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Original article

The effect of 8-week Zumba® fitness on body composition of turkish womens

Aziz Güçlüöver

Kırıkkale University, Faculty of Sport Sciences, Physical Education and Sports Teaching Department, Kırıkkale/TURKEY - E-mail: azizgucluover@hotmail.com

Summary. The aim of this study is to evaluate the effect of 8-week zumba fitness on body composition of Turkish women between the ages of 18-35. The sample of the study consists of 28 (n=14 experimental group and n=14 control group) women who are between the ages of 18-35 and living in the city centre of Kırıkkale. The women in the experimental group participated in the zumba fitness which lasted about 60 minutes 3 days a week for 8 weeks. The women in the control group continued their daily life. Body composition of the participants in both experimental and control groups was determined by Bioelectric Impedance Analysis Method before and after 8 week zumba fitness. The data obtained from applications to determine body composition were evaluated in SPSS 25.0 package program with 95% confidence interval and 0.05 significance level. In statistical analyses, statistically significant difference has been observed in the mean values obtained from the applications of pre-test and post-test regarding variables of BMI (kg/cm^2), body fat percentage (% fat), body fat mass (kg), lean body mass (kg), right leg fat percentage (% fat), right leg fat mass (kg) of the women in the experimental group ($p<0.05$). Within the lights of the findings obtained in the study, it has been concluded that the 8-week zumba fitness caused a decrease in body weight, body fat percentage and BMI values of Turkish women between the ages of 18-35. In the regional body analysis done in the study, it has been understood that the effect of the zumba fitness program was on the lower extremity.

Key words: turkish women, zumba fitness program, body composition

Introduction

In the international studies on health improvement, regular physical activity in women was reported to reduce and prevent problems related to the musculoskeletal system. Participating in regular exercise and avoiding sedentary activity have been highly recommended (1, 2). Recently, the significance of preventive rehabilitation has gradually increased. Health professionals have been focused on participation in regular and sufficient physical activities and prevention of injuries (3). It has been known that adult women participate in different types of exercise, especially the demand of women for spine stabilization exercises which are known as pilates or core trainings are high (4). It has been reported in the literature that these relevant exercises have many positive effects from individuals' flexibility to functional capacities (5, 6).

Due to the fact that women have different physiological structures compared to men and their roles in society change according to cultures, their responsibilities and daily activities (housework, child care, etc.) increase. They prefer to rest rather than regular physical activity or exercise. Therefore, the rate of sedentary life tendency is high. For this reason, regular exercise is significant for women (7, 8).

It was reported in the literature that women were affected more by the negativities caused by sedentary life (7, 9). Thus it is significant to encourage women to exercise and to ensure them to benefit from the ad-

vantages of exercise (7, 8). Exercise in women was reported to be effective on musculoskeletal pain (10), depression, life quality, posture, body composition (such as body mass index and waist-to-hip ratio) (11, 12). Many women who wish to do exercise today prefer zumba fitness.

Zumba fitness which combines exercise with the most active and entertaining figures of Latin dance is one of the most preferred fitness programs by women. Zumba fitness is based on different Latin American rhythms such as, bachata, reggaetón, salsa, merengue, cumbia and samba. Hip hop, belly dancing, Indian and African figures also enrich the content of Zumba fitness (13). Zumba fitness which is one of the most popular fitness programs today was developed in the mid 90's by the famous fitness trainer Alberto "Beto" Perez. One day, Beto Perez notices that he has forgotten the CDs that he always brings to his lessons. At that time, he takes the CD containing salsa and merengue music that he has prepared for himself in his bag and uses that CD in his class. Beto Perez completes the class with his energy and his own choreographies. Everybody who attends the course is amazed. Thus, Zumba fitness is born (14). Zumba fitness session takes an average of 1 hour. The session starts with warm-up music. Then, songs are lined up to be an intermittent exercise. Zumba fitness session ends with the cooling music (15).

