JIMMA UNIVERSITY

COLLAGE OF NATURAL SCIENCE

DEPARTMRNT OF SPORT SCIENCE

COMPARATIVE STUDY ON HEALTH-RELATED PHYSICAL FITNESS VARIABLES BETWEEN ETHIOPIAN YOUTH SPORT ACADEMY AND TURUNESH DIBABA SPORT TRAINING CENTER U19 FEMALE FOOTBALL TRAINEES.

By: - DEREJE TAMENE

A THESIS SUBMITTED TO THE DEPARTMENT OF SPORT SCIENCE PRESENTED IN THE PARTIAL FULFILLMENT OF THE REQUIREMENT OF MSC DEGREE IN SPORT SCIENCE (FOOTBALL COACHING)

OCTOBER, 2019

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DECLARATION

By my signature below, I declare and affirm that this Thesis is my own work. 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 will give recognition through citation.

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APPROVAL SHEET

As members of the Examining Board of the Final M Sc. Open Defense, we certify that we have read and evaluated the thesis prepared by: Dereje Tamene entitled comparative study on Health-Related Physical Fitness variables between Ethiopian Youth Sport Academy and Turunesh Dibaba sport Training Center female football trainees. We recommend that it could be accept as fulfilling the thesis requirement for the degree of Master of Science in coaching football specialization.

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As member of the Examining Board of the final M Sc. Open Defense, we certify that we have read and evaluated the thesis prepared by Dereje Tamene and examine the candidate. We recommend that the thesis be accept as fulfilling the thesis requirement for the Degree of Master of Science in coaching football specialization.

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Name of External Examiner	Signature	Date

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List of Acronyms

AAHPERD	**American Alliance for Health, Physical Education, Recreation and Dance**
BF	**Body Fat**
CAD	**Coronary Artery Disease**
CVE	**Cardio Vascular Endurance**
FIFA	**Federation Internationale de Football Association**
NSCA	**National Strength and Conditioning Association**
SD	**Standard Deviation**
SPSS	**Statistical Package for Social Science**
U-19	**Under 19**
WHO	**World Health Organization**
SNNP	South Nation Nationalities people
EYSA	Ethiopian Youth Sport Academy
TDSTC	Turunesh Debaba Sport Training Center

Abstract

The purpose of this study was to compare and contrast health related physical fitness of U-19 female football trainees of both Ethiopian youth sport academy and Turunesh Debaba sport Training center. Some of the variables used for comparison purpose and for which hypotheses were developed are flexibility, muscular endurance, muscular strength, body composition and cardiovascular endurance of the trainees. Standardized equipment and procedures were applied in the measurement of these variables. The quasi-experimental research design was adopted for the study. A total of twenty subjects (ten from each sport academy) were selected using simple random sampling technique. Data collected were analyzed using descriptive and inferential statistics using SPSS. The descriptive statistics were the mean and standard deviation while the inferential statistic was the independent sample "t" test employed to test for significant difference between the mean scores of subjects from the two academies. The level of significance was set at 0.05 with 18 degree of freedom. Findings of the study revealed that significant differences were observed only in cardiovascular endurance whereas no significant differences were observed in flexibility, body composition, muscle strength and muscular endurance. Finally, it is recommended that the Football Federation has to develop strategies to improve the decreasing level of physical fitness among Ethiopian youth sport academy by implementing sound practices of physical activities for trainees. The coach of Ethiopian youth sport academy is advised to work in collaboration with other coaching staff to enhance declining level of cardiovascular endurance of the trainees; shall focus on various exercises and alternate in between different training programs that can improve the trainee's CVE in proper way and; the coach has to prepare all the sport persons with high level of cardiovascular endurance to excel in sports.

Key Terms: *Fitness test, Independent sample t-test, Ethiopian youth sport academy, Turunesh Dibaba sport training center,*

CHAPTER ONE

INTRODUCTION

1.1. Background of the Study

Football is one of the popular and most played sports in the world and it has reached almost all the countries on earth. According to the statistic provided by FIFA with the data for "Big Count 2006", 270 million people are active worldwide in football. Soccer, which is an interchangeable name for this sport, gains its popularity from its features such as the simplicity in terms of rules, and the limited amount of equipment and cost effectiveness, required to play, as demonstrated by several examples of professionals who learned the game in their youth on the street playing barefoot. (Luca Francesco Masieri, 2017)

By nature human being are competitive and aspire from excellence in every field. Sport is not an exception. Changes are taking place every day in every walk of life. Life of people, their philosophy, ways of living etc. are undergoing changes due to basic and applied research in various fields. Man has reached the space age from the primitive Stone Age because of continuous change. Records have been sprucing and the athletes as a result of combined improvement in the technique of training and coaching. New techniques are developed in laboratories and scientific methods are applied to obtain top-level performance. Sports by their vary nature are enjoyable, challenging, absorbing and require a certain amount of skill and physical condition (Doncash Seaton et al, 1956). Same is true the training of Football the complex nature of physical fitness includes the muscular strength, muscular endurance, cardio-respiratory endurance (Peter V. Karpovich and Wayne E.)

Soccer is the world's most popular sport, being played in every nation without exception. In recent years, there has been a remarkable expansion of sport science. The subject area is now recognized both as an academic discipline and a valid area of professional practice. Coaches and soccer players are more open to Contemporary scientific approaches to prepare for competitions. Dr. Goran Sporis, et, al, (2009)

Soccer is one of the most widely played sports in the world and is a sport characterized by short sprints, rapid acceleration or deceleration, turning, jumping, kicking, and tackling. It is generally assumed that through the years, the game has developed to become faster, with more intensity and aggressive play than seen previously. Elite soccer is a complex sport, and performance depends on a number of factors, such as physical fitness, psychological factors, player technique, and team tactics. Injuries and sequel from previous injuries can also affect the players' ability to perform. (Arnason, et, al, 2004)

Soccer is a highly complex sport influenced by many physical, psychological, tactical and technical factors. The physical demands require players to possess appropriate levels of fitness that allow them to remain competitive for the match entirety. (Darren J. Paul, 2015)

Every soccer player can relate to the feeling of complete exhaustion after several bouts of all-out sprinting… shortly followed by the embarrassment of jelly-like legs trying to perform the simplest of passes Without doubt. The more highly conditioned you become, the more consistently you can perform. Get your conditioning program right, and it gives you (or your entire team) an unparalleled competitive edge. (Phil Davies, 2005)
As well as giving a high level of general physical fitness, the main benefit of well-trained muscles is the prevention of injuries. Ralf Meier, (2007)

Soccer is related to specific physical contacts and gestures such as running, jumping, landing, speeding, abrupt changes in direction, kicking and tipping. Specific physical demands, adequate physical conditioning and constant training may predispose practitioners to sport injury. Moreover, the prevalence of Sport Injury is proportional to the competitive demands in soccer: (E. M. Gorostiaga , et, al, 2004)

1.2. Statement of the Problem

Football has become more and more physical, and an adequate preparation during the preseason is essential to reach the "peak" at the right time and maintain an adequate strength and good level of fitness through the entire league, be competitive and avoid injuries. (Luca Francesco Masieri, 2017)

Soccer is the most popular sport in the world, especially among children and adolescents. Optimizing the physical potential of young soccer players is one of the main objectives of youth soccer academies (Rösch et al., 2000).

The ability to perform the underlying techniques and to respond quickly to the signs sounds experienced during the game. It will require a combination of stamina, strength, speed, skill and flexibility" Reasons…run at varying speeds, jump to catch, strength on the ball and off the ball, to be free from injury. Diarmaid Marsden (2009)

Federal Democratic Republic of Ethiopian government Minister of Youths and sport has opened sport academy for the development of the country's sport. They are Ethiopian youth sport academy and Turunesh Dibaba sport training center. The aim of opening these academies are an institution entrusted to train potentially endowed youngsters in Olympic Sports. The Academy also renders capacity building training to professional in different sports fields. Conducting research & studies which contribute to the quality of different sports disciplines & disseminating the results and academy's objective. Academy's two campuses pursue to produce physically & mentally competent & ethically sound Young Sports elites for national and international competitions. Therefore both institutions have U-19 female football team. However their result is quite different due to the performance they performed and one academy team is grew up to the first female division though one is could not transfer to the next level.

According to Ajay Kumar Pandey, Devarshi Kumar Chaubey, (2015) stated ineffective physical fitness training for the developments of soccer seen as a gap for this study. The achievement of selected physical fitness components used as cause for the improvement of the ability to sustain in the competition and prevent sport injuries U-19 female football player in both team.

According to the observation of the researcher, the team performance of Ethiopian youth sport academy compared to Turunesh Dibaba training center has been found not too much satisfactory. Therefore, this has instigated the researcher to compare the health related physical fitness between Ethiopian youth sport academy and Turunesh Dibaba sport Training center U-19 female football trainee.

1.3. Objective of the Study

1.3.1. General objectives

The general objective of this study was to compare health-related physical fitness components among Ethiopian youth sport academy and Turunesh Dibaba sport Training center U-19 female football trainees.

1.3.2. Specific Objectives

The specific objectives are:

a) To find out the difference of flexibility between Ethiopian youth sport academy and Turunesh Dibaba sport Training center U-19 female football trainees.
b) To compare the muscular endurance between Ethiopian youth sport academy and Turunesh Dibaba sport Training center U-19 female football trainees.
c) To measure and compare the muscular strength between Ethiopian youth sport academy and Turunesh Dibaba sport Training center U-19 female football trainees.
d) To measure and compare the body composition between Ethiopian youth sport academy and Turunesh Dibaba sport Training center U-19 female football trainees
e) To identify the difference of cardiovascular endurance Ethiopian youth sport academy and Turunesh Dibaba sport Training center U-19 female football trainees.

1.4. Hypothesis of the study

The comparison among the Ethiopian Youth Sport Academy and Turunesh Dibaba Sport training Center in terms of their health related physical fitness was done by testing the following hypotheses. Therefore, here under are the lists of these hypotheses in which only the alternative hypotheses are indicated. The reason why only the alternative hypotheses are given is because it is obvious that the null hypothesis always indicate a default hypothesis of "no differences" among the groups to be compared for their means. Therefore, no need to list both, but the alternatives are just enough.

