

**EFFECT OF AEROBIC EXERCISE ON SELECTED HEALTH
RELATED PHYSICAL FITNESS: THE CASE OF UNDER-17
MALE FOOTBALL PROJECT TRAINEES OF DEJEN TOWN;
EAST GOJJAM ZONE, AMHARA REGIONAL STATE,
ETHIOPIA**

MEd THESIS

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**Effect Of Aerobic Exercise On Selected Health Related Physical Fitness: The
Case Of Under-17 Male Football Project Trainees Of Dejen Town; East
Gojjam Zone, Amhara Regional State, Ethiopia**

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MASTER OF EDUCATION In Teaching Physical Education**

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DEDICATION

I dedicate this thesis manuscript to my beloved parents and families.

STATEMENT OF THE AUTHOR

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

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ACRONYMS AND ABBREVIATIONS

ACSM	American college of Sport Medicine
BMI	Body Mass Index
CVE	Cardiovascular Endurance
GYM	Gymnasium
HU	Haramaya University
POT	Post Training Test
PTT	Pre Training Test
PU	Push Up
SPSS	Statistical Package for Social Science
WHO	World Health Organization

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Effect Of Aerobic Exercise On Health Related Physical Fitness: The Case Of Dejen Town Under-17 Males' Football Project, East Gojjam Zone, Amhara Regional State, Ethiopia

ABSTRACT

The main aim of this study was to investigate the effects of 12 week aerobic exercises on health related physical fitness components in Dejen town under 17 male football project trainees. The study was carried out for three consecutive months from (November, 2019 to January 2020). The first month pre-test and last month post- test has been registered. In Dejen Town there are three football project trainees, including under seventeen under fifteen and under thirteen. For this study 24 young male football trainees with the age 14-17 years old participate the informal experimental design used pre and posttest with control group. Dejen Town football project trainees are taken for this study because the total numbers of these players are 24 which are easy to manage and their ages are 14-17 .It used census sampling because all the secondary football project trainees were the participant's in the training program for the selected study. Quantitative data used to collect through the appropriate health related physical fitness test measures like push up test for muscular strength curl up test for muscular endurance 2400m run for cardiovascular endurance sit and reach test for flexibility body mass index for body composition. Aerobic exercise improves the performance of health related physical fitness of U-17 male football trainees of Dejen Town male foot ball project trainees, which implies that there is highly significant difference of cardiovascular endurance, muscular strength, muscular endurance , flexibility and body composition between posttest and the control group because value of “p” is less than 0.05. 12 week aerobic exercise showed a positive effect on the improvement of cardiovascular endurance, muscular strength, muscular endurance flexibility and body composition. For better improvement of physical fitness, individuals should engage in aerobic exercise at least 3 days per week 60 minutes each day. Aerobic exercise showed a positive effect on cardio respiratory fitness. Coaches of under-17 football project trainees are expected to have a regular schedule on health related physical fitness components for improving the fitness of trainees.

Key words: Aerobic exercise, cardiovascular endurance, health related physical fitness, football project trainees,

1. INTRODUCTION

In this chapter the researcher included background of the study, statement of the problem, research questions scope of the study, significance of the study and objectives of the study.

1.1 Background of the Study

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

Physical activity and training is important for initiating and sustaining cardiovascular health. As such, encouragement from childhood and the possibility to participate in sports activity is a major health issue which must be sustained. Reaching adolescence, however, increasing expectations and competitive demands have gradually emerged as an important aspect of recreational sports in the young (Armstrong and McManus, 2010).

Regular aerobic exercise will produce beneficial effects for any age group providing the exercise is specific and appropriate to the level of fitness of the individual. Progressive exercise correctly performed will increase the level of fitness and improve health. It will also create a sense of well-being, produce greater energy and reduce the risk of developing many diseases. Exercise makes demands on the body systems over and above normal every day activities and as result the systems adapt anatomically and physiologically. All activities involve the co-ordinate interaction of many body systems the muscular system and the skeletal system interact to produce movement, the contracting muscles exert a force or pull on the bones , resulting in movement at the joints. Muscle contraction requires energy, which is supplied by nutrients from the digestive system and oxygen from the respiratory system. These products are delivered to the muscles by the cardio-vascular system which also transports the waste products of metabolism such as carbon dioxide and lactic acid away from the contracting muscles. The endocrine system is also involved with the control and regulation of movement. This system will efficiently with everyday activities as they are physiologically adapted to that level (Rosser, *et al.*).

1.2 Statement of the Problem

Ethiopia is a country with long history of football players. However there were no enough achievements on soccer players. In Dejen town there are many football projects including under seventeen under fifteen, and under thirteen but when they become to in competition they are not enough in the competition and they cannot endure to play the game with in a full of potential up to the last minutes and they are not enough. Many research studies says physical exercise are important for the development of all physical fitness but very few research were done on the area of how much aerobic exercise is effective for the improvement of each health related physical fitness components such as cardiovascular endurance, muscular endurance, muscular strength, body composition and flexibility fitness problems. The research investigated the effects of aerobic exercises on improvement of health related physical fitness components of Dejen town male's football project trainees. In line with this, the present study was tried to answer the following four research questions:

1. What is the effect of aerobic exercise on cardiovascular endurance for male football project trainees of Dejen town?
2. What is the effect of aerobic exercise on muscular strength and muscular endurance among Dejen town under 17 male's football project trainees?
3. What is the effect of aerobic exercise on flexibility and body composition among Dejen town under 17 male's football project trainees?
4. Do they develop a performance change due to physical fitness participation among Dejen town under 17 male football project trainees?

1.3 Scope of the Study

The study delimited on the effect of aerobic exercise on physical fitness in Dejen town under 17 male's football project.

1.4 Significance of the Study

The main benefit of any research is to increase knowledge, to give a solution idea for different problems; the study which carried out by one researcher may be further studied and would be studied by others many times which is to increase knowledge upon a specific issue.

The main aim of this study was analyzing the effect of aerobic exercise on health related physical fitness components on Dejen town male's football project, but the outcome of this research would not mean that it was restricted to only Dejen town male's football project. The study basically important for under 17 football project of Dejen Town; it also help to other community football project to understand the effect of aerobic exercise training in enhancing their health related physical fitness components such as cardiovascular endurance, muscular endurance, muscular strength, flexibility as well as body composition. In addition to this the study intended to signify the following importance:

1. Show the effects of aerobic exercise on cardiovascular endurance
2. Show the effect of aerobic exercise on muscular strength and muscular endurance.
3. To aware players about the effect of aerobic exercise on flexibility and body composition.
4. To show the benefits of aerobic exercise for football players.
5. For others research work as a reference for depth studies on the problem undertaken.

1.5. Objectives of the Study

1.5.1. General Objective

The general objective of this research was to investigate the effects of 12 week aerobic exercises on selected health related physical fitness components of under-17 male football project trainees of Dejen town.

1.5.2. Specific objectives

The specific objectives of this research:

1. To analyze the effect of aerobic exercise on the improvement of cardiovascular endurance of under 17 male football project trainees of Dejen town.

2. To evaluate the changes induced by aerobic exercise on muscular strength and muscular endurance after 12 weeks of aerobic exercise among under 17 male football project trainees of Dejen town.
3. To examine the significance of aerobic exercise on the improvement of flexibility and body composition among under 17 male football project trainees of Dejen town.
4. To analyze the performance change due to physical fitness participation among under 17 male football project trainees of Dejen town.

1.6 Description of terms

Aerobic Exercise: is physical exercise of low to high intensity that depends primarily on the aerobic energy generating process. Aerobic means mean relating to involving or requiring free oxygen and refers to the use of oxygen to adequately meet. (Source: United States Department of Health and Human Service 2010)

Exercise is any bodily activity that enhance or maintains physical fitness and overall health and wellness (Source: United States Department of Health and Human Service 2010)

Physical fitness: is defined as a set of attributes that people have or achieve that relates to the ability to perform physical activity. (Source: United States Department of Health and Human Service 2010)

Physical Exercise: is the performance of some activity in order to develop or maintain physical fitness and overall health. (Source: Physical Exercise Science daily)

Physical Training: The systematic use of exercise to promote bodily fitness and strength

Health: Can be defined as physical, mental, and social wellbeing and as a resource for living a full life. It refers not only to the absence of disease, but the ability to recover and bounce back from illness and other problem. (Source: Definition of Health Medicine Net)

2. RELATED LITERATURE REVIEW

2.1 The Football Globalization

Football is the world's most popular sport, at least since the late nineteenth century British and international distribution. The "global game" across all the continents culturally diverse societies million people estimated 250 direct participants, approximately 1.4 billion euro. The interest, flagship" the game of football championship the World Cup Finals, and attracts the cumulative global television 33.4 million billion is only relatively recently the game financially sun paralleled" multicultural appeal unrealized.