Zumba fitness which not only entertains while exercising, but also gives flexibility to body activates effectively all body muscles. While it increases calorie expenditure with aerobic interval loading and strength exercises, it also enables the strength of whole body and cardiovascular system to increase (13). While all the muscles of the body are functioning, calorie burning is between 600 and 1000 in 45 and 60 minute courses and it plays an active role in the weight loss process (15). This modern fitness program provides contributions such as prevention of posture disorders, development of coordination and strengthening of bone joint segments (16). It speeds up weight loss with a balanced diet and helps shape all parts of the body (15). The researches confirm that the implementation of zumba fitness contributed to statistically significant effects in improving functional and motoric abilities of a woman (17, 18, 19, 20) and changes in women body composition. Referring to the results obtained from similar studies, the hypothesis of the study was determined that 8 weeks of zumba fitness had an effect on body composition in Turkish women between the ages of 18-35. Therefore the aim of the study is to evaluate the effect of Zumba fitness on the body composition of Turkish women between the ages of 18-35, who regularly participated in the Zumba fitness program for 8 weeks.

Method

Participants

The sample of the study consists of 28 women who live in the city center of Kırıkkale and between the ages of 18-35 (n = 14 experimental groups and n = 14 control groups).

Zumba Fitness Program

Zumba fitness was practiced 3 times a week for 8 weeks. Each session, which lasted approximately 60 minutes, consisted of warming, cooling with a main section and stretching sections. The intensity of the exercise was determined by the tempo of the music. The warm-up section continued for 8-10 minutes (tempo 125-140 bpm). In the main part of the session, the participants aimed to dance and exercise with their favourite music. The main part of the session was exercised accompanied by 8-10 original fitness Zumba songs. The dance choreographies and intensity of the movements were adapted to the tempo of the music ranging from 140-160 bpm. All Latin American dance choreographies (such as merengue, salsa, samba, belly dance, cha cha cha, tango) were utilized. Each dance song continued for 3-5 minutes with 15-20 seconds rest between the songs. During the cooling phase, which is the last part of the session, the participants were aimed to relax physically and mentally. Stretching exercises were performed to relax muscles, increase muscle flexibility and avoid muscle pain. No jumping and squat movement were allowed during the cooling phase. All of the movements were performed in a standing, sitting and stretching position (tempo of music is 100 Beats Per Minute (BPM)) (13).

Height and Body Weight Measurements

The tape measure with a 0.01 cm degree of accuracy was used in the height measurements of the participants. The measurements were performed when the participants' feet were bare. While height measurements were performed when the participants' heads were upright, the soles of feet stood on the ground flatly, the knees were stretched, the heels were adjacent and body was upright; body weights were measured with a device of Bioelectrical Impedance Analysis (BIA) with a sensitivity of 0.1 and with barefoot and minimal clothing (21).

Bioelectrical Impedance Analysis

Bioelectrical impedance analysis to determine the body composition of the participants was performed with the device of "Tanita-BC 418 MA". The device of Tanita has 8 electrodes and uses high frequency constant current source (50 kHz, 500A). The individuals who participated in the measurement were asked not to eat anything until at least 4 hours before the measurement, not to drink anything including caffeine-containing drinks, not to take a bath or use sauna, not to drink alcohol until 24 hours before the measurement and not to do sports on the day of the measurement. Individuals were asked to stand on bare feet on the metal surface of the device, to hold the parts of the device that should be handled with both hands, and to release their arms free in a position parallel to the body. The measurements lasted approximately 1-2 minutes for each subject, and the percentage of body fat detected by the device of bioelectrical impedance analysis was printed out from the device (21).