- ✓ **H1.** There is a significant difference in flexibility between Ethiopian youth sport academy and Turunesh Debaba sport training centers.
- ✓ **H2.** There is a significant difference in muscular endurance between Ethiopian youth sport academy and Turunesh Debaba sport training centers.

- ✓ **H3.** There is a significant difference in muscular strength between Ethiopian youth sport academy and Turunesh Debaba sport training centers.
- ✓ **H4**. There is a significant difference in body composition between Ethiopian youth sport academy and Turunesh Debaba sport training centers.
- ✓ **H5**. There is a significant difference in cardiovascular endurance of between Ethiopian youth sport academy and Turunesh Debaba sport training centers.

1.5. Significance of the Study

The findings of the study may provide a better understanding on the level of selected health related physical fitness of Ethiopian youth sport academy and Turunesh Dibaba sport Training center U-19 female football players. The outcomes of the study will be helpful to develop suitable conditioning program and to predict future performance of the fitness level for them. Moreover, the study will help the researchers, coaches, fitness coaches and players of the mentioned club sand understand the values and importance of selected health related physical fitness which have effects on the personality and group the athletes in appropriate training group on the basis of their physical fitness., Furthermore it will enable the coaches to assess the success of the training program.

1.6. Delimitation of the study

The study delimited to Ethiopian youth sport academy and Turunesh Dibaba sport Training center. The study delimited to 20 players of (10 Ethiopian youth sport academy and 10 Turunesh Dibaba sport Training center U-19 female football trainees). The study also delimited to health related physical fitness component. The study confined to the following selected test: to compare the health related physical fitness of Ethiopian youth sport academy and Turunesh Dibaba sport Training center U-19 female football trainees. These variables together with their proxy includes; Flexibility (Sit and reach test), Muscular endurance (Wall Squat Test), Muscular strength (Standing Broad jump), Body composition (Body mass index), and Cardiovascular endurance fitness test (cooper test)

1.7. Limitations of the study

The limitations of the study were; one the health status of the subject's athletes were not controlled; second Atmosphere, Climatic conditions and percentage of humidity were not controlled.

1.8. Operational Definition

- ✓ **Physical fitness** is the capacity to early out, reasonably well, various forms of physical activities, without being unduly tired and includes qualities important to the individual's health and well-being. Health related fitness. The expert committee of the World Health Organization (1981)
- ✓ **Health related physical fitness** can be defined as the ability of a person to perform daily activities with vigor, and by traits and capacities that are associated with a low risk for the development of chronic diseases and prevention of premature death. Health related components are very essential for the athlete's performance Anindita Das, Ravi Sharma, 2016)
- ✓ **Body composition** refers to the relative percentage of muscle, fat, bone and other tissue of which the body is composed. (Brown & Benchmark, 1994)
- ✓ Strength is measured by the amount of force you can produce with a single maximal effort. (Brown & Benchmark, 1994)
- ✓ **Cardiovascular endurance** is often referred to as cardio respiratory endurance. It is the entire body's ability to exercise vigorously for extended periods of time without undue fatigue. wuest and lombardo (1994),
- ✓ **Muscular strength** is the amount of force produced with a single maximal effort of a muscle group. Corbin et al. (2003)
- ✓ **Muscular Endurance** is the ability to perform repeated contractions against a sub-maximal resistance (Anderson, Broom,Pooley,Schrodt, and Brown, 1995).
- ✓ **Flexibility** as the ability of the various joints of the body to move through their full range of motion.Wuest and Lombardo (1994)
- ✓ **Body Mass index** (**BMI**) as an attempt to quantify the amount of tissue mass, is measured as the weight in kilograms divided by the square of the height in meters

(kg/m2), this index is commonly used to distribute obesity, overweight or under-weight in adult population (WHO-BMI classification,2004).

1.9. Organization of the Paper

This study is organized into five chapters in which the first chapter covers the introductory part which includes the background, statement of the problems and objectives of the study. Second chapter, provides theoretical and empirical evidence to strengthen the research. Research design and Methodologies applied are discussed and presented in the third chapter. Chapter four deals with the data presentation, analysis and interpretation while chapter Five includes the conclusions and recommendations provided.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1. Concept of Youth Academy

A youth academy attempts to provide a high number of talented players with an opportunity towards becoming a professional soccer player either for the local league or to be sold onto a European club. Through focusing on the youth players and their development, instead of using recruitment as the main way of strengthening your human capital has a couple of advantages for the local football academies. The development of academy players could thus be considered a viable prospect for the long-term sustainability of a football club and also that of the national team. Utilization of the above model may provide an insight into a number of critical assets, competencies and capabilities that may influence football development**. Y**ibeltal Alebachew (2014),

A football academy is an investment program within a particular club structure or football league, which develops and nurtures talent with the vision of using these talented players to play in the first team. Football academies have long been the feature of the landscape of African football (Darby, Akindes&Kirwin, 2007).

A football academy will sign multiple players at a young age, and groom them for the professional team. Through providing them with the opportunity to develop, nurturing their progression and guiding their talent, the clubs are able to progress the football assets along a predetermined path towards the first team. **Y**ibeltal Alebachew (2014)

Talent identification plays a crucial role in the academy system. However, a FIFA ruling has restricted clubs to recruiting locally based players only unless certain circumstances or opportunities arise, at which point the recruiting football club would be required to pay compensation for the recruitment of the talent outside of the country borders This compensation is pre-determined by FIFA until players reach the age of 18 (FIFA). Compensation is due for the training and education costs of the player, and is worked out according to the existing club‘s financial investment in the player.

2.2. Purposes of youth soccer academy

According to Martindale, R., Collins, D., & Daubney (2005) mention some of the purpose of Youth Soccer Academies. Provide soccer players, who have aspirations of becoming a more accomplished player, an avenue to test and enhance their skills.

- ✓ Provide soccer players an opportunity to train with experienced coaches.
- ✓ Provide soccer players an opportunity to investigate the level of play with which they are comfortable, how they fit in with other teams, and for which coaches they would like to play.
- ✓ To create an enabling environment for the provision of first class football education and developmental program in first class facilities.
- ✓ Produce footballers of exceptional quality. Install in our graduates a high sense of discipline, responsibility and commitment.
- ✓ Prepare our graduates for life at the very highest level of achievement. Impact the lives of every talent that we spot not only in sporting terms but also financial as well as educationally.
- ✓ Giving them options in other areas of sports should they wish not to continue the pursuit of a career in football.
- ✓ Be the standard measure for football administration in the country. Promoting and facilitating the development of football through sustainable infrastructural and training initiatives.
- ✓ Engaging in pro-active dialogue with the government to generate a partnership in recognition of football as a national asset.
- ✓ Creating a stable, progressive and innovative institution. Creating a mutually beneficial relationship with the corporate world. Provision of a mechanism for communication and keeping up to date with developments in soccer.

- ✓ To identify & promote each athlete‘s potential that he might learn & strive for excellence in all areas of life To develop self-esteem, self-motivation & self-discipline
- ✓ To maintain a pre-agreed, contractual high level of academic performance To provide individuals with life skills that they may take up their roles in society as active, healthy & knowledgeable citizens
- ✓ To develop athletes‘ fundamental hockey skills to an elite level so they can succeed anywhere in the world at all levels

2.3. Physical fitness

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

The expert committee of the World Health Organization (WHO) described physical fitness as “the ability to undertake muscular work satisfactorily.” Physical fitness is the capacity to early out, reasonably well, various forms of physical activities, without being unduly tired and includes qualities important to the individual’s health and well-being.

Every person has a different level of physical fitness which may change with time, place of work, situation and there is also an interaction between the daily activities, and the fitness of an individual, the point if where to put the level of optimum fitness. From the physiological point of view physical fitness may say to be ability at the body to adopt and recover from strenuous exercise.

Physical fitness is a state rather than a behavior. It is a multidimensional indicator of several functional capacities such as cardiovascular endurance, muscular strength or mobility, which in varying degrees are a result of genetics and stage in the life span, as well as physical activity levels (Ministry of Health of NewZeland, 2003). It still defies exact definition or measurement,

partly because fitness is a multifaceted qualitative parameter that is usually specific to the task involved, and the scores of the many different tests available to measure fitness are not closely correlated (Karinharju, 2005).

Another definition given to physical fitness is, "a set of physical attributes that allow the body to respond or adapt to the demands and stresses of physical effort, that is, to perform moderate to vigorous levels of physical activity without becoming overly tired" (Insel et al., 2001, p.361).. According to Hahn et al (2003) physical fitness is achieved when "the various systems of the body are healthy and function effectively so as to enable the fit person to engage in activities without unreasonable fatigue" (p.64).

Physical fitness also means that the various systems of the body are healthy and function effectively so as to enable the fit person to engage in activities of daily living, as well as recreational pursuits and leisure activities, without unreasonable fatigue. The road to physical fitness includes proper medical care, the right kinds of food in the right amounts, good oral hygiene, appropriate physical activity that is adapted to individual needs and physical limitations, satisfying that, is adapted to individual needs and proper amount of rest and relaxation, since physical fitness affects the total person's intellect, emotional stability and physical conditioning (Prentice, 1997).

Physical fitness is general state of good physical health. Physical fitness is the ability to endure, beat with stand stress and carry on in circumstances where an unfit person could not continue. In order for one to be considered physically fit, heart, Lungs and muscles have to perform at a normal level for the Individual to continue feeling capable of performing an activity. (Ajay Kumar Pandey, Devarshi Kumar Chaubey, 2015).

Physical fitness is a condition in which an individual has sufficient energy to avoid fatigue and enjoy life. The concept of physical fitness is as old as mankind. Physical fitness is one's richest possession, it cannot purchase and it has to be earned through a daily routine of physical exercises. It is a hard fact that physically fit people are in a better position to bear the rigorous and abnormal stress and strain, than those who are less physically fit. (DrHari Singh, 2016)

The relationship between the soundness of the body and the activities of the mind is subtle and complex. Much is not understood we know that the Greek knew. That intelligence and skill can only function at the pick of their capacity when the body is healthy and strong and that hardy sprits and tough minds usually inhabits sound bodies.