In 1998, the football's world governing body FIFA, regulated contracts, it is worth some billion by 2001, football; it was about 250 billion turnover with equivalent to, GDP (The Netherlands Walvin 2001). Since these are the numbers are in themselves, we might propose, Durkheim should be amended, that all the modern cultural forms, the soccer "serious". Interestingly, as long as the research sub-disciplines such as sociology of globalization theories the sport is used, the main sociological analysts the global change to football, with the appropriate subject matter study.⁴ In contrast, the, 50 that what is here in general, and of the football is a sport in particular, it is important for the theorization and empirical research is a multi-dimensional and long-term process of globalization. Something like a cuisine, music, health, sexuality, the fashion, the cinema, and the new and so on. We are here, however, in the 'The Game' - both the international law and of their own and, on the other hand that the globalization will contribute to the sociological understanding. What are the preliminary, sociological analysis main themes, and problems with the football and globalization? Mainly, what is the use of the separate works sociology of globalization and the world of sociology football.⁶ is relatively "voluntaristic" theory of operation globalization highlighted the role of near-empirical developments is in the "global", in this case, the football (Robertson 1992: 61- 2). We understand that globalization is characterized by two closely related but distinct processes. The "actors in society have senses more "globality": this means increasing Globalization represents the world's subjective consciousness; or, in other words, it includes an increased awareness of the world, as a "single" (Robertson 2002). It is also strengthening the global social and cultural "connection", such as telecommunications and the international travel. Tomlinson creates email program to send messages. In addition, we are here, that the globalization processes in by cultural "globalization", by which local cultures and redefine the global cultural product to suit your needs, the faith and

Robertson (1992,1995, 2002; Robertson). Let us examine the broad cultural, social, economic and political issues of globalization are the football. First of all, the cultural elements of the football are globalization, we will focus on the interdependence and the local and the global and universal, and how these processes are reflected in the globalization. Second, it is interpreted as one of the world's largest clubs the transnational corporations (TNCs) that are used to play contemporary globalization (Robertson, 2001; cf. 1992 Sklair 1995). Third, that social exclusion is a football, the context of globalization and how can it, that these democratic reforms challenged by the game. The steering is not globalization upon the somehow introduced outside game, but rather as a football we know representation - in fact, the context of globalization and its manifestations. Of course, the essential components football that, in some advanced global diffusion: the 51 simplest RUGBY with special rules and cricket, as opposed to the British closely associated not to see the plays and the essential equipment costs very low as balls manufactured bundles cloth or paper. However, today, the explanation of the essentialist forks are not loaded football international subsidiary. Rather the problem sociologically we are the cultural, social and political globalization economic and follows the game. While the empirical terms pull, the greater the strength of the South American football culture, Europe and the brevity, the wide our arguments heart of it

2.2 Physical Activity

According to Caspersenet *al.*,(1985) PA is defined as any bodily movement produced by skeletal muscles that results in energy expenditure, and is positively correlated with physical fitness, e.g. walking, jogging, cycling, swimming, domestic chores and gardening. PA level can be categorized as low, moderate or high, based on the amount of calories expended by an individual during the activity period, the weight of body and the amount of oxygen consumed (ACSM, 2013). Furthermore, it is recommended that people should engage in moderate levels of PA for at least 30 minutes per day, three times a week or take at least 10,000 step counts as a result of walking from one place to another per day for health and wellness in order to improve the quality of life (Toriola & Monyeki, 2012). Despite this recommendation, people's turnout regarding the involvement in PA or exercise has been very low in many parts of the world, if not the entire world (CDC, 2009).

In addition to the role it plays in the prevention of overweight and obesity and the exposure to chronic diseases of lifestyle, the importance of PA to the healthy growth and development of children and adolescents cannot be over-emphasized (Hills *et al.*, 2011:866). In addition, the use of automated machines and advances in modern technology (e.g. prolonged TV viewing) has drastically reduced the level of children's involvement in PA in terms of energy expenditure (Nelson *et al.*, 2006: 1631; Rivera *et al.*, 2009: 278-279; Esmaeialzadeh and Siahkouhian, 2011: 624). This has raised much concern as low PA does not give youth the opportunity to comply With recommended PA guidelines which results in poor health-related fitness levels and creates imbalances in their body composition (Nelson *et al.*, 2006: 1627-1628; Rey-Lopez *et al.*, 2008: 244-247) It has been established that the health and wellness of an individual is heavily reliant on his/her socioeconomic status (Gontarevet *al.*, 2013:17). A number of research studies have pointed out that low socioeconomic status, along with factors such as poor household income, low educational qualification, and marital status, amongst others, is a contributory cause of many chronic diseases of lifestyle. Furthermore, the link between socioeconomic status and health is not only related to adults, but also to children and adolescents living in impoverished households (Drenowatzet *al.*, 2014). Children living in these circumstances can easily be exposed to some chronic disease risk factors compared to their counterparts from high socioeconomic status backgrounds (Gontarevet *al.*, 2013:17 the 12-minute run, the PACER run for children and various bicycle, step, and treadmill tests.

2.3 Physical Fitness

Physical fitness is a set of attributes that people have or achieve. Being physically fit has been defined as "the ability to carry out daily tasks with vigor and alertness, without undue fatigue and with ample energy to enjoy leisure-time pursuits and to meet unforeseen emergencies (Caspersenet *al.*, 1985). According to the American Medical Association, is: "the general capacity to adapt and respond favorably to physical effort." Individuals are physically fit when they meet ordinary and unusual demands of daily life safely and effectively without being overly fatigued, and have energy left for leisure and recreational activities.

Physical fitness is in part genetically determined, but it can also be greatly influenced by environmental factors. Physical educators classify physical fitness as skill related (related to sport performance) and health related fitness (associated with disease prevention and health

promotion) which includes components such as cardio-respiratory endurance, muscular strength and endurance, body composition and flexibility. Lack of physical fitness (physical inactivity) is therefore a primary modifiable risk factor for cardiovascular disease and an increasing assortment of accompanying chronic hypo-kinetic (insufficient movement or activity) diseases, including: obesity, diabetes mellitus, cancer (breast and colon), bone and joint diseases (osteoporosis and osteoarthritis), depression, and hypertension (Katzmarzyk *et al.*, 2000a). Hence regular physical exercise is required as early as possible during childhood and adolescence

2.4 Components of Health Related Physical Fitness

Physical fitness is the ability to function effectively in physical work, training, and other activities and still have enough energy left over to handle any emergencies which may arise. The components of health related physical fitness are as follows:

Health-related physical fitness can be defined as an integrated measure of the whole body functioning, be it skeleton muscular, cardio respiratory, hematocirculatory, psycho neurological and endocrine-metabolic, that are involved in the performance of daily PA (Esmaeiade and Ebadollahzadeh, 2012:105). According to Andreasi *et al.* (2010: 497), it is a set of characteristics that has a link with the ability to perform physical and daily functional activities. It is important to know that the basic characteristics of health-related fitness are body composition, cardio respiratory fitness, flexibility, muscular endurance and muscular strength as well as metabolic functioning (Toriola and Monyeki, 2012:797).

2.4.1 Cardio respiratory Fitness

Cardio respiratory fitness (CRF) can be defined as the health-related component of physical fitness with the ability of the circulatory, respiratory, and muscular systems to supply oxygen efficiently and for a long period of time during a sustained PA (Lee *et al.*, 2010:27). Furthermore, CRF is usually expressed in metabolic equivalents (METs) or maximal oxygen uptake (VO₂max) measured by exercise tests such as a treadmill or cycle ergo meter. According to the ACSM (2013), CRF might not be a quick detector and consistently reliable means of measuring habitual PA, but may be a comparatively low-cost and a necessary health indicator for both symptomatic and asymptomatic patients in clinical practice (Myers *et al.*, 2004: 912-913). Individuals with higher fitness levels are able to sustain higher intensity PA for longer periods compared to their less fit counterparts (Beam & Adams, 2011:2). Physical activity patterns,

genetics, and other factors such as age, gender, medical status, and selected health-related lifestyle behaviors are the contributing factors to an individual's CRF level (Pahkala, 2009:14).

2.4.2. Body Composition

Body composition has been known to be one of the major health-related components of physical fitness (PF) that is affected by body weight and interconnected with muscles, fat, bone, and other important body tissues. Sometimes though, this element of a larger whole is reduced to fat and fat-free mass, and assessed as a body fat percentage and total body weight (in kilograms) (Lindsay *et al.*, 2013:2). The higher rate of obesity and underweight in the Potchefstroom area of the North-West Province among 12-18 year-old adolescents raises a concern and poses a threat to the health of the children in the area (Mamabolo *et al.*, 2007). An individual with an excessive percentage of body fat may be at risk of diseases such as cardiac disorders, musculoskeletal injuries and degradation, and reproductive disorders, whereas body fat percentage that is lower than 6-10% to 12-15% in boys and girls respectively, could lead to negative effects which might indicate the incidence of disease, eating disorders or under-nourishment (Goon *et al.*, 2006:23).

2.4.3 Flexibility

Flexibility is a health-related component of physical fitness that relates to the range of motion available at a joint (USDHHS, 1996). Some experts specify that flexibility requires range of motion without discomfort or pain (Howley and Franks, 1997). Flexibility is specific to each joint of the body, thus there is no general measurement of flexibility as there is for cardiovascular fitness. Flexibility is typically measured in the lab using measurement devices such as a goniometry, flex meter and in the field with test exercises such as the sit and reach, and the zipper.

2.4.4 Muscular Endurance

Muscular endurance is a health-related component of physical fitness that relates to the muscle's ability to continue to perform without fatigue (USDHHS, 1996). Muscular endurance is specific in nature. For true assessment of muscular endurance it would be necessary to test each major

muscle group of the body. Lab and field tests of muscular endurance are similar and are based on the number of repetitions that can be performed by the specific muscle group being tested (example: repetitions of push-ups or abdominal curls). Muscular endurance can be measured isometrical (static contractions) or isotonicly (dynamic contractions).

2.4.5 Muscular Strength

Muscular strength refers to the force or tension that can be generated by a muscle or muscle group during one maximal effort (Physiology of Exercise: Responses and Adaptations, 2nd edition). Strength is a health-related component of physical fitness that relates to the ability of the muscle to exert force (USDHHS, 1996). Strength is specific in nature. For true assessment it would be necessary to test each major muscle group of the body. Lab and field tests are similar and involve the assessment of one repetition maximum (the maximum amount of resistance you can overcome one time). 1RM tests are typically conducted on resistance machines. Strength can also be assessed using dynamometers. Strength can be measured isometrically (static contractions) or isotonicly (dynamic contractions).

2.5 Aerobic Exercise and Its Benefits

2.5.1 Aerobic Exercise

Aerobic exercise is a physical exercise of relatively low intensity that depends primarily on the aerobic energy-generating process. Aerobic means “with oxygen”, and refers to the use of oxygen to adequately meet energy demands during exercise via aerobic metabolism. Generally light to moderate intensity activities that are sufficiently supported by aerobic metabolism can be performed for extended periods of time and it refers to exercise that requires the consumption of substantially more oxygen than at rest .and can be undertaken for a prolonged duration without excessive fatigue. (<http://www.newellness.com>)

2.5.2 Studies on Aerobic Exercise

Selvam and Sudha (2008) conducted a study on selected effect of aerobic exercise on selected physiological variables among college girls. For this study aerobic exercise uses large muscle

groups rhythmically and continuously and elevates the heart rate and breathing for a sustained period. Common examples include walking, jogging/running, swimming, rowing, stair climbing, bicycling, cross country skiing, step and dance exercise classes, roller skating, and the more continuous forms of tennis, racquet ball and squash. To achieve this purpose, 60 girls were selected from Theivannai Ammal College for women, Villupuram. The age group of the subjects ranged between 18 to 20 years. The selected subjects were divided into two groups. The groups first trained for aerobic exercise. The training group underwent the training for 5 days in a week for eight weeks and group second acted as control group to make adjustments for differences in the initial means and test the adjusted posttest means for significant differences. The researcher used analysis of covariance (ANCOVA) for interpreting the results. The results for the study revealed that aerobic exercise had a significant effect in the improvement of the physiological variables such as resting pulse rate, breath holding time, vital capacity and respiratory rate.

