

**COMPARATIVE EFFECTS OF THREE TYPES OF  
TRAINING PROGRAM ON MOTOR PHYSICAL FITNESS  
VARIABLES OF BEGINNER MIDDLE DISTANCE  
RUNNERS OF SAGURE TOWN ATHLETICS CLUB**

**Getu Shiferaw**\*

**Sangeeta Rani**\*\*

**Molla Deyou**\*\*

**ABSTRACT**

*Training programs are most important for the athletes due to their long term effect and several methods have been developed to get reliable information about the aerobic and anaerobic capacity of middle and long distance runners. The purpose of this study was also to find out the comparative effects of aerobic, anaerobic and combined training program on performance development of selected motor physical fitness variable among Sagure Athletics club Athletes. To achieve this purpose of the study 30 male athletes were selected from sagure Athletics club as a subject and their age were 14-18 year. They were randomly assigned in to three groups, aerobic (group A), anaerobic (group B) and combined group (group C). Each group consisted of 10 subjects. All three groups participated in supervised aerobic, anaerobic and combined training program 3 days/week for 12 weeks. The parameters selected for the study were speed, balance, agility, power and endurance. Pre, during and post test were conducted for all 30 subjects on selected physical fitness variables and the score were recorded. The analysis of variance (ANOVA) was used to find out the significance difference between the groups and LSD was used to find the post test mean difference among the groups at the level of 0.05%. The result obtained in this study indicate that there was significant improvement in selected motor physical fitness*

\* Instructor, Arsi Zone Digelu Secondary School *Woilta*, Ethiopia

\*\* Assistant Professor, Haramaya University, Haramaya, Ethiopia

variable due to the effects of aerobic, anaerobic and combined training ( $p < 0.05$ ). This study also proved that, aerobic exercise was significantly better than anaerobic and combined in improving power, balance, agility and endurance, anaerobic exercise was better than aerobic and combined to develop speed.

**Keywords:** aerobic exercise, anaerobic exercise, combined exercise, performance improvement, motor physical fitness variable.

## 1. INTRODUCTION

People think that exercise is just done for being in good shape or having a conditioned body, a more clinical aspects but the value of these exercise in human life is much more than that of it. Its vary from individual to individual. Moreover, this sense of energy and vigor applies not only to participation in daily activities but also to those more rigorous activities that would be associated with recreation and/or handling some sort of emergency [5]. Physical fitness is used to denote only the five basic fitness components (muscular strength, muscular endurance, cardiovascular endurance, freedom from obesity and flexibility), whereas motor fitness is a more comprehensive term, which includes all the ten fitness components including additional five motor performance components (power, speed, agility, balance and reaction time), that are important mainly for success in sports. In other word, motor fitness refers to the efficiency of basic movements in additional to the physical fitness [9].

Training programs are also important for developing and maintaining many aspects of motor fitness, therefore reduced training program will impact on fitness in a negative way, despite some controversy over the importance of fundamental motor skills in the maintenance of physical activity levels. Children often withdraw from physical activity opportunities as a consequence of their movement incompetence [2][3].

Several methods have been developed to get reliable information about the aerobic capacity of middle and long distance runners [4]. In addition to respiratory parameters, methods based on determining blood lactate concentration during continuously increasing exertion are favoured for

this. The determination of the individual anaerobic threshold (IAT) serves as an objective measure for aerobic endurance [10]. Improving a middle distance runner is a function of addressing the basic training principles. Without covering these principles adequately, there's little chance that the athlete will race faster. The basic tenet of competitive distance running is that a poorly conditioned athlete will make the greatest gains in performance by focusing on developing their aerobic capacity. But in case of middle distance runner the Athlete must have Aerobic and Anaerobic capacity to work hard.

## **2. MATERIALS AND METHODS**

### **2.1subjects**

One team of thirteen, beginner middle distance runners who volunteered to participate in this study. No one subjects were dropped out and the study continued with thirteen subjects aged 14-18years. All participants gave their voluntary and informed written consent approved by their parents. The training program was given for 12 consecutive weeks, three days.

