EFFECT OF AEROBIC EXERCISE ON SELECTED PHYSIOLOGICAL AND PHYSICAL VARIABLES ON HADIYYA HOSSANA FOOTBALL CLUB TRAINEES, SNNPR, ETHIOPIA

MSc THESIS

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APPROVAL SHEET

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For this study as advisor, I hereby certify that I have read and evaluated this thesis "**Effect of Aerobic Exercise on Selected Physiological and Physical Variables on Hadiyya Hossana Football Club Trainees, SNNPR, Ethiopia** prepared under guidance by Mr.Tekalign Beyene I recommend that it be submitted as fulfilling the thesis requirement.

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DEDICATION

I dedicated this thesis to my father, Beyene Sieda, my mother, Abebech Eromo, and my beloved wife, for their entire contribution and being partner in my success.

STATEMENT OF THE AUTHOR

By my signature below, I declare and affirm that this thesis is my own work. I have followed all ethical and technical principal of scholar in the preparation, data collection, data analysis and compilation of this thesis. Any scholar matter that is included in this thesis has been given recognition through citation.

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BIOGRAPHICAL SKETCH

The author, Tekalign Beyene, was born on January, 1981 in Hossana Town of Hadiyya Zone, SNNPR. He attended his elementary school Alemu Woldehana and secondary school education at Wachemo Senior Secondary and preparatory school at Wachemo preparatory school. After completing grade 12, he joined Wolaita Sodo University in 2000E.C and graduated with BSc degree in Health and Physical Education and minoring Biology.

Up on graduation, he was recruited as teaching staff member and served seven years at Hadiyya zone, Lemo woreda and Lisana secondary school as a teacher from July 2003 E.C to June 2009 E.C. He joined the School of Graduate Studies at Haramaya University in 2010E.C to pursue for his studies that will lead to MSc degree in sport medicine.

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ACRONYMS AND ABBRIVATIONS

ACSM	American College of Sport Medicine
CVE	Cardiovascular Endurance
FITT	Frequency, Intensity, Time, Type of exercise
HHFC	Hadiyya Hosanna Football Club
HRmax	Maximum Heart Rate
RHR	Resting Heart Rate
SNNPR	Southern Nation, Nationalities and Peoples Region
SPSS	Statistical Package for Social Sciences
VO_2 Max	Maximum Volume of Oxygen

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ABSTRACT

This study attempted to explore the effect of aerobic exercise on selected physiological and physical variables on Hadiyya Hossana football club trainees SNNPR, Ethiopia. Purposive sampling technique was used to select 30 football trainees from 45 from them 15 football trainees were experimental group and 15 football trainees were control group of age 18 to 20 years old. The main objective of the study was to investigate the effect of aerobic exercise on selected physiological variables and physical performance changes on trainees. All subjects under this study took part in experimental design pre and post test with control group from Jan 2019 to April 2019, 3 days per week for 3 month and 60-80 minutes per session. The effect of aerobic exercises study in physical performance changes were Cardiovascular Endurance, Muscular Endurance, Muscular Strength and Flexibility and physiological variables were RHR, Respiratory rate and Vo_2 max. The Data were analyzed by using SPSS version 20 paired samples t-test with pair wise comparison of means at 95% confidence interval by using pre and post tests. The results indicated that there were significant improvements in physical performance changes and physiological variables in experimental group, because of effective participation of aerobic training and the result of p value was less 0.05 but in control group there were not significant improvements in both physical performance changes and physiological variables because of less participation of aerobic training and the result of the p value was greater than 0.05 whereas resting heart rate was significant. This study confirmed that the effective participation of aerobic exercise training with active rest were significant to improve the physical and physiological variables of Hadiyya Hossana football club trainees in experimental group.

***Key words**; Aerobic exercise, Physical fitness variables, Physiological variables*

1. INTRODUCTION

1.1 Background of the Study

Fundamental movements of human, which they have achieved from their pre-human ancestors, are walking, running, jumping, climbing, throwing, pulling, pushing, etc. Combination of these basic fundamental movements, man has been developing various secondary movements essential for the day-to-day living and for the use in games and sports (Kennedy, 1960).

Physical fitness is important for all human beings, irrespective of their age and sex. 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 with effective exercises (Rekoninne *et al*., 2013).

Physical activity can be classified in different ways including intensity, duration, type, frequency and context .Intensity refers to how much energy is required by muscle when exercising. Aerobic exercise: “any activity using large muscle groups and maintained continuously with rhythmic pattern'. Aerobic exercise causes the heart and lungs to work harder. Whether it's swimming, skiing, running or aerobic dance, aerobic fitness goes a long way in keeping your heart rate elevated and maintaining good health (ACSM, 2010).

Aerobic activities should be used to develop cardio-respiratory endurance. Basically, aerobic activities are those in which a sufficient amount of oxygen is available to meet the body's demands. Popular aerobic activities including running, walking, rowing, swimming, cycling, aerobic dancing, jogging, tread mill and somewhat continuous in nature the intensity of work load can be easily regulated by controlling the pace for the performance of elevated level for an extended period (Rekoninne *et al*., 2013.

Helegerud *et al.* (2001) indicated that aerobic exercise can affect the football performance skill such as aerobic power, muscular endurance, and body composition of players. People,

who exceed the basic physical activity recommendation further decrease their risk of chronic diseases, attain higher fitness levels, and increase health benefits.

Football is a sport that requires intermittent aerobic and anaerobic ability due to the fundamental characteristics of the game. Choosing an appropriate test to measure aerobic capacity of football players is important for the prescription of conditioning and evaluation of the player. A well-developed aerobic ability in order a player to remain alerted for the full 90 minutes of a match is also required(Papadopoulos & Bekris, 2012).

Therefore, the aim of the study to were perform a critical-narrative review of the aerobic exercise assessment of football players, including physiological parameters and field test in order to provide a critical analysis of the information available in the literature.

1.2 Statement of the Problem

According to ACSM (2000) physical activity is defined as bodily movement produced by the contraction of striated muscle that substantially increases energy expenditure. This definition includes exercise, which is planned, structured, and repetitive physical activity aimed at improving maintaining physical fitness, organized sports or games (football, basketball), run sport (walking, cycling), occupational physical activity(manual labor, household chores) and non-organized, recreational physical activities.

Findings of the study was help team trainees to enhance aerobic power, advance knowledge on the benefits of aerobic training on physiological systems and physical parameters relevant to team-sport performance, and help to know current level of physical fitness

Hypothesis

This study was designed the following hypotheses that were tested on this study based on similar studies of articles and journals related to this issue.

H_0. There would not have a significant effect of aerobic exercise on selected physiological variables (RHR, VO_2max and Respiratory Rate).

H_1. There would have a significant effect of aerobic exercise on selected physiological variables (RHR, VO_2max and Respiratory Rate).

H_0. Aerobic exercises have no significant effect on selected physical performance parameters (CVE, Muscular Strength, Muscular Endurance and Flexibility).

H_1. Aerobic exercises have a significant effect on selected physical performance parameters (CVE, Muscular Strength, Muscular Endurance and Flexibility).

1.3 Scope of the Study

This study was applied at Hosanna town, Hadiyya Hosanna football club in Hadiyya zone at Southern Nation, Nationalities and Peoples Region (SNNPR), Ethiopia. It was to employ aerobic exercise which can improve on selected physiological variables and physical performance changes of Hadiyya Hosanna male football club trainees (HHFC).