Selvalakshmi, (2007) conducted a study on the effect of varied aerobic training programs on obese women working in IT companies for the purpose of the study. For this study, the obese women were grouped into three namely, control, floor aerobic and step aerobics group. The collected data on the cardio respiratory parameters prior to and after 12 weeks of varied aerobics training were statistically analyzed using analysis of covariance (ANCOVA) and result on vital capacity showed significant improvement due to varied aerobic exercises, as where no significant improvement was found in resting heart rate.

Ozcan and Ozturk , (2011) in Mugale, Turkey conducted the study on the effect of twelve week aerobic exercise programme on health related physical fitness components and blood lipids in obese girls .The aim of the study was to investigate the effects of 12 week aerobic exercise program on health related fitness components and blood lipids in obese girls. In this study, a total of 40 girls were recruited as exercise group (n = 20) and control group (n = 19). Participants joined sessions for 60 min per day, 3 days per week for 12-week. There were significant differences in weight, body mass index (BMI), flexibility, sit-ups, hand grip for both hands , skin fold measurements (thigh, triceps, biceps, abdomen, super iliac, sub scapula, chest, body fat percent, heart rate, high density lipoproteins (HDL), low density lipoproteins (LDL), total cholesterol, and triglyceride between pre-test and post test scores in the exercise group ($p < 0.05$). It was concluded that regular aerobic exercise may affect health related fitness components and blood lipids positively in girls. Furthermore, it may result in decreasing obesity in girls. Mills

and Mae (1994) conducted a study on the effect of low intensity aerobic exercise on muscle strength, flexibility and change of balance among sedentary elderly person .The purpose of this study was to determine the effects of a low intensity aerobic exercise program on muscle strength and flexibility of the lower extremities and balance among sedentary elderly persons.

This pre and posttest quasi-experimental study consisted of 47 sedentary elderly subjects not engaged in regular exercise and living in metropolitan housing in southwestern Ohio.

Convenience sampling was used with two apartment complexes randomly assigned to the experimental or comparison groups To prevent diffusion of treatment, subjects were assigned to these groups depending on their place of residence The 20 experimental subjects, with a mean age of 75.3, participated in eight weeks with low intensity of aerobic exercise while the comparison group (n=20), with a mean age of 74.8, maintained their usual level of activity for eight weeks. Experimental subjects also did the exercise on their own between classes. The exercise group had significantly greater flexibility of the ankles and knee than the comparison group. No significant differences were found between the groups for muscle strength. Although balance and perception of balance were not significantly different between the groups, the experimental group improved their balance by 22.4% from pretest.

Arslan, (2011) conducted the study on the effects of an eight-week step-aerobic dance exercise program on body composition parameters in middle-aged sedentary obese women in Aksaray Turkey .This study comprised an eight-week randomized controlled trial. For this study a total of 49 healthy sedentary obese women participated voluntarily. They were randomly divided into two groups: those undertaking a step-aerobic dance exercise program (n=29) and a control group (n=20). The subjects took part in a step-aerobic dance exercise program for one hour per day, three days a week for eight weeks. The subjects' Body Mass Index (BMI), weight, waist circumference, waist-hip ratio, four-site skin fold thickness, fat percentage, basal metabolic rate and lean body mass were assessed before and after the completion of the step-aerobic dance exercise program. After the eight weeks of the step-aerobic dance exercise program, significant differences were found in the subjects' weight, BMI, body composition parameters, waist-hip ratio (WHR), waist circumference (WC), fat percentage, lean body mass (LBM) and basal metabolic rate (BMR) in the experimental group ($p < 0.05$). There were no significant differences in the control group after the experiment in terms of the same measures ($P > 0.05$) .The result of this study concluded that the step aerobic dance program proved to be a useful exercise modality

for weight loss and in terms of body composition. There was a clear response to the eight-week step aerobic dance program in terms of central obesity in sedentary obese Turkish women.

Some of the common types of aerobic exercise

Walking: is one of the simplest and most available aerobic exercises. You can vary the intensity to match your fitness level. Other than walking shoes, it does not require any special equipment. You can walk almost anywhere: outdoors or indoors (malls, indoor tracks, or a treadmill). This makes walking easy to continue throughout the year. Walking is a good choice for starting their first exercise program or finds other exercises too hard on their joints. Some of the ways a walking habit can improve your health: Better cardiovascular fitness, stronger leg muscles, Lower blood pressure, Lower risk of heart disease, diabetes, bowel cancer and osteoporosis. It's also a safe, low-impact exercise that most people can do and it's especially good if you're overweight, unused to physical activity or pregnant. Walking for 30 minutes a day at moderate intensity is great. Walking for a longer period of time is better still. As you get fitter, you will be able to walk more briskly. Walking up and down hills will also help to boost stamina and leg strength. You'll get even more benefits from a walk if you swing your arms as this helps you walk faster and can burn 5 to 10 percent more kilojoules.

Cycling: It is another type of aerobic exercise with wide appeal and value. You can use a stationary or regular bike. Cycling may be ideal for individuals who, due to arthritic or other orthopedic problems, are unable to walk for an extended period of time without pain or difficulty. A program that combines walking and cycling may provide cardiovascular benefits without inducing the limiting pain as quickly. Cycling is also a good choice for people who are greater than 50 pounds overweight. It helps the heart without the mechanical stress on the back, hips, knees and ankles that walking can cause. One drawback - if you cycle outdoors, exclusively, the weather may limit your activity.

Ski Machines, Stair Climbers, Steppers, Elliptical: These types of machines can provide a good aerobic workout and each has its own unique strengths and drawbacks. First, exercise on these machines may be too strenuous to be enjoyable and provide optimal benefit for the beginner or person of low fitness level, even at the lowest settings. To determine if this type of machine is within your capability, give the machine of your choice a trial run at the store or fitness center. You should be able to pass the "talk test" while exercising at a moderate pace. People with knee or hip problems should avoid stair climbers and steppers as these machines can put extra stress

on these joints. Ski machines require above-average coordination to master. The advantage to the machines is that they are indoor activities that can be pursued regardless of the weather.

Swimming: is an excellent aerobic exercise, but considerations should be made before starting a program. For the exercise beginner, low-fit, or non-swimmer it might be a difficult activity to maintain the appropriate intensity for the recommended 30 to 60 minutes. Also, because the focus of swimming is on the smaller upper body musculature and swimming is a less efficient activity than cycling or walking, one can easily exceed their target heart rate range with swimming. Therefore, those with heart conditions should address a swimming program with their physician before starting. Water aerobics and water walking are good alternatives for those with joint pain. The buoyancy provided by the water eases stress on the joints.

Jogging, Aerobic Dance: These can be safe and beneficial exercise for the highly fit person. Both can be done indoors, which makes them year-round activities. Anyone with orthopedic problems or who experiences symptoms such as chest pain or shortness of breath should not engage in these activities. Remember to check with your doctor or cardiac rehabilitation instructor before starting any exercise program. There's more than one way to improve cardiovascular fitness with aerobic or "cardio" exercise that raises your heart rate. The best activity for you and one you're likely to stick with is one you enjoy and that fits easily into your life.

Running: Like walking, running is an inexpensive exercise you can do anywhere at a time that suits you. It is beneficial in helping to improve heart and bone health. Its advantage over walking is that it improves heart fitness and burns kilojoules at a greater rate. It takes roughly an hour for a walker to burn the same number of kilojoules that a runner burns in 30 minutes.

Jogging: It is running at a slower pace which is still a great aerobic exercise. Like walking, running or jogging can be a social activity you can do with a friend or in a group. Many areas have running clubs which welcome runners of all skill levels. University of California Berkeley, Foundations of Wellness. A dozen ways to improve you're walking workouts. [Online] Palm Coast, FL: Remedy Health Media. c2010 [accessed 16 January 2020] Available from: <http://www.wellnessletter.com/html/fw/fwFit04Walking.html>

2.6 Effect of Aerobic Exercise on Health Related Physical Fitness Components

2.6.1 Health Related Physical Fitness

Health-Related Physical Fitness is the portion of physical fitness directed toward the prevention of or rehabilitation from disease, the development of a high level of functional capacity for the necessary and discretionary tasks of life, and the maintenance or enhancement of physiological functions in biological systems that are not involved in performance but are influenced by habitual activity. Maintaining an appropriate level of health related fitness allows a person to Meet emerge, reduce the risk of disease and injury, Work efficiently, Participate and enjoy physical activity (sports, recreation, leisure); and Look one's physical best. (Polwman, 2011), conducted the study in Poland that showed that engaging in moderate physical activities very important for the primary prevention of chronic diseases, decreasing all causes of mortality and that exercise is one of the determinants for physical and psychological well-being.

2.6.1.1 Effect of Aerobic Exercise on Cardiovascular Endurance

Cardiovascular endurance (CVE) is one of the most important measures of overall health. A person's level of cardiovascular endurance helps predict probability of disease, quality of life, and ability to react to acute physical and mental stress. For healthy individuals, higher cardiovascular endurance also indicates an elevated level of physical fitness. (Corbett, 2009)

Aerobic exercise use large muscle group to increase heart rate. This causes faster and deeper breathing which maximize the oxygen in the blood. There are many studies which prove that cardiovascular endurance improved after aerobic exercise. Correctly performed aerobic exercise causes positive change in the body's cardio respiratory system. During maximum aerobic exercise the trained individual has increased maximum oxygen consumption and is better able to process oxygen and fuel can provide more energy to working muscle. Aerobic capacity is the most widely accepted single indicator of one's cardio respiratory fitness level and it is one of the best types of activity for training and maintaining low percentage of body fat. (Probart *et al.*, 1991)

2.6.1.2 Effect of Aerobic Exercise on Muscular Endurance

Muscular endurance, which represents multiple muscle contractions or a sustained muscle contraction over a period of time, for example during running, climbing, swimming, jogging, running on tread mill at the gym there will be muscle contraction those muscle contraction can assists the improvements of muscular endurance. During aerobic exercise, minute ventilation increases and an increased load is placed on the respiratory muscles. Both the frequency and the speed of contraction in the muscle are increased, (Harms *et al.*, 2000).

