

**THE EFFECT OF SELECTED INTENSITY AEROBICS  
PHYSICAL TRAINING PROGRAM ON THE  
REDUCTION OF BODY WEIGHT AMONG  
PARTICIPANTS OF ADDIS ABABA ARAT KILO FITNESS  
CENTER**

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**ABSTRACT**

*The general objective of this study was to investigate the effect of selected intensity aerobics physical training program on the reduction of body weight among participants of Arat kilo Fitness Center. Twenty overweight subjects whose BMI was 25 - 29.9 kg/m<sup>2</sup> and age in between 25-35 years participated in this study. Ten subjects (5 male and 5 female) participated in moderate intensity aerobics physical training program and ten subjects (5 male and 5 female) participated in high intensity aerobics physical training program for three consecutive months three days per week 60 minutes and 45 minutes per day for both moderate and high intensity groups, respectively. PT, DT and POT tests were taken and analyzed accordingly. The training program consisted of moderate intensity (~ 60-65% of HRmax) including warming up, light stretching, brisk walking, running, cycling, and aerobics dance, whereas for High intensity (~80-85% of HRmax) the program include warming up, light stretching, running on treadmill, sit ups, push up, steps, and weight training. The test measurements used to identify the improvements BW, BMI, WC, HC, SKFT, RHR and EHR. Based on the findings, it was concluded that both moderate and high intensity aerobics physical training program had a positive effect on body*

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weight reduction of the subject, but high intensity aerobics physical training program was more effective and better for weight reduction compared to moderate intensity aerobics physical training program.

**Keywords:** Body weight, BMI, High intensity, Moderate intensity, Overweight, Resting heart rate, Exercise heart rate and skinfold thickness.

## I. INTRODUCTION

Obesity is national and global epidemic worldwide (WHO, 2000; Aromaa and Koskinen, 2002). It is a medical condition in which excess body fat has accumulated to the extent that it may have an adverse effect on health, leading to reduced life expectancy and/or increased health problems (Haslam *et al.*, 2005). Obesity is a leading but preventable cause of death worldwide, with increasing prevalence in adults and children, and it is one of the most serious public health problems of the twenty first century (Barness *et al.*, 2007).

The World Health Organization (WHO) classifies adults as overweight when Body Mass Index (BMI) is 25 - 29.9 kg/m<sup>2</sup>, obese when BMI is >30 kg/m<sup>2</sup> and have abdominal obesity when waist circumference (WC) > 94 cm for men and >80 cm for women, and Waist to Hip Ratio (WHR) of > 0.90 in men and > 0.85 in women (WHO, 1999). Overweight is generally defined as having more body fat than the recommended or normal body fat (Flegal, 2002; WHO, 2003). The estimation in 2005 showed that more than 1 billion people worldwide were overweight and more than 300 million were obese. Prevalence of overweight and obesity are expected to increase further in almost all countries, with 1.5 billion people expected to be overweight in 2015 (WHO, 2005).

Several studies indicated that causes of obesity are multifactorial (Kandari, 2006). These factors may include biological and non-biological factors such as heredity, age, sex, occupation, physical inactivity, eating habits and physiological factors (Jensen *et al.*, 2008). Complications are either directly caused by obesity or indirectly through mechanisms sharing a common cause such as poor diet or a sedentary lifestyle.

Even though we need a certain amount of fat in our bodies to insure good health, excess body fat has been found to increase the risk of diseases such as type II diabetes, cardiovascular disease and cancer (Calle *et al.*, 2003). In the reverse, too little body fat can also pose a number of health risks, especially for women.

Regular physical activity is one approach for obesity prevention and treatment (Goris and Westerterp, 2008), as participation in regular exercise reduces major health problems associated with excess adiposity (Burnham, 1998). Kraemer *et al.* (1999) remarked that it's important to consider the duration, intensity and type of exercise that should be recommended for weight loss. The U.S Department of Health and human service, (2008) also recommended that Moderate to vigorous intensity of aerobics training are the best way that every people must be doing while weight control program. This is the reason the investigator had selected the aerobics physical training program for his study. To make people understand the intensity has taken as one of the factors.

**Objectives:** The general objective of this research study was to investigate the effect of selected intensity aerobics physical training program on the reduction of body weight among participants of Addis Ababa Arat kilo fitness center. The specific objectives were to evaluate the significance of applying selected intensity aerobics physical training program on weight loss, to compare and contrast the change of body weight before and after selected intensity aerobics physical training program, to analyze the improvements obtained through selected intensity aerobics physical training program.