Physical fitness is the basis of all activities in our society; if our bodies' growth soft and inactive, if we fail to encourage physical development and prowess, we will undermine our capacity for thought, for work, and for the use of those skills vital to an expanding and complex America. (Brown & Benchmark, 1994)

The fitness components are qualities that athletes must develop to physically prepare for sport competition. They are the building blocks of exercise and physical activity. Sports training programs are designed to build these components in the proper proportions that match the requirements of each sport. A basic definition of physical fitness is "the ability to complete daily tasks with energy, reduce health risks due to inactivity, and be able to participate in a variety of physical activities." The 5 fitness components that are deemed health-related are: cardio, strength, endurance, flexibility, and body composition In addition, speed; agility, power, balance, and coordination have been identified as performance-related. All of these qualities exist to some degree in most sports, but developing certain combinations is important in any given sport. (Ajay Kumar Pandey, Devarshi Kumar Chaubey, 2015

Athletic performances in soccer are a function of aerobic fitness, anaerobic fitness, speed, muscular strength, muscular power, and agility (Bangsbo,et.al.(2006); StelenChaiman, et.al.(2005)

2.4. Health-Related Physical Fitness

Physical fitness is typically defined with focus on two goals: performance and health. Health related physical fitness can be defined as the ability of a person to perform daily activities with vigor, and by traits and capacities that are associated with a low risk for the development of chronic diseases and prevention of premature death. Health related components are very essential for the athlete's performance. The components of fitness each work together to contribute to the ability of the body to handle physical demands. The more efficient the body functions, the higher the level of fitness. Optimal fitness is a combination of lifestyle, nutrition, habits, but it cannot be

reached without an appropriate level of physical activity. Optimum physical performance is a combination of all the components of fitness; depending on the specific demands of the sport or activity. Some components will require more attention than others, but each should be present as a part of an integrated training program. Health-related fitness relates to those components of fitness that are affected by habitual physical activity and relate to health status. They include aerobic functioning, body composition, and musculoskeletal functioning (Anindita Das, Ravi Sharma, 2016)

Health-related fitness concerns itself with cardio-vascular or cardio-respiratory endurance, muscular strength, joint flexibility and body composition. The importance of physical fitness has been highlighted by Wessel and Arant (2004), with the statement that, physical fitness and activity reduces the risk of coronary artery diseases (CAD) in women with suspected ischemia. According to Weuve, King and Maison (2004), regular physical activity over a period of a year is associated with improved cognitive function and reduced cognitive decline in older women. From the above discussion, one is confident to say that physical fitness or health-related fitness is just a component of the total health concept. A person with a very high level of health related fitness should not think that he or she is automatically healthy.

2.4.1. Body Composition

Body composition refers to the relative percentage of muscle, fat, bone and other tissue of which the body is composed (Brown & Benchmark, 1994). Body composition is one of the most relevant features for success in many sports, the contribution that the physical structure´s conformation has on athletic activities, and so, also in football, is widely acknowledge where high percentage of lean mass play a significant role for health and performance as stated by Nikolaidis and Karydis (2011),

The body composition of a soccer player can also have an impact on his performance. Several studies have shown high levels of correlation between the body fat percentage (BF%) and athletic performance, elite players have BF% between 7 and 19% [2, 20]. Also in the elite, forwards are the fastest players and run the greatest distances in sprint during a soccer game. (Jorge Aurélioet al., 2016)

Body composition:-is often considered a component of fitness. It refers to the makeup of the body in terms of lean mass (muscle, bone, vital tissue and organs) and fat mass. In terms of health, fat is the main point of interest and everything else is termed lean body tissue. The amount of fat we carry varies from person to person and healthy averages vary with gender and age. Being over fat or under fat can result in health concerns. A healthy amount of fat for a man is between 15 and 18% and for women is higher at 20-25%.An optimal ratio of fat to lean mass is an indication of fitness, and the right types of exercises will help you decrease body fat and increase or maintain muscle mass (Head Quarters Department of the US Army, 1998) and (President's Council on Physical Fitness and Sport, ND).

Reilly and Secher (1990) addressed that body composition played an important role in fitness of a soccer player. The physical composition of the body (body fat, mass and fat-free mass) is also relevant in the preparation of players for competitive performance. It is an important component of fitness as excess adipose tissue acts as dead weight in common game activities such as running and jumping where body mass must be lifted repeatedly against gravity. It is also recognized that body fat levels affect energy expenditure, players' power to weight ratio, and acceleration capacity. The functional performance characteristics of soccer players are therefore influenced by differences in body size and composition. Carling,et al. (2010)

According to Vikram et al, (2003), and NHS Direct, (2011), a BMI of <18.9 as underweight and may indicate mal nutrition, an eating disorder or other health problems, while a BMI>25 is considered over weight and above 27 is considered obese or high risk. As exceptionally, people who do regular physical activity and possess a large muscle mass and size can be high in body weight without being too fat and weighting at the same time of day, preferably early in the morning is best, because it is more likely to represent real changes in body composition. There is loss of height through aging; BMI will increase without any corresponding increase weight.

Body composition is one of the most relevant features for success in many sports, the contribution that the physical structure´s conformation has on athletic activities, and so, also in football, is widely acknowledge as stated by Nikolaidis and Karydis (2011), where high percentage of lean mass play a significant role for health and performance. The human body can be described as a combination made by muscle, bone, skin, fat and organs. An important part

which makes up usually 30% to 40% of our body weight, of a healthy individual, is rep-resented by so called skeletal muscle mass according to studies as claimed by Ellis (2000).

All fitness components depend on body composition to some extent. An increase in lean body mass contributes to strength and power development. Strength and power are related to muscle size. Thus, an increase in lean body mass enables the athlete to generate more force in a specific period of time. A sufficient level of lean body mass also contributes to speed, quickness, and agility performance (in the development of force applied to the ground for maximal acceleration and deceleration). Reduced nonessential body fat contributes to muscular and cardio respiratory endurance, speed, and agility development. Additional weight (in the form of nonessential fat) provides greater resistance to athletic motion thereby forcing the athlete to increase the muscle force of contraction per given workload. The additional body fat can limit endurance, balance, coordination, and movement capacity. Joint range of motion can be negatively affected by excessive body mass and fat as well and mass can form a physical barrier to joint movement in a complete range of motion. Thus, athletes competing in sports that require high levels of flexibility benefit from having low levels of body fat. NSCA's Guide to Tests and Assessments, (2017),

In elite players, strictly correlation between sprint performance and decreasing of fat mass, especially through the "in-season", have been shown main improvements in the sprint times associated with reduction in body fat percentage. As body fat content decreased during the season, players became faster. (Ostojic, 2002)

"Good posture has many values for the Soldier. First, a Soldier is often judged by his appearance–the man with good posture looks like a good Soldier, he commands attention. Secondly, it is an accepted psychological fact that good posture is associated with good morale–a man with good posture feels better and is more positive. A man with poor posture cannot feel as positive, consequently he may develop a negative and discouraged attitude. Thirdly, good posture permits the body to function most efficiently."Raymond t. oDierno(2012)

2.4.2. Cardiovascular Endurance

Cardiovascular endurance is considered as the most important aspect of health-related Fitness due to its importance in decreasing risk of heart disease, and promotion of optimum performance. Other names given to cardiovascular endurance are cardio respiratory fitness,

cardio-respiratory endurance, cardiovascular fitness or aerobic fitness. The name cardio-respiratory fitness is given because it requires the delivery and utilization of oxygen, which is only possible if the circulatory and respiratory systems are capable to perform these functions.
The term "aerobic fitness" has been in use, because aerobic capacity is considered to be the best indicator of cardio-vascular fitness, and aerobic physical activities are the only means to achieve it (corbin et al., 2003). Cardio-vascular endurance, according to Wuest and Lombardo (1994), is often referred to as cardio respiratory endurance. It is the entire body's ability to exercise vigorously for extended periods of time without undue fatigue.

Robbins et al. (1997) state that "cardio-respiratory endurance is the ability to deliver essential nutrients, especially oxygen to the working muscles of the body, and to remove waste products during prolonged physical exertion" (p.27). They go on to say, that exercise reduces coronary heart disease risk, but that does not mean that when you exercise you will not have heart attack. Genetic and other lifestyle factors are involved.

Cardio-respiratory endurance, according to Insel et al. (2001), depends on the ability of the lungs to deliver oxygen from the environment to the bloodstream, the hearts capacity to pump blood, ability of the nervous system and blood vessels to regulate blood flow, the muscles capacity to generate power and capability of the body's chemical systems to use oxygen and process fuels for exercise. They have made it clear that improved cardio-respiratory fitness helps the heart to function efficiently, resting heart rate slows down, blood volumes increase, improved blood supply to tissues, blood pressure at rest decreases, bio-chemical function in muscle and liver are improved, increase in the ability of the body to use energy supplied by food and to do more exercise with less effort from the oxygen transport system.

Hahn et al., (2003) also share the view that cardio-respiratory endurance increases the capacity to sustain a given level of energy production for a prolonged period. It helps your body to work longer and at greater levels of intensity. Prentice (1997) has defined cardio-respiratory endurance as the ability to persist in a physical activity requiring oxygen for physical exertion without experiencing undue fatigue. Contrary to the belief that strenuous work harms the heart, experts have found no evidence that regular progressive exercise is bad for the normal heart. The heart muscles rather increase in size and power to allow the pumping of greater volumes of blood with

fewer strokes per minute. They explain that "the heart of a normal individual beats reflexively about 40 million times a year. Over 4000 gallons or 10 tons of blood are circulated each day. The workload of the heart every night is equivalent to a person carrying a 30 pound pack to the top of the 102- storey empire state building"(lindsey,welk, and corbin, 2000, p.106).

Good cardiovascular fitness requires a fit heart muscle, fit vascular system, fit respiratory system, fit blood with adequate hemoglobin in the red blood cells and fit muscle tissue capable of using oxygen. These reduce risk of heart disease, other hypo kinetic conditions and early death. It is now known that appropriate physical activity can build cardiovascular fitness in all types of people and those with excess body fatness. Good cardiovascular fitness enhances the ability to perform various tasks, improves the ability to function and is associated with a feeling of wellbeing (Newport, 2001).

Cardiovascular fitness could be developed through performance of active aerobic activities such as brisk walking, jogging, aerobic dancing, cycling, and tennis, playing football, swimming and many others. For optimal level of development, activities should be done daily, at least, not less than three times a week, Walt (2003).