2.6.1.3 Effect of Aerobic Exercise on Flexibility

Flexibility has been defined as ‘the intrinsic property of body tissues, which determines the range of motion achievable without injury at a joint or group of joints, Flexibility determines how efficiently your muscles are. Increased flexibility has also been associated with decreased risk of acute and chronic (overuse) injuries. Poor flexibility can directly affect cardiovascular endurance, muscle strength and muscular endurance. Physiologically flexibility can include extra-muscular (range of motion at a joint) and intramuscular factors such as hyper tonicity (knots) within the muscles themselves. Aerobic exercise and strengthening allows muscle to contract and flex.

Those muscles also need to be starch to protect them from injury and to improve range of motion in the joints .So aerobic activities has its own contribution for flexibility and balance.

2.6.1.4 Effect of Aerobic Exercise on Body Composition

Regular aerobic exercises reduce the body fat percentage without the loss of the muscle as well as important effect on anthropometric and hematologic level of obese and overweight women. (Evrimet *al.*,2010). Aerobic exercise including walking, running, and swimming has been proven to be an effective way to lose weight; Body Composition Changes for over fat or borderline over fat people, regular aerobic exercise reduces body mass and body fat. Increases in fat free body mass also accompany a regular program of resistance training. Exercise only, or exercise combined with calorie restriction, reduces body fat more than fat lost with only dieting because exercise conserves the body’s lean tissue mass (Katchet *al.*, 2011)

2.7 Characteristics of Exercise Intensity

Exercise intensity refers to how hard your body is working during physical activity. Your health and fitness goals, as well as your current level of fitness, will determine your ideal exercise intensity. The goal is work hard, but not too hard. Typically, exercise intensity is described as low, moderate, or vigorous. For maximum health benefits, the goal is to work hard, but not too hard, described as moderate-intensity by the (National Physical Activity Guidelines for Australians). These guidelines recommend that for good health, you should aim for at least 30 minutes of moderate-intensity physical activity on most days. This is the same for women and men ([http://www. Remeder health media, 2010](http://www.Remederhealthmedia.com)). The process of determining and controlling appropriate exercise intensity presents a challenge, which has implications related to both physiological changes and to individual compliance within an exercise program. (Desta enyew, 2012)

Several measurements for gauging exercise intensity for various exercise modalities have been devised and applied. These include proportion of maximal oxygen uptake (%VO₂ max), proportion of maximal heart rate (%HR max), proportion of maximal heart rate reserve (%HRR max), and blood lactate indices. The following will cover the main principles of predicting and controlling exercise intensity by extrapolation from the relationships between oxygen uptakes, heart rate, and power output and running speed. Ideally, proportions of the O₂ max are used to specify exercise intensity levels. The recommended intensity range is normally between 40% and 85% depending on the health and training status of the individual (ACSM, 1995).

Low- intensity -The decrease in the minimal intensity to 40% of VO₂max and 55% of HR max represents a change in the ACSM recommendation and more clearly recognizes that the Minimal threshold for improving fitness/health is quite variable at the lower end of the intensity scale. For low-intensity sub maximal exercise, fatigue may result from substrate depletion, dehydration, hyperthermia, or loss of motivation associated with central fatigue (Desta enyew, 2012).

Moderate-intensity- activity in this statement referred to activities that use Approximately 150 kilocalories (630 kJ) per day or are equivalent to 55-65% of VO₂max. 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 regimen of activity that is of longer duration or of more vigorous intensity are likely to derive greater benefit” (Montoye. H, 1996)

2.8. Measurement of Exercise Intensity

There are varying ways to measure your exercise intensity to make sure your body is getting the most out of every workout. You may need to experiment to find out which method of measuring exercise intensity suits you best. Three different measurement methods include: - Target heart rate, Talk test, and Exertion rating scale (<http://www.betterhealth>, 2013).

2.8.1. Heart Rate

A cardio regulatory center in the medulla oblongata of the brain can alter the heart rate by way of the autonomic nervous system. Parasympathetic motor impulses conducted by the vagus nerve cause the heart rate to slow, and sympathetic motor impulses conducted by sympathetic motor fibers cause the heart rate to increase. The cardio regulatory center receives sensory input from receptors within the cardiovascular system.

The cardio regulatory center is under the influence of the cerebrum and the hypothalamus.

Therefore, when we feel anxious, the sympathetic motor nerves are activated, and the adrenal medulla releases the hormones nor epinephrine and epinephrine. The result is an increase in heartbeat rate. On the other hand, activities such as yoga and meditation lead to activation of the vagus nerve, which slows the heartbeat rate. Other factors affect the heartbeat rate as well. For example, a low body temperature slows the rate. Also, the proper electrolyte concentrations are needed to keep the heart rate regular (Vander, 2001).

Target heart rate (THR): The human body has an in-built system to measure your exercise intensity – your heart. Your heart rate will increase in proportion to the intensity of your exercise. You can track and guide your exercise intensity by calculating your Target Heart Rate (THR) range (<http://www.betterhealth>, 2013). For low to high -intensity physical activity, a person's Target Heart Rate should be 40 to 85% of his or her maximum heart rate (ACSM, 1995). This maximum rate is based on a person's age. An estimate of a person's maximum heart rate can be calculated as 220 beats per minute (bpm) minus your age. Because it is an estimate, use it with caution-Take your pulse again when you have been exercising for about 5-10 minutes.

Continue taking your pulse at regular intervals. A heart rate monitor is an easy way to keep track of your heart rate while you are exercising or you can take your pulse.

2.9 Aerobic fitness

Aerobic fitness is a measure of the combined efficiency of the lungs, heart, blood stream and exercising muscles in getting the oxygen to muscles and putting them to work. A larger aerobic capacity increases the body's efficiency to perform daily activities (Stephens *et al.*, 2003).

Aerobic endurance is the highest proportion of VO₂max at which an individual can sustain >20 minutes' activity. It is closely allied to the lactate threshold point at which muscular fatigue begins to be hastened. Elite endurance athletes can sustain activity typically at greater than 80% of their aerobic power, whereas sedentary or diseased individuals may only be able to sustain activity at 40–50% of aerobic power. This means the inactive or diseased person not only has a reduced capacity but also cannot utilize as much of whatever capacity they possess compared with the more active or fitter individual. Aerobic power, typically described as VO₂max. It is the maximal amount of oxygen the body can take in and utilize during physical activity. These are influenced by three factors: the lungs' ability to oxygenate the blood, the cardiovascular system's ability to deliver the oxygenated blood to the exercising muscles and the muscles' ability to extract and utilize the oxygen to produce energy for sustained contractions (Buckley and Hughes, 2008).

3. MATERIALS AND METHODS

3.1 Description of the Study Area

The study area Dejen is part of East Gojjam Zone found in one of the nine regional states of Amhara region, which is situated 232 km south of the capital city of Addis Ababa and 372 km north of Bahir Dar. It is located in the north part of Enemay Wereda, in the south part of Abay River, in the east part of Shebel and in the west part of Awabal Wereda. The district has three climatic zones: 75% woynadega (intermediate elevation), 2% dega (high land) and 23% kola (low land). The urban center where 14.9% of the population lives in the district is located in the Woynadega zone. The climate is monsoonal and varies with elevation. The primary wet season extends from April through October; among these, July and August are the wettest months.

According to the Central Statistical Agency of 2007, the district has an estimated total population of 128,917 and the town has a population size of 18,135. It has wide ranging topography of which 40% lies between 1500masl and 2700masl. The other 60% lies between 1080 and 1500masl. This Woreda has an annual rainfall of 800 to 1200 mm and has a mean annual temperature ranging from 15°C to 30°C. The main stall of the population is rain fed and subsistence agricultural householders in this Woreda practice mixed farming. The Woreda considered as “Woina Degas” having two major seasons, namely Belg and Meher and irrigation is practiced in some areas. In terms of total consumption and for other purposes, normally, Belg season crop harvested contributes about 67.5% of the average Crop production and the remaining 32.5% is from the Maher season. Dejen town has 3 youth football projects such as Under 17, Under 15, and Under 13. (Source: Dejen Woreda Communication Office 2011)

3.2. Study Materials

During this research process instruments like whistles, stop watch, ladder, measuring tape, record sheet, paper, pen and football were used.

3.3. Research Design

For this research the researcher would design to employ experimental method. For the study the researcher followed and observed 12 week training with a session of three days per a week and

60 minutes per day on 48 players which were selected purposive (available) from total population of 48 players, 24 experimental group and 24 control groups. The pre and post tests informal experiments were performed on cardiovascular endurance, muscular endurance, muscular strength, flexibility and body composition.

Table 1: The Study Design Layout

Treatment	Aerobic exercise program
Exercise days	Monday, Wednesday and Friday
Time of training	Morning(12:00)
Frequency	3days/week
Total duration	12 weeks
Duration /session	40-60 minutes
Intensity	Moderate (50-65HRmax)

3.4 Study Population

Participants of the study were Dejen Town under 17 male football projects player in the study area. There are three male football project trainees in Dejen Town, for this study the researcher use only one project and 48 players were selected for both experimental and control group.

3.5 Sample Size and Sampling Techniques

In Dejen Town there are 3 football project trainees including under seventeen, under fifteen and under thirteen. The number of players in each project in Dejen Town are 20, 22 and 48 for under thirteen, under fifteen and under seventeen respectively. The target population for this study was the young male under seventeen soccer project trainees at Dejen Town. The sample size for this study was the total number of Dejen Town under 17 males' football project trainees. There are 48 players in this project with ages of 14-17. The researcher used census sampling technique from the total 48 project members. In order to divide the samples into control and experimental group I used random sampling technique.

