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INFLUENCE OF AEROBICS VERSUS WALKING ON BODY COMPOSITION IN OVER WEIGHT AND OBESE FEMALE SUBJECTS

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Abstract: **Background:** Overweight and obesity cause a large number of health problems, both independently and in association with other diseases and are among the most significant contributions to ill health. Over the past few years, excess body weight (manifest as overweight and obesity) has become significantly more prevalent in developed and developing nations. Many of health risks associated with the increased body weight begin to appear in children and young people. Increase in the prevalence of type 2 diabetes and associated medical complications is a great concern. **NEED OF THE STUDY:** Isolated studies were done on the effect of aerobics on body composition and walking on body composition. The purpose of this study is to find the influence of aerobics versus walking on the body composition in over weight and obese female subjects as there were limited studies in this concern. 1**OBJECTIVES:** 1. To study the effect of aerobics on the body composition using N20 body composition analyzer in overweight and obese female subjects. 2. To study the effect of walking on flat surface on body composition using N20 body composition analyzer in over weight and obese female subjects. 3. To compare the effect of aerobics and walking on flat surface on body composition. **METHODOLOGY:** Informed consent was taken from all the subjects after explaining about the protocol in detail. The subject's height, weight and body composition was recorded using N20 body composition analyzer. **RESULTS**: After the analysis, the results revealed significant improvement in experimental group when compared to the control group. **CONCLUSION:** The present study was done to study the influence of aerobics versus walking on body composition in over weight and obese female subjects. When comparing the pre and post values, the post values of the BMI, weight, % body fat, fat free mass, muscle mass were improved in both the groups. However, improvement of parameters was significant in the experimental group when compared to the control group.

Keywords: BMI, overweight and obesity, body composition, walking, aerobics.

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INTRODUCTION

Overweight and obesity cause a large number of health problems, both independently and in association with other diseases and are among the most significant contributions to ill health (1-4). Over the past few years, excess body weight(manifest as overweight and obesity) has become significantly more prevalent in developed and developing nations(5). Many of health risks associated with the increased body weight begin to appear in children and young people. Increase in the prevalence of type 2 diabetes and associated medical complications is a great concern (6, 7, 8). Physical activity recommendations of 30 minutes of moderate activity on at least 5 days of the week are associated with improved fitness and protection from cardiovascular diseases (10). However, recent evidence highlights a requirement for 45-60 minutes per day to maintain lowered weight and prevent weight regain (11). The American College of Sports Medicine (ACSM) defines aerobic exercises as an activity which is rhythmic in nature consisting of various moves that uses large muscle groups such as aerobic moves, step moves, etc that overloads the heart and lungs and causes them to work harder than at rest. Aerobic exercise has long been a popular approach in achieving weight loss and physical fitness.

Aerobic exercises consists of

- Aerobic moves.

- Jazzercise moves.

- Kickboxing moves.

- Step moves.

- Arm moves.

Studies reveal that the aerobics breakdown carbohydrates, fats and proteins to provide energy for such exercises by phosphorylating ADP to ATP and to sustain a high level of steady rate physical activity with minimal fatigue. Regular aerobic exercises increase bone density and helps to prevent the loss in bone mineralization that leads to osteoporosis. Aerobic exercises also helps in prevention and control of type 2 diabetes and increases energy levels.

NEED OF THE STUDY: Isolated studies were done on the effect of aerobics on body composition and walking on body composition. The purpose of this study is to find the influence of aerobics versus walking on the body composition in over weight and obese female subjects as there were limited studies in this concern.

AIM OF THE STUDY: The aim of the study is to determine the influence of aerobics versus walking on the body composition in over weight and obese female subjects.

OBJECTIVES: 1. To study the effect of aerobics on the body composition using   N20 body composition analyzer in overweight and obese female subjects. 2. To study the effect of walking on flat surface on body composition using N20 body composition analyzer in over weight and obese female subjects. 3. To compare the effect of aerobics and walking on flat surface on body composition.

MATERIALS: 1. Stop watch.

2. N20 body composition analyzer.

3. Measuring tape.

INCLUSIVE CRITERIA:

•   Female over weight and obese subjects.

•   BMI more than 25k.g/m^2.

•   Age: 17-30 years.

 EXCLUSIVE CRITERIA:

•   Subjects with BMI less than 25k.g/m^2.

•   Age less than 17 and more than 30.

•   Musculoskeletal disorders.

•   Neurological disorders.