### **2.2Sampling Size and Sampling Techniques and research design**

In this study the complete randomize design (CRD) was used. For this study design the training program was dividing in to three group's i.e. Group 'A' as aerobic, Group 'B' as anaerobic, and Group C as combination of both. For this study simple random sampling technique was used. The health history and physical preparation selection was depend on the club rule and regulation. The group contains 30 male i.e. 10 (group A), 10 (group B) and 10 (group C) beginner athletes with age groups of 14-18years from Sagure Town athletics club. All participants finished the program without any problem.

### **2.3Experimental Materials**

For this study, stadium was used for field test as well as to give the training program to the groups. The materials that were used for the study were such as stopwatch, sheet, rope and whistle during training and for tests

### **2.4Methods and Procedures of Data**

Data were collected through the appropriate physical fitness test measures like 800m run, T test, vertical jump, stroke balance test and 50 m dash run after giving training for athletes. The data was recorded by the investigators.

### 2.5 Testing procedure

**800 meter Run Test :** The aim of this test was to complete the 800 meter course in the quickest possible time. To start this test, all participants were line up behind the starting line. On the command 'go,' the clock was started, and participants run to cover 800m distance in their own pace. Cheering or calling out the elapsed time was also permitted to encourage the participants to achieve their best time. The total time taken to run 800m was recorded as their score.

**T-Test:** This test was done on the football field, the tests includes forward, lateral, and backward running. The measuring tape, marking cones, stopwatch, timing gates (optional) were used to arrange the test. This test was administer by Setting out four cones (5 yards = 4.57 m, 10 yards = 9.14 m). The subject started at cone A. On the command of the timer, the subject sprints to cone B and touches the base of the cone with their right hand. Then they turn left and shuffle sideways to cone C, and also touch its base, this time with their left hand. Then shuffling sideways to the right to cone D and touching the base with the right hand. Then they shuffle back to cone B touching with the left hand, and run backwards to cone A. The stopwatch was stopped as they passed cone A. The trial was not counted. The best time of three successful trials to the nearest 0.1 seconds was recorded as his score.

**Vertical jump :** the purpose was to test the power.: For this test the performer were asked to stand with one side near the wall, heels close together then his extent the arm near to the wall without raising the heels and make a mark on the wall. Then he was suppose to take a crouch position and jump up as high as possible and makes another mark. The distance between first and second mark was measured. Three trials were given and the best result out of three was recorded as his score.

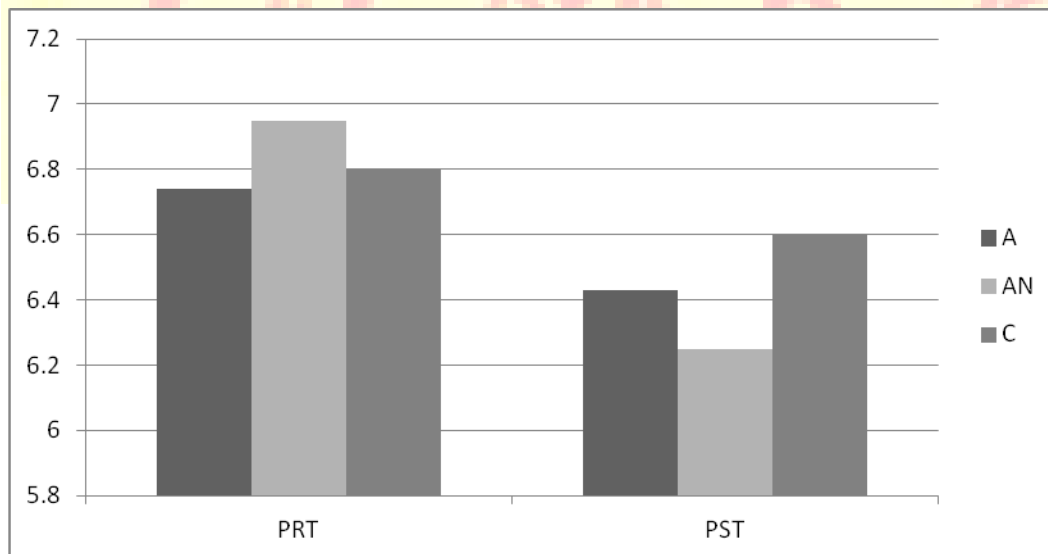
**Stork balance:** The stork balance test requires the person to stand on one leg. The purpose of this test was to assess the ability to balance on the ball of the foot. For this test the subject were asked to remove the shoes and placed the hands on the hips, then position the non-supporting foot against the inside knee of the supporting leg. The subjects were given one minute to practice the balance and then he raised the heel to balance on the ball of the foot. The stopwatch was started