3.6 Inclusive and exclusive criteria

Inclusion Criteria

The subjects who full fill the healthy history questioners and whose ages were 14-17 young male football projects were included in this study, being free from any drug abuse and age were the criteria that need to be the subject include in the study

Exclusion Criteria

The players, who has special training program, were excluded to this study. According to their health questioners result participants who have medical condition restrict and resent injury status were excluded to this study. Subjects who had possibly to resign in between reject after short interview were made.

3.7. Methods and Procedures of Data Collection

The researcher were used primary data that is obtained from the subjects by using fitness tests, (pre and post) field works and experimental variables according to the designed procedures and use quantitative data collection method to collect data from the subjects, by using pre-test and post-test through the appropriate health related physical fitness tests including measuring, 90°angle push up test (isometrically) for muscular endurance and sit and reach test for flexibility and the results were collected and recorded by the investigator with the help of assistant who was takes training for two days. Each test was held at a field of Dejen Town.

3.8 Procedures for Data Analysis

Quantitative data was used to collect through the appropriate health related physical fitness test measures like push up test for muscular strength, curl up test for muscular endurance, 2400m run for cardiovascular endurance, sit and reach test for flexibility and body mass index for body composition. The researcher used the following materials for the study which includes football, cones, watches, and whistle. The data was recorded by the researcher and two assistant coaches.

3.8.1 Fitness Test Analysis

3.8.1.1 Push ups

Purpose: to identify the level of strength.

Equipments: insolate or hard surface gymnastic mat.

Starting position: the participant were a front lying position on the mat with hands placed approximately under shoulder, legs straight

Procedures: the participant then pushes with the arms until they are fully extended, keeping legs and back straight. The body is then lowered, using the arms and keeping the back in a straight line from the head to toes, until the elbow reach 90 degrees and the upper arms are parallel to the floor. This movement is repeated as many as possible

3.8.1.2 Curl-Up

Purpose: to identify the level of endurance.

Equipment: gymnastic mat

Starting position: the participant lied on back, with the knee slightly bent at an angle of 140 degree (approximately 6 to 10 cm off the floor). Heels on the ground, arms extended along thigh with fingers pointing toward the knees, stabilization, hooking, or anchoring of the feet is not permitted.

procedures: the initial phase of the curl-up must involve a flattening out of the lower back region (i.e., pelvic tilting), followed by a slow curling up of the upper spine with the hands sliding along thigh until finger tips teaches knees at this point, the trunk should be raised at an angle of greater than 30 degrees to the floor .heels must remain in the contact with the floor at all times .return to starting position touching the partners hand with back of head.

The movement is slow and well controlled. The time to perform the lifting and lowering stage is the same

3.8.1.3 Endurance Run

Purpose: to identify the level of cardiovascular endurance.

Equipment: stop watch for each timer, starting flag

Instruction: mark of 50m square (alternatives 60 by 40m).ensure that all participants have running shoes.

Procedures: place one group of participants with timer at each corner. Timers tally laps for each runner on back of the last record card. Inform participants how many laps they will run.

Instruct participants to maintain a steady pace to complete the distance as quickly as possible, but to stop or preferably walk if they are unable to continue running.

Action: at completion of required number of lap's registered elapsed time in minutes and seconds on test record card.

Note-it is important that participants be allowed a light warming up before and a cooling down period following this events .stretching leg muscles before and after release strain and tightness in muscle. Encourage participants to continue walking and deep breathing for three to five minutes. .

Sit and Reach Test

Purpose: to test the flexion of trunk and the ability to stretch the lower back and thigh muscles (hamstrings).

Direction: Sitting with legs fully extend and bottom of feet flat against box or steps about 20 cm high and extend (stretch) arms and hands forward as far as possible and hold for a count three. Then with a ruler (in mm or cm) the distance before or beyond the edge of the board that reach is measure. Distances before the edge (not able to reach toes) were express as negative scores; those beyond the edge were expressed as positive scores.

Procedure: Participants were performs warming up activities and some stretching activities for 5 minutes before starting test.

Remove their shoes and sit on the floor with legs stretched out straight ahead.

The soles of the feet are placed flat against the sit and reach box.

Both knees are locked and pressed flat to the floor, the tester assists by holding them down with the palms facing downwards, and the hands on top of each other or side by side, the subject reaches forward along the measuring line as far as possible.

3.9 Method of Data Analysis

The data collected through fitness tests were analyzed, interpreted and tabulated in to a meaningful idea using manually and in computer in order to compare the selected health related physical fitness components changes which observed among participants that undergoing aerobic exercise program. The data was analyzed using computerized statistical package software (SPSS version 20). Analysis of covariance was used to compare the pre and post training data at level of significance is < 0.05 .

3.10. Data Quality Control

To ensure quality of data only standard physical fitness test were used to reduce the mistake occur during data collection, the data collector were trained and tests were recorded with video and photograph for further check on test Procedure.

3.11. Ethical Consideration

The research conducted as pre rule, politics and research ethics of Haramaya University and the privacy of the participants were protected by the protocol that is approved by the university guidelines. The participant had an awareness to inform earlier when there is something which is harm for them, and took a signed agreement to participate in this study with a written letter. Generally the research went in line with necessary ethical issues.

The study considered the ethical issue related to investigation. It made guarantees for confidentiality of information that may receive from research participants and risk of harm due to participation

4.1 RESULTS AND DISCUSSIONS

4. 1 Analysis of data and results of the study

This chapter contains data analyzed on selected physical, physiological and psychological variables after 12 weeks of aerobic training. To determine the dissimilarity among the experimental and control groups in pretest and posttest data related to variables were statistically analyzed by analysis of covariance. SPSS 20 version is used to calculate ‘F’ ratio and at 0.05 level of significance the obtained ‘F’ value is tested.

The findings of experimental and control groups for pretest and posttest through analysis of covariance has been presented and explained in the following tables.

Table 2: Analysis of co-variance on cardio vascular endurance between experimental and control group of Under-17 football project trainees of Dejen Town

Groups	EG	Control groups	SOV*	Df	Mean Square	F-ratio (*)	Sig
Pretest Mean	10.2492	10.2763	B W	19 14	0.632 0.002	5.736	0.051
S.D	0.72310	0.72600					
Posttest Mean	8.9417	10.1865	B W	19 14	0.239 0.042	297.064	0.000
S.D	0.45241	0.7164					

* Significant at 0.05 level * SOV-Stream of Variation, EG- Experimental group

The above table–2 reveals that pretest mean on cardio vascular endurance of aerobic exercise and control groups of Under-17 football project trainees are 10.2492 and 10.2763 respectively. The obtained ‘F’ ratio value is 5.736 and the P value is 0.051 which is greater than 0.05. This shows that there is no significant difference between the experimental groups & control group.

The post-test means of aerobic exercise and control groups of Under-17 men football project trainees on cardio vascular endurance are 8.9417 and 10.1865 respectively. The obtained ‘F’ ratio value is 297.064 and P value is 0.00. As the P value is below the 0.05 it shows a statistically significant difference between the experimental groups and control group on cardio vascular endurance.

The results of the current study are in line with junior male soccer players following programs consisting of short-sprint training (Mujika, I., Santisteban, J., & Castanga, C., 2009), and conform to positive effect in female soccer players of similar age. Most experiments have been conducted on males, with programs combining strength and speed training (Rumpf, *et al.*, 2012). Reports of male youth athletes aged 14 to 18 years have shown an enhanced effect on sprint with high-intensity speed training (Mujika, I., Santisteban, J., & Castanga, C., 2009) found that a 10-week training program, with one hour per week shuttle sprint training, produced significant improvement in 30 yard sprint. The research results agree to results of previous studies, those studies have also suggested that speed training have an improvement on players acceleration, and also it was concluded that in speed training, it is important to improve as many fast motor units as possible, which are more suitable for fast movements. The gains in sprint performance occurred in the initial acceleration and speed-maintenance phases. The ability to accelerate quickly from a stationary position will provide a competitive advantage for athletes. (Cecilia Geva, HalilTaskin, FatmaArslan et al., 2012)

Table 3: Analysis of co-variance on muscular strength between experimental and control group of Under-17 football project trainees of Dejen Town

Groups	EG	Control Groups	SOV*	Df	Mean square	F-ratio (*)	Sig
Pretest Mean	29.7917	29.5000	B W	17 6	60.958 0.944	3.832	0.52
S.D	6.73072	6.80792					
Posttest Mean	37.7083	29.5743	B W	17 6	49.929 13.028	64.544	0.000
S.D	6.34843	6.82365					

* Significant at 0.05 level * SOV-Stream of Variation, EG- Experimental group

The above table-3 reveals that pretest mean on muscular strength of aerobic exercise and control groups of foot ball trainees Under-17 are 29.7917 and 29.5 respectively. The obtained 'F' ratio value is 3.832 and the P value is 0.052 which is greater than 0.05. This shows that there is no significant difference between the experimental groups and control group.

The post-test means of aerobic exercise and control groups of Under-17 men football project trainees on muscular strength are 37.7083 & 29.5743 respectively. The obtained 'F' ratio value is 64.544 and P value is 0.00. As the P value is below the 0.05 it shows a statistically significant difference between the experimental groups and control group on muscular strength.

This study finding was consistent with the finding of Michael G. Miller, Jeremy J. Herniman, *et al.*, (2006), who conducted the study on the effects of a 6-week plyometric training program on strength; a study result revealed that six weeks plyometric exercises program can significantly improve the performance players' strength. The result of this finding was also in line with the finding of a study conducted by (ZoranMilanović, *et al.*, 2013) conducted a study on the effects of a 12-week conditioning program involving speed, strength, and quickness (SAQ) training and its effect on agility performance in young soccer players.

Table 4: Analysis of co-variance on muscular endurance between experimental and control group of Under-17 football project trainees of Dejen Town

Groups	EG	Control groups	SOV*	Df	Mean square	F-ratio (*)	Sig
Pretest Mean	31.000	31.7917	B	12	31.500	2.613	0.321
			W	11	0.000		
S.D	4.054	4.29336					
Posttest Mean	36.5	31.986	B	12	19.618	17.150	0.000
			W	11	1.144		
S.D	3.2837	4.4137					

* Significant at 0.05 level * SOV-Stream of Variation, EG- Experimental group

The above table-4 reveals that pretest mean on muscular endurance of aerobic exercise and control groups of Under-17 football trainees are 31.000 and 31.7917 respectively. The obtained 'F' ratio value is 2.613 and the P value is 0.321 which is greater than 0.05. This shows that there is no significant difference between the experimental groups and control group.

