

# Effects of Aerobic Exercise on Improving Health Related Physical Fitness Components of Dilla University Sedentary Female Community

Mr. Mathewos Hosiso<sup>1</sup>, Dr. Sangeeta Rani<sup>2</sup>, Dr. Shemelis Rekoninne<sup>3</sup>

<sup>1</sup> Lecturer, Dilla University, Ethiopia

<sup>2</sup> Assistant Professor, Haramaya University, Haramaya, Ethiopia

<sup>3</sup> Assistant Professor, Haramaya University, Haramaya, Ethiopia

**Abstract-** The study was conducted to investigate the effect of aerobic exercise on improving health related physical fitness components of Dilla University sedentary female community. Twenty females from Dilla university sedentary female community were selected as study subjects and their age range were 22-28 years. All Selected subjects were participated in moderate intensity aerobic exercise for 12 consecutive weeks, i.e. 3 days per week 60 minute duration per day. Pre, during and post training tests were conducted on the components of health related physical fitness variables. The data collected from the study subject was analyzed using SPSS version 16 software. The data pertaining to health-related physical fitness components were analyzed by paired sample 't' test to determine the difference between initial and final mean for participant. According to analyzed data in 12 meter run 724.8 mean difference was recorded. The mean difference value boosted in push up performance by 5.4 after 12 weeks aerobic exercise. In sit up and sit and reach test 4.7 and 4.52 increments were observed respectively. But in body mass index 2.18 decrement and in body weight 5.8 reduction were observed throughout the study period. The result obtained in this study indicated that there were significant improvement in cardiovascular endurance, muscular endurance, muscular strength and flexibility but in the case of body mass index and body weight there were reduction. Based on this finding, it can be concluded that Moderate aerobic exercise has positive effect on improvement of health related physical fitness components of sedentary female communities

**Index Terms-** Aerobic exercise, improving health related physical fitness components, sedentary females

## I. INTRODUCTION

Fundamental movements of man, which they have achieved from their pre-human ancestors, are walking, running, jumping, climbing, throwing, pulling, pushing etc. By permutation and combination of these basic fundamental movements, man has developed various secondary movements essential for day-to-day living and for the use in games and sports. Physical fitness is important for all human beings, irrespective of their age. A given work may not be carried out if the required physical strength is not available. Fitness is the first and foremost thing to enjoy the life fully (Reddy, 2012).

Regular physical activity, fitness, and exercise are critically important for the health and wellbeing of people of all, whether they participate in vigorous exercise or some type of moderate health-enhancing physical activity. Even among frail and very old adults, mobility and functioning can be improved through physical activity (Butler *et al.*, 1998).

Regular aerobic exercise will produce beneficial effects for any age group providing the exercise is specific and appropriate to the level of fitness of the individual. Progressive exercise correctly performed will increase the level of fitness and improve health. It will also create a sense of well-being, produce greater energy and reduce the risk of developing many diseases. Exercise makes demands on the body systems over and above normal every day activities and as result the systems adapt anatomically and physiologically (Rosser, 2001).

Appropriate regular daily physical activity is a major component in preventing chronic disease, along with a healthy diet and not smoking. For individuals, it is a powerful means of preventing chronic diseases; for nations, it can provide a cost effective way of improving public health across the population. Available experience and scientific evidence show that regular physical activity provides people, both male and female, of any conditions including disabilities with a wide range of physical, social and mental health benefits. (WHO 2003)

Fitness for living in the house or on the farm or at office or factory or in work places or in any service implies freedom from disease, enough strength, endurance and other abilities to meet the demands of daily living. Doing physical activity everyday contributes to optimum health and quality of life. Life styles can be changed to improve health and fitness through daily exercises. Aerobic exercise stimulates heart, lungs and all working group of muscles and produces valuable changes in body and mind. Many physiological changes are determined by daily aerobic exercises (Shahana *et al.*, 2010).