1.4 Significance of the Study

The finding of this study was to investigate the effects of aerobic exercise in improving physiological as well as physical fitness changes. It was also helps to know the type of training for aerobic exercise given to trainees in order to improve aerobic capacity in physiological and fitness abilities of the trainees.

1.5 Objective of the Study

1.5.1 General objective

The general objective of this study was to examine effect of aerobic exercise on selected physiological and physical variables of Hadiyya Hosanna male football club trainees.

1.5.2 Specific objective

- To examine the effect of 12 weeks aerobic exercises on selected physiological variables (VO_2max and Respiratory Rate) in Hadiyya Hosanna male football club trainees.
- To compare the effect of aerobic exercise training on resting heart rate before and after the intervention of exercise training in Hadiyya Hosanna male football club trainees.
- To evaluate the effect of aerobic exercises training on selected physical performance variables (CVE, Muscular Strength, Muscular Endurance and Flexibility) in Hadiyya Hosanna male football club trainees.

2. REVIEW OF RELATED LITERATURE

2.1 What is Aerobic Exercise?

Aerobic means in the presence of oxygen. Aerobic exercise is the type of moderate-intensity physical activity that you can sustain for more than just a few minutes with the objective of improving your cardio respiratory fitness and your health. Aerobic exercises as "any activity that uses large muscle groups which can be maintained continuously, and is rhythmic in nature. The effect of aerobic training is the key to understand the basis for physical performance of football competition (ACSM, 2010).

Football is characterized by a series of a cyclic action that develop during a match in the form of high--intensity running, jumping, heading, and kicking. These actions are mainly anaerobic activities; however, energy derived from the aerobic metabolism is used for 90% of the movements of football players and is a prerequisite for this modality (Sperlich *et al.*, 2011).

Aerobic exercise is any physical activity that makes you sweat, causes you to breathe harder, and gets your heart beating faster than at rest. It strengthens your heart and lungs and trains your cardiovascular system to manage and deliver oxygen more quickly and efficiently throughout your body. Aerobic exercises refers to various types of exercises e.g., swimming, jogging, running, cycling etc which stimulate heart & lung for a longer duration of period to produce beneficial changes in the body. Any changes induced by exercise in our body system are called the training effect. An exercise cannot be classified as aerobic exercise unless it is of sufficient intensity & duration to produce a training effect (Blair *et al*., 1989).

Reilly (1997) reported that within the total playing time of a game, players' movements include jogging (36.9%), walking (24.8%), turns (18.6%), short sprints (11.2%), backward (reverse) running (6.5%), and running with the ball in their possession (2%).

2.2 Benefit of Aerobic Exercise

Benefits of aerobic exercise include the ability to utilize more oxygen during exercise, a lower heart rate at rest, the reduction of less lactic acid, greater endurance. Exercise physiologists have found that aerobic exercise reduces blood pressure and changes blood chemistry. Aerobic exercise is also improves the efficiency of the heart. More evidence is needed to substantiate the belief that aerobic exercise is reasonable for the development of supplemental blood vessels to heart which would be held in the event of the heart attack, and also that such exercise results in increasing the size of coronary arteries and thus assisting the flow of blood to the heart if the artery is narrowed by a clot *(*Impellizzeri *et al., 2006*).

In addition to strengthening the heart and cardiovascular system, participation in regular aerobic exercise has many health benefits. Aerobic exercise:

- Improves blood circulation and helps body use oxygen better
- Increases energy
- Increases endurance, which means the body can work out longer without getting tired
- Helps reduce the risk of developing heart disease
- Helps reduce body fat
- Helps reach and maintain a healthy weight
- Improves sleep *(*Impellizzeri *et al., 2006*).

2.3 Physiological Variables

2.3.1 Resting Heart Rate

RHR differs with the age, gender, and health of an individual. It also differs in an athletes and non-athletes. RHR is a strong indicator of an individual basic level of fitness. Through (RHR) the strength of heart can be measured. With each contraction more blood are

pumped by a strong heart. A healthy heart beats less times in one minute than a weak heart. Athletes have low resting heart rate than non athlete shows the fitness level as athletes had training program that strengthen their heart(Toppo, 2014).

There is decrease in RHR with regular participation in aerobic exercise. The speed of heart as well as openings of blood vessels to distribution of blood throughout the body is regulated by complex network and interaction of nerves and chemicals. The autonomic nervous system sympathetic and parasympathetic nerves influence the resting heart rate. A decrease in RHR due to increase in parasympathetic activity and decrease in sympathetic activity (Craven *et al*., 1997)

2.3.2 Respiratory Rate

Practically the number of times the chest rises or falls per minute is used as to determine the respiratory rate. A normal respiratory rate is variable and depends on several factors. Age and health status are two of the most important of these. Respiration is fastest in infants and decreases with age. The normal breathing rate for healthy adults is anywhere from 8 to 16 breaths per minute. The respiratory rate in infants is much faster, averaging as many as 44 breaths per minute. The respiratory rate is significantly influenced by various factors as sleeping, agitation, crying and age (Weinstein *et al*., 2013).

2.3.3 Maximal Oxygen Consumption (VO_2 Max)

VO_2 Max was generally established in an incremental exercise test using a large amount of muscle mass in which a plateau of VO_2 is attained or signs of maximal effort are attained (Swain, 2014).

2.4 Fitness Components

Health-related physical fitness is a measure of a person's general physical wellbeing. It is comprised of five different components: cardio respiratory endurance, muscular strength, muscular endurance, flexibility, and body composition (Ayers and Sariscsany, 2011).

2.4.1 Cardiovascular Fitness

Cardiovascular endurance is a health-related component of physical fitness that relates to the ability of the circulatory and respiratory systems to supply oxygen during sustained physical activity (Buchner, 2014).

Cardiovascular endurance is the ability to be active for a prolonged period of time at a moderate to high intensity level and is aerobic in nature (Ciccomascolo *et al.,* 2015).

2.4.2 Muscular Endurance

Muscular endurance is an important health related component of physical component. It is defined as one's ability to perform many repetitions with a sub maximal resistance over a given period of time. It prevents undue fatigue from work and other daily activities, and allows greater success and enjoyment in athletic and recreational endeavors (Hoffman, 2006).

2.4.3 Muscular Strength

Muscular Strength is the maximum amount of force a muscle or muscle group can generate (Wooten, 2016). This is commonly measured by performing a one repetition maximum for a specified exercise. It also can be estimated by performing an exercise with heavy resistance until failure, or by used of dynamometers (Hoffman, 2006).

2.4.4 Flexibility

Flexibility is has been defined as the range of motion of muscle and connective tissues at a joint or group of joints. In contrast to other, more general or systemic fitness components, flexibility is highly specific to each of the joints of the body. For this reason, although flexibility has been included in national fitness test batteries, linking it to one or more health outcomes is difficult, and few data support such an association (Pate *et al.,* 2012).

