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EFFECTS OF EXERCISE ON BODY COMPOSITION AND LIFE QUALITY IN OBESE INDIVIDUALS[i]

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Abstract:
The purpose of this study is to investigate the effect of 12-week exercise, applied to obese individuals, on body composition and life quality. Experimental group between the ages 23-66 n:21 (10 men, 11women) average of ages: 44,52 ±9.88 and control group n:25 (12 men, 13 women) average of ages: 43.68±10.93, totally 46 obese individuals joined in this study. Aerobic exercise program including 12-week of walking and running which is 4 days a week has been applied to the experimental group. Any exercise program hasn't been applied to the control group. In order to determine the body compositions, both groups have been measured with bioelectrical impedance analyzer (InBody230, InBody Co. Ltd., USA) a week before and a week later. In order to determine the life quality, test of SF-36 has been applied. For the analysis of data, the comparison of the binary groups, t-test has been applied after finding the differences between first test and the last test. For the comparison of the first test and the last test of each group, paired sample t-test has been applied. Our findings show that, when the first and the last test results of the experimental group are analyzed, statistically in a positive way a significant variation in the whole body composition and SF-36 life quality scale parameters has been detected ($p<0.05$). According to the first and the last test results of control group, while any significant difference hasn't been detected in the body composition parameters ($p>0.05$), decline in a negative way has been determined in the SF-36 life quality scale results ($p<0.05$). When the first and last test results of experimental and control groups are compared, a significant variation in the whole body composition parameters and sub-dimensions of SF-36 life quality scale on behalf

[i] This study was presented under same title as the master thesis of Halil Rahman Başkılıç.
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of experimental group has been detected ($p<0.05$). In conclusion, it can be said that 12-week of walking and running exercises affect body composition parameters and life quality of obese individuals positively.

Keywords: obesity, body composition, life quality, exercise

1. Introduction

Obesity is defined as excessive fat accumulation in tissues at a level that will create a risk for human health. Inactive lifestyle, physical inactivity, excess of nutrition and irregularity are the main factors of obesity. Nowadays, body mass index measurements are made to evaluate the obesity status and comments are made on the values obtained (Tekin et al., 2015).

Factors causing obesity are genetic factors, age, gender, sedentary life and eating habits. According to data reported by the World Health Organization (WHO), there are 1.6 billion mild obesity and around 400 million obese people in the world. WHO has reported that these data will be updated to 2.3 billion mildly overweight and 700 million obese people in 2015 (Akbulut G, 2010). Obesity is classified 3 group according to body mass index, body fat distribution and fat cell.

When examining health expenditures made in the south-east of America, Europe and Asia, total health expenditure reaches 15% for the treatment of the problems caused by obesity treatment and obesity in developed or developing countries in these regions. Much of these expenditures relate to psychological and physical disturbances caused by obesity (Altunkaynak and Özbek, 2006).

Along with the increase in obesity, the risk rate for some diseases also increases. Obesity affects the body systems and psychosocial situation negatively and increases the risk of illness. The risk of heart and vascular diseases, diabetes, skeletal system problems, cancer types is increasing due to obesity (Özkan et al., 2013)

According to the survey conducted by the Turkish Statistical Institute (TUİK) in 2008, 32.4% of the adult population is mildly overweight and 15.2% is obese. When we examined Turkey nutrition and health survey data in 2010, the frequency of being overweight in our country is 34.6% and the frequency of being obese is 30.3%. According to TÜİK 2012 research data, 34.8% of the adult population is mildly overweight and 17.2% is obese (Altunkaynak and Özbek, 2006).

Regularly aerobic exercises made up of mild to moderate severity are the most important measure in combating obesity Exercise programs should be prepared in consideration of variables such as age specific gender. (Tekin et al., 2015).

This study was conducted to investigate the effect of aerobic exercise on body composition and quality of life on obese subjects for 12 weeks.