Many research studies says physical exercise are important for the development of all physical fitness but no research was done in Ethiopia specially in Dilla University on women health related physical fitness problems. Now a days in our country Ethiopia, because of sedentary life style most people are attacked by chronic disease such as; coronary heart disease, hypertension, diabetes, and Some other upcoming diseases. According to many research studies finding physical inactivity is one of the causes for development of chronic disease and poor fitness. Similarly, in Dilla University people are living sedentary lifestyle due to poor culture of having regular physical exercise. Therefore. The

research investigated the effects of aerobic exercises on improvement of health related physical fitness components of Dilla university sedentary female community

II. MATERIALS AND METHODS

Study Design

In this study informal experimental design was applied. The layout for this study was as the follows:

**Table1. The study design layout**

Treatment	Aerobic exercise program
Frequency	3days/week
Total duration	12 weeks
Duration /session	40-60 minutes
Intensity	Moderate (55-69HR <sub>max</sub> )
Exercise days	Monday, Wednesday and Friday
Time of training	Morning

**Sample Size and Sampling Technique**

For this study stratified random sampling was used to select subjects. Because of Dilla university sedentary female community holds students, staff members and householders. Total number of females who willingly registered to participate in this study were 65 .Based on medical history questionnaire as well as inclusion and exclusion criteria 5 participants were excluded and 60 sedentary female were full filled inclusion criteria. To select appropriate representative from those sedentary female community three strata were made and they were grouped in to Students, Staff members and Householder (non-workers) and they were considered asP<sub>1</sub>, P<sub>2</sub> and P<sub>3</sub> respectively and then the following formula was conducted.

$$n_1 = \frac{n(p_1)}{N}$$

**Methods of Data collection and Data Analysis**

The data collected through fitness tests like 12 minutes run/walk test for cardiovascular endurance, push up test for muscular strength, sit up test for muscular endurance, sit and reach test for flexibility, and body mass index (BMI) test for body composition and the collected data were analyzed

interpreted and tabulated in to a meaningful idea using manually and in computer in order to compare the health related physical fitness variable changes observed among participants that underwent aerobic exercise program. Data was analyzed using computerized statistical package software (SPSS). The paired t-test was used to compare the pre training and post training data. The level of significance was 0.05

III. RESULT AND DESCUSSION

To achieve the purpose of the study 20 females from Dilla university sedentary female community were selected as subjects and their age was 22-28years.Aerobic exercise was given for 12 consecutive weeks The variables selected for this study were health related physical fitness components. Pre, during and posttest were conducted for all the 20 subjects on health related physical fitness components and the scores were recorded and then the collected data were analyzed by paired t-test by using SPSS. The results for each fitness variables are discussed below.

**Table2. Mean values of 12<sup>th</sup> minute run/walk and push up for Dilla University sedentary female community**

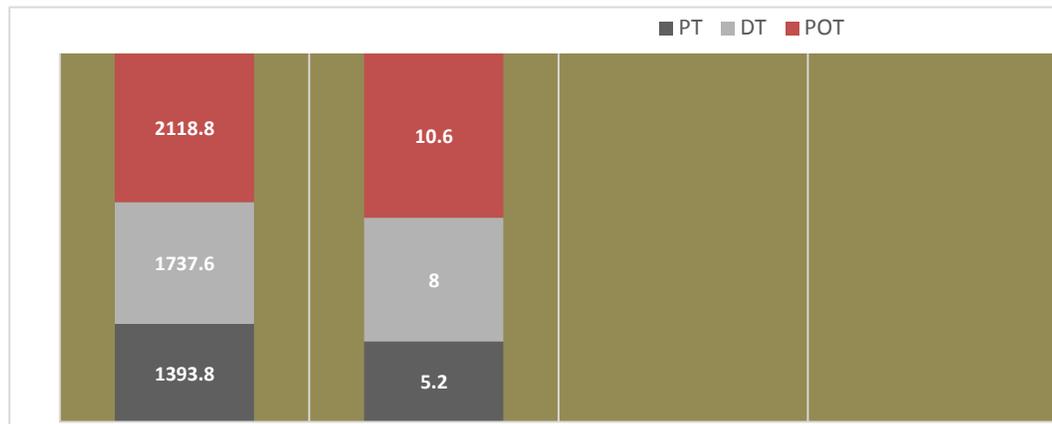
Aerobic exercise			
Dependent variables	PT	DT	POT
	Mean ±SD	Mean ± SD	Mean ± SD
12 minute run	1393.6±289.03	1737.8±253.910	2118.6 ± 261.251
Push up	5.200 ± 2.8760	8.000 ± 2.65568	10.600 ±3.2991

Values are mean ± SD, PT = pre training test which was taken before aerobic exercise, DT=during training test which was measured at 6<sup>th</sup> week of aerobic exercise, POT= posttest which was taken after 12<sup>th</sup> week of aerobic exercise training.