## II. MATERIALS AND METHODS

### Sampling Size and Sampling Techniques

Purposive sampling method was used based on the designed parameters to select the variables among the participants. Twenty volunteer overweight subjects were selected by using prepared physical activity readiness questionnaire (PARQ). From these 10 subjects (5 male and 5 female) were participated in moderate intensity aerobics physical training program and 10 subjects (5 male and 5 female) were participated in high intensity aerobics physical training program for

three consecutive months, three days per week, 60 minutes and 45 minutes per day for both moderate and high intensity groups respectively. The physical activity readiness questionnaire (PARQ) was distributed for all population by the researcher and according to the response, the selection had been carried out by considering the questions as an inclusion and exclusion criteria.

### The Study Design

The design for the study was experimental design. Ten participants were assigned for moderate intensity (~60-65% HRmax) program and another ten participants were assigned under high-intensity (~80-85% HRmax) program. The layout for this study was as following:-

Experimental group			
No	Activities	Moderate intensity (~60-65% HRmax)	High intensity (~80-85%HRmax).
1	No. of participants	10 (5 female and 5 male)	10 (5 female and 5 male)
2	Age groups	25-35 years	25-35 years
3	Training types	Aerobics exercises	Aerobics exercises
4	Frequencies	Three times in a weak	Three times in a weak
5	Training day	Monday, Wednesday and Friday	Monday, Wednesday and Friday
6	Training time	5:00pm-6pm	6:30pm-7:15pm
7	Duration of training	60 minutes	45 minutes

### Methods of Data Analysis

The data was analyzed by SPSS statistical software package version 16.0. Paired T- test was used to identify or to see the significance between the training program results on the reduction of bodyweight. The level of significance was set at 0.05%.

### Exercise Training Protocol

The selected subjects were divided in to two groups (moderate intensity ~60-65% HRmax and high intensity ~ 80-85 HRmax aerobics training program group). The duration of the study was for three consecutive months from October, 2012-December, 2012. For the first two consecutive weeks of the experimental period both groups of participants were involved in different aerobics exercise with low intensity (~ 40-50% HRmax) as a physical preparation or readiness, but the rest ten weeks, all participants were engaged with their respected intensity group. The training program consisted of different aerobics physical exercises such as warming up, light stretching, brisk walking, running, cycling, aerobics dance, sit ups, push up, steeps, weight training and others. The frequencies of the days were three times in a week (Monday, Wednesday and Friday) from 5pm-6pm and 6:30pm -7:15pm for moderate and high intensity group, respectively.

### III. RESULT AND DISCUSSION

The test measurement used to collect the results were body weight, body mass index, waist circumference, hip circumference, skinfold thickness, resting heart rate and exercise heart rate. In this study, the tests had been taken three times (Pre, during and post). The results of those variables are discussed as follows.

#### Body Weight (kg) and BMI (kg/m<sup>2</sup>)

Table 1: The mean values of body weight and BMI for female and male groups involved in moderate and high intensities aerobics exercise for twelve weeks of experimental period.

Female (N=10) (5 MI and 5 HI) and Male (N=10) (5 MI and 5 HI)

Sex	EIG	Parameters					
		BW			BMI		
		PT	DT	POT	PT	DT	POT
Female	MI		71.8 ±	70.4 ± 8.17	28.3±1.5	27.4 ± 1.44	26.9 ± 1.54
		74.0±8.60	8.26		1		
	HI	74.0 ±	71.4 ± 8.88	68.6± 7.99	27.0± 1.99	26.1 ± 2.06	25.1± 1.69
		9.03					
Male	MI	84.8±2.39	82.6 ± 2.30	81.2 ± 2.28	27.0 ±1.45	26.3 ± 1.50	25.9 ± 1.64

HI	81.8 ±	79.0 ± 3.81	76.8 ± 3.27	27.8 ± 1.52	26.9 ± 1.53	26.1 ± 1.29
	3.77					

EIG= exercise intensity group, MI= moderate intensity exercise group HI= high intensity exercise group, Values are mean ± SD, PT= pre training, DT= during training (after six weeks), POT= post training (after 12- weeks) BW= Body weight, BMI= body mass index.

The data (Table 1) showed that there were significant changes in the reduction of body weight and BMI in both groups of female participants. This was due to the training program they were engaged in the gymnasium. Body weight reduced from 74.0 to 70.4 kg (4.9 %) and from 74.0 kg to 68.6 kg (7.3%) for moderate intensity and high intensity female group participants, respectively. BMI also reduced from 28.3 kg/m<sup>2</sup> to 26.9 kg/m<sup>2</sup> (4.8%) for moderate intensity female group and from 27.0 kg/m<sup>2</sup> to 25.1 kg/m<sup>2</sup> (7.3%) for high intensity female group participants.