Study design: This shall be an informal experimental study- before and after with control design.

Study setup: The study was performed in the department of physiotherapy, SVIMS, Tirupati. **Sample size:** 30 samples were taken for this study.

Study duration: 6 Weeks.

METHODOLOGY: Informed consent was taken from all the subjects after explaining about the protocol in detail.

The subject's height, weight and body composition was recorded using N20 body composition analyzer.

GROUP 1: Experimental group: Aerobic training was given for 6 weeks, 5days per week, one session per day, each session lasting for 45 minutes which includes 10 minutes of warm up, 30 minutes of aerobic work outs and 5 minutes of cooling down.

Aerobic exercise Protocol:

Aerobic exercise	Time
Warm up exercises	10 min
• V-box • Hamstring curls • Grape vine • Double V step • Knee lift ssd Pattern aerobic exercises	10min 20 min
Cool down exercises	5 min

All exercises were performed for 10 minutes, frequency – 15 repetitions, intensity 3sets, duration 30mins. Pattern exercises were performed for 20mins followed by cooling down of 5 minutes.

Group 2: Control group: Subjects were made to do warm up exercises for 10 minutes before the protocol. The warm up period included self stretching of larger muscle groups of upper limb and lower limb, 3 repetitions each sustained for a period of 30 seconds. The subjects were

instructed to do walking on flat surface in the ground for a period of 30 minutes a total distance of 2500 meters, each round consisting of 500 meters. The time is measured using a stop watch. Distance is measured using a measuring tape. After completing 30 minutes of walking, cooling down exercises were done for 5 minutes. Subjects were instructed to do walking for 6 weeks, 5 days per week, one session per day, each session lasting for 45 minutes which includes 10 minutes of warm up, 30 minutes walking on flat surface and 5 minutes of cooling down.

After 6 weeks, the subjects of both groups were assessed for body composition by using N20 body composition analyzer. Statistical analysis was done by comparing the pre and post values.

STATISTICAL ANALYSIS: To analyze the significance of aerobics versus walking, body composition was assessed before and after the protocol which was analyzed for the subjects of both experimental and control groups. The statistical analysis was carried out by using IBM SPSS inc.20.0 version. All the subjects were divided in to 2 groups who completed the entire protocol as designed for 6 weeks during their training session. For statistical analysis, paired t-test and two sample t-test was applied to the outcome measures- Descriptive measures like mean and standard deviation were reported along with P- value.

RESULTS

Table 1: Comparison of pre and post values of weight in both experimental and control groups:

Group		N	Mean	SD	t-value	P-value
Weight(EG)	Pre	15	74.42	5.793		
	Post	15	70.43	4.321	6.384	0.000
Weight(CG)	Pre	15	69.37	5.182		0.000
	Post	15	67.14	5.039	15.958	

RESULTS: Pre and post weight values of mean and standard deviation are 74.42± 5.793 and 70.43±4.321 for the experimental group where as for the control group is 69.37±5.182 and 67.14±5.039. Inference: On performing the paired t-test, there is a statistical significance (P<0.000) is existing between the pre and post intervention values of both the groups. The t-value of weight for experimental group 6.384 where the t- value of weight for control group is 15.958.

Graphical representation: 1 The comparison of pre and post values of means of weight of experimental and control groups:
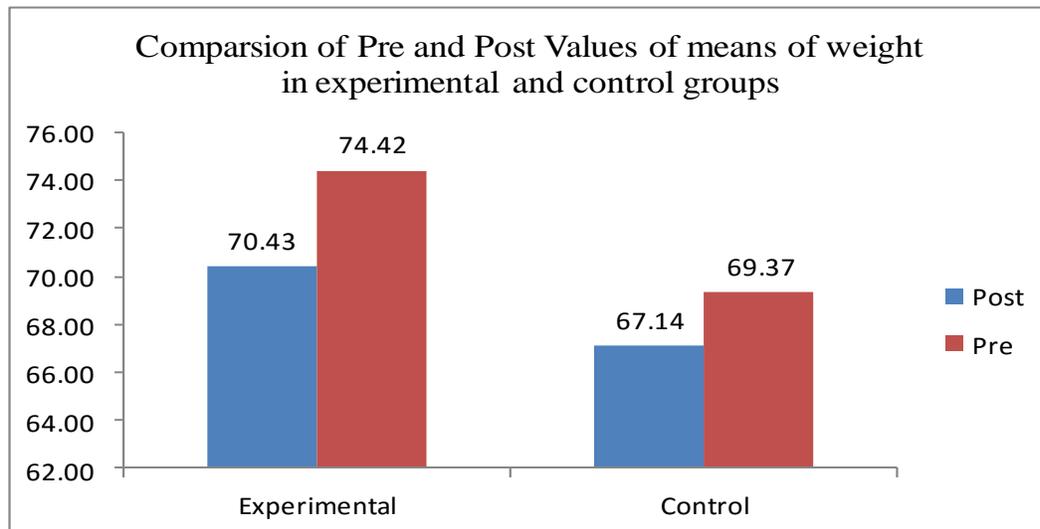