Cardiovascular fitness is the ability of the heart, blood vessels, blood and respiratory system to supply fuel, especially oxygen, to the muscles and the ability of the muscles to utilize fuel to allow sustained exercise. Cardiovascular fitness is referred to as cardiovascular endurance because a person who possesses these types of fitness can persist in physical exercises for long period of time without undue fatigue (Brown& Benchmark, 1994)

The high level of the anaerobic capacities in soccer players enables them to perform high-speed runs, which in the end may have a crucial impact on match results (24). Soccer is a predominantly aerobic game (5,20,37, and 39) and anaerobic energy is essential to performance in sprints, high-intensity runs, and duel plays, all of which may contribute to the final outcome of the game (23). Top-class soccer players are able to perform more high-intensity running than moderate professional soccer players

Soccer is perhaps the most demanding of all sports. Few other games have as large a playing field. No other sport lasts as long without regular rest periods. In today's game players must run

virtually nonstop, often times sprinting, for an hour and a half. On average a player can cover as much as eight miles (13km) during a ninety-minute competitive game. Covering that amount of distance, at any intensity, for an hour and a half requires good stamina or endurance. Couple that with the fact that in soccer much of that movement consists of high-intensity sprints, explosive jumps, running backwards and tough challenges, and high levels of stamina become absolutely crucial! (Phil Davies, 2005)

Endurance shares importance with strength and power development in soccer because previous investigations have indicated a positive relationship between endurance capacity and performance results in elite soccer (Wisloff et al. 1998) and because enhanced aerobic endurance improves soccer performance (Helgerud et al. 2001). Soccer is a high-intensity, intermittent exercise that relies predominantly on aerobic energy pathways (Ekblom 1986)

In a soccer match, activities like walking, jogging, and slow to moderate running are fuelled predominantly by the aerobic energy system. It is these activities that make up as much as 90-95% of a player's performance. Aerobic endurance conditioning will allow you to sustain these kinds of activities at a much higher level. It will also help you to recover following shorter, more intense exercise. Even though a player may only sprint for a total of five minutes in a game, that still equates to forty or fifty all-out bursts. As a match progresses these short, sprints become slower and less sharp. Aerobic endurance training will help you to perform at the same level in the last ten minutes as you did in the first ten minutes (Phildavies, 2005)

2.4.3. Muscular Strength

Muscle strength is the ability of a muscle or muscle group to exert force in a single effort against resistance. It is also made clear, that there is some crossover effect between muscular strength and muscular endurance. Development of muscular strength also produces some increase in muscular endurance. However, muscular endurance does not enhance strength (Wuest and Lombardo, 1994).

Corbin et al. (2003) have defined strength as the amount of force produced with a single maximal effort of a muscle group. According to WHO, (2005), women have smaller amounts of the anabolic hormone testosterone and therefore have less muscle mass and size than men.

Because of this, women typically have 60% to 80% of the absolute strength of men and have relative strength similar to man. Muscle strength peaks, around 25 years of age, plateaus through 35 or 40 years of age, and then shows an accelerating decline, with 25% loss of peak force by the age of 65 years. The male and female strength ratio is unchanged, so that women are limited by a loss of strength at an earlier age than men. Muscle strength can be greatly improved as little as 8 weeks of resistance training, even in 90 years old. Maximum strength is usually reached in the 20s and typically decline with age. As people grow older, regardless of gender, muscular strength is better among people who train than people who do not. This suggests that progressive resistance training is one antidote to premature aging.

Strength is measured by the amount of force you can produce with a single maximal effort. You need strength to increase work capacity, to decrease the chance of injury, to prevent low back pain, poor posture and other hypo kinetic disease, to improve athletic performance; and perhaps to save life or property in an emergency. (Brown & Benchmark, 1994)

Muscular strength is a component of both health-related and sport-related physical fitness. It is defined as the ability of a muscle group to develop maximal contractile force against a resistance in a single contraction and is either static or isometric, which involves no change in muscle length, and dynamic, which involves either eccentric or concentric action (Heyward, 2010). A normal level of strength is necessary for normal healthy living, while muscle weakness might impair normal functional movement (Prentice W. E, 2007). In a systematic review of muscular strength development in children and adolescents, the association of inadequate strength with increased injury risk, muscular imbalance, decreased self-esteem and body image was also highlighted (Manno, 2008).

Hoeger and Hoeger (2002) have condemned the idea that strength is necessary only for highly trained athletes and other individuals who have jobs that require muscular work. To them, strength is undoubtedly a basic component of fitness and wellness, and is crucial for optimal performance in daily activities such as sitting, walking, running, lifting carrying objects and doing household work or even enjoying recreational activities. Strength is seen as an equally important aspect of health-related fitness and refers to the maximum tension or force muscles develop in a single contraction against a given resistance.

Stronger players to maintain a higher work rate during the game. They perform more high intensity actions during the match and cover a greater distance while sprinting, especially during the second half (Silva et al. 2013). Players with greater strength levels also show less post-match fatigue despite the higher game load (Johnstonet al. 2014). Because stronger players are better able to maintain a high level of performance during the game, display less neuromuscular fatigue, and recover faster after a game it should come as no surprise that strength training has been shown to significantly reduce acute and overuse injuries (Asklinget al. 2003)

In the normal loads that occur during a game, such as tackles, twisting or abrupt stops, it is the strength of the muscles surrounding the passive musculoskeletal system that determine whether it is damaged by these stresses or it can absorb and harmlessly dissipate them. Muscles support and protect vulnerable structures like joints, tendons and ligament (Ralf Meier, 2007)

Soccer strength is the basis to optimal performance in competition. It will help improve soccer speed, soccer speed-endurance and power. Strength is the physiological basis to all movement. It even takes strength to get up out of the sofa! So it follows logically that soccer strength is also important in soccer-movement... and to no small degree. (Mark Kislich, 2012)

A stronger player can sprint faster, jump higher, change direction more quickly, and kick the ball harder (Bram Swinnen, 2016)

In order to obtain a high leg swing velocity, the exertion of knee extension and hip flexion strength is important (Levanon&Depena, 1998).

The modern game of soccer is unquestionably more athletic and strength-based than a few decades ago. It is rare to find a top player without a washboard stomach and muscular upper body. Players now train in gyms or in club weight rooms; and the particularly dedicated also complement their club's training sessions by working out with a personal trainer. Well-developed muscles reduce the risk of injury. Even in the fairest of games, which are few and far between these days anyway, a certain amount of physical contact is un- avoidable. It is not surprising then that soccer is consistently one of the highest risk sports. (Ralf Meier, 2007)

Soccer places considerable demands on the neuromuscular and the hormonal systems (Bangsbo, 1994). The ability of the neuromuscular system to produce maximal leg power output appears to

be important in soccer because one of the main physiological differences between soccer players of different levels seems to be the ability to develop maximal strength (Wisloff et al. 1998) and muscular power (Cometti et al. 2001; De Proft et al. 1988) with high contraction velocities while executing the numerous explosive bursts of activity required during a game, such as jumping, tackling, kicking, heading, turning and short-distance sprinting.

Strength is the pre-requisite for every kind of movement. Contrary to the commonly held view, bigger and stronger muscles do not slow you down. Strong muscles are always quick muscles, too. Weightlifters and the like are always excellent sprinters. Anyone who wants to improve their sprinting does not need to run more; they need to improve the maximal strength of their thigh muscles. (Ralf Meier, 2007)

2.4.4. Muscular Endurance

Muscular Endurance is the ability to perform repeated contractions against a sub-maximal resistance (Anderson, Broom,Pooley,Schrodt, and Brown, 1995). The ability of the muscle to exert a sub-maximal force against resistance repeatedly or to sustain muscular contraction continuously overtime is characterized by activities of long duration but low intensity (Robbins et al., 1997).
Corbin et al. (2003) define muscular endurance as the maximum number of repetitions or muscle contractions one can perform against a given resistance. For example, the numbers of times you can bench press 60 kilograms weight.

Muscular endurance is developed through endurance training which leads to adaptations in the slow-twitch fibers that allow them to produce energy more efficiently and better resist fatigue. The principle of training is used in a number of ways to develop muscular endurance in slow-twitch muscles fibers. Isotonic, isometric and Isokinetic exercises could be mentioned here. Unlike strength development which requires high resistance, muscular endurance requires low resistance and repeated contractions with short rests. Muscular endurance exercises are performed with a relatively high number of repetitions and lower resistance (Siedentop, 2001).

Just like muscle strength, muscle endurance is also necessary for optimal health and maximum performance. The fireman without this mentioned component of health-related fitness would not

be able to fight bushfire for hours continuously. The marathon and other long distance athletes also need muscular endurance for them to perform creditably.

It has been proved by Corbin et al. (2003) that athletes and people interested in jobs requiring high-level performance such as the law enforcement and fire safety are, especially, likely to benefit from good muscular endurance fitness.

Muscular endurance is the capacity of skeletal muscle or a group of muscle to continue contracting over a long period. When you have good muscular endurance, you have the ability to resist fatigue and you can hold a position or carry something for a long period. You also have the ability to repeat a movement without getting tiered. (Brown & Benchmark, 1994)

Joseph et al.., (2005), stated that if you are tested on absolute endurance measured by the maximum number of repetition or muscle contractions, one can perform against a given resistance (e.g. the number of times you can move a designated number of pounds), a stronger person has an advantage. However, if you are tested on relative muscular endurance (the number of times you can move a designated percentage of your maximum strength), the stronger person does not have an advantage. For this reason men and women can compete more evenly in relative muscular endurance activities. In fact, on some endurance tasks women have done as well or better than men. If your goal is to build muscular endurance, you will decrease the amount of weight you use so that you can continue to perform repetitions over the course of a workout without failure, continuing exercise for 30 minutes or more. Muscular endurance showed great variability between individuals. However, no decrease in endurance was seen in 24 older ages. Though muscular endurance declines with age, it is not as dramatic as decreases in absolute strength.

2.4.5. Flexibility

Flexibility is the measurement of the achievable distance between the flexed position and the extended position of a particular joint or muscle group. This measurement depends on the length and looseness of the muscles and ligaments due to normal human variation and the shape of the bones and cartilage that make up the joint (Chek, 2002).