Table 1. Comparison of the pretest and posttest averages of the body composition of women in the experimental group

Variables	Pre-test			Post-test			t	p
	N	$\bar{X}$	Sd±	N	$\bar{X}$	Sd±		
Body Weight (kg)	14	60.64	10.08	14	58.43	11.47	-2.232	0.003*
Body Mass Index (kg/cm^2)	14	23.96	3.36	14	22.58	3.56	-1.476	0.005*
Basal Metabolic Rate	14	1346.6	115.4	14	1352.7	121.2	-1.186	0.238
Total Body Water (kg)	14	31.12	2.56	14	31.20	2.52	-0.994	0.342
Fat Percentage (% fat)	14	31.66	7.34	14	30.22	7.16	-2.458	0.002*
Fat Mass (kg)	14	20.82	7.29	14	19.56	8.15	-2.776	0.016*
Free Fat Mass (kg)	14	41.42	4.71	14	42.52	5.17	-1.145	0.028*
Right Arm Fat Percentage (% fat)	14	33.92	8.26	14	33.96	9.26	0.614	0.596
Right Arm Fat Mass (kg)	14	1.12	0.62	14	1.09	0.58	-0.489	0.512
Right Arm Free Fat Mass (kg)	14	1.10	0.24	14	1.24	0.28	-1.108	0.256
Left Arm Fat Percentage (% fat)	14	34.58	8.10	14	33.46	8.22	1.424	0.424
Left Arm Fat Mass (kg)	14	1.07	0.48	14	1.11	0.54	1.378	0.486
Right Arm Free Fat Mass (kg)	14	1.90	0.22	14	1.92	0.26	-3.402	0.286
Fat Percentage (% fat)	14	43.86	6.79	14	43.42	7.12	0.916	0.268
Fat Mass (kg)	14	9.92	5.74	14	9.78	5.68	-1.405	0.214
Free fat Mass (kg)	14	22.52	1.65	14	23.04	1.61	-1.504	0.166
Right Leg Fat Percentage (% fat)	14	34.66	5.32	14	34.49	5.41	-1.124	0.268
Right Leg Fat Mass (kg)	14	3.95	1.29	14	4.14	1.30	-4.067	0.001*
Right Leg Free Fat Mass (kg)	14	4.28	071	14	4.18	0.72	2.385	0.033*
Left Leg Fat Percentage (% fat)	14	34.56	5.16	14	35.81	5.10	-4.564	0.001*
Left Leg Fat Mass (kg)	14	3.90	1.26	14	4.05	1.28	-4.048	0.001*
Left Leg Free Fat Mass (kg)	14	4.13	0.74	14	4.12	0.70	1.992	0.005*

**0.05 significance level*

Data Analysis

The statistical analysis of the data obtained from the measurements carried out to determine the body composition of women in the experimental and control groups participating in the study were performed in the SPSS 25.0 package program with 95% confidence interval and 0.05 error level. Paired Sample T Test was utilized to compare the averages of the values observed in two different cases of a variable.

Results

When Table was examined it was observed that there was a statistically significant difference between the average values obtained from the pre-test and post-test applications regarding body mass index (kg/cm^2), body fat percentage (% fat), body fat mass (kg), body free fat mass (kg), right leg fat percentage (% fat), right leg fat mass (kg), right leg free fat mass (kg), left leg fat percentage (% fat), left leg fat mass (kg) and left leg free fat mass (kg) variables of women in the experimental group ($p < 0.05$). In Table 2, it was observed that there was no statistically significant difference between the average values obtained from the pre-test and post-test applications to determine the body composition of women in the control group ($p > 0.05$).

Discussion and Conclusion

In this study, the zumba fitness applied to women in the experimental group caused changes in the body composition of women. Variables in which these changes have been observed are body weight (kg), BMI (kg/cm^2), body fat percentage (% fat), body fat

Table 2. Comparison of the pretest and posttest averages of the body composition of women in the control group