2.5 FITT Principle

TABLE 1FITT Principle Improves Fitness Level

FITT Application	Cardiovascular Fitness	Muscular Endurance	Muscular Strength	Flexibility
Frequency	2-4 time per week	2-4 times per Week	2-4 times per Week	Daily
Intensity	Train within the Target Heart Rate Zone (60%-80%)	Low Resistance	High Resistance	Hold beyond normal muscle length
Time	Minimum of 20 minutes	High number of Repetitions	Low number of Repetitions	Hold each stretch a minimum of 20 seconds
Type	Aerobic activity keeping heart rate within the THR zone	Resistance Training, Yoga, Light Weights, Pilates	Anaerobic Activities: weight lifting, core training	Movements that allow full range of motion.

2.6 Characteristics of Exercise Intensity

2.6.1 Moderate Intensity

Activity that use approximately 150kilocalories (630 kJ) per day or are equivalent to 55-65% of VO_2 max. The statement also highlights that many health benefits may be accrued by accumulating short bouts of activity throughout the daytime.

This recommendation should be seen as the minimal recommendation for health benefit as not all diseases respond to moderate-intensity activity. Indeed, the Surgeon General of the United States later updated the recommendation to state that. Additional health benefits can be gained through greater amounts of physical activity. People who can maintain a regular regiment of activity that is of longer duration or of more vigorous intensity are likely to derive greater benefit (Montoye, 1996).

2.6.2 Aerobic High Intensity

This training elicits increases in cardiovascular parameters such as heart size, blood flow capacity, and artery dispensability. These changes improve the capacity of the cardiovascular system to transport oxygen, such as heart size, blood flow capacity, and artery distensibility.These changes improve the capacity of the cardiovascular system to transport oxygen, resulting in faster muscle and pulmonary VO_2 kinetics and higher VO_2max (Enger, 2003)

Furthermore, the most successful teams perform more high-intensity activities during a game when in possession of the ball. Hence, footballers need a high fitness level to cope with the physical demands of the game. Studies on football players have shown that 8 to 12 week of aerobic high-intensity running training (>85% HR max) leads to VO_2max enhancement (5% to 11%) (Enger, 2003).

3. MATERIALS AND METHODS

3.1 Description of the Study Area

The study was conducted on Hadiyya Hosanna male football club trainees. Hossana founded at 232 km South of Addis Ababa and 175 km from Hawassa town, the capital of the SNNPR. Hosanna is located 7°31` to 7°35` North latitude and 37°49` to 37°53`East longitude. The training fields, stadium and fitness center, used for conducting aerobic exercise are found in Abiyo Ersamo Stadium (HZFEDO-2007) its shows in the appendix.

3.2 Study Materials

For this study the following equipment, materials and facilities were used: stop watch, whistle, skipping ropes, pens, pencils and rope made ladders, boxes, football field, calculator, meter, 16¼ inch high bench and cones.

3.3 Treatments and Research Design

The study was focus on experimental study for twelve weeks (3 months) of selected aerobic exercise and examines physical and physiological variables. All the subjects of experimental group participate to aerobic training program apart from their regular work for three days per week for duration of 12 weeks but control group stay controlled.

TABLE 2 Treatments and research design

Training Periods	Aerobic Exercise Program
Exercise Days	Tuesday, Thursday and Saturday
Duration /Session	60-80 minutes
Intensity	Moderate
Frequency	3 Days/Week
Total duration	12 weeks

3.4 Inclusion and Exclusion Criteria

3.4.1. Inclusion Criteria

- All subjects was football trainees
- They was member of Hadiyya Hosanna football club,
- Their age was 18-20 years old
- All trainees was male

3.4.2. Exclusion Criteria

- The players was any recent physical injury
- Players with different problems like heart problem, high blood pressure…etc.
- Those age was less than 18 and more than 20 years exclude from this study
- The natural climate and weather condition
- Female trainees

3.5 Description of Population and Sampling Method

This study was used purposive sampling method. Thirty subjects were selected from the total population of 45 and participant was randomly grouped in two. Experimental group (n=15) and were control group 2(n=15).

3.6 Type of Data and Data Collection Method

Table 3 Tests/ Tools/

Variables	Test	Units of Measurements
Physical Variables		
Muscular Strength	Push Ups	Counts/mints
Muscular Endurance	Sit-Up	Counts/mints
Flexibility	Sit and Reach	Centimeters
Cardiovascular Endurance	12 Minutes Run /Walk	Meter
Physiological Variables		
Resting Heart Rate	Manual Method	Counts/mints
Respiratory Rate	Manual Method	Counts/mints
VO_2 max	Manual Method	Counts/Mints

3.6.1 Data Collection Methods

The study was used primary source of data. The data was collected by taking pre and post tests on the field through selected aerobic exercises.

3.6.2 Data Collection Procedure

1. Cardiovascular Endurance

Cooper 12 minutes run test

Equipment: Track or area with consistent intervals set up to ensure proper distance to be recorded

- Stop watch
- Pencil/paper

Procedure:

- Allow the client some time to warm-up
- Cue them to begin and start the 12 minutes on stopwatch
- Remind them of time remaining throughout the test
- 12 minutes were complete record the exact distance traveled(Cooper 1968)

2. Muscular Strength test

Push up Test

Procedure

1. Pushes up test was administered with male subjects starting in the standard down position hands pointing forward under the shoulder ,back straight ,head up, using the as pivotal point.

2. The subject must rise the by straightening the elbow and return to down position, until the chin touches the mat. The stomach should not touch the mat.

3. The subjects back must be straight at all times and the subject must push up to straight arm position.

4. The maximal numbers of push up performed consecutively without rest were counted as the score.

5. The test was stopped when the client strains forcibly or unable to maintain appropriate techniques with in two repetition (ACSM, 2010).

3. Muscular Endurance test

Sit up Test

Purpose: The test was done to measure core muscle endurance and strength

Procedures:

1. The client was lay supine with their feet flat against the ground in a 90 degree angle at the knees.

2. Another person was kneeling next to their feet while placing one arm over the top of both knees as a guide.

3. Both of the client's arms should be extended out in front. Ensure that the back is fully against the ground while engaging the core.

4. One sit up consists of the client engaging their core to sit up to touch the top of your arm, and then return back down.

5. Have the client perform as many proper sit ups as possible within a timed minute.

Result The numbers of correctly completed sit ups were recorded. If the client loses proper form, it does not count (Hoffman, 2006).

4. Flexibility Test:

Sit and Reach Test

Purpose this test was designed to test the flexibility of the lower back and hamstring muscles.

Procedure*:*

1. Sit and reach test was best completed after a substantial amount of warm up completed in order to ensure the best results as well as being a safety precaution. When a warm up involved it is critical that the same warm up is completed each time the test is conducted.
2. To begin the test, the client sit on the floor with both feet straight out against a box for them to press their feet against.
3. Their foot was bare, both knees were pressed down to the floor, and their palms are facing downward.
4. The clients were allowed some practice reaches before you record their final hold.
5. The client should not be making any jerky or quick movements while recording.

Result

Measure the distance from their toes to their fingertips, and record. If their fingers were passed their toes, the results were positive, if the fingers were behind the toes, the results were negative (Australian College of Sport and Fitness, 2013).

5 Respiratory Rate

Purpose*:* To measure the athletes breathing rate

Procedure*:* Subject's respiratory rate was calculated while he was at rest without the aware in order to obtain a more reliable count. He lays on the floor with a supine position by clothing his eyes and count the number of inhalations (chest expands) in10 seconds and Multiply by 6 to calculate the breathing rate per minute Breathing rate and the volume of

air in each breath increase. Be relax, inhale and exhale comfortably be given instruction by tester.