2. Material and Method

46 obese volunteers have been included in this study. Two groups were formed from volunteers as experimental group and control group. The mean age of the experimental group n: 21 (10 males, 11 females) was 44.52 ± 9.88 and the control group was n: 25 (12 males, 13 females) the mean age was 43.68 ± 10.93. The experiment group applied individually prepared aerobic training program for themselves for 12 weeks, 4 days a week, control group continued their normal life for 12 weeks.

Initial measurements of volunteers were taken one week before the training schedule and final measurements were taken one week after the training schedule. Subjects also did not have a diet program. All subjects were informed about the study plan and purpose and a written voluntary confirmation document was obtained from participants indicating that they voluntarily participated in the study. For this study, permission was obtained from Gaziantep University Clinical Research Ethics Committee.

The body composition of the volunteers was measured with Inbody 230, a bioelectrical impedance instrument, and the SF-36 test was used to determine the quality of life.

2.1 Collection of Data

The ages of the volunteers were determined as years and asked themselves. The height lengths of the volunteers were measured with a stadiometer (SECA, Germany) with a sensitivity level of 0.01 m. Body composition parameters (Body Weight, Body Fat Rate,

Body Mass Index (BMI)) of volunteers were measured with Inbody 230, bioelectrical impedance analyzer.

The SF-36 test was applied to measure the quality of life parameters of the volunteers and their scores were recorded.

2.2 Statistical Analysis

The data obtained at the end of the study; the Excel program (Microsoft Office, version 2007. Microsoft Corp. Redmond, WA, USA) was used to calculate the percentiles and

percentages. Statistically analyzed, the SPSS package program (SPSS for Windows, version 16.0.2008, SPSS Inc. Chicago, Illinois, USA) was used. Data are presented as arithmetic mean and standard deviation. Shapiro-Wilk test for normality test; Levene test was applied for homogeneity test. In the comparison of the binary groups, pre-test and post-test differences were taken and independent t-test was applied. Paired sample t-test was used to compare pretest and posttest of each group. Statistical results were evaluated at 95% confidence interval and $p < 0.05$ significance level was used.

3. Results

Measured features of participants in pre and post-tests have been examined and analyzed in this section. Intra-group and inter-groups comparisons are presented below.

Table 1: Pre- and post-test analysis of body composition parameters experiment group and control group

		EG (n=21)			CG (n=25)		
		Ave.	**SS**	**P**	**Ave.**	**SS**	**P**
Body Weight (kg)	Pre-test	85.36	11.51	**0.001***	91.80	16.34	**0.017***
	Post-test	80.82	11.58		92.25	16.20	
Body fat rate	Pre-test	32.63	6.25	**0.001***	36.46	12.10	0.124
	Post-test	27.67	6.57		36.90	11.88	
BMI (kg/m^2)	Pre-test	31.77	3.25	**0.001***	34.42	6.27	**0.041***
	Post-test	29.90	3.44		34.58	6.12	
Body fat (%)	Pre-test	38.40	6.25	**0.001***	39.30	7.590	0.261
	Post-test	34.56	6.98		39.6400	7.399	
Waist / Hip Ratio	Pre-test	0.9805	0.03542	**0.001***	0.97	0.042	0.731
	Post-test	0.9595	0.04748		0.97	0.04	

*p<0.05

In Table 1, the pre and posttest parameters of the experiment and control group were examined. Significant improvements were observed in all parameters of the experimental group. While the body weight and body mass index values of the control group increased significantly, no significant change was observed in other parameters. ($p<0.05$)

Table 2: Pre- and post-test analysis of life quality parameters experiment group and control group