The post-test means of aerobic exercise and control groups of Under-17 men football trainees on muscular endurance are 36.5 and 31.986 respectively. The obtained 'F' ratio value is 17.150 and P value is 0.00. As the P value is below the 0.05 it shows a statistically significant difference between the experimental groups and control group on muscular endurance.

This result matched with the finding of (R. Arjunan 2015), the improvements observed is supposed induced by speed, agility, and quickness (S.A.Q) training on the basis of the results the impact of Speed, Agility and Quickness training has significantly contributed to improving the selected Physical Fitness Variables such as speed, agility muscular strength endurance, and explosive power (R. Arjunan 2015).

Table 5: Analysis of co-variance on flexibility between experimental and control group of Under-17 football project trainees of Dejen Town

Groups	EG	Control Groups	SOV*	Df	Mean square	F-ratio (*)	Sig
Pretest Mean	6.8333	7.3750	B	11	37.947	10.006	0.062
			W	12	0.160		
S.D	4.26988	3.9761					
Posttest Mean	11.0417	7.6527	B	11	41.064	237.581	0.000
			W	12	4.104		
S.D	4.6669	4.1221					

* Significant at 0.05 level * SOV-Stream of Variation, EG- Experimental group

The above table-5 reveals that pretest mean on flexibility of aerobic exercise and control groups of Under-17 football trainees are 6.8333 and 7.3750 respectively. The obtained 'F' ratio value is 10.006 and the P value is 0.062 which is greater than 0.05. This shows that there is no significant difference between the experimental groups and control group.

The post-test means of aerobic exercise and control groups of Under-17 men football trainees on flexibility are 11.0417 and 7.6527 respectively. The obtained 'F' ratio value is 237.581 and P value is 0.00. As the P value is below the 0.05 it shows a statistically significant difference between the experimental groups and control group on flexibility.

This result of this study is in line with (Konstantinos M, Christos P, Ioannis G, 2015) who conducted effect of an eight-week program of static and dynamic stretching on the range of motion (ROM) of the joints of the lower limbs, the 20 m sprint, and the performance of the standing long jump (LJ) and the drop jump (DJ 20 cm) Statistical analysis indicated significant

improvements after the stretching exercises of ROM. Results showed that the program has a positive effect on the ROM of the joints, as well as the speed and jumping ability of the subjects.

Table 6: Analysis of co-variance on body composition between experimental and control group of Under-17 football project trainees of Dejen Town

Groups	EG	Control groups	SOV*	Df	Mean square	F-ratio (*)	Sig
Pretest Mean	18.8958	18.9888	B W	17 6	2.967 0.001	20.563	0.055
S.D	1.4810	1.51112					
Posttest Mean	18.1850	18.79997	B W	17 6	2.371 0.115	2670.465	0.000
S.D	1.3351	1.43221					

* Significant at 0.05 level * SOV-Stream of Variation, EG- Experimental group

The above table–6 reveals that pretest mean on body composition of aerobic exercise and control groups of Under-17 football trainees are 18.8958 and 18.9888 respectively. The obtained ‘F’ ratio value is 20.563 and the P value is 0.055 which is greater than 0.05. This shows that there is no significant difference between the experimental groups and control group.

The post-test means of aerobic exercise and control groups of Under-17 men football trainees on body composition are 18.1850 and 18.79997 respectively. The obtained ‘F’ ratio value is 2670.465 and P value is 0.00. As the P value is below the 0.05 it shows a statistically significant difference between the experimental groups and control group on body composition.

This finding is similar with the finding of De Souza e Silva MJ., *et al* (2007) who reported that people who adhere to diet and aerobic exercise for 60 to 90 minutes in 5 to 7 days a week due to the increase in VO₂ max and HDL levels are achieved and their waist circumference decreased. Since physical activity significantly reduces body fat content for the treatment of heart diseases, it is very important in cardiovascular exercise (aerobics) compared to other training is more effective in reducing body fat percentage.

4.2 Discussion

Following the collection of data, appropriate statistical analysis has been done in order to present the discussion on findings. The scholar examined the effective analysis of aerobic training for twelve weeks on Under-17 football project trainees of Dejen Town. Aerobic training had significant effects on selected physical, physiological and psychological variables after twelve weeks training program.

Discussion on Cardiovascular Endurance

In this study cardiovascular endurance is significantly improved in experimental groups than control group on male football trainees of Under-17. Aerobic exercise group had better improvement than control group after twelve weeks of training. Cardiovascular endurance of a person depends on many physiological parameters including heart rate, stroke volume, cardiac output and maximal oxygen consumption. Improvement in aerobic fitness is achieved through a complex set of central and peripheral adaptations. Training exercise induces increase in type I muscle fiber area as well as mitochondrial number and function increasing the capacity to use oxygen. Aerobic exercise training induces changes in cardiac hypertrophy that enhances peak cardiac output and stroke volume. Blood flow to working skeletal muscle increases oxygen utilization. It allows the heart to maintain a given sub maximal work level at a lower heart rate. Danielle Wigmore, (2011).

The findings of the study can be substantiated by observations made by renowned experts Bernard Gutin, *et al.*, (2002), Ramirez Lechuga J., *et al.*, (2012), Usha Rani. S. and Satyander Pal Sing, (2013).

Discussion on Muscular Strength

The result of the present study shows that the muscular strength is significantly improved in both experimental groups when compared to control group on male football trainees. Aerobic exercise group had better improvement than aerobic exercise group than control group after twelve weeks of training. Basically training may confer neuromuscular adaptations in conjunction with increases in muscle mass and muscle size, which all increase during puberty in association with the increased secretion of sex steroids. But the gain in muscle strength in response to training in pre pubertal children may also primarily be the result of neural adaptations as muscle strength could significantly increase without a concomitant augmentation in muscle size, even after a period and intensity of training for which muscle hypertrophy is evident in adults. The amount of

moderately intense exercise within the school curriculum physical education to 40 minutes per day provides a feasible strategy to enhance muscle strength in Pre pubertal boys. Stenevi Lundgren S, *et al.*, (2010).

The findings of this study can also be substantiated by observations made by renowned experts Yokesh, T.P. and Chandrasekaran, K., (2011) and Maniazhagu, C. Robert Alexander and Sukumar Sha (2011).

Discussion on Muscular Endurance

The result of the present study indicates that the muscular endurance is significantly improved in experimental groups than control group on male football trainees. Aerobic exercise group had better improvement than control group after twelve weeks of training. Aerobic exercise led to metabolic changes in the body. With increase in exercise mitochondrial content of a muscle fiber alters the biochemical signals controlling energy metabolism during sub maximal exercise Dudley *et al.*, (1987). The signal within trained muscle fibers that accelerate metabolism during exercise are attenuated, thereby reducing the rate of carbohydrate breakdown and probably contributing to the sparing of muscle glycogen observed in trained subjects karlsson *et al.*, (1972) thus, the biochemical adaptation in muscle helps the muscle to sustain endurance for longer duration of time.

The findings of this study can be substantiated by observations made by renowned experts Baljit Singh Sekhon and P. V. Shelvam, (2013), Maniazhagu, C. Robert Alexander and Sukumar Sha (2011), Wilmore, Jack H., (2003). Usha Rani. S. and Satyander Pal Sing (2013).

Discussion on Flexibility

The result of the present study shows that the flexibility was significantly improved in experimental groups than control group. Aerobic exercise group have been better improvement than control group of both normal and overweight school boys after twelve weeks of training.

Greene and Ignico, (1995) demonstrated that ten weeks of a physical fitness programme had significantly improved trunk flexibility in children. Likewise, Usha Rani. S. *et al.*, (2013) and Manjappa. P. *et al.*, (2013) found that aerobic exercise/dance significantly improved flexibility after 6 weeks of training. Similarly flexibility is improved in overweight school boys after 12 weeks aerobic exercise, (Yokesh, T.P., 2011).

Aerobic exercise works a muscle through a full range of motion and increases the ability of stretching there by releasing the lactic acid that results in the release of stiffness, tension, pain

and fatigue from the muscle. It leads to increase in the range of motion and lubrication in the joints. This result shows enhanced fluidity throughout the body and sense of ease and comfort.

Thus aerobic exercise program may have been specific enough to improve hamstrings and low back flexibility of male football trainees of Under-17.

Discussion on Body Composition

The result of the present study shows that the body composition was significantly improved in experimental groups than control group after twelve weeks of training. Aerobic exercise increases caloric output that provides a significant and desirable option for unbalancing the energy equation to facilitate weight loss and desirable modification Mc. Arde and Toner, (1988). The alterations in body composition most after due to decrease in fat weight and a maintenance or slight increase in fat free indicate the importance of aerobic exercise to burning calories and losing body fat.(Kravitz L. 1995). The findings of this study can be substantiated by observations made by renowned experts Aaron L. Carrel., *et al.*, (2005), Fatma Arslan (2011), Bernard Gutin, *et al.*, (2002).

5. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary

The purpose of this study was to investigate the effects of 12 week aerobic exercises on selected health related physical fitness components in Dejen town under 17 male football project trainees. For this purpose, the researcher reviewed the available literatures in order to decide the focus of the study and methodologies. In order to attain the general objective of the study, the following specific research objectives were formulated.

1. To identify the effect of aerobic exercise on the improvement of cardiovascular endurance.
2. To investigate the changes induced by aerobic exercise on muscular strength and muscular endurance after 12 weeks of aerobic exercise.
3. To measure the significance of aerobic exercise on the improvement of flexibility and body composition.
4. To prove the performance change due to participating in physical fitness training.

Based on the above specific objectives, the research questions were formulated. In dealing with these basic objectives, the study conducted on U-17 male football project trainees using census sampling system 24 subjects/target groups were underwent experimental of aerobic exercise training for three months and 3 days per week,. A pretest and posttest of selected physical fitness tests were compared to the control group and the result was taken to gain the necessary information required.

