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## The effects of selective aerobic exercise on cardiovascular fitness in Debre Markos preparatory school sedentary female students

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### Abstract

The study conducted to investigate the effect of aerobic exercise on improving cardiovascular fitness of Debre Markos preparatory school at Debre Markos town.15, sedentary preparatory school female students selected as the study subjects and their age range from 16-18 years old. All chosen participants participated in moderate-intensity aerobic exercise for 8 consecutive weeks (3 days per week), 40-60 minutes duration per day.12 minutes run test and step test used, and pre, during, and after training test conducted on cardiovascular fitness variables. The data collected from the study analyzed quantitatively using descriptive statistics of central tendency of mean and standard deviation and determined the difference between initial and final mean scores for participants. The results of 12 minutes run test mean difference (826.86 meters), and the in-step, test mean difference (28.13 minutes) per set and also 12 minutes run test result (73.33%) of participants recorded under good performance zone and 26.66% of them positioned under the marginal zone after training. Based on the findings, it can conclude that moderate aerobic exercise has a positive effect on the cardiovascular fitness of Debre Markos preparatory school sedentary lifestyle female students.

**Keywords:** Aerobic exercise, effect, cardiovascular fitness, endurance, sedentary lifestyle

### 1. Introduction

Aerobic Exercise is an activity that strengthens the lungs and heart, and it improves the body's ability to using oxygen. It can improve heart rate and blood pressure as well as breathing system [1] cardiovascular fitness is vital for all human beings, irrespective of their age. According to [2] given work may not carry out if the required physical strengthen is not available. Fitness is the first and foremost thing to enjoy life fully. Regular physical activity, fitness, and exercise are critically important for the health and wellbeing of people of all whether they are participated in vigorous exercise or some type of moderate health-enhancing physical activity. Even for very old adults, mobility and functioning can improve through physical activity.

Aerobic activity should be an integral part of every exercise prescription for an apparent health individual. Still, how much in aerobic relation with resistance training depends in large part on each client's current condition and his or her fitness goals. Whether working with someone who was previously sedentary or a world-class athlete's fitness-related goals should be precise possible, and future objectives. Measurement to make to ensure the clients are progressing towards those goals, whether they are fat reduction, general fitness, or competitive athletes

Appropriate regular physical activity is a major component in preventing chronic disease, along with a healthy date and not smoking for individuals. Daily physical activity is a powerful means of preventing chronic disease. A reliable experience and scientific evidence show that regular physical activity provides people with both males and females of any conditions, including disabilities with a wide range of physical, social, and mental health benefits [3].

Aerobic Exercise is sometimes known as the cardio exercise that requires the pumping of oxygenated blood by the heart to deliver oxygen to working muscle and stimulates the heart rate and breathing rate to increase in a way that can sustain for the exercise session. There are different of aerobic Exercise such as cardio machine, spinning, running, swimming, walking, jogging and dancing are the aerobic exercise that can help to prevent the chance of developing some cancers, diabetes, depression and cardiovascular disease [4].

Regular aerobic Exercise will produce beneficial effects for many age groups providing the specific exercise with that appropriate to the level of fitness of the individual [5].

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The progress of practice correctly performed will increase the level of fitness and improve health conditions [6]. It also creates a sense of wellbeing that produces more considerable energy and reduces the risk of developing many diseases. The body system may demand vigorous, and above normal activities, the result adopts anatomically and physiologically [7].

Therefore, to fill the research gap based on the above scholar idea and review literature, besides the observation and experience of the researcher was to investigate the effect of selective aerobic exercise on cardiovascular fitness of Debre Markos preparatory school sedentary female students.

## 2. Methods and Materials

### 2.1 Participants

The targeted population of the study considered 45. Based on medical history, questionnaires as well as inclusion and exclusion criteria, 30 participants were excluded, and 15 sedentary female students were fulfilling inclusion criteria of sample.

### 2.2 Measures

The particular employed physical quality measurements took a pre-test and post-test were took place whether selective aerobic exercise were positive effects on cardiovascular fitness or not, pre-exercise during practice and post-exercise experimental tests. In order to now the effect of aerobic exercise on cardiovascular fitness, an international standard of 12-minute and step test standards were employed.

