

## A Study About the Effect of 12 Week Aerobic Exercises on Certain Physical Fitness Parameters on Obese Housewives Living in Çankırı \*

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### Abstract

Thirty-four volunteer obese housewives, who have not done exercise regularly during the last six months and have had no health problems to prevent them from exercising, have participated in the study. For the participating volunteers (n = 34), their age averages have been determined as (39.30 ± 11.30 years), their average height have been determined as (166.40 ± 8.50 cm) and their average body weights have been determined as (82.44 ± 15.02 kg), their average BMIs have been determined as (26.03 ± 6.65 kg/m<sup>2</sup>) and their average body fat percentages have been determined as (32.17 ± 8.05 %). The volunteers have been given an aerobic exercise program at 75% an exercise intensity according to the Karvonen formula for 50 minutes a day and for 4 days a week during 12 weeks. Measurements (body weight, waist circumference, body fat percentage) of the volunteers have been taken at the beginning and the end of the 12-week aerobic program. The data have been analysed by using the SPSS 17.0 statistical package program. Statistical analyses have been made by using Wilcoxon Test and the significance value has been determined as p< 0.05.

After the statistical analysis, statistically significant difference have been detected between the preliminary and the final test values of the subjects in terms of Body Weight (z=-5.08, p<0.05), Waist Circumference (z=-5.08, p<0.05), Body Fat Percentage (z=-4.71, p<0.05) and Body Mass Index (z=-4.57, p<0.05).

As a result, it has been determined that aerobic exercise of 12 weeks in aerobic style has positive effects on physical fitness parameters of obese housewives. For this reason, the importance of the cost-free aerobic exercise in the right intensity for every age has been revealed again.

**Keywords:** obesity, physical fitness, woman, aerobic

### 1. Introduction

Obesity and overweight are important health problems that have accelerated in recent years. The World Health Organization (WHO) has characterized obesity as a global epidemic. Obesity is defined by the World Health Organization (WHO) as "a significant increase in fat tissue, leading to adverse health outcomes" (Çayır et al., 2011). Obesity, in general, is the result of excessive increase in the ratio of lean mass to lean body mass, which is above the desired level of body weight according to height (Özpuat & Sivri, 2013).

The prevalence of obesity is increasing all around the world in all age groups and is a rapid growing chronic disease in developed and developing countries (Kılıç et al., 2016). In the study of World Health Organization (WHO), which is called MONICA having been lasted for 12 years on different 6 regions of Asia, Africa and Europe, it has been determined that the prevalence of obesity in 10 years, that is, the proportion of all cases with a disease in a given period of time, has increased between 10-30% (Bastian, 2011). In the studies conducted, the incidence of the disease has been determined as 33.3% in males and 35.3% in females in the United States (Bonfiglioli et al., 2007). In Europe, the prevalence of overweight in adults ranges from 32-79% in males and 28-78% in females (Çelik, 2011). According to the data of 2016 Turkey Statistical Institute (TUIK) Turkey Health Survey, while the percentage of obese individuals aged 15 and older became 19.9 % in 2014, it became 19.6% in 2016. If it is looked at gender discrimination; in 2016, 23.9% of women were obese and 30.1%

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were pre-obese. In males, these rates were observed as 15.2% and 38.6% respectively (www.tuik.gov.tr).

A decrease in physical activity in the development of obesity, age, being female, unemployment, are risk factors for obesity (Şimşek et al., 2005). Along with diminishing physical activity, poor nutritional habits that lead to increasing amounts of saturated fat and to excessive use of sugar, not doing exercise, have made obesity a widespread problem not only in developed countries but also in the whole world (Günay et al., 2014). Moreover, the widespread use of advanced technological tools (mobile phones, televisions, computers, home cinema, etc.) that easily fill our leisure time has contributed significantly to the increase of obesity (Li et al., 2013).

One of the health problems affecting women is also obesity (Esin&Aktaş, 2012). In the social life, a decrease has occurred in the house works of the housewives or working ladies, which are based on physical strength. Because these movements in household work are repetitive and monotone, energy expenditure falls accordingly and it is difficult to maintain body composition (Arslan & Ceviz, 2007).