Comparsion of Pre and Post Values of means of weight in experimental and control groups

TABLE: 2 Comparison of pre and post values of BMI in both experimental and control groups:

Group		N	Mean	SD	t-value	P-value
BMI(EG)	Pre	15	29.42	0.619		
	Post	15	25.80	2.098	6.384	0.000
BMI(CG)	Pre	15	28.79	0.877		
	Post	15	27.27	1.066	9.886	0.000

RESULTS: Pre and post values of mean and standard deviation of BMI are 29.42± 0.619 and 25.80±2.098 for experimental group where as for control group is 28.79±0.877 and 27.27±1.066. Inference: On performing the paired t-test, there is a statistical significance (P<0.000) is existing between the pre and post intervention values of both the groups. The t-value of BMI for experimental group 6.384 where the t- value of BMI for control group is 9.886.

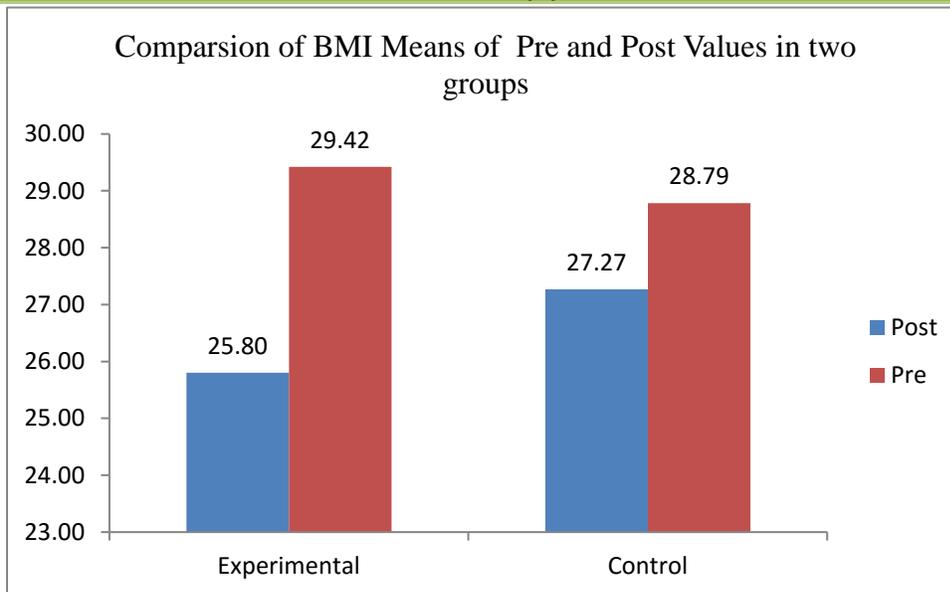Graphical representation: 2 The comparison of pre and post values of BMI of experimental and control groups:

Comparsion of BMI Means of Pre and Post Values in two groups

Table 3: Comparison of pre and post values of WHR in both experimental and control groups:

Group		N	Mean	SD	t- value	P- value
WHR(EG)	Pre	15	0.95	0.025		
	Post	15	0.82	0.016	9.886	0.000
WHR(CG)	Pre	15	0.96	0.021		
	Post	15	0.91	0.043	5.015	0.000

RESULTS: Pre and post values of mean and standard deviation of WHR are 0.95 ± 0.025and 0.82±0.016 for experimental Where as for control group is 0.96±0.021 and 0.91±0.043. Inference: On performing the paired t-test, there is a statistical significance (P<0.000) is existing between the pre and post intervention values of both the groups. The t- value of WHR for experimental group 9.886 where the t- value of WHR for control group is 5.015..