**Table 1:** Standards of 12-minute run test

| Classification        | Age Categories |           |           |           |
|-----------------------|----------------|-----------|-----------|-----------|
|                       | 17-26          | 27-39     | 40-49     | 50+       |
| High performance zone | 2320+          | 2160+     | 2000+     | 1840+     |
| Good fitness zone     | 2000-2319      | 1920-2159 | 1840-1999 | 1680-1839 |
| Marginal zone         | 1840-1999      | 1680-1919 | 1600-1839 | 1520-1679 |
| Low zone              | <1840          | <1680     | <1600     | <1520     |

Adopted from Concept of physical fitness for wellness 10th edition, Charles B. Corbin Ruth and Grey Welk (2000)

**Table 2:** Standard of the step test

| Classification            | 60-second heart rate |
|---------------------------|----------------------|
| The high-performance zone | 84 or less           |
| Good fitness zone         | 85-95                |
| Marginal zone             | 96-119               |
| Low zone                  | 120 and above        |

Adopted from Concept of physical fitness for wellness 10th edition, Charles B. Corbin Ruth and Grey Welk (2000)

### 2.3 Methods

The method of the study is descriptive statistics of mean and standard deviation. The collected data were analyzed, interpreted, and tabulated into meaning full idea using tables with appropriate standards. The variables chosen for this study were cardiovascular fitness and step test. Pre, during, and posttest conducted for all 15 subjects and the scores recorded, then the collected data was analyzed quantitatively by descriptive statics of central tendency.

## 3. Results and Discussion

**Table 3:** Step test before, during and after training

| Standard classification | Before training | %   | During training | %   | After training | %     |
|-------------------------|-----------------|-----|-----------------|-----|----------------|-------|
| High performance zone   | -               | -   | -               | -   | -              | -     |
| Good fitness zone       | -               | -   | -               | -   | 11             | 73.33 |
| Marginal zone           | -               | -   | -               | -   | 4              | 26.66 |
| Lower zone              | -               | -   | -               | -   | -              | -     |
| Total                   | 15              | 100 | 15              | 100 | 15             | 100   |

According to table 3, no subject has high performance, reasonable fitness, and marginal zone level before and during training. All participants located in the low zone, but after practice, 73.33% of the participants positioned under a

good fitness zone, and 26.66% of participants located under the marginal zone. This result indicated that effective change was observed on the participant's cardiovascular level after they engaged in some selective aerobic exercise.

**Table 4:** Mean value of 12-minute run test and step test

| Dependent variables | Mean Scour Before training | Mean Scores during training | Mean scour after training |
|---------------------|----------------------------|-----------------------------|---------------------------|
| 12 minute run test  | 1200.2                     | 1708.46                     | 2027.06                   |
| Step test           | 123.06                     | 101.33                      | 94.93                     |

According to table 4, there results were significant difference between pre to post test scores due to the effects of aerobic exercise. As a result, the mean score of 12 minutes run test before selective aerobic exercise was 1200.2 meter, the test measurement taken after the 4<sup>th</sup> week of aerobic exercise calculated 1708.46 meters and after training test measured after 8<sup>th</sup> week of aerobic exercise increases to 2027.06 meter. When the results of mean score before training test compared with the mean scores after 8<sup>th</sup>-week aerobic exercise, the mean difference scours increased by 826.86 meters (69%). The effect result aerobic exercise

indicated that the more the average change observed on participants' cardiovascular fitness levels.

The mean score result for step test before training was 123.06 bpm, during training test the scour estimated 101.33bpm, and after training test adoption take place the score confirmed 94.93bpm. Comparing the mean scores before training test with the mean scores of 8<sup>th</sup> weeks of aerobic exercise, the mean difference reduced by 28.13bpm. Therefore, the progress observed due to the eight consecutive week's aerobic exercise under the supervision of the researcher bought consistent change on the participants' heart rate.

**Table 5:** Standard deviation of the above result to mean

| Dependent variables | SD before training | SD during training | SD after training |
|---------------------|--------------------|--------------------|-------------------|
| 12 minute run test  | 310.14             | 441.49             | 523.83            |
| Step test           | 31.78              | 26.17              | 24.52             |

According to the numerical values indicated in table 5, 12-minutes run test before training the mean scores of cardiovascular fitness deviated positively by 310.14. During training of 4<sup>th</sup> weeks of aerobic exercise, the mean scores of cardiovascular endurance varied positively by 441.49. After the practices of two weeks, the mean scores of cardiovascular fitness deviated positively by 523.83. From the above-depicted result, anyone can infer that selective aerobic exercise increases the effect of cardiovascular fitness.

The step test measured before training, the mean score of cardiovascular fitness deviated positively by 31.78. Throughout training of 4<sup>th</sup> weeks, the mean scores of cardiovascular fitness differed positively by 26.17. After taken of 8<sup>th</sup> training weeks, the mean scores of cardiovascular fitness varied positively by 24.52. Therefore, the result mean score indicates that there was effective change observed on participants' cardiovascular fitness heart rate.

