1-5,
26. Stevenson, E., Williams, C., Biscoe, H. (2005), The Effect Of The Glycemic İndex Of An Evening Meal On The Metabolic Responses To A Standard High Glycemic İndex Breakfast And Subsequent Exercise in Men. Int J Sport Nutr Exerc Metab.
27. Thompson DL. Rakow J Perdue SM. (2004). Relationship between accumulated walking and body composition in middle-aged women. Med Sci Sports Exerc.; 36: 911- 4.
28. Tran, Z.V., & Weltman, A. (1985) Differential effects of exercise on serum Lipid and lipoprotein levels seen with changes in body weight: A Meta–Analysis. Jama, 254:919–24.
29. Walsh, N. P., Blannın, A.K., Clark, A.M., Cook, L., Robson P.J., Gleeson M. M. M. (1999). The Effects Of High-İntensity İntermittent Exercise On Saliva Iga, Total Protein And Alpha-Amylase
30. Zorba E. Bodybuilding Measuring Methods and Being Overweight, 1. Publication, Morpa Culture Publications, İstanbul 2005; 69-81, 105-131