The above table 2 showed that there was significant difference in-between the pre to post test score. The improvement in performance was due to the aerobic exercise in which they were engaged in. The mean score value for 12minute run/walk test before aerobic exercise was 1393.8,during training test was 1737.6m and after training mean score value was 2118.6m,. When we compare the mean value score of before

tarining test with the mean score values of after 12 weeks aerobic exercise,the mean difference value increased by 724.8m(52%).This result indicated the effective change was observed on participants cardiovascular fitness level and muscular strength

Figure 1. Pre, During and Post (CVE) 12meter run/walk and push up (Muscular strength) test result for Dilla University sedentary female community



As indicated in the table 2 and figure 1 the push up Mean value of pre training test result was 5.200 during traing test was 8.00 and posttraining test was 10.60. When we compare performance of an individuals before training test result to after training test 5.4 mean difference was recoded. The improvement in pushup performance implies an enhancement in muscular strength. From this result it is possible to concluide that aerobic exercise has positive effects on push up performance, indeed in

muscular strength. results matched with the finding of Selvam and his friend. They conducted a study on selected effect of aerobic exercise on selected physiological variables among college girls. Their study finding revealed that aerobic exercise uses large muscle groups rhythmically and continuously and elevates the heart rate and breathing for a sustained period. (Selvam and sudha 2008)

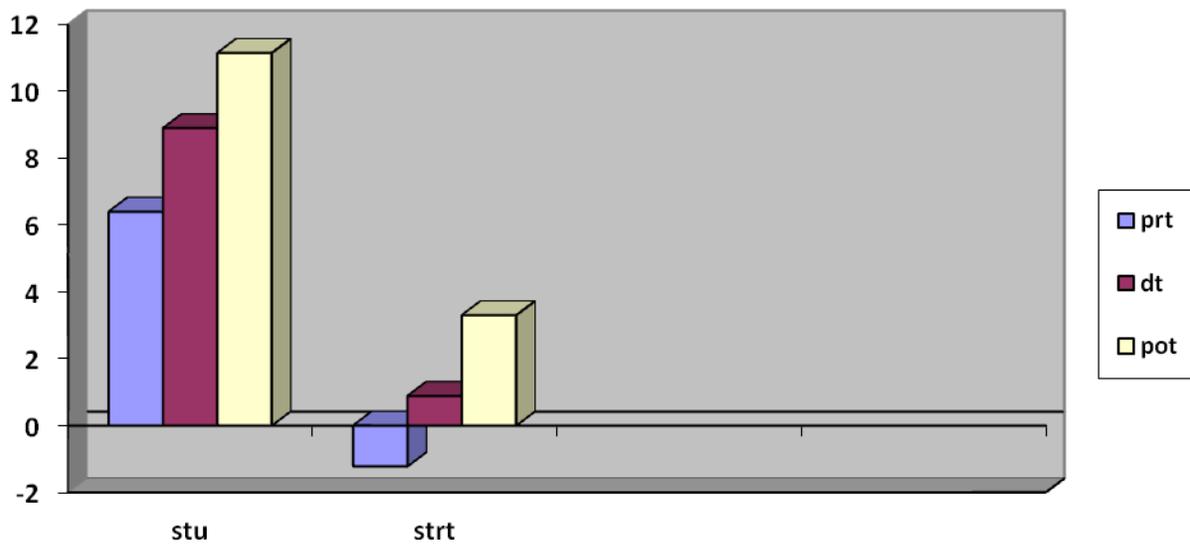
Table 3. Pre, during and Post training test Mean values of sit up (number/ minute) and, sit and reach test (cm).