Equipment's*:* Stop watch, mats pen, recording sheet

Scoring*:* Count the number of inhalation (chest expands) in 10 second and multiply by 6 to calculate breathing rate per minute.

6 Resting Heart Rate

Purpose*:* To measure the resting heart rate of the trainees

Procedure*:* The participants was sit upright position in a straight back chair they were rest, relax and comfortable. When the signal was given to participants are start counting their resting heart rate in the radial artery for 10 seconds.

7 Maximal Oxygen Consumption (VO_2 max)

Purpose: To measure the maximal or peak oxygen capacity of the subject.

3 minutes step test

Step for 3 min, must completely step up and down at the proper pace; wait 5 sec, then 15 sec HR convert to beats per minute.

Equipment's*:* A 16¼ inch high bench or step, Stopwatch and Assistant.

Scoring: Record your pulse when you have reached 1 minute result. The data recorded by the researcher with the help of one researcher assistant.

3.7 Methods of data Analysis

The statistical computation of the data was analyzed by using SPSS version 20 (statistical package software). Descriptive statistics (mean and standard deviation) were used to analyze continuous variables. Paired sample 't' test was used to compare the difference between pre and post test training data. Differences were considered statistically significant at p-values < 0.05.

3.8 Data Quality Control

To insure data quality, all the field tests, procedures, collection of data and handling information was carried out in accordance with standard protocols and measurements. To avoid errors training were given for the data collector on how to use data collecting instruments and measurements during data collection. Finally the data were coded and fed to software twice with different persons to avoid error in data feeding.

3.9 Research Ethics

The study was deal with the ethical issues related to the investigation. It was protecting the privacy of research participants and can make guarantees and confidentiality of the information that was given to the study, and risk of harm due to participation. Participation of subjects in this study is purely a voluntary activity and their right not to participate and can resign at any time of training session were respected. Therefore, the study was conduct all actions based on the Haramaya university rule, code of conduct and policies concerning research ethics. The protocols were approved by the university guide lines and written consent was given and informs the concerned bodies.

4. RESULTS AND DISCUSSIONS

The findings of aerobic exercise on selected physiological and physical variables on experimental and control groups for pretest and posttest through analysis has been presented and explained in the following tables.

4.1 Analysis of Cardiovascular Endurance (12 minutes run test) between Experimental Groups and Control Group

TABLE 4 Mean and Standard Deviation of 12 Minutes Run/Walk Test

Descriptive Statistics 12 minutes run/walk test			
Groups	N	Experimental group	Control group
Pre-Test mean	15	2093.33	2073.33
Std. Deviation		228.24	257.64
Post-Test-mean	15	2700.00	2086.67
Std. Deviation		169.03	244.56
P. value		0.000	0.49

The above table 4 that there was a significant improvement observed in twelve minutes run/walk pre and post training tests mean values score of 12 weeks exercise in experimental group.

The mean value of experimental group with pre training tests results of twelve minutes run was 2093.33 and post training test mean value result of twelve minutes run were 2700 and P value is 0.000. As the P value is below the 0.05 it shows a statistically significant difference between the experimental groups. This result revealed that the Cardiovascular Endurance was significantly improved in experimental groups. From these results the researcher were observed the significant improvements in their performance of the subjects due to effective participation aerobic exercises.

The mean value of control group with pre training tests results of twelve minutes run was 2073.33 and post training test mean value result of twelve minutes run were 2086.67. The

P value is 0.49 which is greater than 0.05, this shows that there is no significant control group due to less participation of aerobic exercise.

When we compare 12 minutes run test of experimental groups and controls group in pre and post test result of the participants after 12 weeks of exercises program. The 12 minutes run test result was compared with an international 12 minutes run test norms among similar age groups that range from 17-20 years. The international 12 minutes run test norms is **2700-3000m** for these age groups while the 12 minutes run test mean value result of this study was 2700. Hence, the study result has fallen in **above average standard.**

4.2 Analysis of Muscular Strength (push up) between Experimental Groups and Control Group

TABLE 5 Mean and Standard Deviation of Push up Test

Descriptive Statistics push up			
Groups	N	Experimental group	Control group
Pre-test mean	15	12.00	11.86
Std. Deviation		2.29	3.15
Post-mean	15	25.73	12.73
Std. Deviation		4.23	2.57
P. value		0.000	0.11

The above table 6 that there was a significant improvement observed in push up test pre and post training tests mean values score of 12 weeks exercise in experimental group rather than control group.

The mean value of experimental group with pre training tests results of push up test was 12.00 and post training test mean value result of push up test were 25.7333 and P value is 0.000. As the P value is below the 0.05 it shows a statistically significant difference between the experimental groups. This result revealed that the Muscular Strength was significantly improved in experimental groups. From these results the researcher were observed the significant improvements in their performance of the subjects due to aerobic exercises.

The mean value of control group with pre training tests results of push up test was 11.86 and post training test mean value result of push up test were 12.73. The P value is 0.11 which is greater than 0.05. This shows that there is no significant control group.

When we compare push up test of experimental groups and control groups in pre and post test result of the participants after 12 weeks of exercises program. The push up test result was compared with an international push up test norms among similar age groups that range from 17-20 years. The international push up test norms is **19-34** for these age groups while the pushes up test mean value result of this study was **25**. Hence, the study result has fallen in **Average.**

4.3 Analysis of Muscular Endurance (sit up) between Experimental Groups and Control Group

TABLE 6 Mean and Standard Deviation of Sit up Test

Descriptive Statistics sit up			
Groups	N	Experimental group	Control group
Pre-test mean	15	20.13	15.86
Std. Deviation		5.37	3.56
Post-mean	15	36.80	16.33
Std. Deviation		4.47	3.58
P. value		0.000	0.08

The above table 8 that there was a significant improvement observed in sit up pre and post training tests mean values score of 12 weeks exercise in experimental group rather than control group.

The mean value of experimental group with pre training tests results of sit up test was 20.13 and post training test mean value result sit up test were 36.80 and P value is 0.000. As the P value is below the 0.05 it shows a statistically significant difference between the experimental groups. This result revealed that the Muscular endurance was significantly improved in experimental groups. From these results the researcher were observed the significant improvements in their performance of the subjects due to aerobic exercises.

The mean value of control group with pre training tests results of sit up test was 16.13 and post training test mean value result of push up test were 16.80. The P value is 0.08 which is greater than 0.05. This shows that there is no significant control group.

When we compare sit up test of experimental groups and control groups in pre and post test result of the participants after 12 weeks of exercises program. The sit up test result was compared with an international sit up test norms among similar age groups that range from 17-20 years. The international sit up test norms is **35-38** for these age groups while the pushes up test mean value result of this study was **36.80**. Hence, the study result has fallen in **Average.**

4.4 Analysis of flexibility (sit and reach) between Experimental Groups and Control Group

TABLE 7 Mean and Standard Deviation of Sit and Reach Test

Descriptive Statistics sit and reach			
Groups	N	Experimental group	Control group
Pre-test mean	15	-3.43	-2.26
Std. Deviation		4.51	3.99
Post-mean	15	3.60	-1.80
Std. Deviation		3.79	3.44
P. value		0.000	0.133

The above table 10 that there was a significant improvement observed in sit and reach pre and post training tests mean values score of 12 weeks exercise in experimental group rather than control group.