Wuest and Lombardo (1994) have defined flexibility as the ability of the various joints of the body to move through their full range of motion. Insel et al. (2001) refer to flexibility as the ability to move the joints through their full range of motion. To them flexibility is not a significant factor in the everyday activity of most people, but inactivity causes the joints to become stiffer with age, causing poor posture, back, shoulder and neck pains. Prentice (1997), has defined flexibility as the ability to move freely throughout a full, non-restricted, pain-free range of motion about a joint or series of joints.

A study Kras, H. (1972) done on several 100 adults who had complaints of chronic lower back problems revealed that approximately 80% had sever muscle weakness and joint inflexibility diagnosed as the cause, while only 20% had a specific anatomical disease or lesion as the cause. Thus, there is an obvious tendency in our society to neglect the body through lack of physical exertion including stretching and flexibility exercise. Although flexibility can be increased with persistent exercise, the magnitude of increase is a very individual matter and is dependent up on the specific types and forms of activity. There is little scientific evidence to indicate that a person who can reach 2 inches past his or her toes on a sit and reach test is less fit than a person who can reach 8 inches past the toes. As children grow older, their flexibility increases until adolescence when they become progressively less flexible, generally girls tend to be more flexible than boys is probably due to anatomical differences in joints and differences in type and extent of activities they choose. In adults, there is less difference between sexes and older adults frequently have reduced flexibility, principally because of reduced activity, regular stretching can help older people maintain good flexibility throughout life.

According to Lindsey et al. (2000), flexibility is the measure of the range of motion available at a joint or group of joints. It is determined by the shape of the bones, cartilage in the joint, length and extensibility of muscles, tendons, ligaments and fascia that cross the joint.

The potential for muscle wasting, inactivity brings with it a tendency for our muscles to become less flexible, thus decreasing the 'range of motion' of our joints as we age (i.e. the joints stiffen). Regular stretching exercises and full 'range of motion' activities (such as gently swinging the arms and 'high kicking') will reduce or delay this onset of inflexibility. Stretching for flexibility is best done after you have completed your endurance or resistance training, because the muscles are warm; as a result they will be able to be fully stretched. Long, slow stretches are

recommended (hold for 20-30 seconds), with each stretch being taken to the point where a slight discomfort is experienced. Each stretch should be followed by a short rest, and then repeated several times. All the major muscle/tendon groups (legs, abdomen, arms, shoulders, wrists and so on) should be stretched. Stretching should be conducted several times per week, preferably after conducting aerobic and/or resistance training (American Heart Association and the National Heart, Lung and Blood Institute, 2005).

It is interesting to know that there is no ideal standard for flexibility. There is little scientific evidence to show that a person who can reach 2 inches past his or her toes on a sit-and-reach test is less fit than the person who is able to reach 6 inches past his or her toe. Too much flexibility as well as too little flexibility could be detrimental (Corbin et al., 2003).To develop flexibility, it is recommended that muscles are stretched past normal length until resistance is felt. For duration, the stretch should be held from 5 to 10 seconds initially, building to 30 to 45 seconds (Wuest et al., 1994).

The importance of flexibility to health, good posture and physical performance is even appreciated by animals like the cat and the dog that stretch after sleeping to maintain good joint mobility. Every person needs some flexibility to perform efficiently and effectively in daily life. Body builders, who have developed bulged muscles through improper weight-training, usually sacrifice flexibility in order to develop muscle strength. In strength training, it is important to ensure that all movements are carried through their full range of motion to satisfy the good thumb rule; " stretch what you strengthen and strengthen what you stretch "(Scott, 2002).

Improvement in flexibility can reduce muscle strain from trying to do things which your current flexibility prohibits without effort. It can improve back movement and muscle pain and will sometime help with problems such as migraines and Crump. Proper stretching is one of the more helpful ways to reduce chronic pain. If you don't stretch, your muscles get tight and weak which leads to a pain. One of the main causes of back pain is tight hamstrings. While stretching may make you feel better, it does not remove a potential case of injury. This is why stretching, especially static stretching, before working out does not prevent injuries (KurzT, 2000).

Fox (1998) and other authorities like Fahey, Insel and Roth (2001), have recommended flexibility and stretching exercises to help maintain good joint mobility, increase resistance to muscle injury and soreness, maintain good postural alignment and help to improve personal appearance and image. According to Lindsey et al. (2000), adequate flexibility provides the following health benefits. Backache and the risk of muscle strain is reduced when a person is flexible. Flexibility is a measure of the range of motion available at a joint or group of joint. (Brown & Benchmark, 1994)

Flexibility is more than just exploring wider ranges of motion. Instead, it is about the ability to use power through the entire range motion of a joint. This sort of mobility reduces injury and improves performance in all the fine motor skills required for typical soccer skills. Also, you will see improvements in agility (Admin, 2017).

Flexibility is the ability of possessing full range of motion around joints in the body. Flexibility reduces the injury proneness in day to day life and in sports and under various occasions. This component has its bearing on stride length in running, perfection in executing follow through actins involved in performing almost all executing follow through actions involved in performing almost all activities and in connection with the body space aesthetics. The flexibility can be improved by stretching exercises, calisthenics and practice of Asana. . (Ajay Kumar Pandey, Devarshi Kumar Chaubey, 2015)

CHAPTER THREE

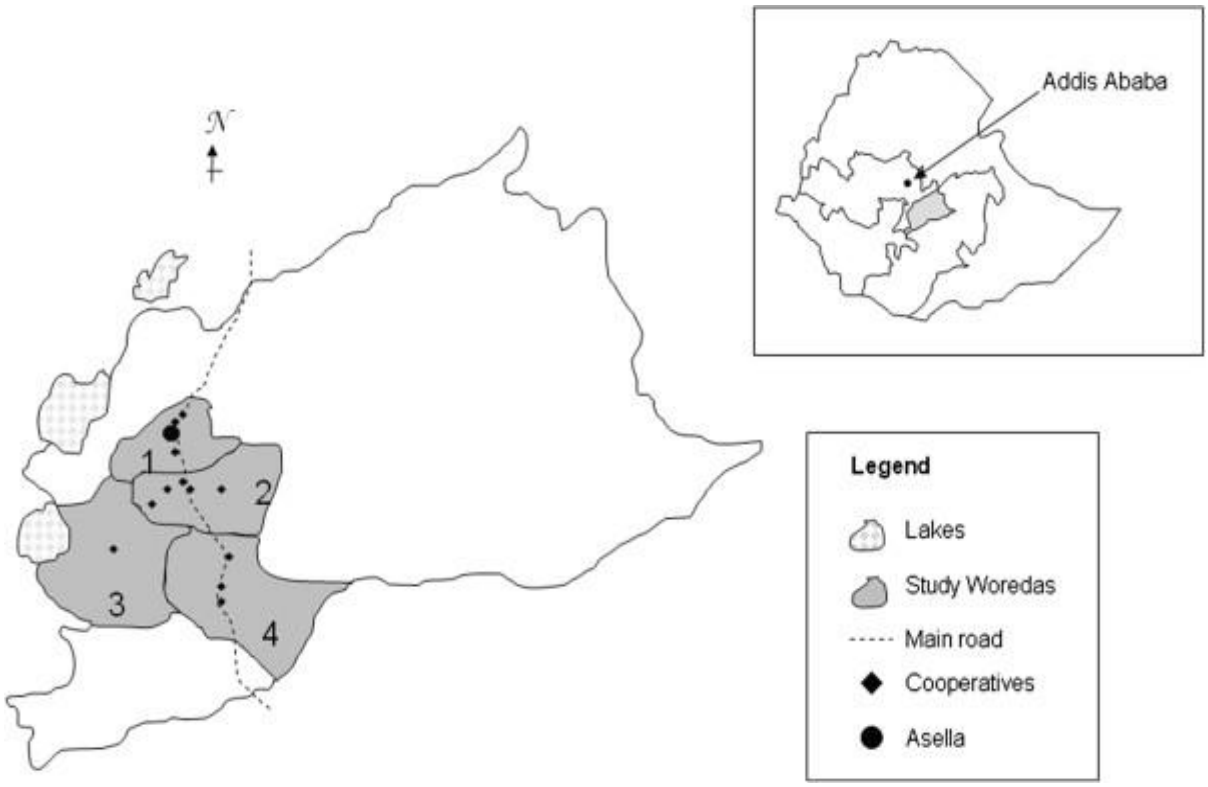
RESEARCH METHODOLOGY

This chapter deals with the study area, research design, study population, target population, sample and sampling techniques, sources of data, data collection instrument, data collection procedures, methods of data analysis, and ethical consideration of the study participants of research were explained as follows:

3.1. Study Area

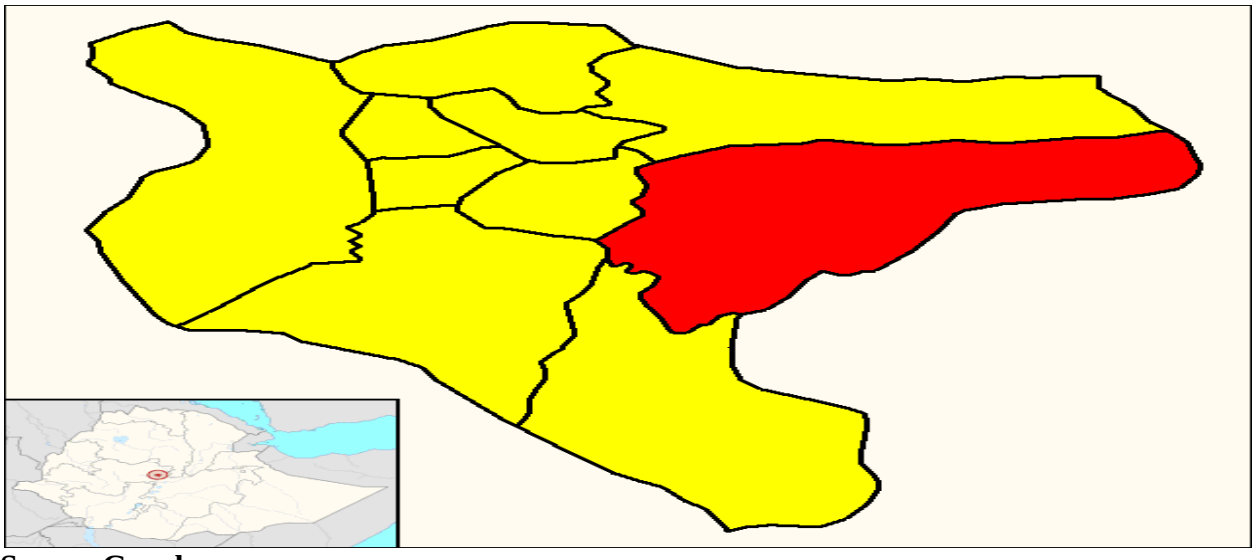
The study was conducted at Ethiopian youth sport academy located in the eastern neighborhood of the capital / Bole sub city Woreda 03 adjacent to Bob Marley square. It is located at 90^{0}’ 9.70^{0} North & 38^{0}47’ 43.09^{0} East longitude, at an altitude of 2,334m above sea level and Athlete Turunesh Debaba sport Training center Located in the Arsi Zone of the Oromia Region about 175 kilometers from Addis Ababa, this city has a latitude and longitude of 7°57′N 39°7′E, at an altitude of 2,430 meters above sea level

Figure 1 Map of AsellaTurunesh Dibaba sport training center



Source Google map

Figure 2 Map of Addis Ababa Ethiopia youth sport academy



Source Google map

3.2. Research Design

The study was a quasi-experimental research design in which health related fitness of soccer players in both U-19 female football trainees of Ethiopian youth sport academy and Turunesh Debaba sport Training center were compared. Their mean values in health related physical fitness were compared to determine whether or not, there was any significant difference between the two groups.