Through with the Analysis of covariance table, the data were analyzed. Hence, the following findings were investigated.

1. The finding of this study indicated that Improvement in cardio vascular endurance was observed.

2. The finding of this study indicated that muscular endurance and muscular strength significantly improved after twelve weeks of aerobic exercise on under-17 football project trainees.
3. The finding of this study indicated body composition significantly reduced in aerobic exercise on under-17 football trainees from pre to post test.
4. The finding of this study showed that significant changes were found in flexibility in aerobic exercise on under-17 football players from pre to posttest.

5.2. Conclusion

Based on the major finding of this study, the following points were stated as conclusions.

- ✓ There was no significant difference between pretest mean of aerobic exercise and control groups on physical variable namely cardio vascular endurance, muscular strength, muscular endurance, flexibility and body composition in Dejen town under 17 male's football project
- ✓ There was significant difference between posttest mean of aerobic exercise and control groups on physical variable namely cardio vascular endurance, muscular strength, muscular endurance, flexibility and body composition in Dejen town under 17 male's football project
- ✓ 12 week aerobic exercise significantly important on the improvement of cardio vascular endurance in case of dejen town Under-17 male football project.
- ✓ 12 week aerobic exercise significantly important on the improvements of muscular strength, in case of dejen town Under-17 male football project.
- ✓ 12 week aerobic exercise significantly important on the improvements of muscular endurance in case of dejen town Under-17 male football project.
- ✓ 12 week Aerobic exercise significantly important on the improvements of flexibility in case of dejen town Under-17 male football project.
- ✓ Aerobic exercise was found effective in significantly reduced body composition in case of dejen town Under-17 male football project.

5.3 Recommendations

Based on results, discussions and findings of the study, the following recommendations were recommended:

- Aerobic exercise had a positive effect on cardio respiratory fitness. So for the better improvement Under-17 football project trainees should participate in aerobic exercise.
- Under-17 football project coaches as a means to improve the health related physical fitness status of football players should encourage aerobic exercises.
- Efforts through project coaches should be made in advocating the importance of aerobic exercise training since it has enormous benefits.
- Aerobic exercise had a great effect on the reduction of excess body fat, and BMI. So that people should do exercise for 60 to 90 minutes in 5 to 7 days a week due to the increase in VO_2 max and HDL levels.
- Further study should be conducted in different projects to understand how aerobic exercise affects health related physical fitness.

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7. APPENDICES

APPENDIX - A

Physical Activity Readiness Questionnaire (PAR-Q)

Please read the following questions carefully and indicate your correct responses to each question by ticking (X) for your answer “YES” or “NO”

Table 1: Health Status Questionnaire

NO	Questions	Yes	No
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?		
2	Do you have high blood pressure?		
3	Do you have low blood pressure?		
4	Do you have Diabetes mellitus or any other metabolic disorder?		
5	Do you have or ever suffered from heart condition?		
6	Have you ever felt pain in your chest when you do physical exercise?		
7	Is your doctor currently prescribing you drugs or medication?		
8	Have you ever suffered from shortness of breath at rest or with mild exercise?		
9	Is there any history of Coronary Heart Disease within your family?		
10	Do you currently smoke?		

If you have answered **YES** to any of the above questions please give details: _____

Source: Canadian Society for Exercise Physiology. *Revised 1994*

APPENDIX- B

Participants Information Sheet and a Consent Form

Researcher`s Name: Endeg Debas Temesgen

Major Advisor`s Name: Desta Enyew (PhD)

Co-Advisor`s Name: Abinet Ayalew (PhD)

Thesis Title: Effect Of Aerobic Exercise On Selected Health Related Physical Fitness: The Case Of Dejen Town Under-17 Male Football Project Trainees; East Gojjam Zone, Amhara Regional State, Ethiopia’’

You are being asked to participate in this research study as described below. All research studies carried out like this one are governed by the regulations for research on human beings. These regulations require that the researcher should obtain a sign agreement (consent) from you to participate in this research project. The researcher will explain to you in detail the purpose of the project, the procedures to be used, the potential benefits and the possible risk of participation in this study. You can ask a researcher any questions that you may have about a study and expect to receive satisfactory answers regarding the same. A basic explanation of the project is summarized below.

1. Purpose and procedures

The purpose of this research project is to examine the Effect of Aerobic Dance on Selected Motor Fitness Variables: The Case of Female Sport Science Students of Debre Birhan University, Ethiopia. The target groups to be involved in this study will be 36 male students. This study requires your participation to perform a certain tests in measuring the Agility, Flexibility and Static Balance variables.

2. Risks and Safeguards

The risks of this research study are small. While administering the tests and during training sessions you may experience localized skeletal muscle fatigue. You might feel some muscle soreness and fatigue during and after the cessations of the training exercises and tests. But we do not expect any unusual risks as a direct result of this study. If any unexpected physical injury occurs, appropriate first aid will be provided, but no financial compensation will be given.

3. Confidentiality

The information obtained about you will be kept in confidence, although you are free to release it to your own physician. The information will be used only for scientific purposes without identifying you as an individual.

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I certify that I have fully understood the above project; therefore, I consent to participate in this study.

Name of target: -----

Signature: -----

Address: -----

Date: -----

I certify that I clearly explained the nature of the study, purpose of potential benefits and that may be possible risks involved in this research study.

Signature of Investigator: -----

Date: -----

APPENDIX- C

Table 2: Fitness Assortment Record Sheet of Subjects

Name_____

Initial Height/M _____

Age_____

Initial Weight/Kg_____

Sex_____

Code_____

NO	Types of Test	Parameter to be Measured	Unit	Participants fitness level		
1	2400m run	cardiovascular endurance	Minute			
2	Push- up	Muscular strength	Repetition per minutes			
3	Curl-up	Muscular endurance	Repetition per minutes			
4	Sit and reach test	Flexibility	Cm			
5	Body mass index	Body composition	Kg/m ²			
6	Height	Body height	Cm			
7	Mass	Body weight	Kg			

APPENDIX-D

Description of Training Schedule for three Months

Training protocol

According to Jakl (2008) 8 to 12 weeks of training program is essential to maximize individual's physiological fitness abilities. Based on this idea the investigator purposively prepared 12 weeks training program. Thus, the subjects underwent 3 months (12weeks) of training, which is December - February 2020).

The Training Days per Week

According to ACSM (1990) 3-5 days per week and 20-60 minutes is needed for developing and maintaining fitness through aerobic exercise. So, the investigator took a minimum of 3 days (60 minutes per session) that are Monday Wednesday and Friday since they are student the schedule was prepared by considering their convenient time for them. The researcher was under taken pre and post test to know the change that occurred due to the 12-week aerobic dance exercise and the dependent variables for this study were agility, flexibility and static balance, independent variable is also aerobic dance exercise.

The following table includes different types of aerobic exercise which was performed by the subjects within 12 weeks in order to improve their agility, flexibility and static balance. The exercises involve in this study were warming up exercise, step aerobic exercise like: turn step, step touch, box step V-step and basic step and finally cooling down exercise which helped to develop athletes' fitness level. Also FITT (Frequency, Intensity, Time and Type of Exercise) principle of training was applied in the schedule;

1. **Frequency of training:** the repetition of exercise in one set. The training schedule was completed 3 days per week that is Monday, Wednesday and Friday.
2. **Intensity of training:** is how hard the body exercising or how much energy is expended when exercising. It can be defined on either an absolute or a relative scale. Absolute intensity refers to the amount of energy expended per min of activity, while relative intensity takes a person's level

of exercise capacity or cardio respiratory fitness into account to assess the level of effort. Either scale can be used to monitor the intensity of aerobic dance exercises • In this study the researcher was used low intensity, moderate intensity to adapt the exercise to high intensity for increasing load in the consecutive three months. There were ways to measure intensity of training;

- ❖ Heart rate - Heart rate can be an indicator of the challenge to the cardiovascular system that the exercise represents.
- ❖ VO₂max- the amount of oxygen consumed by the body during exercise

Exercise is categorized into three different intensity levels. These levels include **Low** (40-50% MHR), **Moderate** (50-65% MHR), and **Vigorous** (65-85% MHR) for aerobic dance exercise and are measured by the metabolic equivalent of task. The effects of exercise were different at each intensity level (i.e. training effect). Recommendations to lead a healthy lifestyle vary for individuals based on age, weight, and existing activity levels. “Published guidelines for healthy adults’ state is that 20-60 minutes of medium intensity continuous or intermittent aerobic activity 3-5 times per week is needed for developing and maintaining fitness” (ACSM, 1990).

3. **Duration of training:** the subjects perform the exercise for 60 minutes per day in this study. Duration is dependent on the intensity of the activity, thus, medium-intensity activity should be conducted over a longer period of time (25 min or more) and conversely individuals training at higher levels of intensity should train at least 10min or longer (ACSM, 1990).

4. **Type of activity:** any activity that uses large muscle groups, which can be maintained continuously, and is rhythmical and aerobic in nature, e.g., walking-hiking, running, jogging, bicycling, cross-country skiing, aerobic dance/group exercise, rope skipping, rowing, stair climbing, swimming, skating, turn step, step touch, box step V-step and basic step and various endurance game activities or some combination thereof (ACSM, 1990). .

➤ Basic Step

This move can be performed on an aerobics step bench or on the floor. Do several in a row with the lead leg, or alternate lead legs for variety

How to do it: Start with your feet side by side, about hip-distance apart. Step about two feet forward with your lead leg. Bring the back leg forward to meet it. Step back two feet with your lead leg and draw the other foot back to meet it. (Outevsky, *et al.*, 2015)

➤ V-Step

This dance step is also doable on an aerobic step or the floor. It gets its name from the wide, v-shape of the movement.

How to do it: Stand with your feet parallel and hip-distance apart. Step your lead foot 2 to 3 feet forward to the corresponding corner of the floor or the bench. Step the opposite foot wide to its corner. Step back to the original position with your lead leg. Bring the opposite leg back to meet it. You may alternate lead legs or repeat the step on the same leg several times before switching. (Outevsky, *et al.*, 2015)

➤ Step Touch

Step touch is commonly found in floor-based classes. It's an easy move to master.