The mean value of experimental group with pre training tests results of sit and reach test was **-3.4** and post training test mean value result of sit and reach test were **3.60** and P value is 0.000. As the P value is below the 0.05 it shows a statistically significant difference between the experimental groups & control group. This result revealed that the flexibility was significantly improved in experimental groups. From these results the researcher were observed the significant improvements in their performance of the subjects due to aerobic exercises training.

The mean value of control group with pre training tests results of sit and reach test was **-2.27** and post training test mean value result of sit and reach test were **-1.80**. The P value is **0.133** which is greater than 0.05. This shows that there is no significant control group.

When we compare sit and reach test of experimental groups and control groups in pre and post test result of the participants after 12 weeks of exercises program. The sit and reach test result was compared with an international male sit and reach test norms. The

international male sit and reach test norms is **0 to +5cm** ,while the sit and reach test mean value result of this study was **3cm**. Hence, the study result has fallen in **Average standard.**

4.5 Analysis of Respiratory Rate between Experimental Groups and Control Group

TABLE 8 Mean and Standard Deviation of Respiratory Rate

Descriptive Statistics Respiratory Rate			
Groups	N	Experimental group	Control group
Pre-test mean	15	18.60	18.53
Std. Deviation		0.82	1.72
Post-mean	15	14.40	18.66
Std. Deviation		1.50	1.29
P. value		0.000	0.685

The above table 12that there was a significant improvement observed in Respiratory Rate pre and post training tests mean values score of 12 weeks exercise in experimental group rather than control group.

The mean value of experimental group with pre training tests results of Respiratory Rate was **18**.**60** and post training test mean value result of Respiratory Rate were **14**.**40** and P value is 0.000. As the P value is below the 0.05 it shows a statistically significant difference between the experimental groups. This result revealed that the Respiratory Rate was significantly improved in experimental groups. From these results the researcher were observed the significant improvements in their performance of the subjects due to aerobic exercises training.

The mean value of control group with pre training tests results of Respiratory Rate was **18**.**53** and post training test mean value result of Respiratory Rate were **18**.**67**. The P value is 0.086 which is greater than 0.05. This shows that there is no significant control group.

4.6 Analysis of Resting Heart Rate between Experimental Groups and Control Group

TABLE 9 Mean and Standard Deviation of Resting Heart Rate

		Descriptive Statistics RHR	
Groups	N	Experimental group	Control group
Pre-test mean	15	64.33	66.13
Std. Deviation		2.32	1.80
Post-mean	15	56.53	65.33
Std. Deviation		3.14	1.49
P. value		0.000	0.017

The above table 14 that there was a significant improvement observed in resting heart rate pre and post training tests mean values score of 12 weeks exercise in experimental group.

The mean value of experimental group with pre training tests results of resting heart rate was 64.33 and post training test mean value result of resting heart rate were 56.53 and P value is 0.000. As the P value is below the 0.05 it shows a statistically significant difference between the pre training tests and post training experimental groups.

The mean value of control group with pre training tests results of resting heart rate was 66.13and post training test mean value result of resting heart rate test were 65.33. The P value is 0.017which is less than 0.05. This shows that there was significant control group. This result revealed that the resting heart rate was significantly improved in both experimental groups and control groups. From these results the researcher were observed the significant improvements in their performance of the subjects due to aerobic exercises training.

When we compare resting heart rate test of experimental groups and control groups in pre and post test result of the participants after 12 weeks of exercises program. The resting heart rate test result was compared with an international resting heart rate test norms among similar age groups that range from 17-20 years. The international resting heart rate test norms is **56-61** for these age groups while the resting heart rate test mean value result of this study was **59bit/min**. Hence, the study result has fallen in **Excellent.**

4.7 Analysis of Maximal Oxygen Consumption (VO_2 max) 3 minutes step test between Experimental Groups and Control Group

TABLE 10 Mean And Standard Deviation of 3minutes Step Test

Descriptive Statistics VO_2 max			
Groups	N	Experimental group	Control group
Pre-test mean	15	98.93	98.26
Std. Deviation		6.38	5.49
Post-mean	15	90.20	97.66
Std. Deviation		5.72	4.23
P. value		0.000	0.25

The above table 16 that there was a significant improvement observed in maximal oxygen consumption (VO_2 max) test pre and post training tests mean values score of 12 weeks exercise in experimental group. The mean value of experimental group with pre training tests results of 3 minutes step test was 98.93 and post training test mean value result of 3 minutes step test were 90.20 and P value is 0.000. As the P value is below the 0.05 it shows a statistically significant difference between the experimental groups & control group. This result revealed that the Maximal Oxygen Consumption (VO_2) max was significantly improved in experimental groups. From these results the researcher were observed the significant improvements in their performance of the subjects due to aerobic exercises.

The mean value of control group with pre training tests results of 3 minutes step test was 98.26 and post training test mean value result of 3 minutes step test were 97.67. The P value is 0.25 which is greater than 0.05. This shows that there is no significant control group. When we compare 3 minutes step test of experimental groups in pre and post test result of the participants after 12 weeks of exercises program. The 3 minutes step test result was compared with an international 3 minutes step test norms among similar age groups that range from 17-20 years. The international 3 minutes step test norms is 88-93for these age groups while the maximal oxygen consumption (VO_2 max) test mean value result of this study was **90.20**. Hence, the study result has fallen in **Above Average.**

5. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS.

5.1 Summary

The purpose of the study was to analyze the effect of 12 weeks aerobic training on selected physiological and physical variables of Hadiyya Hossana football club trainees. The age of the subjects ranged between 18 – 20 years old. Further they were divided into two group's experimental groups and control group each group consists of 15 subjects. All the subjects of experimental group participate to training program apart from their regular work for three days per week for duration of 12 weeks. They performed only one session practice a day with duration of 60-90 minutes.

Both experimental groups and control group were tested before & after the training program of 12 weeks with relevant standard tests for measuring selected physiological and physical performance changes variables. The physical variables which were selected are cardiovascular endurance, muscular strength, muscular endurance and flexibility. They were measured by test pushup, sit-up, sit & reach and 12 min run/walk. The physiological variables which were selected RHR, respiratory rate and maximal oxygen consumption (VO_2 Max).

The data collected from the study was analyzed using SPSS version 20 software and an experimental research design was used. The differences between the pre and post test scores in selected variables were subjected to statistical treatment using paired t test to find out whether the mean value were significant or not.

5.2 Conclusions

Based on the major findings of the study to examine aerobic exercises in improving physiological variables and physical performance changes on trainees the following points were stated as conclusions.

1. 12 weeks participation of aerobic exercise training significantly improved between pre and post test physical variables namely cardiovascular endurance, muscular strength, muscular endurance and flexibility of experimental group.
2. 12 weeks participation of aerobic exercise training significantly improved between pre and post test physiological variables namely resting heart rate, respiratory rate and maximal oxygen consumption (VO_2 max)) experimental group.
3. There was no significant difference between pre and post test on physical performance changes variables namely cardiovascular endurance, muscular strength, muscular endurance, and flexibility of control group but relative change was observed.
4. There was no significant difference between pre and post test on physiological variables namely respiratory rate and maximal oxygen consumption (VO_2 max) control group but relative change was observed.
5. There was significant improved both experimental group and control group on resting heart rate of physiological variable due to aerobic exercise training .