		EG (n=21)			CG (n=25)		
		Ave.	**SS**	**P**	**Ave.**	**SS**	**P**
Physical Function	Pre-test	77.61	12.00	**0.001***	70.60	19.96	**0.039***
	Post-test	86.66	11.43		67.40	19.79	
Role- Physical	Pre-test	71.42	28.81	**0.001***	58.00	10.00	**0.023***
	Post-test	96.42	8.96		45.66	17.740	
Body Pain	Pre-test	71.52	20.75	**0.001***	71.12	14.02	**0.001***
	Post-test	84.47	22.48		56.28	18.93	
General Health Situation	Pre-test	67.28	12.83	**0.007***	54.52	19.54	**0.021***
	Post-test	72.76	14.58		51.92	19.69	
Liveliness	Pre-test	67.14	16.70	**0.021***	55.20	19.65	**0.003***
	Post-test	71.90	15.12		47.00	20.00	
Social Function	Pre-test	70.14	19.53	**0.001***	74.00	17.27	**0.001***
	Post-test	86.30	19.32		62.50	15.72	
Role-Emotional	Pre-test	67.19	32.75	**0.001***	82.66	32.09	0.161
	Post-test	98.41	7.26		80.00	33.33	
Soul Health	Pre-test	75.23	12.87	**0.012***	76.64	19.10	0.669
	Post-test	77.52	13.99		75.84	16.98	
General Physical Health	Pre-test	47.44	5.61	**0.001***	41.88	9.63	**0.001***
	Post-test	52.07	5.08		37.86	10.89	
General Soul Health	Pre-test	48.61	7.93	**0.001***	51.41	9.00	0.067
	Post-test	53.37	5.75		49.95	9.15	

In Table 2, pre- and post-test parameters of the quality-of-life scale scores of the experimental and control groups were examined. Accordingly, significant improvements were observed in all parameters of the experimental group. On the other hand, there was no significant change in the role-emotional, mental health, and general mental health scores of the control group, but there was a significant decrease in the scores in all other parameters. ($p<0.05$)

Table 3. Comparison of differences between pre and post-tests of EG and CG body composition parameters

		N	Ave.	SS	P
Body Weight (kg)	EG	21	-4.53	1.64908	**0.001***
	CG	25	0.44	0.87040	
Body fat rate	EG	21	-4.96	2.37707	**0.001***
	CG	25	0.44	1.38173	
BMI (kg/m^2)	EG	21	-1.87	0.63396	**0.001***
	CG	25	0.15	0.35251	
Body fat (%)	EG	21	-3.83	2.21167	**0.001***
	CG	25	0.33	1.44156	
Waist / Hip Ratio	EG	21	-0.02	0.01947	**0.001***
	CG	25	0.00	0.01152	

In Table 3, the pre- and post-test parameters of the body compositions of the experimental and control groups were compared. Accordingly, there was a significant difference in favor of the experimental group in all parameters. ($p<0.05$)

Table 4: Comparison of differences between pre and post-tests of EG and CG life quality parameters

		N	Ave.	SS	P
Physical Function	EG	21	9.04	8.00	**0.001***
	CG	25	-3.20	7.34	
Role- Physical	EG	21	25.00	1.00	**0.001***
	CG	25	-12.33	1.35	
Body Pain	EG	21	12.95	1.46	**0.001***
	CG	25	-14.84	1.68	
General Health Situation	EG	21	5.47	1.34	**0.001***
	CG	25	-2.60	1.25	
Liveliness	EG	21	4.76	1.72	**0.001***
	CG	25	-8.20	1.32	
Social Function	EG	21	16.07	1.33	**0.001***
	CG	25	-11.50	1.39	
Role-Emotional	EG	21	30.94	3.45	**0.001***
	CG	25	-2.66	1.23	

Soul Health	EG	21	2.28	1.30	0.183
	CG	25	-0.80	0.23	
General Physical Health	EG	21	4.62	1.56	**0.001***
	CG	25	-4.01	1.87	
General Soul Health	EG	21	4.75	1.45	**0.001***
	CG	25	-1.45	1.79	

In Table 4, the pre- and post-test parameters of the quality-of-life scale scores of the experimental and control groups were compared. There was no significant difference in terms of mental health scores, whereas all other parameters showed a significant difference in favor of the experimental group. ($p<0.05$)

4. Discussion

Findings that were obtained have been discussed by comparing with the literature in this section.

