TRIDHA
Journal of Clinical Cases & Reports
Volume 2022, Issue S5, 6 pages
https://doi.org/10.46619/joccr.2022.5-S5.1025



**CASE REPORT**

# The Upshot of Varide Aerobic Exercise Intensity on Overweight Women: The Case of Arbaminch City

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Received: 20 April 2022; Accepted: 07 May 2022; Published: 14 May 2022



## ABSTRACT

### AIM

The intention of existing study was to compare the effects of varied aerobic exercise intensity on body composition of sedentary overweight females in Arbaminch.

### METHOD

Forty overweight participants [body mass index (BMI) ≥ 25 kg/m$^2$, age 18 years - 32 years] were randomized into four equal groups (n = 10): light-intensity training group (LITG), 40%-60% heart rate reserve (HRR); middle intensity training group (MITG), 60%-70% HRR; high-intensity training group (HITG), 70%-80% HRR; and control group (CG). Aerobic exercise training program was conducted for 40 minutes - 60 minutes per day on a treadmill 3 days per week for 12 weeks. All participant height, weight, WHR, BMI and %of BF were measured at pre and after 12 weeks.

### RESULT

At the starting point, the component of body composition indicates did not differ significantly among the four groups (p >0.05). After 12 weeks exercise intervention, the HITG and MITG had significantly more changes in body weight, waist-to-hip ratio (WHR), %BF and BMI than the LITG.

### CONCLUSIONS

A 12 weeks high and moderate intensity exercise intervention can considerably reduce body weight, body fat, WHR, and BMI, whereas a light-intensity exercise intervention can significantly reduce body weight and body

fat. Based on my investigation all types of intensity can reduce body weight. But high and moderate intensity training had reduced weight quickly than low intensity training.

**KEYWORDS**

Aerobic exercise; Exercise intensity; Body composition; Overweight

## INTRODUCTION

Obesity and overweight are defined as accumulated of excessive fat in the body. And it is one of World Series problem for increasing hypo kinetic disease [1]. Most probably many times body composition assessed by Skin fold Calipers, Hydrostatic Weighing, Bioelectrical Impedance Analysis (BIA), waist to hip ratio, girth measurement [2]. Body mass index (BMI) is a measurement which is widely used to estimate the prevalence of overweight and obesity within a population, and it is calculated as weight (kg)/height squared ($m^2$). Cut off points of 25 $Kg/m^2$ and 30 $Kg/m^2$ are recognized worldwide as definitions of overweight and obesity, respectively [3].

Overweight and obesity are global problems that are growing at a shocking and uncontrollable rate. According to the WHO, 2.3 billion adults are overweight and the prevalence is higher in females. Studies have shown that BMI is significantly correlated with total body fat for the majority of people [4].

Physical inactivity and sedentary lifestyle are leading metabolic disorder, cardiovascular disease, cancer, musculoskeletal disorder and psychological problem. In Europe the prevalence of obesity has increased by 10%-50% in the last ten years [5]. Current studies concluded that between 10% and 20% of men and 10% and 25% of women are obese [6]. Aerobic training is an activity which is performed with presence of oxygen. It has performed for long time. And it helps for improving cardiovascular endurance and reduces the body weight. Substantial documented evidence have shown that Aerobic trainings have independent effects on obesity [7].

High-intensity exercise training can successfully reduce body weight and abdominal fat [8]. Many people's understand that aerobic exercise has significant for reducing weight. But, they do not know which intensity of aerobics helps to reduce body weight [9].

Too many obese people work but, are not effective in addition; many researchers have not established which activity pressure is more useful than others to reduce obesity. Some studies about the effects of aerobic exercise on obese female. However, there is no comparison of studies which aerobic intensity {low, medium or high} is more important for reducing body weight in the case of Ethiopia. There for, this research was conducted to make a clear understanding about which intensity of aerobic exercise have more effect for reducing body weight.

The aim of this study was to examine the effect of 12 weeks of varied aerobic exercises intensity on overweight women.

## MATERIALS AND METHODS

This study was conducted in arbaminch Nechsar gymnasium which is located in SNNP state, Ethiopia. We conducted a 12 weeks randomized controlled trial. 40 obese sedentary females (age 18-32) were selected purposely for this experimental study. Those 40 females were randomly assigned into a light-intensity training group (LITG, n = 10), middle-intensity training group (MITG, n = 10), high-intensity training group (HITG, n = 10), and control group (CG, n = 10) which means the experiment was involved four groups {3 experimental and 1 control}. The exercise was given for three months on a treadmill, 3 days per week to overcome the cardio respiratory fitness. Each session contains 10-min warm-up, cool-down, and stretching periods. The duration of the exercise per session was 40 m - 60 m to overcome the effects aerobic exercise. The intensity of the exercise was {Low intensity 40%-50% MHR, medium intensity 50%-70%MHR and High intensity 70%-80% MHR} based on (MHR = 220 - Age of an individual) [10]. In order to keep participants health, we follow progression principle. Monday, Wednesday and, Friday at 11:00 pm - 12:00 pm was the training day. In this study the exercises were done with orientation, instruction, and supervision and sufficient support by the researcher and technical assistance.