Variables	Pre-test			Post-test			t	p
	N	$\bar{X}$	Sd±	N	$\bar{X}$	Sd±		
Body Weight (kg)	14	60.64	12.08	14	61.43	12.47	-2.113	0.055
Body Mass Index (kg/cm^2)	14	23.89	4.40	14	24.12	4.46	-1.870	0.084
Basal Metabolic Rate	14	1312.9	117.9	14	1319.9	120.5	-1.192	0.255
Total Body Water (kg)	14	30.02	2.45	14	30.20	2.48	-0.998	0.336
Fat Percentage (% fat)	14	30.78	8.38	14	31.40	8.41	-1.753	0.103
Fat Mass (kg)	14	19.77	9.22	14	20.23	9.37	-1.882	0.082
Free Fat Mass (kg)	14	40.40	4.83	14	69.30	8.26	-1.033	0.320
Right Arm Fat Percentage (% fat)	14	33.84	9.17	14	33.60	9.14	0.602	0.557
Right Arm Fat Mass (kg)	14	1.04	0.51	14	1.05	0.53	-0.694	0.500
Right Arm Free Fat Mass (kg)	14	1.87	0.19	14	1.89	0.20	-1.482	0.128
Left Arm Fat Percentage (% fat)	14	34.27	9.06	14	33.96	9.22	0.673	0.513
Left Arm Fat Mass (kg)	14	1.10	0.56	14	1.09	0.59	0.618	0.547
Right Arm Free Fat Mass (kg)	14	1.90	0.24	14	1.92	0.26	-1.309	0.126
Fat Percentage (% fat)	14	44.94	6.96	14	27.87	9.80	0.963	0.353
Fat Mass (kg)	14	9.60	5.61	14	9.89	5.71	-1.358	0.198
Free Fat Mass (kg)	14	22.95	1.57	14	23.18	1.59	-1.510	0.155
Right Leg Fat Percentage (% fat)	14	34.48	5.21	14	34.52	5.19	-1.728	0.167
Right Leg Fat Mass (kg)	14	3.95	1.29	14	4.14	1.30	-1.162	0.214
Right Leg Free Fat Mass (kg)	14	4.28	0.71	14	4.18	0.72	-2.385	0.367
Left Leg Fat Percentage (% fat)	14	34.56	5.16	14	35.81	5.10	-2.564	0.412
Left Leg Fat Mass (kg)	14	3.90	1.26	14	4.05	1.28	-3.314	0.324
Left Leg Free Fat Mass (kg)	14	4.13	0.74	14	4.12	0.70	1.992	0.068

mass (kg), body free fat mass (kg) and right leg fat percentage (% fat), right leg fat mass (kg), right leg free fat mass (kg), left leg fat percentage (% fat), left leg fat mass (kg), left leg free fat mass (kg). Similar findings can be found when the literature is examined.

Barene et al. (22) have stated that the 12-week zumba fitness reduced the fat percentage and fat mass values of women working in the health sector. Ljubojević et al. (23) have suggested that zumba fitness program caused a decrease in overall body weight, fat percentage and fat mass values of women who are between the ages of 25-35. Micallef (24) has confirmed the effect of Zumba fitness on body composition stating that it decreases fat mass, BMI and fat mass values. Cugusi et al. (25) have stated that the 12-week zumba fitness caused a significant change in body weight and BMI values and decreased the number of heart beats during resting. In their studies, Jain and Nigudkar (26) divided 60 women who are between the ages of 20-50 into two groups, who participated in the 12-week zumba fitness and who both participated in the zumba fitness and also went on a diet during this period. After the 12-week program, differences have been observed in both groups in terms of anthropometric characteristics, body composition and components of physical fitness. No significant difference has been observed in fat percentage and waist-to-hip ratio values in the group participating only in the zumba fitness after the application. Baştuć et al. (27) have concluded that there was a significant decrease in BMI and body weight values of women who participated in the study after 12 weeks of pilates, crossfit, zumba fitness. In the study done in 2009, Biçer et al. (28) investigated the effects of 8-week (3 days a week, 60 minutes a day) aerobic dance exercises on cardiovascular fitness, recovery pulse rate, blood pressure, flexibility and body weight. At the end of the research, the finding that the difference between cardiovascular fitness, recovery pulse rate, systolic blood pressure, flexibility and body weight was statistically significant has been reached. Krishan et al. (29) have stated that the 12-week Zumba fitness ensured the development of aerobic fitness of women who were overweight, obese and have type 2 diabetes, and decreased their body weight and body fat percentage.