5.3 Recommendations

The findings of this study proved that twelve weeks aerobic training on selected physiological and physical variables football trainees. Based on these results, discussions and findings of the research, the following points are recommended.

- The result of aerobic exercises training should be useful for the coaches, physical trainers, physician, and sports professionals to set the training program to Hadiyya Hossana football club trainees.
- As effects of aerobic exercises on Athletes was crucial to any footballer, athletics and other sport coaches or concerned bodies may consider exercise as a part of main work for all Athletes.
- Similar study can be under taken on other age groups.

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7. APPENDIXES

Appendix A

Physical Activity Readiness Questionnaire (PARQ)

Being physically active is very safe for most people and for most should not cause any problem or hazard. However, some people should check with their doctor before them becoming much more physical active. The following list of questions should be completed by anyone who looking to start an exercise program to increase their activity current levels or participate in any fitness testing assessment. The questionnaire helps to determine how safe it is for you.

The questionnaires are suitable for those age 17-20 years trainee. Common sense is your best guide in answering these questions. Read the questions carefully and answer each one honestly. Please put X mark in the box of your answer.

Participant's information

Sex_____ Age_____ Address_____

Physical fitness

Weight_____ Height_____

Emergency contact information

Name_____Address_____

Relationship_____ Telephone number_____

1. Do you have a bone or joint problem such as arthritis, which has been aggravated by exercise or might be made worse with exercise? A. Yes B. No
2. To your knowledge, do you have high blood pressure? A. Yes B. No
3. To your knowledge, do you have low blood pressure? A. Yes B. No

4. Do you have or ever suffered a heart problem? A Yes B No
5. Have you ever felt pain in your chest when you do physical exercise? A Yes B No
6. Have you ever suffered from shortness of breath at rest or with mild exercise? A. Yes B. No
7. Do you ever feel feint, have spells of dizziness or have ever lost consciousness? A. Yes B. No
8. Do you currently drink alcohol? A. Yes B. No
9. Do you currently smoke? A. Yes B. No
10. Do you currently exercise regularly (at least 2 times per week) and/or work in a job that is physically demanding. A. Yes B. No
11. Do you have a recent physical injury such as bone, muscle and joint which will be aggravated by physical exercise? A. Yes B. No

- You decide to participate, your participation will be;

- Regularly
- Occasionally

Participant's Name…….

Signature……

Adapted from Canadian society for exercise physiology, physical activity readiness questionnaire, 2002)

Appendix B

Aerobic exercise Training Participation Consent Form

Researcher's Name: Tekalign Beyene Seida

Supervisor's Name: Dr. Eyasu Merhatsidk (PhD) and

Dr.K.V.Balamurugan (PhD)

Thesis Title: Effect of aerobic exercise on selected physiological variable and physical performance change on Hadiyya Hossana male football club "team b" trainees, SNNPR, Ethiopia

Purpose of the Study:

The purpose of this study is to investigate Effect of aerobic exercise on selected physiological variable and physical performance change on Hadiyya Hossana male football club "team b" trainees, SNNPR, Ethiopia

Procedure and Duration:

Your involvement will last from 45 to 90 minutes exercise program per session, three days per week for 12 weeks. You will not any supplement; you also participate in physiological and physical performance tests in three phases, at the beginning, after 8 week training and final test at the end of 12 week training. You will receive all the current standard care for your health.

Risks and Benefits:

The risk of being participating in this study is very minimal. In fact muscle strain, sprain and injuries may occur if proper warming up, gradual progression and safety procedures are not followed.

There are benefits for participating in this study. Such as; you will get your current ability concerning with the measured variables. Moreover, it is hoped that, in the future, the society will be beneficial from this study by understanding the effects of soccer type aerobic exercises on selected biochemical parameters and physical performance changes and adjusting life style in doing their daily routine.

Confidentiality:

Information of your participation in this research project will be kept confidential. Records pertaining to this research will be coded secretly in numbers and put in a secured storage area. Results will be reported in such a way that you cannot be identified. The findings of the study will be general for the study community and will not reflect any thing particular of individual.

Rights:

Participation for this study is full voluntary. You have the right to declare to participate or not in this study. If you decide to participate, you have the right to withdraw from the study at any time and this will not label you for any loss of benefit which you otherwise are entitled. Don't answer any question that you do not want to answer.

Contact Address:

If you have any questions or enquires any time about this research project or procedures,

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Appendix C

Tests Record Sheet

TABLE 11 physical Fitness Parameter Test Recording Sheet for Experimental Group

Code of subjects	Pre-test				Post-test				Remark
	CVE	Pushup	Sit up	Sit & reach/cm	CVE	Push up	Sit up	Sit & reach/cm	
S1	2000	10	20	-10	2700	25	33	-1	
S2	2100	12	19	-8	2800	24	30	2	
S3	2200	10	26	1	2900	23	40	6	
S4	1800	12	20	1	2500	30	45	7	
S5	2400	9	15	-5	2900	20	36	1	
S6	1800	15	11	1	2400	31	32	7	
S7	2100	14	19	1	2600	30	37	10	
S8	2000	8	20	-10	2600	19	42	-2	
S9	1900	15	20	-1	2600	32	40	5	
S10	1800	11	21	-2	2500	25	39	5	
S11	1900	14	11	-5	2600	29	29	1	
S12	2300	15	30	1	2800	29	40	3	
S13	2300	10	18	-6	2800	21	38	1	
S14	2400	13	27	-10	2900	26	35	1	
S15	2400	12	25	2	2900	22	36	10	

TABLE 12 physiological Variables Test Recording Sheet for Experimental Group

Code of subjects	Pre-test			Post-test			Remark
	RR/min	RHR/ min	VO_2 max/min	RR/mi n	RHR/ min	VO_2max /min	
S1	19	66	100	15	61	95	
S2	19	66	110	13	53	99	
S3	20	62	104	14	56	89	
S4	19	66	102	15	58	86	
S5	17	67	97	14	63	92	
S6	19	63	90	15	52	85	
S7	19	69	111	16	60	98	
S8	19	60	100	12	56	88	
S9	18	64	94	14	52	90	
S10	19	63	98	12	55	87	
S11	19	66	102	17	56	100	
S12	18	64	100	16	56	93	
S13	17	62	93	16	58	83	
S14	18	64	92	14	55	84	
S15	19	63	91	13	57	84	

TABLE 13 physical Fitness Parameter Test Recording Sheet for Control Group

Code of subjects	Pre-test				Post-test				Remark
	CVE	Push up	Sit up	Sit & reach/ cm	CVE	Push up	Sit up	Sit & reach/cm	
S1	1900	13	18	-8	2000	14	20	-7	
S2	1800	10	17	1	1800	10	17	1	
S3	2000	12	15	-8	2000	12	16	-5	
S4	2200	15	11	2	2300	11	15	2	
S5	2300	9	13	-3	2200	10	13	-3	
S6	2200	8	12	-6	2300	12	13	-7	
S7	1700	8	15	-1	1800	13	14	1	
S8	1900	10	12	1	1900	11	12	1	
S9	1800	9	12	2	1700	10	12	1	
S10	2000	11	17	-3	2000	12	17	-2	
S11	2200	13	20	-4	2200	14	20	-3	
S12	2400	17	20	-7	2300	16	19	-6	
S13	2500	16	22	1	2500	17	21	1	
S14	2400	17	20	-5	2400	18	23	-4	
S15	1800	10	14	4	1900	11	13	3	