Obesity was analyzed using five anthropometric measurements, including BMI, WHR, WH, HI, and % of BF. These measurements were performed after the participants removed their shoes and heavy clothing. The values of body height and weight were recorded in meters to the nearest 0.1 cm and 0.1 kg with a calibrated automatic height and weight scale. BMI was calculated using the following formula: BMI = bodyweight (in kg)/[height (in m)]$^2$. WHR was measured to the nearest 0.1 cm by using a flexible steel tape at the level midway between the lowest rib margin and the iliac crest. BF%, fat mass and fat-free mass was determined by skin fold caliper and using an online caliper calculator. The data was analyzed by paired sample t-test and ANOVA.

## RESULTS

The results of this study for all subjects considered together are summarized just like.

**Table 1:** The comparison of body composition following 12 weak training on control group.

| Variables | CG (n=10) | | |
|---|---|---|---|
| | Pre-test | Post-test | P-value |
| Body height(cm) | 1.54 ± 0.017 | 1.594 ± 0.017 | t-can't be computed |
| Body Weight (Kg) | 66.10 ± 1.20 | 66.90 ± 1.25 | 0.137 |
| BMI(Kg/m$^2$) | 26.84 ± 0.30 | 27.97 ± 0.38 | 0.132 |
| WHR | 0.81 ± 0.0072 | 0.81 ± 0.0076 | 0.234 |
| % of Body fat | 32.30 ± 0.213 | 31.54 ± 2.60 | 0.351 |

Abbreviation: BMI Body mass index; CG: Control Group; WHR: Waist Hip Ratio; SE: Standard Error Data are expressed as mean ± SE.

Results in table 1 indicate the value of p >0.05 means that there is no significance mean difference between pre and post-test on control group.

**Table 2:** The comparison of body composition following 12 weeks training on low intensity group.

| Variables | LG (n=10) | | |
|---|---|---|---|
| | Pre-test | Post-test | P-value |
| Body height(cm) | 1.59 ± 0.01 | 1.59 ± 0.01 | t-can't be computed |
| Body Weight (Kg) | 66.80 ± 1.22 | 64.50 ± 1.72 | 0.001 |
| BMI(Kg/m$^2$) | 26.44 ± 0.32 | 25.46 ± 0.35 | 0.010 |
| WHR | 0.83 ± 0.0065 | 0.81 ± 0.0092 | 0.003 |
| % of Body fat | 32.10 ± 0.34 | 31.20 ± 0.44 | 0.008 |

**Abbreviation:** BMI Body mass index; LG: Low Intensity Training Group; WHR: Waist Hip Ratio; SE: Standard Error Data are expressed as mean ± SE

The result of table 2 indicates that except the height of the body all (W, BMI, WHR and BF) p-value were less than 0.05 this means there is a significant mean difference between pre and post-test on low intensity training group.

**Table 3:** The comparison of body composition following the 12 weak training on medium group.

| Variables | MG (n=10) | | |
|---|---|---|---|
| | Pre-test | Post-test | P-value |
| Body height(cm) | 1.60 ± 0.0098 | 1.60 ± 0.0098 | t-can't be computed |
| Body Weight (Kg) | 68.40 ± 1.002 | 66.20 ± 0.99 | 0.001 |
| BMI(Kg/m$^2$) | 27.07 ± 0.30 | 25.80 ± 0.35 | 0.001 |
| WHR | 0.84 ± 0.0053 | 0.82 ± 0.0057 | 0.001 |
| % of Body fat | 32.50 ± 0.30 | 31.30 ± 0.21 | 0.001 |

Abbreviation: BMI: Body Mass Index; MG: Medium Intensity Training Group; WHR: Waist Hip Ratio; SE: Standard Error Data are expressed as mean ± SE.

The result of table 3 indicates that except the height of the body all (W, BMI, WHR and BF) p-value were less than 0.05 this means there is a significant mean difference between pre and post-test on low intensity training group.