60 healthy sedentary mid-fat and young women participated in the study conducted by Akdur et al. (30). The groups were asked to do exercise for an hour, 3 days a week, for 10 weeks. Following the research, a positive significant difference in body fat ratio values was observed. They attempted to determine the contribution of dance and walking activities to performance in 60 men and women between the ages of 24-48. Dividing the experimental group into two, they practiced dance for the first group and walking exercises for the second group for 8 weeks. At the end of the research, no significant difference was found between the groups. Nindl et al. (31) practised a physical activity program consisting of resistance and aerobic activities for 31 healthy women 5 days a week for 6 months. It was found that their body weights averages before exercise were 66.5 kg and 64.8 kg after exercise, their body fat weight averages were 24.7-22.1 kg, and free fat body weight averages were 41.8-42.7 kg. At the end of the exercise program, they observed 2.2% decrease in body weight, 10% decrease in body fat and also 2.2% improvement in free fat body weight. In the study Çolakoğu and Karacan (32) applied aerobic exercise with 50-75% intensity for middle aged and young women for 12 weeks, 3 days a week, 45-60 minutes, they found a decrease in body weight in both groups. Sucu (33) determined that at the end of 10 weeks BMI values of those who exercised were lower than those who did not perform physical activity. Moreover, it was determined that participants' body weight, chest, waist, hip, arm and BMI values before the exercise program decreased positively at the end of the exercise program. In the study by Güneş (34), when the anthropometric measurements of women who were doing and not doing sports were compared, a difference was observed in favour of women who were doing sports in terms of measurement of chest and shoulder. Additionally, it was concluded that waist-hip ratio and hip circumference measurement scores were higher in the groups doing sports. Özenoğu et al. (35) observed that for women who have been doing aerobic exercise alone for 3 months and 3 hours a week for 3 months, the average weight before exercise decreased from 70.33±11.53 kg to 69.06±10.94 kg, BMI values average from 27.14±4.27 kg/cm^2 to 26.58±4.20 kg/. In the study, it was observed that exercise caused a significant decrease in the weight, BMI, waist circumference, waist-height ratio, body fat percentage, hip circumference measurements of adult women ($p<0.05$). In the

study Amano et al. (36) practised aerobic exercise to 18 obese individuals during 30 minutes 3 times a week for 12 weeks, the mean values of body weight, BMI, body fat percentage before and after training was observed respectively as 74.1±2.6 kg, 70.3±2.9 kg; 27.3±0.4 kg/cm^2, 25.9±0.5 kg/cm^2; %29.6±1.3, %26.6±1.3. It was reported that the reductions observed in anthropometric measurements were significant. In the study by Dalleck et al. (37), it was observed that exercise for 5 days / week, 30 minutes and 45 minutes for 12 weeks ensured a decrease in BMI, body composition and waist circumference of postmenopausal women compared to the control group who do not exercise.

Within the findings obtained in the study, it has been concluded that the 8-week zumba fitness caused a decrease in body weight, body fat percentage and BMI values of Turkish women between the ages of 18-35. In the regional body analysis done in the study, it has been understood that the effect of the zumba fitness program was on the lower extremity. It has been foreseen that if Zumba fitness is performed for a longer period and is supported by diet, it can contribute more to the body composition to reach the desired level.

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Correspondence:
Prof., Aziz Güçlüöver
Kırıkkale University, Faculty of Sport Sciences,
71450, Kırıkkale / TURKEY
Phone: + 90 318 357 42 42 ext.2507,
Fax: + 90 318 567 42 20
E-mail: azizgucluover@hotmail.com