In addition to adequate and balanced nutrition in maintaining body composition, there is a need for a lifestyle being maintained with regular exercise habits. In some studies, it is stated that obesity prevalence is between 2 and 2.5 times higher in housewives than in other occupational groups. (Bjorntorp, 2011). Therefore, shifting the daily eating habits to a healthy direction, raising the level of physical activity and acquiring other healthy lifestyle habits are important both in treatment and preventing obesity. Diet and exercise are the primary methods of prevention and treatment of obesity. Sport is used as a prescription for many health problems, such as obesity, with a positive impact on individuals (Hilton et al., 2012; Lee & Wang, 2005; Photiou et al., 2008).

The American College of Sports Medicine (ACSM) has defined an appropriate dose of physical activity as a tempo to feel comfortable, to encourage sedentary individuals. ACSM has recommended that healthy adults should exercise moderate-intensity aerobic activity for at least 30 minutes a day for 5 days a week (Focht, 2013).

Based on the above data, in this study, it has been aimed to investigate the effect of 12-week aerobic exercise on some physical fitness parameters in obese housewives.

## **2. Method**

### *2.1 Participants*

34 voluntary housewives who walk recreationally in Çankırı city stadium ranging 22 - 66 ages (age:  $39.32 \pm 11.30$  years, height:  $166.40 \pm 8.50$  cm, body weight:  $82.44 \pm 15.02$  kg) have been included in the study. Following a four-week observation in the stadium, the participants have been informed about their work on Saturdays between 08:30-12:00, which is the most intense sport attendance, and have been invited to the next day's meeting. On the second day of the meeting, detailed information has been given about the purpose of examining all the volunteers. Signed volunteer affirmation forms have been received from the participants who have volunteered to work between the hours of 08:30 and 11:00 on the following Saturday. The participants have undergone an aerobic exercise program with 75% exercise intensity according to the Karvonen formula 50 minutes in a day for 4 days a week for 12 weeks. Each exercise session have been with a 15 minute warm-up walk / running at the beginning, and a 15 minute cooling exercise has been done in the end. The target heart rate (THR) has been monitored with the Polar RS 800 Cx model pulse watch in the exercises performed. The measurements have been taken before the participants have started exercising and after 12 weeks of exercises. The volunteers have been warned not to drink alcohol, take drugs, eat fatty foods and not to do strenuous activity 24 hours before the measurements.

### *2.2 Anthropometric Measurements*

#### *2.2.1 Height Measurement*

The standing position of the volunteer has been measured in cm with the Holtain (UK) stadiometer, with bare feet, adjacent to the foot heels, with a vertical head and an eye-to-face accuracy of 0.01 m.

#### *2.2.2 Body Weight Measurement*

To measure body weight parameters the standing position of the volunteer (body weight, body fat ratio), we have used a scale (Tanita SC330, Japan) with a precision of  $\pm 0.1$  kg.

Body weights of volunteers; with t-shirt and shorts on, bare feet and anatomic posture, have been measured as 'kg'. The individual to be measured has been asked to stand in a vertical position by pressing on the aluminium soles of the analysis tool with the bare feet, in the light suit, to perceive the hand electrodes. The data have been saved with the help of the computer connected to the body composition analyzer.

### 2.2.3 Waist Circumference Measurement

The smallest diameter between the arcus corticum and the anterior superior of the processus spina ilica has been measured by using a gullick meter, and specified as cm, while the volunteer has t-shirts and shorts and while she has been in barefoot and anatomic postures.

### 2.2.4 Body Mass Index

Body Mass Index; (WHO, 2008), body weight and height measurements have been formulated as follows:

$$\text{BMI} = (\text{Weight [kg]} / \text{Height}^2[\text{m}])$$

The Body Mass Index (BMI) categories are evaluated as "weak" for under 18.5, "normal" between 18.5-24.9, "mildly overweight (overweight)" between 25.0-29.9, "medium overweight" (obese I) between 30.0-34.9, "Heavily overweight" (Obese II) between 35.0 and 39.9, "Too Heavily overweight" (Obese III) for over 40 (WHO, 1997).

### 2.2.5 Calculation of Exercise Intensity

Estimated maximal heart rate of participants;

Exercise intensity and target heart rate (THR) have been calculated using the Karvonen method (Karvonen et al., 1957), while the HR (maximum HR) has been calculated by the formula of  $226 - \text{age (years)}$

$$\text{Target Heart Rate} = [(\text{max HR} - \text{resting HR}) \times \% \text{Intensity}] + \text{resting HR example}$$

### 2.2.6 Ethics Committee Report

The study has been approved by Çankırı Karatekin University Ethics Committee (2017/ 21533)

### 2.2.7 Statistical Analysis

Statistical analyzes of all data have been analyzed by SPSS 17.0 statistical package program on computer. Normal distribution analyzes of the data have been performed with the Shapiro-Wilk test. The Wilcoxon test has been applied to statistical calculations since the data did not show normal distribution. Significance value has been taken as  $p < 0.05$ .