TABLE 14 Physiological Variables Test Recording Sheet for Control Group

Code of subjects	Pre-test			Post-test			Remark
	RR/min	RHR/ min	VO_2 max/min	RR/min	RHR/ min	VO_2max /min	
S1	18	65	105	18	64	104	
S2	17	64	100	19	65	99	
S3	19	69	99	18	67	97	
S4	20	66	97	19	65	96	
S5	16	67	101	17	67	100	
S6	19	66	90	17	64	94	
S7	20	68	102	20	67	101	
S8	19	66	97	19	67	95	
S9	20	68	96	19	66	97	
S10	18	65	92	19	63	93	
S11	20	62	109	19	63	105	
S12	19	68	100	21	67	101	
S13	20	67	90	20	65	91	
S14	14	65	93	16	66	92	
S15	19	66	103	19	64	100	

Appendix D

Table 15 Norms of Each Fitness Test

Norms for 12 Minute Run Tests of Male Athletes

Age	Excellent	Above Average	Average	Below Average	Poor
13-14	>2700m	2400-2700m	2200-2399m	2100-2199m	<2100m
15-16	>2800m	2500-2800m	2300-2499m	2200-2299m	<2200m
17-19	>3000m	2700-3000m	2500-2699m	2300-2499m	<2300m
20-29	>2800	2400-2800m	2200-2399m	1600-2199m	<1600m
30-39	>2700	2300-2700m	1900-2299m	1500-1999m	<1500m
40-49	>2500	2100-2500m	1700-2099m	1400-1699m	<1400m
>50	>2400	2000-2400m	1600-1999m	1300-1599m	<1300m

Source: Burr *et al*., 2011. *The Physician and sports medicine, 39*(2), pp.133-139.

Standard Value of Muscular Strength Test (Push up) For Only Men

Age	17-19	20-29	30-39	40-49	50-59	60-65
Excellent	>56	>47	>41	>34	>31	>30
Good	47-56	39-47	34-41	28-34	25-31	24-30
Above average	35-46	30-39	25-33	21-28	18-24	17-23
Average	19-34	17-29	13-24	11-20	9-23	6-16
Below average	11-18	10-16	8-12	6-10	5-8	3-5
Poor	4-10	4-9	2-7	1-5	1-4	1-2
Very poor	<4	<4	<2	0	0	0

Thompson *et al*., 2010. *ACSM's guidelines for exercise testing and prescription*.

Standard value of Muscular endurance test (sit up) for only men

Age	18-25	26-35	36-45	46-55	56-65	65+
Excellent	>49	>45	>41	>35	>31	>28
Good	44-49	40-45	35-41	29-35	25-31	22-28
Above average	39-43	35-39	30-34	25-28	21-24	19-21
Average	35-38	31-34	27-29	22-24	17-20	15-18
Below average	31-34	29-30	23-26	18-21	13-16	11-14
Poor	25-30	22-28	17-22	13-17	9-12	7-10
Very poor	<25	<22	<17	<13	<9	<7

Mackenzie, B., 2005. Performance evaluation tests. London: Electric World plc.

Standard Values of Flexibility (Sit and Reach Test)

	Very poor	Poor	Fair	Average	Good	Excellent	Super
Female	< -15	-15 to -8	-7-to 0	+1 to +10	+11 to +20	+21 to +30	> +30
Male	< -20	-20 to -9	-8 to -1	0 to +5	+6 to +16	+17 to +27	> +27

Prepared for you by the Australian College of Sport & Fitness 2013

Standard Values of 3 Minutes Step Test

Rating for men(age)	18-25	26-35	36-45	4-55	56-65	>65
Excellent	50-76	51-76	49-76	56-82	60-77	59-81
Good	79-84	79-85	80-88	87-93	86-94	87-92
Above average	88-93	88-94	88-92	95-101	97-100	94-102
Average	95-100	96-102	100-105	103-111	103-109	104-110
Below average	102-107	104-110	108-113	113-119	111-117	114-118
Poor	111-119	114-121	116-124	121-126	119-128	121-126
Very poor	124-157	126-161	130-163	131-159	131-154	130-151

Prepared for you by the Australian College of Sport & Fitness 2013

Appendix E

Table 16 Training Protocol

First Month Training Schedule

Day	Types of Exercises	Duration	Set & Repetition	Frequency	Intensity
	Warming up: General and specific and walking	4-6m	2-3 set, 3-4reps	3days/w	45-55% MHR
Tuesday	Aerobic and resistance exercise -Slow running	40-60m			
	Biceps curl, bench press, sit-ups Or curl-up, squat, leg press, leg Extension, leg curl				
	Cooling down: stretching , relaxation exercise and resting	4-6m			
Thursday	Warming up: General and specific and walking	4-6m	2-3 set, 2-3reps	3days/w	45-55% MHR
	Aerobic and resistance exercise Slow running	40-60m			
	Biceps curl, bench press, sit-ups Or curl-up, squat, leg press, leg Extension, leg curl				
	Cooling down: stretching ,relaxation exercise and resting	4-6m			
Saturday	Warming up: General and specific and walking	4-6m	2-3 set, 2-3reps	3days/w	45-55% MHR
	Aerobic and resistance exercise Treadmill run and stationary biceps curl, bench press, sit-ups or curl up, squat, leg press, leg extension, leg curl	40-60m			
	Cooling down: stretching ,relaxation exercise and resting	5-8m			

Second Month Training Schedule

Day	Types of Exercises	Duration	Set & Repetition	Frequency	Intensity
	Warming up: General and specific and walking	5-7m	3-4 set, 3-4reps	3days/w	55-60% MHR
Tuesday	Aerobic and resistance exercise -Slow running	50-60m			
	Biceps curl, bench press, sit-ups Or curl-up, squat, leg press, leg Extension, leg curl				
	Cooling down: stretching , relaxation exercise and resting	5-7m			
Thursday	Warming up: General and specific and walking	5-7m	3-4 set, 3-4reps	3days/w	55-60% MHR
	Aerobic and resistance exercise Slow running	50-60m			
	Biceps curl, bench press, sit-ups Or curl-up, squat, leg press, leg Extension, leg curl				
	Cooling down: stretching ,relaxation exercise and resting	5-7m			
Saturday	Warming up: General and specific and walking	5-7m	3-4 set, 3-4reps	3days/w	55-60% MHR
	Aerobic and resistance exercise Treadmill run and stationary	50-60m			
	biceps curl, bench press, sit-ups or curl up, squat, leg press, leg extension, leg curl				
	Cooling down: stretching ,relaxation exercise and resting	5-7m			