as the heel goes up from the floor. The stopwatch was stopped if any of the follow occurs: the hand(s) come off the hips, the supporting foot swivels or moves (hops) in any direction; the non-supporting foot loses contact with the knee. The heel of the supporting foot touches the floor. 50m dash run test to test Speed was used .The total time in seconds was recorded. The score was the best of three attempts. The purpose of this test was to measure the speed of the individual. It was preferable to administer this test to two pupils at a time. For this test both participants took the position behind the starting line and on the command “Are you ready?” and “Go!”.The subjects run as fast possible to cover the distance. The score were the minimum time taken by the participant to cross the finish line. The score was recorded in seconds to the nearest tenth of a second.

### 3. RESULTS

As analysis of variance showed that there was significant difference in speed at the level of 0.05%. All three training group showed improvement. The rationale behind the improvement among all group participants was due to the twelve week training program in which they were engaged in. The pre test mean showed that at initial stage there was no significant difference between the groups, because the calculated F values was less than the required tabulated value, but after 12 weeks of training program the significant difference existed.

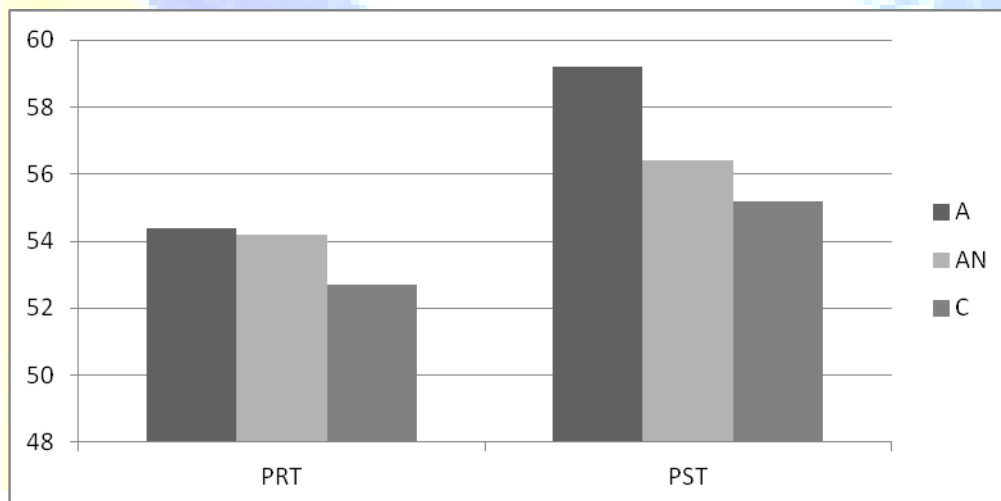
Figure 1 Comparative analysis of pre and post test data on Speed



The pair wise mean comparison analysis showed that there was significant difference between the post test mean. Since, the post test mean difference value was greater than the required value of LSD (0.18) at the level of 0.05% for all three groups. This indicates that there was significant difference between the post tests mean of aerobic, anaerobic and combined group. Thus, in this study, speed was improved more in anaerobic group. The finding of this study was in agreement with [11] who conducted the effect of 40-m repeated sprint training on maximum sprinting speed, repeated sprint speed endurance, vertical jump, and aerobic capacity in young elite male soccer players and found that sprint running was develop through 40-m repeated sprint training.

The pair wise mean comparison analysis proved that there was no significant difference between anaerobic and combined group as the mean difference value between the groups was less than the LSD value of the group (1.53).