Graphical representation: 3 The comparison of pre and post values of WHR in experimental and control groups:
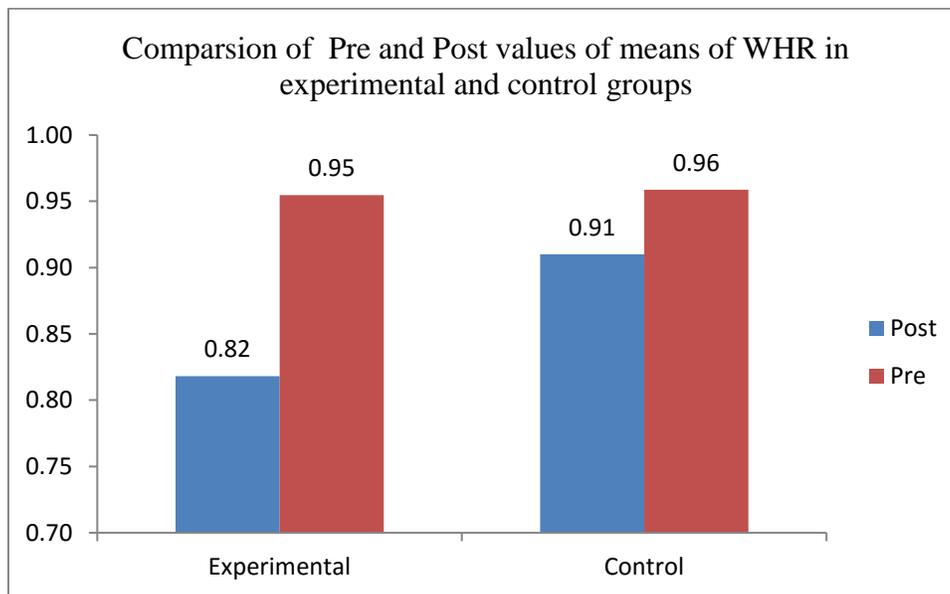
Comparsion of Pre and Post values of means of WHR in experimental and control groups

Table 4: Comparison of pre and post values of % body fat in both experimental and control groups:

Group		N	Mean	SD	T-value	P-value
% body fat(EG)	Pre	15	42.67	3.549	13.092	0.000
	Post	15	38.27	3.200		
% body fat(CG)	Pre	15	43.47	2.943	7.306	0.000
	Post	15	40.86	2.8567		

RESULTS:

Pre and post values of mean and standard deviation of % body fat are 42.67±3.549and 38.27±3.200 for experimental where as for control group is 43.47±2.943 and 40.86±2.857.

Inference: On performing the paired t-test, there is a statistical significance (P<0.000) is existing between the pre and post intervention values of both the groups.

The t- value of % body fat for experimental group is 13.092 where the t- value of % body fat for control group is 7.306.

Graphical representation: 4 The comparison of pre and post values of % body fat of experimental and control groups:
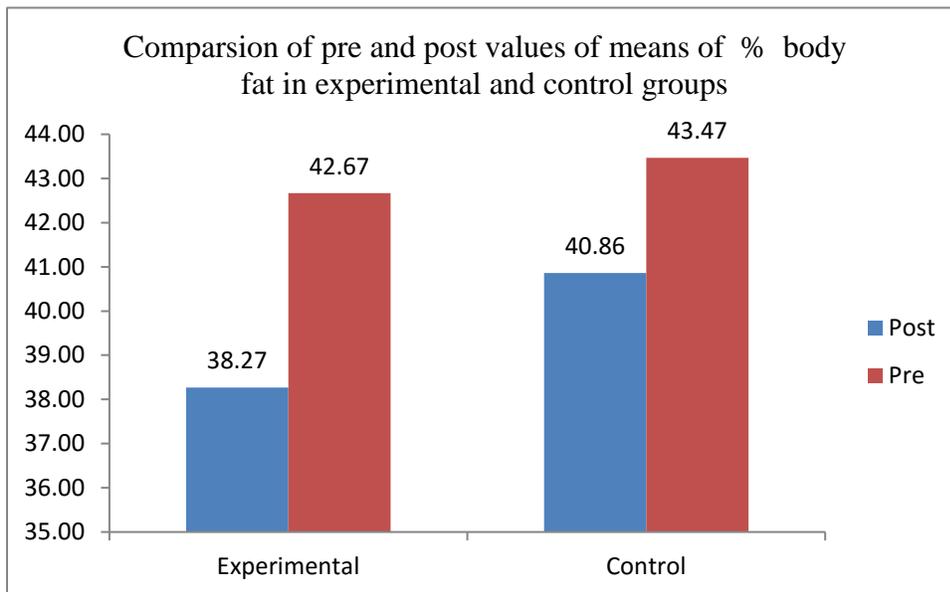
Comparsion of pre and post values of means of % body fat in experimental and control groups