## 3. Results

The results of the study aim at the effect of aerobic exercise on some physical fitness parameters in obese housewives are given below:

Table 1. Comparison of Body Weight, Waist Circumference, Body Fat Rate and Body Mass Index Pre-test Post-test Values of Women Attending the Study.

Variables (n=34)	Pre-Test $\bar{x} \pm \text{sd}$	Post-Test $\bar{x} \pm \text{sd}$	Z	p
Body Weight (kg)	82.44 ± 15.02	78.20 ± 14.41	-5.08	.00*
Waist Circumference (cm)	70.99 ± 14.01	67.48 ± 13.58	-5.08	.00*
Body Fat Rate (%)	32.17 ± 8.05	28.86 ± 7.26	-4.71	.00*
BMI (kg/m <sup>2</sup> )	26.03 ± 6.65	22.53 ± 6.38	-4.57	.00*

$p < 0.05^*$

When the results of Table 1 have been examined, the statistical analyses performed have been as follows: Body Weight ( $z = -5.08$ ,  $p < 0.05$ ), Waist Circumference ( $z = -5.08$ ,  $p < 0.05$ ), Body Fat Rate ( $z = -4.71$ ,  $p < 0.05$ ) and Body Mass Index ( $z = -4.57$ ,  $p < 0.05$ ) have been found statistically significant.

## 4. Discussion

In this study, the effects of aerobic exercise on body weight, waist circumference, body fat ratio and BMI have been investigated in obese housewives. A statistically significant reduction in body weight, waist circumference, body fat percentage and BMI values have been determined for women participating in the study (Table 1).

When the pre-test and post-test values of the exercising women are examined (Table 1), the body weight average before exercise is  $82.44 \pm 15.02$  kg and has been decreased to  $78.20 \pm 14.41$  kg after exercise ( $p < 0.05$ ). Amano et al., (2001) Aerobic exercise programme have been applied to obese subjects for 3 days and 30 minutes for 12 weeks. The body weights of individuals were  $74.1 \pm 2.6$  kg before exercise and  $70.3 \pm 2.9$  kg after exercise. In Sivalingam et al., (2011), obtained significant changes in weight loss among the individuals who had aerobic exercise for 3 days and 30 minutes per week in their studies. Ryan et al. (2014) conducted a study for 77 obese sedentary women between the ages of 50 and 76 with a 65-80% severe during 6 month to do treadmill exercise for 45 minutes in a day and determined 8% decrease in body weight in the exercise group. Diaz et al. (2015) performed 1250 kilocalories diet and aerobic exercise in volunteers in their work to determine effects of low-calorie diet + aerobic exercise on body composition, cardiovascular functions and some cardiovascular risk factors in obesity and they found 7.7 kg decrease in body weight at the end of 12 weeks. Kuwon et al.

(2017) applied simple stretching exercises, 30 minutes of treadmill and 30 minutes of cycling exercise and diet restriction on a professional trainer for 30 minutes for 12 weeks, 3 days a week, 70 minutes in a day for 30 obese women. There was a significant decrease in body weight values on these obese individuals as a result of a 12-week exercise and diet restriction ( $p < 0.05$ ). Zileli et al. (2017) applied a 75-minute walking exercise in obese and overweight women for 8 weeks, 5 days a week, 75% exercise intensity according to the Karvonen formula. As a result of the measurements, the mean body weight before exercise was  $77.80 \pm 10.90$  kg, while the mean body weight decreased to  $76.60 \pm 10.90$  kg after exercise and there was a statistically significant difference ( $p < 0.05$ ) in body weight value. Our study findings are in parallel with the literature and we can say that aerobic exercise reduces body weight.