Aerobic exercise			
Dependent variable	PT Mean ±SD	DT Mean ±SD	POT Mean ±SD
SU	6.4000±6.57227	8.9000±6.71134	11.1500±7.02833
STRT	-1.2200±6.57216	0.8850±5.9194	3.3000±5.22987

Values mean ± SD, PT = pre training test which was taken before aerobic exercise, DT= during training test measured at 6<sup>th</sup> week of aerobic exercise, POT= posttest which taken after 12<sup>th</sup> week of aerobic exercise training, SU=sit up, STRT=sit and reach test

The data (table 3) showed that there were significance difference before the exercise and after 12 weeks of aerobic exercise on individuals' sit up and sit and reach performance. The mean values of sit-ups (number/minute ) were 6.40 in before aerobic exercise, which was improved to 8.90in during test and improved by 11.15 after 12 week aerobic exercise test, this means the sit up performance improved by 4.75 (79%) after 12 weeks of aerobic exercise. The main reason for these improvements was due to aerobics exercise they took in the gymnasium. The above table also revealed the sit and reach

performance. The mean value of sit and reach flexibility test was -1.22, 0.8850 and 3.30 for pre, during and posttest respectively. When we compare the mean value of pretest result with post test result 4.52 increments was observed .The improvement of the rate of this data was one indicator of the improvement of the participant's range of motion in the joints. The reason behind this change was aerobic exercise training that they were engaged in



**Figure2. Sit up (Muscular strength) and sit and reach (Flexibility) test results of pre, during and after 12 weeks aerobic exercise.**

The results in Figure 2 showed the improvement of sit-up and sit and reach performance due to the 12 weeks aerobic program. The finding of this study was corroborated by Li *et al.* (2006) who did his study on the Effectiveness of Aerobic Exercise Intervention on Worksite Health-Related Physical

Fitness -A Case in a High-Tech Company. His study finding indicated that 12-week aerobic exercise program was effective in improving the abdominal muscle strength and endurance of employees of a high-tech company

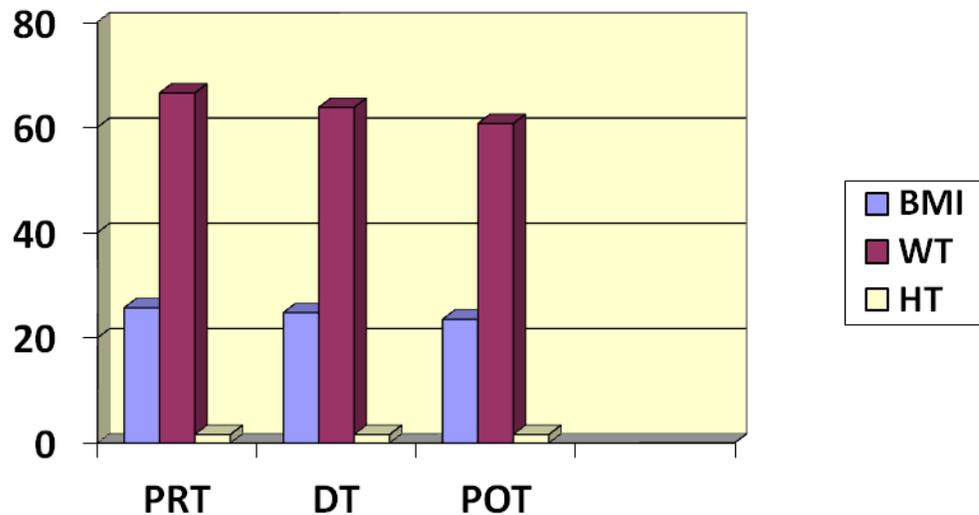
**Table 4. Mean values for Bodyweight (kg), height (m) and body mass index (kg/m<sup>2</sup>) of Dilla University sedentary female communities before, during and after aerobic exercise program.**

Aerobic exercise			
Dependent variable	PT	DT	POT
WT(KG)	66.5000±8.59927	63.9000±8.16862	60.7000±8.11172
HT(M)	1.6060±0.06492	1.6060±0.06492	1.6060±0.06492
BMI	25.678±2.4333	24.7531±2.30416	23.4960±2.24224

Values are mean ± SD, PT= pre training test which was taken before aerobic exercise, DT=during training test which was measured at 6<sup>th</sup> week of aerobic exercise, POT= posttest which is taken after 12<sup>th</sup> week of aerobic exercise training, WT =Weight, HT =height, BMI=body mass index.