Table 5: Comparison of pre and post values of % muscle mass in both experimental and control groups:

Group		N	mean	SD	t-value	P-value
% Muscle mass	Pre	15	40.58	4.481		
(EG)	Post	15	36.58	4.435	7.306	0.000
% Muscle mass	Pre	15	43.89	2.079		
(CG)	Post	15	41.88	2.557	7.102	0.000

RESULTS: Pre and post values of mean and standard deviation of % muscle mass are 40.58±4.481and 36.58±4.435 for experimental group where as for control group is 43.89±2.079 and 41.88±2.557. Inference: On performing the paired t-test, there is a statistical significance (P<0.000) is existing between the pre and post intervention values of both the groups. The t-value of % muscle mass for experimental group is 7.306 where as the t- value of % body fat for control group is 7.102.

Graphical representation: 5 The comparison of pre and post values of % muscle mass of experimental and control groups:
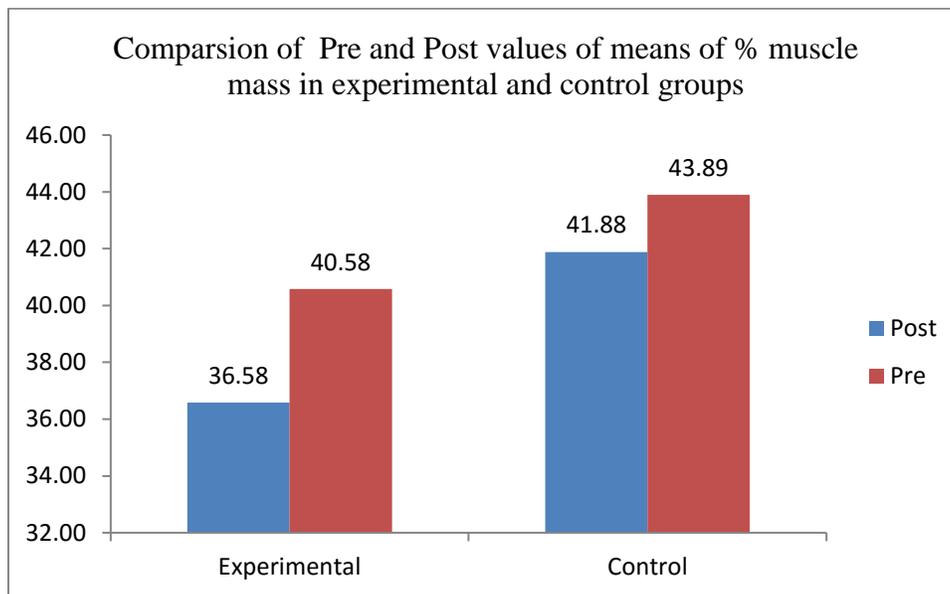
Comparsion of Pre and Post values of means of % muscle mass in experimental and control groups

Table 6: Comparison of pre and post values of % fat free mass in both experimental and control groups:

Group		N	Mean	SD	t-value	P-value
% Fat free mass(EG)	Pre	15	42.31	5.803		
	Post	15	38.02	5.182	8.390	0.000
% Fat free mass(CG)	Pre	15	42.41	2.317		
	Post	15	40.53	2.199	7.381	0.000

RESULTS: Pre and post values of means and standard deviation of % fat free mass are 42.31±5.803and 38.02±5.182 for experimental group where as for control group is 42.41±2.317 and 40.53±2.199. Inference: On performing the paired t-test, there is a statistical significance (P<0.000) is existing between the pre and post intervention values of both the groups. The t-value of % fat free mass for experimental group 8.390 where the t- value of % fat free mass for control group is 7.381.