The results of step test before, during and after training calculated using descriptive statistics show that 73.33% of the participants positioned under a good fitness zone, and 26.66% of were located under the marginal zone standards. Any one simply conclude that the results of the study indicated the effectiveness change observed on the participant's cardiovascular observed with the average scores of 94.93 heart bpm. According to [8] the result of cardiovascular fitness conditioning has a direct positive effect on muscular endurance and indirect impact on strength and flexibility uptake oxygen with the working muscles participate in physical activities build the muscle and stores energy for the maximum efforts [9]. Mentioned the impact of aerobic exercise which could be an effective way to increase the endurance of the cardiopulmonary system by maintaining the aerobic phase of exercise in many styles.

The finding of the study considering the mean scores of 12 minutes run test before involving in some selective aerobic exercise was 1200.2 and exceed to 2027.06 meters after eight week of aerobic exercise training, increased by MD of 826.86 meters (69%) computed using descriptive statistics of central tendency. The effect result of aerobic exercise indicated that more than average scores observed on participants' cardiovascular fitness levels.

In association with the finding of the study [8] and [10] suggests that anaerobic exercise is a form of exercise that requires continuous use of oxygen over an extended period of usually time for at the list for 15 to 30 minutes to develop cardiovascular endurance. Similarly [11], recommend that aerobic exercise always be performed for the target heart rate of cardiovascular benefit between 60 to 90% difference between resting heart rate and maximum heart rate. The maximum heart rate is 220 minutes for the age of average resting heart rate is about 70bpm. To achieve and maintain cardiovascular endurance, people should be exercising 3 to 5 days per week. The exercise session should include 15 to 60 minutes of continuous aerobic activity. The number of minutes depends on the intensity of the activity. In supporting, The American College of Medicine tends to

favor the aerobic exercise of longer duration with less intensity. When this plan followed, there is more likely to be a total fitness effect and less likely to be any health hazards [10].

The results of standard deviation in performing 12 minutes run test, the mean scores of cardiovascular fitness before training deviated positively from 310.14 by 523.83. And the step test of cardiovascular fitness before practices varied undoubtedly by 31.78 to 24.52. Consequently, the effective change observed on participants' cardiovascular fitness parameters of heart rate adopted. In supporting the idea stated above, [8] indicates that active people increase their life expectancy by two years compared to those who are inactive. Sedentary people experience 20% to a two-fold increase in early death compared to active people. They all so physical inactivity, in combination with poor eating patterns, ranks with tobacco use among the leading preventable contributors to death and can contribute exposed to risk factors for anxiety, cardiovascular disease, breast cancer, depression, diabetes, and high blood pressure. According to [11] aerobic exercise can prevent the chance of developing some cancers, diabetes, depression, cardiovascular disease, and osteoporosis [12].

Regarding the benefits of aerobic exercise for a sedentary person [1] suggests that strengthening muscles, facilitate the flow of air in and out of lungs, strengthening and enlarging heart muscle to improve its pumping efficacy and reduce resting heart rate; improving circulation efficiency and lowering blood pressure and increase the total number of red blood cells in the body, facilitating the transport of oxygen, improve mental health; including reducing stress and lowering the incidences of depression and reducing the risk for diabetes; enhancing the ability of muscles to use fats during exercise and improving the speed at which muscle recover from high-intensity exercise and increase storage of energy molecules such as fat and carbohydrates within the muscles allowing for boosting endurance.

Furthermore, cardiovascular fitness affected many physiological parameters, including heart rate, stroke volume, cardiac output, and maximum oxygen consumption. Understanding the relationship between cardiorespiratory and endurance training requires a review of changes that occur with increased aerobic or anaerobic capacity. An early study by [13] aerobic capacity increases general metabolism rises, muscle metabolism, hemoglobin raise, increase bloodstream rate, improved venous return, and improved stroke volume.

#### 4. Conclusion

Based on the major finding of the study, the effect of selective aerobic exercise on cardiovascular fitness concludes as the following points, respectively:

- Moderate aerobic exercise has a positive impact on the improvement of cardiovascular fitness through regular physical exercise plan during training.
- Selective aerobic exercise (walking, jogging, rope skipping, long-distance running, bicycling, aerobic dance) have a significant effect on the improvement of

health and wellbeing of sedentary people thereby the test of 12minute run and step test.

- Regular aerobic exercise has a positive effect on cardiovascular fitness, and these relatively intended positive effects lead to increase stroke volume, lower resting heart rate, lowering blood pressure, diabetes, asthma, and other upcoming hypokinetic disease.

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