As indicated in table 4, the mean values of participants' weight was 66.5 before aerobic exercise, this was reduced to 63.9 in during exercise and 60.7 after 12 weeks aerobic exercise. This mean totally the mean of weight was reduced by 5.8kg throughout the study period. This was due to the 12 week's aerobic exercise

under which the participants went through. The result also showed that the height was same throughout the study. Which indicates no significance difference was observed on height of participants. But it was taken to calculate body mass index



**Figure 3 Bodyweight, height and body mass index pre, during and posttest results of participants**

According to table 4 and figure 3, significance difference was observed on the mean value of BMI. The mean values of an individual's before exercise was 25.676 which was decreased to 24.753 and 23.496 during and after aerobic exercise respectively. At the end of the study, the mean value of participants BMI was significantly reduced by 2.18kg/m<sup>2</sup>. One of the major benefits of aerobic exercise that reducing risk of obesity by ensuring healthy body composition. Both body mass index and body weight of individuals was highly reduced by 12 weeks aerobic exercises, the main reason of this change might be increase of daily calories expenditure of participants during aerobic exercise. This result was consistent with the finding of Willis and his friends. The result of their investigation showed that Aerobic exercise was efficient method of exercise for losing body weight and body fat (Willis *et al.*, 2012). This result was also agreed with finding of Arslan. He pointed out eight weeks step aerobic dance exercise significantly decreased body composition parameter of middle aged sedentary obese women (Arslan, 2011). Aerobic exercise including walking, running, and swimming has been proven to be an effective

#### IV. CONCLUSIONS

Based on the major finding of the study, the following points are stated as conclusion

- ❖ Moderate aerobic exercise has positive effect on improvement of cardiovascular endurance, muscular strength, muscular strength and flexibility of sedentary female communities
- ❖ Aerobic exercise significantly reduced the body mass index and body weight of sedentary female
- ❖ Moderate aerobic exercise has significant effects on improvement of health related physical fitness components.

#### REFERENCES

- [1] Arslan, J., 2011. Conducted on the study on the effects of an eight-week step-aerobic dance Exercise programme on body composition parameters in middle-aged sedentary obese women. *International Sport Med Journal*, 12 (4):160-168
- [2] Butler, R.N., R. Davis and C.B. Lewis, 1998. Physical fitness: benefits of exercising for the Older patient. *Geriatrics*, 3(10):46-62.
- [3] Lin, L.C., H.M. Tseng; R.F. Tseng and J. L.Show, 2006. The Effectiveness of an Aerobic Exercise Intervention on Worksite Health-Related Physical Fitness A Case in a High Tech Company. *Med J.*, 29(1):100
- [4] Reddy, M., 2012. Comparison of Circuit Training Methods on Performance Variables of Sc/St Non-Sc/St Boys. *International Journal of Multidisciplinary Research*, 2 (4): 2231 -5780
- [5] Rosser, M., 2001. *Body Fitness and exercises*. 2nd edition. p32
- [6] Shahana, A., S.N. Usha and S.S. Hasrani, 2010. Effect of Aerobic exercise program on Health Related physical fitness components of middle Aged women. *Br J Sports Med.*,
- [7] Selvan V.S., 2008. "Effect of Aerobic Exercise on Selected Physiological Variables among College girls" A Paper Presented at National Seminar on Professional and Scientific Approaches in Physical Education and Sports Sciences.
- [8] WHO, 2003 Global strategy on Diet, Physical activity and Health. <http://www.who.int/dietphysicalactivity/media/en/gsfspa>. Accessed on October 20(2012)
- [9] Willis, L. H., C.A. Sletzer, L.A. Bateman, A.T. Shields, L.W. Piner, C.W. Bales, J. A. Houmard and W. E. Kraus, 2012. Effects of aerobic training on body mass and Fat mass in overweight or Obese adults. *Journal of Applied Physiology*, 113 (12):1831

#### AUTHORS

**First Author** – Mr. Mathewos Hosiso, Lecturer, Dilla University, Ethiopia

**Second Author** – Dr. Sangeeta Rani, Assistant Professor, Haramaya University, Haramaya, Ethiopia

**Third Author** – Dr. Shemelis Rekoninne, Assistant Professor, Haramaya University, Haramaya, Ethiopia