3.3. Study Population

The population of the study consisted of a total of 48 U-19 female football trainee in both center which comprises twenty three (23) trainee from Ethiopian youth sport academy and twenty five (25) trainee from Turunesh Debaba sport training center. These subjects, (U-19 female football trainees) have been trained by their own coaches for two years in their own training center and had been playing Ethiopia female second division premier league matches in 2010 E.C and in 2011 E.C Trunesh Debaba sport Training center has been playing in female first division premier league matches, and Ethiopian youth sport academy stayed in second division.

3.4. Sample and Sampling Techniques

Simple Random sampling technique was employed in this study. The sampling was employed where each element in the population have an equal probability of getting into the sample; and all choices are independent of one another. C.r.kothari (May 1990). The selection of population depends on their interest to participate in Comparative Study on Health Related Physical Fitness Variables between Ethiopian youth sport Academy and Turunesh Dibaba sport Training center female football trainees. The sample size of this study was 20; 10 from Ethiopian youth sport academy and 10 from Turunesh Debaba sport Training center.

3.5. Source of Data

Primary data was the only data that has been used in this research, since the design is quasi experimental. The data was collected from the subjects of experimental study group on flexibility, muscular endurance, strength, body composition and cardiovascular endurance.

3.6. Data Collection Instruments

The Ethiopian youth sport academy and Turunesh Debaba sport Training center football ground and gymnasium were used as testing venue. The American Alliance for Health, Physical Education, Recreation, and Dance (AAHPERD) were used to conduct Physical Fitness Tests to measure status and achievement in physical fitness on the subjects selected for the experiment.

A. Sit and reach test

- ✓ Purpose: To evaluate the flexibility (extensibility) of the low back and posterior thighs.
- ✓ Equipment: Self-constructed test box with a measuring scale, pencil and recording paper.
- ✓ Test Description: Before performing, the test participants had been given the time for warm up and stretching. Before the test, subjects removed their shoes, tight clothes and sat down at the test apparatus with their knees fully extended with the feet, shoulder width apart. The feet placed flat against the end board. The arms extend forward and hands placed on top of each other in order to perform the test. The subjects tried to reach directly forward with the palms down along the measuring scale three times and held the position at the maximum reach until recording. The furthest points reached in the three attempts were recorded to the nearest centimeters.
- ✓ Scoring: The three trials were given to all subjects to perform correct sit and reach over the testing box keeping palms down. The distance covered during the reach measured in centimeters. The maximum reach was recorded as the score in centimeters.

Table 3.1. Normative Data for the Sit and Rich Test

Gender	Excellent	Above Average	Average	Below Average	Poor
Female	>15cm	12-15cm	7-11cm	4-6cm	<4cm

B. Wall Squat Test

- ✓ Purpose:- to monitor the development of the athlete's quadriceps strength endurance.
- ✓ Equipment:- Warm dry location – gym, Smooth wall, Stop watch and Assistant.
- ✓ Test Description:- Stood comfortably on both feet with their back against a smooth wall and Slide their back down the wall to assume the position till to be a 90° angle at the hip and knee. When they lifted one foot 5cm off the ground and balance for as long as possible. Assistant starts the stop watch. The watch stopped when they put their feet back on the ground and take a rest and then repeat the test with the other leg.
- ✓ Scoring:- The total time elapsed during performing an activity was recorded

Table 3.2. Normative Data for the Wall squat Test

Gender	Excellent	Above Average	Average	Below Average	Poor
Female	>60 sec	60-46 sec	45-36 sec	35-20 sec	<20 sec

C. Standing Broad jump)

- ✓ Purpose: To evaluate the leg strength of the subject.
- ✓ Equipment: Steel measuring tape, non-slip floor, soft landing area, marking powder recording paper and pencil/pen.
- ✓ Test Description: The athletes stood behind a line marked on the ground with their feet slightly apart. A two feet takeoff and land, with swinging of the arms and bending of the knees to provide forward drive. The athletes attempted to jump as far as possible, landing on both feet without falling backwards. The measurement was taken from take-off line to the nearest point of contact on the landing surface/pit. The three trials were given to all subjects.
- ✓ Scoring: After taking three trial jumps, the longest distance covered by the subjects was recorded in meters as score.

Table 3.3. Normative Data for the Standing broad Jump

Gender	Excellent	Above Average	Average	Below Average	Poor
Female	>2.8m	2.5m	2.2m	1.9m	<1.7m

D. Body mass index

- ✓ Purpose: To measure the body composition (weight in relation to height).
- ✓ Equipment: Calculator, pencil, weighing machine, stadiometer and recording paper.
- ✓ Test Description: The subject's body weight was taken by making them to stand on the weighing machine without shoes/foot wear. Whereas the subjects were made to stand erect/straight up right on the stadio-meter platform without foot wears to measure the exact height of each subject.
- ✓ Scoring:-The weight in kilograms and height in meters was taken as score (Kg/m^2).

E. cooper test

- ✓ Purpose: measuring cardiovascular endurance.
- ✓ Equipment:-Field, Stopwatch, Whistle, pencil/pen and Recording paper.
- ✓ Test Description: It was to measure the 12 minute running test. Each subject covered the distance in the 12 minute and recorded the distance in meters for each subject. The test was conducted only one time for each subject. The subjects' warmed up, marked cones, were given the command "GO" started the stopwatch, the assistant kept the subjects informed of the remaining time at the end of each lap, blew the whistle when the 12 minutes has elapsed and recorded the distance the subjects covered to the nearest 10 meters.
- ✓ Scoring: The total distance covered by the subjects in 12 minutes run was recorded in meters.

Table 3.4. Normative Data for the Cooper Test

Gender	Excellent	Above Average	Average	Below Average	Poor
Female	>2300m	2100-2300m	1800-2099m	1700-1799m	<1700m

3.7. Data Collection Procedures

Before the experiment was conducted, the randomly selected trainees were asked for their willingness to participate in the experiment and found them all willing and interested to participate. Then the next activity done was, to ask them if they have got any history on their health status. Furthermore, the subjects who had any physical injury and medical condition didn't participate in this study.

To ensure quality of the data of health related fitness; cardiovascular endurance, muscular endurance, muscular strength, flexibility and body composition, a brief explanation and demonstration was given about the tests to the subjects. They were allowed to warm up by their own before the actual test was administered. A recovery time was given before administering the next test in order to avoid influence by the previous test item. To minimize the mistakes that may occur during data collection and to collect the appropriate test, assistant recorder of data was trained. Quantitative data were collected through appropriate health related physical fitness tests in order to take comparison between the two groups.

3.8. Methods of Data Analysis

Statistical Analysis for determining the comparison descriptive statistics (mean and standard deviation) was used; the data was analyzed with the help of SPSS (version 22) software. Descriptive statistics were analyzed through the determination of Means and Standard Deviations. For the inferential part, independent t-test was applied to test hypotheses and to compare the variables of interest. The reason why the independent t-test was used is because of the following reasons. One, the observations (subjects) in the Ethiopian youth sport academy sample is independent of those observations (subjects) in the Turunesh Dibaba sport and training center sample, and of each other. Second, the two populations are approximately normal. Third,

the two populations have equal variance. The test of hypotheses were conducted at a significance level of $\alpha = 0.05$.

The independent sample t-test has three assumptions which needs to be tested. These are, first the two samples must be independent from each other, second the data needs to be normally distributed, and finally their variance must be smaller (needs to be homogeneous). Therefore, all the three assumptions were tested. First it is obvious that the two groups are independent of each other as it was discussed in the discussion of the study are. Second, as can be seen in appendix B, the academy and the center distributions were sufficiently normal for the purpose of conducting a t-test (i.e., skew $< \left| 2.0 \right|$ and kurtosis $< \left| 9.0 \right|$ Schmider, Zeigler, Danay, Beyer, and Buhner, 2010). Additionally, the assumption of homogeneity of variance was tested and satisfied via Levene's*F* test, $F\ (18) = 0.34$, $P = 0.57$.

3.9. Ethical Consideration

The study was design in such a way that ethical issues properly addressed. Privacy of the subjects and confidentiality was strictly observed and maintained throughout the study. The study was conducted under each center rules and codes of conduct in governing research activities and ethical issues. The written consent/ agreement form was given and informed to the concerned bodies

CHAPTER FOUR

DATA INTERPRETATION AND ANALYSIS

In this chapter I will present and interpret the results found from testing the hypotheses using the independent sample t-test for the variables identified to compare Ethiopian Youth Sport academy against Turunesh Dibaba Sport training Center. As it has been already described under the methodology part in the previous chapter, before the testing the hypothesis, the data has been tested and passed all the three assumptions under the independent t-test. Just to recap, the two groups (Ethiopian youth sport academy and Turunesh Dibaba sport and training center) were independent from one another, the data are approximately normally distributed and the variance among the groups is smaller in which homogeneity is observed. Therefore, it is after the data passed these tests that the analysis or hypotheses test was conducted. The findings are discussed briefly and in detail in the next sections.