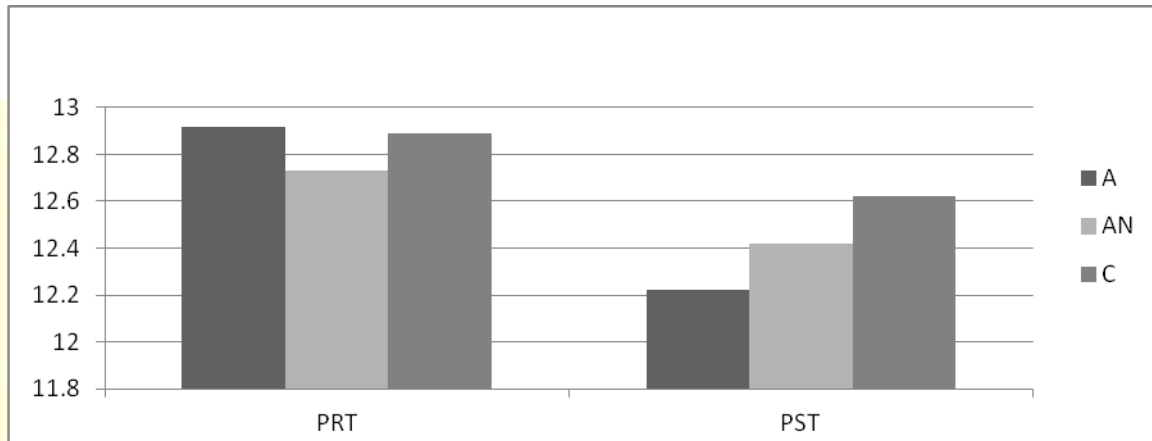
Figure 2. Comparative Analysis of pre and post data on balance



In this study the participant's balance was significantly improved more because of aerobic exercise which enable the subjects to perform significantly better in stork balance than that of the anaerobic and combined group. Therefore, aerobic exercise was recommended for those who want to develop their balance. This study was in agreement with [6] who conducted study on Exercise intervention designed to improve strength and dynamic balance among community-

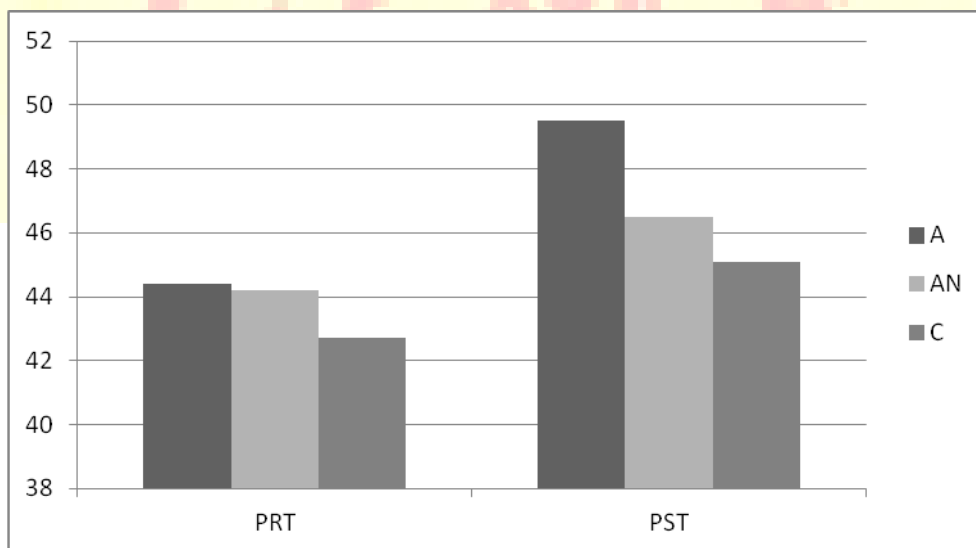
dwelling older adults and found significant improvement in strength and dynamic balance among community –dwelling older adults.