**Table 4:** The comparison of body composition following 12-week training on high intensity group.

| Variables | HG (n=10) | | |
|---|---|---|---|
| | Pre-test | Post-test | P-value |
| Body height(cm) | 1.59 ± 0.01 | 1.59 ± 0.01 | t-can't be computed |
| Body Weight (Kg) | 67.82 ± 0.82 | 63.64 ± 0.76 | 0.000 |
| BMI(Kg/m$^2$) | 26.64 ± 0.46 | 25.004 ± 0.59 | 0.001 |
| WHR | 0.84 ± 0.0096 | 0.81 ± 0.011 | 0.001 |
| % of Body fat | 32.27 ± 0.42 | 31.18 ± 0.64 | 0.01 |

Abbreviation: BMI: Body Mass Index; HG: High Intensity Training Group; WHR: Waist Hip Ratio; SE: Standard Error Data Is Expressed as mean ± SE.

The result of table 4 indicates that, except the height of the body all (W, BMI, WHR and BF) p-value was less than 0.05 this means there is a significant mean difference between pre and post-test on low intensity training group.

**Table 5:** Mean difference in body composition following 12 week training programs.

| Variable | CG(n=10) | LIG(n=10) | MIG(n=10) | HIG(n=10) | P-Value | Tukey's post hoc test |
|---|---|---|---|---|---|---|
| Wp-W | 0.3 ± 0.213 | -2.3 ± 0.684 | 3.2 ± 0.416 | -4.182 ± 0.44 | 0.0001 | HIG, MIG>LIG>CG |
| BMIP-BMI | -0.07 ± 0.95 | -0.979 ± 0.344 | -1.26 ± 0.154 | -1.636 ± 0.149 | 0.0001 | HIG>MIG>LIG>CG |
| WHRP-WHR | -0.01 ± 0.03 | -0.019 ± 0.005 | -0.02 ± 0.004 | -0.03 ± 0.004 | 0.0001 | HTG, MIG>LIG>CG |
| BFP-BF | 0.0 ± -0.14 | -0.900 ± 0.277 | -1.20 ± 0.259 | -1.09 ± 0.368 | 0.0001 | HTG>MIG>LIT>CG |

Abbreviation: BMI: Body Mass Index; BMIP: Body Mass Index During Post-Test; CG: Control Group Low Intensity Training Group; MG: Moderate Intensity Training Group; HG: High Intensity Training Group; WHRP: Post-Test of Waist Hip Ratio; WHR: Waist Hip Ratio; BFP: % of Body Fat During Post-Test; BF: % of Body Fat; SE: Standard Error Data are Expressed as mean ± SE.

Table 5 also presents the differences in the changes in body composition components among the four groups. ANOVA indicated significant means group effects for changes in the body WEIGHT, BMI, WHR, %BF, (all p <0.05); Furthermore, post hoc comparisons revealed that the changes in body WEIGHT, WHR, were significantly higher in the HITG and MITG compared with the LITG and CG; changes in the HITG and MITG did not differ significantly, whereas those in the LITG and CG did. In addition, the changes in BMI and BF%, significantly differed among the four groups.