 Graphical representation: 6 The comparison of pre and post values of % fat free mass of experimental and control groups:

Comparsion of pre and post mean values of fat free mass in the experimental and control groups
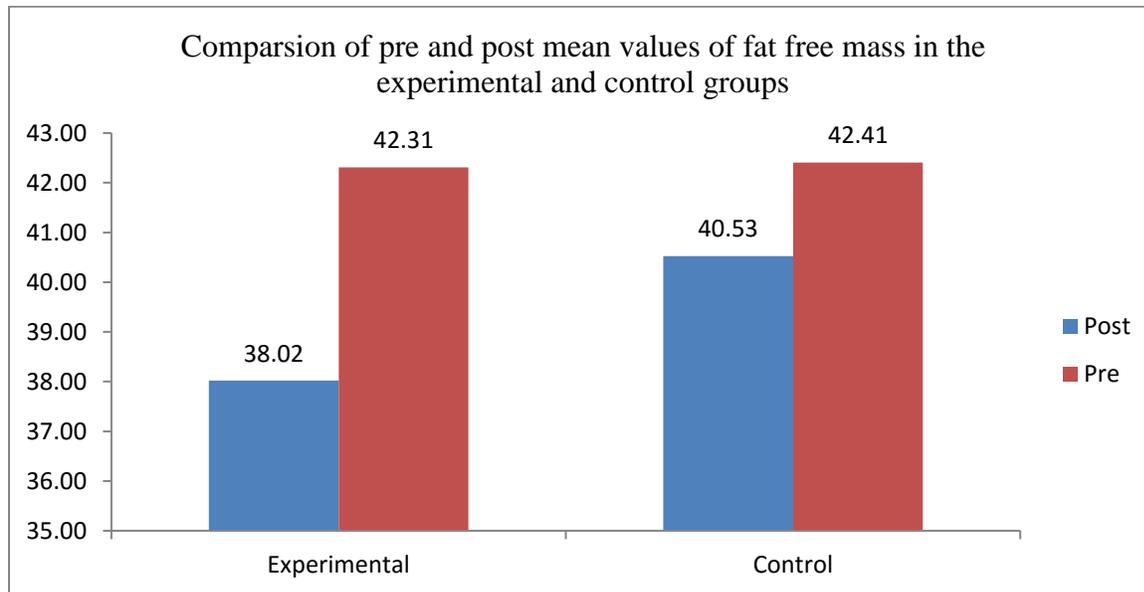
Discussion:

In the present study, out of 30 overweight and obese female subjects, 15 were selected for experimental group and the other 15 were selected for control group. These two groups have under gone the protocol that was designed for 6 weeks, 5 days per week and one session per day. The results in the table 1 shows that is weight of the experimental group has significantly reduced after 6 weeks (P<0.000) compared with the control group.

The results in the table 2 shows that the BMI of the experimental group has significantly reduced after 6 weeks (P<0.000) compared with the control group.

A similar study conducted by Wong and colleagues (2008) examined 12 weeks exercise program on aerobic fitness, body composition, blood lipids in obese adolescents results showed that exercise significantly reduced body composition, BMI, body weight is effective compared to the control group (12).

The results in the table 3 shows that the WHR of the experimental group has significantly reduced after 6 weeks (P<0.000) compared with the control group.

The results of table 4 shows that the %body fat of the experimental group has significantly reduced after 6 weeks (P<0.000) compared with control group.

A similar study conducted by Lehri A. Mokhar (2006) based on the results of the study it is concluded that resistance training and aerobic training exhibit greater potential for the weight management aerobic training has been observed to reduced body weight from both the fat and muscle mass(13).

The results of table 5 shows that the percentage of muscle mass of the experimental group has significant increased after 6 weeks (P<0.000) compared with control group.

The results of table 6 shows the %fat free mass of the experimental group has significantly reduced after 6 weeks (P<0.000) compared with control group.

According to Cakamakci E et.al (2010) it can be said that in the obese and overweight women, the applied exercise protocol have an important effect on the anthropometric and hematologic levels, regular aerobics will reduce the body fat % without the loss of muscles (14)

A similar study conducted by Evrimc, Akmokci (2015) as a result, this major findings of the present study was that there was a clear answer to effect of 8 weeks aerobic dance exercise progress in the amount of weight change and decrease in BMI and body fat, body composition parameters and lean body mass in overweight women (15).

Conclusion: The present study was done to study the influence of aerobics versus walking on body composition in over weight and obese female subjects. When comparing the pre and post values, the post values of the BMI, weight, % body fat, fat free mass, muscle mass were improved in both the groups. However, improvement of the parameters were significant in the experimental group when compared to the control group.

Limitations: Only female subjects were included. This study was done on a smaller sample size of subjects. The study was done for a short duration of 6 weeks. Body composition was the only outcome measure in this study.

Recommendations: Both genders can be included to know and to differentiate the aerobic exercises in both males and females, Further studies can be done on larger samples and longer durations, Along with body composition other out comes such as lipid profile, lung function may be included.

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