4.1. Demography of Respondents

Table 4.1. The frequency distribution of respondents in terms of age.

Age	Name of the club				Total	
	Turunesh Dibaba		Ethiopian sport Academy			
	Frequency	Percent	Frequency	Percent	Frequency	Percent
17	2	20%	3	30%	5	25%
18	6	60%	7	70%	13	65%
19	2	20%	0	0%	2	10%
Total	10	100%	10	100%	20	100%

Table 4.1 Depicted age of participant of the study of Turunesh Dibaba sport training center has 20% age 17, 60% age 18 and 20% of the participant were age 19 category and Ethiopian sport academy only has 17 and 18 age group and 30% and 70% respectively from the group.

Table 4.2. The frequency distribution of respondents in terms of the history of education

Grade	Name of the club				Total	
	Turunesh Dibaba		Ethiopian sport Academy			
	Frequency	Percent	Frequency	Percent	frequency	Percent
8	1	10%	1	10%	2	10%
9	1	10%	1	10%	2	10%
10	8	80%	8	80%	16	80%
Total	10	100%	10	100%	20	100%

Table 4.2 shows grade level of participant of the study of Turunesh Dibaba sport training center has 10% grade 8, 10% grade 9 and 80% of the participant were grade 10 grade level and Ethiopian sport academy has the same as that of the counterpart

4.2. Analysis and Interpretation of the Data

4.2.1. Flexibility (Sit and Reach Test)

Table 4.3. Statistics for Sit and Reach Test

	Group	N	Mean	Std. Deviation	Std. Error Mean
Sit and Rich Test	Ethiopian Youth Sport Academy	10	15.0000	3.94405	1.24722
	Turunesh Dibaba Sport and Training Center	10	12.6000	6.32807	2.00111

Flexibility, measured by the sit and reach test has a mean of 15cm with standard deviation of 3.95cm for the subjects randomly selected from Ethiopian youth sport academy and a mean of 12.6cm with standard deviation of 6.33cm for the subjects from Turunesh Dibaba sport and training center. Here, the mean value of players from the academy is greater by 2.4cm than the mean value of players from Turunesh's training center. The significance of this difference must be tested having a temporary assumption that the difference is insignificant or there is no difference in the mean value between the two groups as a null hypothesis and that the groups have a significant mean difference as an alternative hypothesis. The result of the hypothesis test is shown on the next table and discussed in the section that follows.

Table 4.4. Independent Samples Test for Sit and Rich Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Sit and Rich Test	Equal variances assumed	3.803	.067	1.018	18	.322	2.40000	2.35797	-2.55390	7.35390
	Equal variances not assumed			1.018	15.075	.325	2.40000	2.35797	-2.62369	7.42369

The Ethiopian youth sport academy group (N = 10) was associated with a flexibility level with *Mean* = 15 (*SD* = 3.94). By comparison, the group from Turunesh Dibaba (*N* = 10) was associated with a numerically smaller flexibility level with *Mean* = 12.6 (*SD* = 6.33). An independent t-test was run to determine if there were differences (if the observed difference was significant) in flexibility between the Ethiopian youth sport academy and Turunesh Dibaba sport and training center. After running the independent t-test for the two groups, the result has indicated a *p-value* of 0.322. Since the p-value is greater than the significance level of $\alpha = 0.05$, we do not reject the null hypothesis. Therefore, based on the result, we can conclude that there is no significant difference in flexibility of female players between Ethiopian youth sport academy and TuruneshDibaba sport and training center at a 5 percent significance level. So, the two groups are the same in terms of their flexibility in which a mean difference of 2.4cm is just occurred by chance.

4.2.2. Muscular endurance (Wall Squat Test)

Table 4.5. Statistics for Wall Squat Test

	Group	N	Mean	Std. Deviation	Std. Error Mean
Wall Squat Test	Ethiopian Youth Sport Academy	10	1.0930	.68165	.21556
	Turunesh Dibaba Sport and Training Center	10	.8730	.49916	.15785

The muscular endurance of the subjects in the two groups were measured using a wall squat test and shows a mean value of 1.1 for Ethiopian youth sport academy with standard deviation of 0.68 and a mean value of 0.87 with standard deviation of 0.5 for the subjects in the second group. In order to conclude that the mean difference of 0.22 between the groups is significant or not, and to generalize the mean muscular endurance of Ethiopian youth sport academy is greater than their counter parts, a test has been run and its result has been discussed under the following section.

Table 4.6. Independent Samples Test for Wall squat Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Wall Squat Test	**Equal variances assumed**	1.166	.295	.823	18	.421	.22000	.26717	-.34130	.78130
	Equal variances not assumed			.823	16.497	.422	.22000	.26717	-.34499	.78499

In this part, the null hypothesis stated as no difference in body muscular endurance between the groups was tested and the results in the above table were obtained. As per the test result on the above table, the *p-value* which is 0.421 is greater than the significance level of $\alpha = 0.05$. If p-value is greater than the significance level, then the null hypothesis will not be rejected. Therefore, we fail to reject the null hypothesis which states that there is no significant difference in muscular endurance between the groups at a 5 percent significance level and we can say that the difference observed in their means is as a result of the sample. Therefore, a conclusion can be drawn that the female players at both; the academy and the training center have got similar muscular endurances.

4.2.3. Muscular strength (Standing Broad Jump)

Table 4.7. Statistics for Standing Broad Jump

	Group	N	Mean	Std. Deviation	Std. Error Mean
Standing Broad Jump	Ethiopian Youth Sport Academy	10	1.9350	.12501	.03953
	Turunesh Dibaba Sport and Training Center	10	1.9800	.10317	.03263

The muscular strength is the ability of a muscle to exert force in a single effort against resistance which is very essential for any player. This was the third objective of this research in which the two groups are compared for their muscular strength. The research has found a muscular strength of Ethiopian youth sport academy to be 1.94 on average in which there was a standard deviation of 0.13 among the subjects included in the sample. The investigation also came up with mean muscular strength of 1.98 and standard deviation of 0.1 for the subjects from Turunesh's center. If we compare the mean values for the groups, there is a difference of 0.045. With this much difference, can we conclude the muscular strength of the groups are different? The answer is given with the analysis in the next paragraph.

Table 4.8. Independent Samples Test for Standing Broad Jump

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Standing Broad Jump	**Equal variances assumed**	.483	.496	-.878	18	.392	-.04500	.05126	-.15269	.06269
	Equal variances not assumed			-.878	17.375	.392	-.04500	.05126	-.15296	.06296

It was temporarily hypothesized that there is no significant difference in muscular strength between Ethiopian youth sport academy and Turunesh Dibaba sport and training center as a null

hypothesis and that there is a significant difference as an alternative hypothesis. And an independent sample t-test was conduct to compare mean muscular strength of the groups at a significance level of $\alpha = 0.05$. The test statistics shows a *p-value* of 0.392 which is way much higher than the significance level. Therefore, when the p-value is greater than the significance level, the null hypothesis cannot be rejected. Thus, we fail to reject the null hypothesis at a 5% level of significance and we conclude that there is no significant difference in the muscular strength between the two groups. The muscular strength of female players in Ethiopian youth sport academy is similar to the muscular strength of female players in Turunesh Dibaba sport and training center.

4.2.4. Body Composition (Body Mass Index)

Table 4.9. Statistics for Body Mass Index

	Group	N	Mean	Std. Deviation	Std. Error Mean
Body Mass Index	Ethiopian Youth Sport Academy	10	21.0840	1.20379	.38067
	TuruneshDibaba Sport and Training Center	10	20.6730	1.28649	.40683

Body composition, measured by Body mass index test has a mean of 21.08 with standard deviation of .38 for the subjects randomly selected from Ethiopian youth sport academy and a mean of 20.67 with standard deviation of .41 for the subjects from Turunesh Dibaba sport training center. Here, the mean value of players from the academy is greater by 0.411 than the mean value of players from Trunesh's training center In order to conclude that the mean difference of 0.411 between the groups is significant or not, and to generalize the mean Body composition of Ethiopian youth sport academy is greater than their counter parts, a test has been run and its result has been discussed under the following section

Table 4.10. Independent Samples Test for Body Mass Index

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Body Mass Index	Equal variances assumed	.339	.568	.738	18	.470	.41100	.55715	-.75953	1.58153
	Equal variances not assumed			.738	17.921	.470	.41100	.55715	-.75990	1.58190

The Ethiopian youth sport academy group (N = 10) was associated with a body mass index *M* = 21.08 (*SD* = 1.21). By comparison, the group from TuruneshDibaba (*N* = 10) was associated with a numerically smaller body mass index *M* = 20.67 (*SD* = 1.29). To test the hypothesis that there is a significant body mass index difference between Ethiopian youth sport academy female players and TuruneshDibaba sport and training center, an independent sample t-test was performed. The independent sample t-test was associated with a statistically insignificant effect, because *p*-value which is 0.470 is greater than the significance level $\alpha = 0.05$. Thus, the Ethiopian youth sport academy was associated with a statistically insignificantly larger mean body mass index than the Turunesh Dibaba Sport and Training Center. Therefore, we fail to reject the null hypothesis which states that there is no significant difference in body mass index between the groups at the 5 percent significance level. Based on this result, we can conclude that the mean body mass index for both groups is similar, because the difference was found statistically insignificant.

4.2.5. Cardiovascular Endurance Fitness Test (Cooper Test)

Table 4.11. Statistics for Cooper Test

	Group	N	Mean	Std. Deviation	Std. Error Mean
Coopers test	Ethiopian Youth Sport Academy	10	2435.0000	95.39625	30.16694
	TeruneshDibaba Sport and Training Center	10	2584.4000	193.15060	61.07958

The Cardiovascular endurance of the subjects in the two groups were measured using Coopers test and shows a mean value of 2435m for Ethiopian youth sport academy with standard deviation of 95.4 and a mean value of 2584.4m with standard deviation of 193.15 for the subjects in the second group. In order to conclude that the mean difference of 149.4m between the groups is significant or not, and to generalize the mean muscular endurance of Ethiopian youth sport academy is lesser than their counter parts, a test has been run and its result has been discussed under the following section.