Similarly, Table 1 also indicated that the male group participants' body weight and BMI were highly reduced. Body weight reduced from 84.8 kg to 81.2 kg (4.3 %) and from 81.8 kg to 76.8 kg (6.2 %) in moderate intensity and high intensity male group participants, respectively. The mean values of BMI also reduced from 27.0 kg/m<sup>2</sup> to 25.9 kg/m<sup>2</sup> (4.2 %) and 27.8 kg /m<sup>2</sup> to 26.1 kg/m<sup>2</sup> (6.1 %) for moderate and high intensity male group participants, respectively.

The data showed a great change of body weight and BMI in both groups of male and female participant however, a better change was recorded under high intensity exercise group than moderate intensity exercise group. This was because of more calories were burned during high intensity aerobics physical exercise compared to moderate intensity aerobics physical exercises.

### Waist Circumference (cm) and Hip Circumference (cm)

Table 2: The mean values of waist and hip circumference for female and male groups involved in moderate and high intensities aerobics exercise for twelve weeks of experimental period.

Female N=10 (5 MI and 5 HI), and male N=10 (5 MI and 5 HI)



## Parameters

Sex	EIG	WC			HC		
		PT	DT	POT	PT	DT	POT
Female	MI	94.0 ± 7.91	90.8 ± 3.56	86.8 ± 7.50	107.2 ± 9.58	105.6 ± 9.48	103.6 ± 8.82
	HI	91.6 ± 7.60	87.0 ± 7.18	84.0 ± 6.89	106.6 ± 8.35	103.6 ± 8.08	102.6 ± 8.02
Male	MI	105.0 ± 3.61	101.6 ± 3.85	97.8 ± 3.63	102.8 ± 3.11	101.0 ± 3.46	99.0 ± 2.92
	HI	103.6 ± 2.51	99.4 ± 2.19	95.4 ± 2.07	101.6 ± 5.59	99.4 ± 5.18	97.6 ± 5.46

EIG= exercise intensity group, MI= moderate intensity exercise group HI= high intensity exercise group, Values are mean  $\pm$ SD, PT= pre training, DT= during training (after six weeks), POT= post training (after 12- weeks) WC= waist circumference, HC= hip circumference.

The data in Table 2 revealed that the test results of hip and waist circumference in both groups were progressively changed from the pre test to post test of experimental period. The female group waist circumference was reduced from 94.0 cm to 86.8 cm (7.7 %) and from 91.6 cm to 84.0 cm (8.3%) in moderate and high intensity female group participant. The hip circumference also reduced from 107.2 cm to 103.6 cm (3.4 %) and from 106.6 cm to 102.6 cm (3.8 %) in moderate and high intensity female group participants, respectively.

The better improvement was also recorded in both male group participants. Waist circumference was reduced from 105.0cm to 97.8cm (6.9 %) for moderate intensity male groups, and from 103.6 cm to 95.4cm (7.9 %) for high intensity aerobics exercises. Hip circumference also reduced from 102.8 cm to 99.0 cm (3.7 %) for moderate intensity group and from 101.6 cm to 97.6 cm (3.9 %) for high intensity male group participants. The above Table 2 also showed that even though the improvements had been observed in both groups, the high intensity groups showed a great change as compare to moderate intensity group participants.

### Skinfold Thickness (%) and Waist to Hip Ratio

Table 3: The mean value of skinfold thickness and waist to hip ratio for female and male groups involved in moderate and high intensities aerobics exercise for twelve weeks of experimental period.

Female N=10 (5 MI and 5 HI) and male N=10 (5 MI and 5 HI)

Sex	EIG	Parameters					
		SKFT			WHR		
		PT	DT	POT	PT	DT	POT
Female	MI	39.6±6.17	34.6 ± 4.84	31.4± 4.95	0.89 ± 0.08	0.86 ± 0.08	0.84 ± 0.08
	HI	42.0 ± 5.45	35.5 ± 6.68	33.2 ± 6.68	0.86 ± 0.06	0.84 ± 0.06	0.82 ± 0.06
Male	MI	17.6± 3.83	14.7 ± 3.85	12.9 ± 3.70	1.02 ± 0.06	1.01 ± 0.06	0.99 ± 0.06
	HI	21.0 ± 5.02	16.9±4.39	14.7 ± 4.38	1.02 ± 0.05	1.00 ± 0.05	0.98 ± 0.05

EIG= exercise intensity group, MI= moderate intensity exercise group HI= high intensity exercise group, Values are mean ±SD, PT= pre training, DT= during training (after six weeks), POT= post training (after 12- weeks) SKFT= skinfold thickness, and WHR= waist to hip ratio.