When pre-test and post-test values of exercising women were examined (Table 1), waist circumference averaged  $70.99 \pm 14.01$  cm before exercise and  $67.48 \pm 13.58$  cm after exercise ( $p < 0.05$ ). Ghroubi et al. (2009) found that in the study of obesity treatment, the combination of two exercise protocol and diet effects; for the control group, only diet, exercising and diet with 60% of the maximum heart rate in the treadmill, and diet and strength training in the third group were performed. As a result of the study, it was found that decrease of waist circumference in exercise groups was significant. Zileli et al. (2017) applied 8 weeks, 5 days a week, 75 minutes exercise training with 75% exercise intensity according to Karvonen formula to obese and overweight women. As a result of the measurements, waist circumference value was  $96.50 \pm 8.82$  cm before exercise,  $93.80 \pm 7.80$  cm after exercise and there was a statistically significant difference in waist circumference. A significant decrease in waist circumference was reported in the literature (Irving et al., 2008; Martins et al., 2010; Ryan et al., 2014). We can say that walking exercise reduces waist circumferences according to our study findings which is parallel to the literature.

When pre-test and post-test values of exercising women were examined (Table 1), body fat ratio before exercise was  $32.17 \pm 8.05$  and decreased to  $28.86 \pm 7.26$  after exercise ( $p < 0.05$ ). Amano et al., (2001) applied aerobic exercise program for 30 days, 3 days a week for 12 weeks to obese subjects. Body fat percentage of individuals was  $29.6 \pm 1.3$  before exercise and  $26.6 \pm 1.3$  after exercise. Narayani et al., (2010) conducted a 60 minute endurance exercise for 6 weeks, 3 days a week, in a study with 20 obese women aged 17-25 years. At the end of the study, there was a significant decrease in body fat percentage of the volunteers. Pan et al. (2011) reported that BFP decreased by 18% at the end of the study with 26 obese women and 60% of maximum oxygen consumption for 3 months. Diaz et al. (2015) applied 1250 kcal diet and aerobic exercise in volunteers in their studies to determine the effects of low calorie diet + aerobic exercise on body composition, cardiovascular functions and some cardiovascular risk factors in obesity. They informed that there was decrease on fat mass at the end of 12 weeks. Again, based on our findings in parallel with the literature, we see a positive result of aerobic exercise on body fat percentage.

When pre-test and post-test values of exercising women were examined (Table 1), the mean BMI before exercise decreased from  $26.03 \pm 6.65$  kg / m<sup>2</sup> to  $22.53 \pm 6.38$  kg / m<sup>2</sup> after exercise ( $p < 0.05$ ). Amano et al., (2001) applied aerobic exercise programme to obese individuals for 3 days in a week and 30 minutes in a day for 12 weeks. The individuals had body mass indexes of  $27.3 \pm 0.4$  kg / m<sup>2</sup> before exercise and  $25.9 \pm 0.5$  kg / m<sup>2</sup> after exercise. Pan et al. (2011) reported that 26 obese women exercised with 60% of their maximum oxygen consumption for 3 months and decreased BMI by 12% at the end of the third month. Akbulut et al., (2011) found that the most weight loss in the studies of weight loss of individuals according to BMI values was in the third obese group (8.78 kg), the most obese group. Marandi et al. (2013) applied aerobic exercise program to 45 obese women aged 25-40 years, with body mass index (BMI)  $\geq 25-30$  kg / m<sup>2</sup>, 60 minutes daily for 3 days a week for 10 weeks. It has been determined that mild and moderate aerobic exercise affects body composition in obese women positively. Kuwon et al. (2017) applied simple stretching movements, 30 minute treadmill and 30 minute cycling exercise and dietary restriction to 30 obese women for 12 weeks, 3 days a week for 70 minutes per day with a professional trainer. They found that 12-week exercise and dietary restriction resulted in a significant decrease in BMI values of obese individuals. Zileli et al. (2017) applied 8 weeks, 5 days a week, 75 minutes in a day exercise training with 75% exercise intensity according to Karvonen formula to obese and overweight women. As a result of the measurements, before exercise, mean BMI was  $31.38 \pm 4.13$  kg / m<sup>2</sup>, decreased to  $30.87 \pm 4.15$  kg / m<sup>2</sup> after exercise and they found statistically significant difference ( $p < 0.05$ ) in BMI values. Based on our findings, which are similar to the literature, we can say that as a result of the aerobic exercise reducing the body weight parameter, an expected result also occurs in the BMI.

As a result, 12-week walking exercises were found to have positive effects on the physical fitness parameters of obese housewives. When the literature is examined, the negative effects of obesity on women's health are obvious, it should be taken into consideration that an understanding of active life in the struggle against increasing obesity should be adopted especially in housewives, that aerobic exercise does not require cost and has positive effects on health.

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