Third month training schedule

Day	Types of Exercises	Duration	Set & Repetition	Frequency	Intensity
	Warming up: General and specific and walking	8-10m	4-5 set, 4-5reps	3days/w	60-70% MHR
Tuesday	Aerobic and resistance exercise -Slow running Biceps curl, bench press, sit-ups Or curl-up, squat, leg press, leg Extension, leg curl	60-80m			
	Cooling down: stretching , relaxation exercise and resting	8-10m			
Thursday	Warming up: General and specific and walking	8-10m	4-5 set, 4-5reps		60-70% MHR
	Aerobic and resistance exercise Slow running Biceps curl, bench press, sit-ups Or curl-up, squat, leg press, leg Extension, leg curl	60-80m		3days/w	
	Cooling down: stretching ,relaxation exercise and resting	8-10m			
Saturday	Warming up: General and specific and walking		4-5 set, 4-5reps	3days/w	60-70% MHR
	Aerobic and resistance exercise Treadmill run and stationary biceps curl, bench press, sit-ups or curl up, squat, leg press, leg extension, leg curl	60-80m			
	Cooling down: stretching ,relaxation exercise and resting	8-10m			

Appendix F

Paired sample t-test result of each parameter

Table 17 paired samples t- test 12 minutes run

Paired Samples Test 12 minutes run						
Groups		Paired Differences				
		Mean	Std. Deviation	95%Confidence Interval of the Difference		Sig. (2tailed)
				Lower	Upper	
Experimental group	Pretest-Posttest	606.67	96.11	659.89	553.43	0.00
Control group	Pretest-Post test	13.33	74.32	54.49	27.82	0.49

Table 18 paired samples t-test push up

Paired Samples Test push up						
Groups		Paired Differences				
		Mean	Std. Deviation	95% Confidence Interval of the Difference		Sig. (2-tailed)
				Lower	Upper	
Experimental group	Pretest-Post test	13.73	2.43	15.08	12.38	0.00
Control group	Pretest-Post Test	0.87	1.99	1.97	0.23	0.11

Table 19 paired samples t-test sit up

Paired Samples t test sit up						
Groups		Paired Differences				
		Mean	Std. Deviation	95% Confidence Interval of the Difference		Sig. (2-tailed)
				Lower	Upper	
Experimental group	Pretest-Post test	19.46	4.20	21.79	17.13	0.00
Control group	Pretest-Post test	0.67	1.39	1.44	0.11	0.08

Table 20 paired samples t- test sit and reach

Paired Samples t test sit and reach						
Groups		Paired Differences				
		Mean	Std. Deviation	95%Confidence Interval of the Difference		Sig.(2tailed)
				Lower	Upper	
Experimental group	Pretest-Post test	-7.03	2.03	-8.16	-5.90	0.00
Control group	Pretest-Post test	-0.46	1.12	-1.08	0.15	0.13

Table 21 paired samples t-test respiratory rate

Paired Samples Test Respiratory Rate						
Groups		Paired Differences				
		Mean	Std. Deviation	95% Confidence Interval of the Difference		Sig.(2-tailed)
				Lower	Upper	
Experimental group	Pretest-Posttest	4.20	1.86	3.17	5.2	0.00
Control group	Pretest-Posttest	0.13	1.25	0.82	0.56	0.68

Table 22 paired samples t-test **RHR**

Paired Samples Test RHR						
Groups		Paired Differences				
		Mean	Std. Deviation	95% Confidence Interval of the Difference		Sig.(2tailed)
				Lower	Upper	
Experimental group	Pretest-Post test	6.53	2.89	4.92	8.13	0.00
Control group	Pretest-Post test	0.80	1.26	0.09	1.50	0.02

Table 23 paired samples t-test vo_2 max

Paired Samples Test VO_2 max						
Groups		Paired Differences				
		Mean	Std. Deviation	95% Confidence Interval of the Difference		Sig.(2tailed)
				Lower	Upper	
Experimental group	Pretest-Post test	8.73	4.21	6.39	11.06	0.00
Control group	Pretest-Post test	0.60	1.95	-0.48	1.68	0.25

Appendix G

LOCATION MAP OF HOSSANA

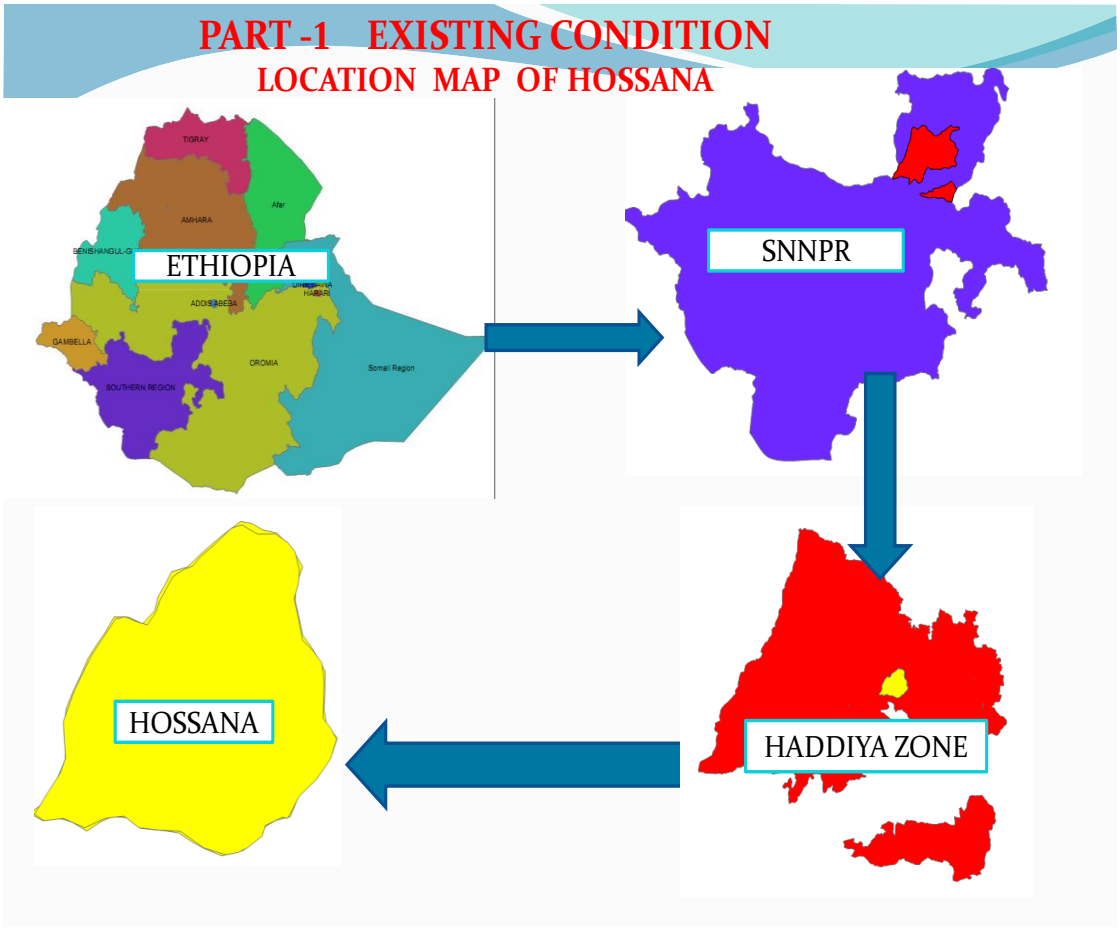

FIGURE 1 Map of the Study Site

Source htts//www.bing.com/image/search?view