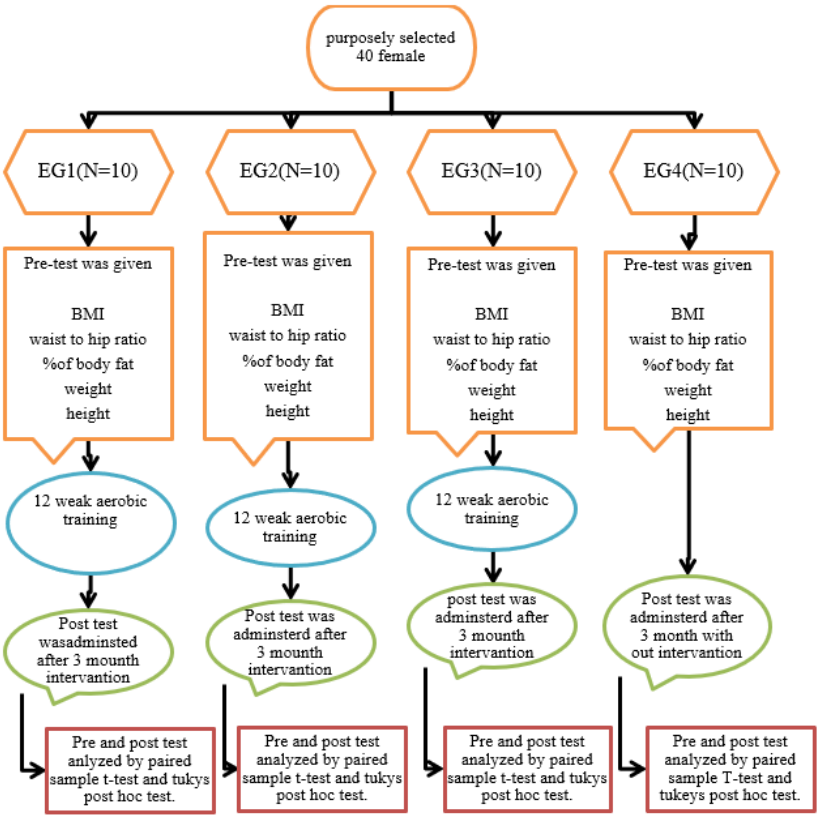


**Figure 1:** Chart about methodology of research.

The changes in the body composition, fitness among the four groups between baseline and Week 12 are presented in Table 1 - Table 4. At Week 12, the HITG showed significant improvement in body composition in ($p \leq 0.05$). Similarly, the body composition measurements significantly improved in the MITG and LITG; In addition, no significant changes were observed in any of these Table 5 also presents the differences in the changes in body composition among the four groups. ANOVA indicated significant means group effects of changes in the body weight, BMI, WHR, BF, (all p <0.05); however, the changes in body weight did not have significant differences in the group effects. Furthermore, post hoc comparisons revealed that the changes in body weight, WHR, BMI and BF, were significantly higher in the HITG and MITG compared with the LITG and CG; changes in the HITG and MITG did not differ significantly, whereas those in the LITG and CG did differently.

## DISCUSSION

In this experimental study, we examined the effect of aerobic exercise at three intensities on body weight and body fat of overweight individuals. After a 12 weeks exercise intervention, higher intensity exercise training

(HITG and MITG) led to significantly more changes in body composition. Body weight, WHR, BMI, and BF were significantly improved in the HITG and MITG compared with those in the LITG and CG.

Our results are consistent with those of previous studies: high-intensity training is more effective in decreasing. The higher exercise intensity and energy expenditure may be involved in improving body composition Compared with low-intensity exercise, high-intensity exercise may reduce body weight and body fat significantly, when the energy expenditure is equal, taken together, higher exercise intensity may result in significantly higher long-term reduction in body fat compared with lower exercise intensity. This finding is consistent with recent studies showing that long-term exercise training may not affect energy intake and reduce the benefit of weight loss. Fat (-1.7% ± 0.1%) decreased significantly in the LITG. Exercise training for 150 minutes - 250 minutes per week effectively reduces body weight. Exercise at the similar duration and intensity can also reduce body weight and body fat. These findings are consistent with those of our study, suggesting that three sessions of light intensity training for 60 minutes per day effectively reduce body weight and body fat in sedentary obese people.

## REFERENCES


1. Deurenberg P, Deurenberg-Yap M, Guricci S et al. (2002) Asians are different from Caucasians and from each other in their body mass index/body fat per cent relationship. Obesity Reviews 3(3): 141-146.
2. Neovius M, Janson A, Rossner S (2006) Prevalence of obesity in Sweden. Obesity Reviews 7(1): 1-3.
3. Flegal KM, Carroll MD, Kuczmarski RJ et al. (1998) Overweight and obesity in the United States: Prevalence and trends, 1960-1994. International Journal of Obesity and Related Metabolic Disorders 22(1): 39-47.
4. Du Plessis SS, Cabler S, McAlister DA et al. (2010) The effect of obesity on sperm disorders and male infertility. Nature Reviews Urology 7(3): 153-161.
5. Varo JJ, Martínez-González MA, Alfredo M et al. (2002) Obesity prevalence in Europe. Anales del sistema sanitario de Navarra 25(1): 103-108.
6. Martins D, Wolf M, Pan D et al. (2007) Prevalence of cardiovascular risk factors and the serum levels of 25-hydroxyvitamin D in the United States: Data from the Third National Health and Nutrition Examination Survey. Archives of Internal Medicine 167(11): 115
7. Sarsan A, Ardiç F, Ozgen M et al. (2006) The effects of aerobic and resistance exercises in obese women. Clinical Rehabilitation 20(9): 773-782.
8. Lee MG, Park KS, Kim DU et al. (2012) Effects of high-intensity exercise training on body composition, abdominal fat loss, and cardiorespiratory fitness in middle-aged Korean females. Applied Physiology, Nutrition, and Metabolism 37(6): 1019-1027.
9. Chiu CH, Ko MC, Wu LS et al. (2017) Benefits of different intensity of aerobic exercise in modulating body composition among obese young adults: A pilot randomized controlled trial. Health and Quality of Life Outcomes 15(1): 1-9.
10. Borresen J and Lambert MI (2008) Autonomic control of heart rate during and after exercise. Sports Medicine 38(8): 633-646.