Figure 3. Comparative Analysis of pre and post data of Agility



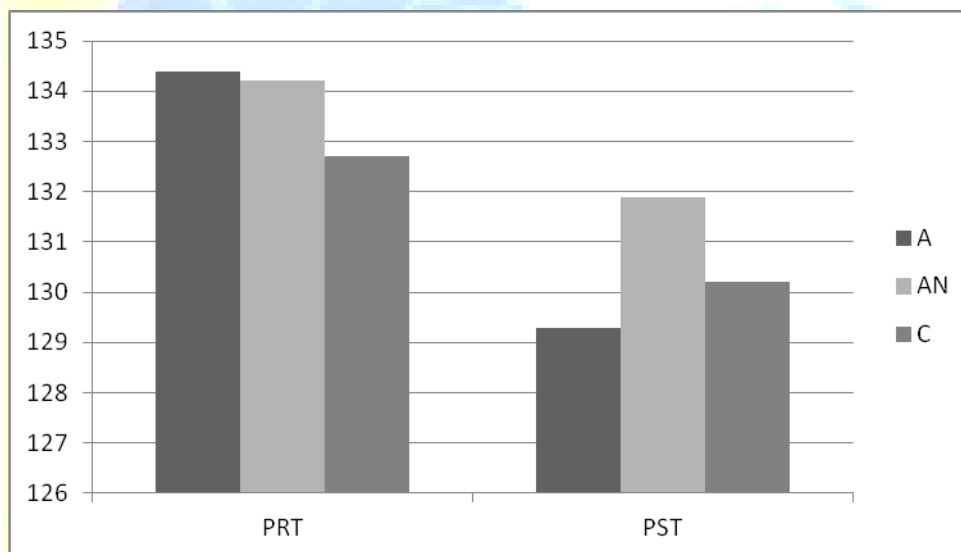
The pair wise mean comparison showed that there was significant difference among all three groups. The finding of this study was in agreement with the study done by [7] who examined effects of Test-retest reliability; criterion related validity and minimal detectable change of the Illinois agility test in male team sport athletes and found change with Agility.

Figure 4. Comparative Analysis of pre and post data of Power



The post test mean difference was recorded in between aerobic and anaerobic as 3, 4.4 in between aerobic and combined group and 1.4 in between anaerobic and combined group. The multiple comparisons of means showed that there was significant difference between the post test means of aerobic and anaerobic group, aerobic and combined group but no significant difference was observed between anaerobic and combined group because the 1.4 mean difference value was less than that of the required LSD value (1.82) at 5 % confidence interval. Thus, in this study, power was improved more because of aerobic exercise than anaerobic and combined training program. The finding of this study was in agreement with [8] who examined the effects of speed, agility, quickness training method on power performance in elite soccer players and found an improved power performance of the students.

Figure 5. Comparative Analysis of pre and post data on Endurance



The pair wise mean comparisons showed that there was significant difference between the post test means of aerobic and anaerobic. But there was no significance difference between aerobic and combined group and anaerobic and combined group since the mean difference value was less than the LSD value. The mean difference showed that aerobic exercise was better than the other groups. So it is recommended for those who want to develop their endurance on middle distance running aThe finding of this study was in agreement with [1] who studied on the improved exercise performance and increased endurance capacity after aerobic training of



patients with stable polymyositis and dermatomyositis and found that endurance training was significantly improved in aerobic capacity.

#### 4. CONCLUSIONS AND RECOMMENDATION

Based on the major finding of the study to increase the performance of middle distance runner athletes the following points are stated as conclusions. It is concluded that isolated and combined effect of aerobic and anaerobic training significantly improve speed of the beginner middle distance runner athletes. Anaerobic exercise in moderate intensity has a great benefit to the beginner middle distance runner athletes than others to develop speed. Training program significantly improve agility of middle distance runner athletes. Aerobic group was significantly better than anaerobic and combined training to develop balance, agility and endurance.

By considering the major findings and conclusions of the study, it is important to state the following points as a recommendation to investigate more on effects of aerobic and anaerobic training and combined training on improvement of motor physical fitness variable among middle distance runner. Hence, it is recommended to include aerobic training program in the training schedule of the Athletics club to improve their agility, balance, and power and endurance performance of middle distance runner Athletes'. Depending on the benefit of aerobic, anaerobic and combined training, athletics club may consider inclusion of this exercise as a part of main work for all middle distance runner athletes.

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