How to do it: Stand with your feet side by side and hip distance apart. Step your lead leg to the side and bring the other foot to meet it. Switch the direction as you alternate touching side to side. Sometimes, you might do two to four steps to the right, and then an equal number to the left (or vice versa). (Outevsky, *et al.*, 2015)

➤ Mambo

The mambo step in aerobics dance takes its cue from the dance style. It's a fundamental move that has you swinging your hips.

How to do it: Stand with your feet hip-distance apart. For a right leg lead, take a small step forward on your right foot; keep your left foot where it is. Shift weight onto the right foot, and then shift weight onto the left foot as you step the right foot backward. Shift weight onto the right foot, then to the left; immediately take the step forward with the right to repeat the step. (Outevsky, *et al.*, 2015)

➤ Box Step

A box step is sometimes called a "jazz square." **How to do it:** Stand with your feet hip-distance apart and parallel to one another. For a right leg lead, step the right foot slightly forward and in front of your left foot. Step the left foot out to the side. Bring the right foot a step back and cross over it with your left foot. Repeat multiple times. (Outevsky, *et al.*, 2015)

➤ Grapevine

The grapevine offers a way to travel side to side during a floor-based aerobics class. Sometimes, an instructor adds a knee lift or hamstring curl instead of the tap before switching directions.

How to it: Stand with your feet hip-distance apart. To move to the right, step your right foot to foot next to it to switch directions. (Outevsky, *et al.*, 2015)

➤ Turn step

Do the turn step on an aerobic bench, also in four counts. Start the move facing the step sideways.

How to do it: Leading with the right foot, step up on right corner of the bench sideways. Then bring the left foot up onto the bench to the left corner as you turn. Step off the bench with the right foot; bring the left foot down next to the right foot. Repeat with the left side for as many reps as desired. (Outevsky, *et al.*, 2015)

5. Load and Effort: Within the area of aerobic dance exercise, intensity is generally considered to represent the effort required by the body at a given velocity, incline, and resistance (or other variable) at a given work rate and is typically expressed relative to quantities such as heart rate (HR), % of heart rate maximum blood lactate or oxygen uptake (VO_2). With regard to muscular effort, however, the percentage of one repetition maximum is purely a representation of **load**. Whilst increasing or decreasing a given load might indeed require greater or lesser effort, it should never be considered a measure of the effort or intensity that the body is working at. It is surely not acceptable that terminology can be used with different meanings based on differing modalities of exercise being performed (Fisher and Smith, 2012).

Components of workload

1. The amount of weight lifted during an exercise.
2. The number of repetitions completed for a particular exercise.
3. The length of time to complete all exercises in a set or total training session

The table of training schedule of this study for three months is listed in the next pages

APPENDIX-E

Table 3: First Month Training Schedule (November 2019)

Days	Fitness	Type of activity	Dosage				Intens ity
			Time	Rep	Rest	Duratin	60 %
1 st week	Conditional Exercise	Warming up by walking jogging walking stretching Pushups Hand balance squat cooling down	8 minute 8x2min 8x2minute 6x2minute 6minute	1 times 4times 4 times 4 times 4 times	30sec 30sec 30sec 30sec	60 min	
2 nd week	Conditional Exercise	Warming up jogging running on the spot Hand flexion Shoulder stretch Hip rotation Front flexion Cooling down	8 minute 8x2min 8x2minute 6x2minute 6minute	1times 3 times 3 times 3 times 2 times 1 times	30sec b/ n 30sec 30sec 1min	60 min	
3 rd week	Conditional Exercise	Warming up running on the spot rope jumping jogging cooling down	8 minute 8x2min 8x2minute 6x2minute 6minute	3 times 3 times 3 times 2 times 1 times	1min 30 sec 30 sec 1min s	60 min	
4 th week	Aerobic exercise	Warming up walking jogging, stretching step up simple run push up sit ups running on the spot cooling down	8 minute 8x2min 8x2minute 6x2minute 6minute	1 time 4 times 2times 4times 3times 2times -	1 min 1min 1 min 1 min 1 min -	60min	

The above schedule was performed on November, 2019.

APPENDIX-F

Table 4: Second Month Training Schedule (December 2019)

Week	Fitness	Type of activity	Dosage				Intensity
			Time	Rep	Rest	Duration	75%
5 th week	Aerobic exercise	Warming up walking jogging, stretching step up simple run push up sit ups running on the spot cooling down	8 minute 8x2min 8x2minu 6x2minu 6minute	1 time 4 times 2times 4times 3times 2times -	30 sec 30 sec 30 sec 30 sec -	60min	
6 th week	Aerobic exercise	Warming up Road crossing Push up Sit up Cooling down	8 minute 8x2min 8x2minu 6x2minu 6minute	1times 1times 4times 4times 1times	30 sec 30sec 1min	60min	
7 th week	Aerobic exercise	Warming up Step up Curl-up Advance push up Cooling down	8 minute 8x2min 8x2minu 6x2minu 6minute	1time 4time 4time 4tim 1times	30sec 30sec 30 sec Passive rest	60min	

The above schedule was performed on December, 2019.

APPENDIX-G

Table 5: Third Month Training Schedule (January 2020)

Day	Fitness	Type of activity	Dosage				Intensit y 80%
			Time	rep	Rest	DUR	
8 th week	Aerobic exercise	Warming up walking jogging, stretching step up simple run push up sit ups running on the spot cooling down	7min 4x2min 2x7min 4x2min 3x2min 2x4min 4 min	1 tim 4 times 2 times 4 times 3 times 2 times -	1 min 30 sec 30 sec 1 min 1 min 1 min -	60min	
9 th -10 th	Aerobic exercise	Warming up Road crossing Push up Sit up Cooling down	7min 35min 2x2min 2x2min 5min	1 times 1 times 1times 4 times 1 times	1min 2min 30sec 30sec 1min	60min	
11 th - 12 th week	Aerobic exercise	Warming up Step up Curl-up Advance push up Cooling down	10min 4x5mi 4x3min 4x2min 7min	1time 4time 4time 4tim 1times	1min 30sec 30sec 1min passive rest	60min	

The above schedule was performed on January, 2020

APPENDIX-H

Table 6: Row Data for Selected Health Related Physical Fitness of five Components

No	Cardiovascular endurance			Muscular strength			Muscular endurance			flexibility			Body composition		
	Pre	post	Contr ol Group	pr e	po st	Co ntr ol gro.	Pre	Post	Con trol Gro	Pre	pos t	Con trol Gro.	pre	post	Cont rol Gro.
1	11.01	9.30	11.02	32	36	31	37	41	38	7	12	8	18.46	18.01	18.49
2	9.07	8.02	9.09	27	35	28	31	40	32	9	12	10	19.24	18.73	19.34
3	10.25	8.62	10.28	37	46	38	34	39	35	12	19	12	18.7	18.2	18.9
4	9.00	8.35	9.02	19	31	18	24	33	24	8	10	9	16.6	16.2	16.8
5	10.31	8.53	10.28	27	39	27	30	35	31	12	16	12	17.0	16.77	17.1
6	11:00	9.36	11.02	31	30	32	35	38	36	8	11	9	20.1	19.1	20.4
7	10.04	8.42	10.07	30	41	30	30	38	31	13	17	13	18.3	18.0	18.5
8	10.05	9.04	10.06	23	32	24	28	35	29	11	17	11	20	19.2	20
9	10.23	9.10	10.33	20	27	19	28	34	29	7	12	8	21.2	19.9	21.3
10	10.01	8.9	10.03	31	38	32	34	38	35	11	14	11	20.4	19.4	20.7
11	11.30	9.47	11.33	35	46	35	49	44	40	9	15	9	19.6	19.01	19.7
12	9.21	8.30	9.29	25	32	26	30	34	31	0	3	1	18.8	18.01	18.8
13	10.18	9.02	10.28	18	26	17	28	35	29	2	7	2	18.3	17.3	18.3
14	9.03	8.40	9.00	23	35	22	27	31	28	8	13	8	20	19.3	20
15	10.05	9.04	10.08	36	41	35	32	34	33	6	8	6	17	16.2	17
16	10.33	9.02	10.32	33	41	32	30	36	30	0	4	1	17.1	16.2	17.1
17	11.22	9.23	11.25	29	38	29	25	31	25	0	4	1	21.1	20.4	21.2
18	11.08	9.26	11.08	41	49	41	37	41	38	0	5	1	16.6	15.8	16.6
19	11.35	10.00	11.35	38	48	37	35	37	36	6	11	7	20.1	19.4	20.4
20	10.31	9.05	10.303	41	44	40	33	39	34	12	16	12	20	18.6	20
21	10.23	9.01	10.33	38	40	37	34	39	35	7	8	8	17.1	17.0	17.1
22	9.45	8.65	9.40	29	38	28	28	35	29	2	7	3	17.4	17.01	17.5
23	11.01	9.17	11.05	24	30	23	25	33	25	4	8	5	20	19.2	20
24	10.26	9.34	10.37	28	32	27	30	36	30	10	16	10	20.4	19.5	20.5

APPENDIX-I

Table 7: Normative Data for Push up

Standard by age	Male						
	12	13	14	15	16	17	18
Excellence	31	39	40	42	44	53	53
Very good	28	35	32	37	40	46	46
Good	18	24	24	30	30	37	37
Fair	9	11	13	20	22	23	23

Source [Http://ukasblack.com2014/canada-fitness-test](http://ukasblack.com2014/canada-fitness-test)

APPENDIX-J

Table 8: Normative Data for Endurance

Standard by age	Male						
	1600m		2400m				
	12	13	14	15	16	17	18
Excellence	7:41	11:31	10:43	10:23	10:08	10:08	10:08
Very good	8:04	11:49	11:09	10:50	10:42	10:32	10:32
Good	8:46	12:51	12:16	11:51	11:10	11:10	11:10
Fair	10:31	15:35	14:40	14:46	13:33	13:33	13:33

Source: [Http://ukasblack.com2014/canada-fitness-test](http://ukasblack.com2014/canada-fitness-test)

APPENDIX-K: LIST OF FIGURE IN THE APPENDIX

1: Map of the Study Site

Source: Dejen Woreda Agricultural Office