As Table 3 clearly showed that there were significant changes from pre to post training test in both female group participants. The waist to hip ratio reduced from 0.89 to 0.84 cm (4.5 %) for moderate intensity group and 0.86 to 0.82 (4.7 %) for high intensity female group participants. Skinfold thickness was reduced from 39.6 to 31.4 % (20.6 %) and 42.0 to 33.2 (21.0 %) for moderate and high intensities female group participants, respectively. As indicated in Table 3 that the result of waist to hip ratio and skinfold thickness for male participants were significantly better in post-test. Waist to hip ratio decreased from 1.02 to 0.99 (2.9 %) and from 1.02 to 0.98 (3.9 %) for moderate and high intensity male group participants, respectively. The skinfold thickness reduced from 17.6 % to 12.9 % (27.2 %) for moderate intensity group, and from 21.0 % to 14.7 % (30.2 %) for high intensity male group participants.

The results obtained from both groups showed that high intensity aerobics physical training was better than the moderate intensity aerobics training. Depending on this result it is possible to conclude that high intensity aerobics physical training has a positive effect on the reduction of over fat around the waist, abdomen and trunk areas of the body.

#### Resting Heart Rate and Exercise Heart Rate (beat/min).



Table 4: The mean value of resting heart rate and exercise heart rate for female and male groups involved in moderate and high intensities aerobics exercise for twelve weeks of experimental period.

Female N=10 (5 MI and 5 HI) and male N=10 (5 MI and 5 HI)

Sex	EIG	Parameters					
		RHR			EHR		
		PT	DT	POT	PT	DT	POT
F	MI	108.8 ± 3.35	99.2 ± 3.35	95.2 ± 3.35	138.4 ± 8.29	126.4 ± 6.69	121.6 ± 6.07
	HI	108.8 ± 3.35	99.2 ± 3.35	89.6 ± 2.19	146.4 ± 14.59	131.2 ± 12.77	120.0 ± 8.49
M	MI	111.2 ± 3.35	102.4 ± 4.56	98.4 ± 2.19	140.0 ± 10.2	134.4 ± 10.43	131.2 ± 10.35
	HI	116.0 ± 12.64	103.2 ± 13.08	94.4 ± 8.29	156.8 ± 14.25	133.6 ± 11.87	120.8 ± 10.35

EIG= exercise intensity group, F= female, M= male, MI= moderate intensity exercise group HI= high intensity exercise group, Values are mean ± SD, PT= pre training, DT= during training (after six weeks), POT= post training (after 12- weeks) RHR= resting heart rate, and EHR= exercise heart rate.

Table 4 showed that the mean values of resting heart rate from pre to post test reduced by 12.5% for moderate intensity and 17.7 % for high intensity female group. Similarly, the exercise heart rate mean value was reduced by 12.1% and 18 % for both moderate and high intensity female group participants, respectively.

As Table 4 also indicated that both resting and exercise heart were significantly changed in male group participants. The mean values of resting heart rate reduced from 111.2 beat/min to 98.4 beat/min (11.5%) and 116.0 beat/min to 94.4 beat/min (18.6%) for moderate and high intensity male groups, respectively. The exercise heart rate mean values also decreased from 140.0 beat /min to 131.2 beat/min (6.3 %) and from 156.8 beat/min to 120.8 beat/min (23 %) for moderate and high intensity male group participants, respectively.

Since all mean values had been reduced from pre to post test it clearly showed that the cardiovascular fitness were progressively well improved from pre training to post training in both groups (moderate and high intensity groups). This assured that the given activities had a positive effect on improved the body resistance. Such as: - to reduce or prevent cardiovascular and respiratory disease that resulted following obesity.

Even though the improvements observed in both groups, a significance change was recorded in high intensity group as compared to moderate intensity group.

#### IV. Conclusion

1. Almost in all parameters, clearly showed that the better test results were recorded in post training than pre and during training. This indicates that both selected intensity aerobics physical training program were effective for the reduction of overweight.
2. Continuing participating in either moderate or high intensity aerobics physical training program had the ability to reduce more body fat. Because the more you do, more you benefited.
3. In general, this findings clearly noted that both moderate and high intensities of Aerobics physical training program has a significant effect on the reduction of overweighed body that resulted following the accumulation of excessive fat in the body. However, participating in high intensities of Aerobics physical training program has more effect as compared to moderate intensities of Aerobics physical training program.

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