While the body composition parameters of the study group showed a significance level of $p <0.05$ in all parameters of the experimental group after the 12 week exercise program applied in our study, the body weight and body mass index values of the control group showed a negative meaningfulness whereas the other parameters did not show any meaningfulness. ($p<0.05$)

Persons who exercise for a long time are expected to have a number of physiological changes, both acute and chronic adaptation. It is stated that regular, long-term and moderate aerobic exercises reduce lipids such as Total Cholesterol, LDL-C, Triglyceride, and high-density lipoprotein (HDL-C) levels of coronary artery risk factors. It is also emphasized that high blood pressure and obesity diseases decrease with exercise (Lemura and Amdreacci, 2000, Fox et al., 1999, Kyle et al., 2006).

Amano and colleagues found that the aerobic exercise program exercises performed during 12 weeks for obese men and women showed a significant difference of $p <0.05$ in the body weight values for the experimental group between pre-test and post-test results (Amano et al.).

Szmedra and colleagues found significant differences in body weight, body fat ratio, body mass index body weight parameters of the subjects between pretest and posttest measurement results, which were applied to the 6-week treadmill exercise group (Szmedra et al., 1998).

Many studies have shown that aerobic exercise programs result in a decrease in body fat percentage. (Kyle et al., 2006, Ransdell et al., 2004)

Arslan and Ceviz have worked on 383 housewives and 414 working women. Comparisons between housewives and working women found that the percentage of body fat was significantly lower for women working as housewives (Arslan and Ceviz, 2007)

Shaw and colleagues have shown that in their study of obesity, they achieved much more successful results through diet programs combined with exercise (Shaw et al., 2006).

Dal found significant differences in the BMI and waist hip ratio parameters of the subject group as a result of the mild and moderate training program applied to the subject group in the study (Dal, 2016).

Short and colleagues found significant differences in body weight and body mass index among subjects' pre-test and post-test measurements at the end of the 16-week aerobic cycling exercise program (Short et al., 2004).

Altunsoy studied the effect of aerobic exercise and combined exercise on his work and reported that there was a statistically positive reduction in body weight, BMI, and BFM values of all groups in the study as a result of the study (Alltunsoy, 2014).
When we look at similar studies in the literature, it is seen that the values of body composition parameters are parallel to other studies. It can be considered that the aerobic exercise programs to be applied have positive effects on body composition parameters of obese individuals.

In his study, Yorulmaz found that all the sub- and main dimensions and total scores of the quality-of-life scale of the subject group increased after the operation (Yorulmaz, 2015).

Altınok and colleagues found statistically significant differences in the physical and mental dimension scores of the main quality of life dimensions in the analysis of the pre-test post-test results of the quality of life scale they applied in their experiment group (Altınok et al., 2014.)

Alıcı and colleagues found that there was a statistically significant increase in the quality of life scale physical function, physical-role, general health perception, social function sub-dimensions and mental health dimension after the training (Alıcı and Pınar, 2008).

Warkentin and colleagues found that 5% weight loss was not associated with a significant improvement in health-related quality of life for most patients, 10% weight loss was not sufficient to account for health-related quality of life also, but 20% weight loss was clinically significant they will provide an improvement (Warkentin et al., 2014).

Kline and colleagues found that aerobic training programs applied to obese individuals with obstructive sleep apnea syndrome improved the physical and mental parameters of subjects participating in the study relative to the SF 36 quality of life scale (Kline, 2012).

Lofrano-Prado and colleagues found positive improvements in SF-36 quality of life scores as a result of the medium intensity aerobic exercise program they applied on 66 obese individuals for 24 weeks (Lofrano and Prado, 2009).

Gündüzoğlu stated that the effect of the coaching program on the quality of life in obese subjects was statistically significant compared to the control group in the quality of life parameter outcomes of the study group (Gündüzoğlu, 2013).

Günendi, investigate the effect of ergonomic regulation with posture exercises given office workers on life quality. The results of the study showed that the improvement in the quality of life of the individuals who did the exercise regularly was increased (Günendi, 2015).

As a result, a significant decrease in body composition values and a significant increase in the quality of life parameters were obtained in a regular and planned 12 week aerobic exercise program. It can be said that regular aerobic exercises will contribute to improving the quality of life and body composition of obese individuals in a positive way and contributing to a better quality of life.

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