Table 4.12. Independent Samples Test for Cooper Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Coopers test	Equal variances assumed	2.416	.137	-2.193	18	.042	-149.40000	68.12312	-292.52137	-6.27863
	Equal variances not assumed			-2.193	13.144	.047	-149.40000	68.12312	-296.40711	-2.39289

The subjects in Ethiopian youth sport academy group (N = 10) was associated with cardiovascular endurance of M = 2435m (SD = 95.4m). By comparison, the group in the second (N = 10) was associated with a numerically larger cardiovascular endurance M = 2584.4m (SD = 193.15). To test the hypothesis that there is a significant cardiovascular endurance difference between female players in Ethiopian youth sport academy and Turunesh Dibaba sport and training center, an independent sample t-test was performed. The independent sample t-test was associated with a statistically significant effect, for which the p-value of Levene's test is printed as 0.042 which is less than the significant level $\alpha = 0.05$ ($p < 0.05$), so we reject the null hypothesis and conclude that the mean cardiovascular endurance fitness for Ethiopian Youth Sport Academy and Turunesh Dibaba Sport and Training Center is significantly different. Based on the result, we can state that there was a significant difference in mean cardiovascular

endurance between Ethiopian Youth Sport Academy and Turunesh Dibaba Sport and Training Center. The average cardiovascular endurance for Turunesh Dibaba Sport and Training Center was 149.4 higher than the average cardiovascular endurance for Ethiopian Youth Sport Academy.

4.2. Discussion

The purpose of the present study was to compare the health related physical fitness among female trainees of Ethiopian Youth Sport Academy and Turunesh Dibaba sport Training Center. No significant differences were observed in case of flexibility, body composition, muscular strength and muscular endurance of all trainees (Table 4.4, 4.6, 4.8, and 4.10). But in case of endurance there was significant difference among female trainees of Ethiopian Youth Sport academy and Turunesh Dibaba sport Training Center.

Flexibility was determined with sit and reach test. Ethiopian youth sport academy had a mean score of 15.0000 as against 12.6000 recorded for Turunesh Dibaba sport training center. When compared for significance, there was none between the two groups. Trainees in the two academies also appeared to be homogenous as their standard deviations values were very low. Ethiopian youth sport academy trainees had a standard deviation of 3.94405 while Turunesh Dibaba sport training center trainees had a standard deviation of 6.32807. According to Admin, (2017). Flexibility is more than just exploring wider ranges of motion. Instead, it is about the ability to use power through the entire range motion of a joint. This sort of mobility reduces injury and improves performance in all the fine motor skills required for typical soccer skills. Also, you will see improvements in agility, thus, making Flexibility a factor for successful performance in the game of football.

According to Robbins et al., 1997, Muscular endurance is the ability of the muscle to exert a sub-maximal force against resistance repeatedly or to sustain muscular contraction continuously overtime. It is characterized by activities of long duration but low intensity. Wall Squat was used to test Muscular endurance of subjects**.** Ethiopian youth sport academy had a mean score of 1.0930 as against 0.8730 recorded for Turunesh Dibaba sport and training center. When compared for significance, there was none between the two groups. Trainees in the two

academies also appeared to be homogenous as their standard deviations values were very low. Ethiopian youth sport academy trainees had a standard deviation of 3.94405 while Turunesh Dibaba sport training center trainees had a standard deviation of 6.32807.

Standing Broad Jump was used to test Muscular strength of subjects. The mean of 1.9350meter and 1.9800 meter were recorded for Ethiopian youth sport academy trainees and Turunesh Dibaba sport training center trainees respectively. Trainees in the two academies were very homogeneous in their strength. Similarly the standard deviations of .12501 and .10317 recorded for trainees in Ethiopian youth sport academy and Turunesh Dibaba sport training center respectively, were enough grounds for this conclusion.

Considering the need for good strength ability for all trainees, one could see why their standard deviation values were so negligible. Strength is therefore a factor for successful performance in a game of soccer. As Mark Kislich, (2012) stated soccer strength is the basis to optimal performance in competition. It will help improve soccer speed, soccer speed-endurance and power. Strength is the physiological basis to all movement. It even takes strength to get up out of the sofa! So it follows logically that soccer strength is also important in soccer-movement... and to no small degree. A stronger player can sprint faster, jump higher, change direction more quickly, and kick the ball harder (Bram Swinnen, 2016)

Body Composition was determined with Body Mass Index test. Ethiopian youth sport academy trainees had a mean score of 21.0840 as against 20.6730 recorded for Turunesh Dibaba sport training center trainees. When compared for significance, there was none between the two groups. Trainees in the two academies also appeared to be homogenous as their standard deviations values were very low. Ethiopian youth sport academy trainees had a standard deviation of 1.20379 while Turunesh Dibaba sport training center trainees had a standard deviation of 1.28649. Relative percentage of body fat with lean body usually observed in elite football players.

A sufficient level of lean body mass contributes to speed, quickness, and agility performance (in the development of force applied to the ground for maximal acceleration and deceleration). Reduced nonessential body fat contributes to muscular and cardio respiratory endurance, speed, and agility development. Additional weight (in the form of nonessential fat) provides greater

resistance to athletic motion thereby forcing the athlete to increase the muscle force of contraction per given workload. The additional body fat can limit endurance, balance, coordination, and movement capacity. Joint range of motion can be negatively affected by excessive body mass and fat as well and mass can form a physical barrier to joint movement in a complete range of motion. Thus, athletes competing in sports that require high levels of flexibility benefit from having low levels of body fat. NSCA's Guide to Tests and Assessments, (2017)

Football is a game which requires more endurance. Turunesh Dibaba sport Training Center trainees have more than female trainees of Ethiopian Youth Sport Academy. Hence, significant differences were observed among the two different academies (Table 12). In case of other health related physical fitness variables, more or less they were required in all the both teams due to which these variables had shown insignificant difference among the trainees. Previous Studies revealed that Soccer is perhaps the most demanding of all sports. Few other games have as large a playing field. No other sport lasts as long without regular rest periods. In today's game players must run virtually nonstop, often times sprinting, for an hour and a half. On average a player can cover as much as eight miles (13km) during a ninety-minute competitive game. Covering that amount of distance, at any intensity, for an hour and a half requires good stamina or endurance.

Different investigations have indicated a positive relationship between endurance capacity and performance results in elite soccer and because enhanced aerobic endurance improves soccer performance. soccer is a high-intensity, intermittent exercise that relies predominantly on aerobic energy pathways In a soccer match, activities like walking, jogging, and slow to moderate running are fuelled predominantly by the aerobic energy system. It is these activities that make up as much as 90-95% of a player's performance. Aerobic endurance conditioning will allow you to sustain these kinds of activities at a much higher level. It will also help you to recover following shorter, more intense exercise. Even though a player may only sprint for a total of five minutes in a game, that still equates to forty or fifty all-out bursts. As a match progresses these short, sprints become slower and less sharp. Aerobic endurance training will help you to perform at the same level in the last ten minutes as you did in the first ten minutes (Wisloff et al. 1998) , (Helgerud et al. 2001), (Ekblom 1986) and (Phil Davies, 2005)

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1. Summary

The main objective of this study was to compare and contrast health related physical fitness of U-19 female football trainees of both Ethiopian youth sport academy and Turunesh Debaba sport Training center using a quasi-experimental research design. For this purpose, five hypotheses were developed and tested to compare the health related physical fitness of the two groups. The variables used to compare their means were flexibility, muscular endurance, muscular strength, body composition and cardiovascular endurance of the trainees.

To test the hypotheses and compare their means, a total of 20 subjects (10 subjects from each group) were randomly selected using a simple random sampling technique and tested for their status and achievements in physical fitness by applying the "American alliance for health, physical education, recreation and dance (AAHPERD) test" by following the appropriate procedures in careful manner. The experiment and data collection took place at the Ethiopian youth sport academy and Turunesh Debaba sport Training center football ground and gymnasium. Then, the measurements and data were carefully entered into SPSS version 22 and run for tests.

To test the hypotheses, an independent sample t-test has been selected as method of analysis and a significance level of $\alpha = 0.05$ was used. But, before the hypotheses were tested, the three assumptions for the independent sample t-test were conducted and it satisfied the assumptions. Based on this, the following conclusions were drawn.

5.2. Conclusion

The mean values of flexibility, muscular endurance and body mass index of players from the Ethiopian youth sport academy is numerically greater than the mean value of players from Trunesh Dibaba sport training center. Although they are numerically different, the difference is statistically insignificant at the selected level of significance. However, the mean value for muscular strength and cardiovascular endurance of players from the Ethiopian youth sport academy is numerically smaller than the mean value of players from Trunesh Dibaba sport training center. The difference for muscular strength was statistically insignificant, whereas a statistically significant difference for cardiovascular endurance were found.

In conclusion, the findings of the study revealed that significant differences were observed only in cardiovascular endurance whereas no significant differences were observed in flexibility, body composition, muscle strength and muscular endurance.

5.3. Recommendation

Based on the major findings and conclusions of the study, it is important to state the following points as a recommendation.

- ✓ The coach of Ethiopian youth sport academy must work in collaboration with other coaching staff like fitness coach and nutritionist etc., to enhance declining level of cardiovascular endurance of the trainees.
- ✓ The Ethiopian youth sport academy coach must focus on various exercises and alternate in between different training programs that can improve the trainee's CVE in proper way.
- ✓ It will be recommended that cardiovascular endurance compulsory for footballers to achieve high excellence in sports. The Coach must prepare all the sport persons with high level of cardiovascular endurance to excel in sports.
- ✓ It will be good to conduct Similar research to compare skill related physical fitness and physiological variables in both academy and training center.

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APPENDIX-I-

LIST OF ETHIOPIA YOUTH SPORT ACADEMY TRAINEES PARTICIPATED IN THE STUDY (CODE LIST)

Serial codes of Subjects	Region came from	Age	Class Level	Weight	Height	Training age
Subject-1	TIGRAY	17	8	50	1.57	3
Subject-2	SNNP	18	10	52	1.56	3
Subject-3	SNNP	17	9	56	1.65	3
Subject-4	AMHARA	18	10	58	1.66	3
Subject-5	AMHARA	18	10	53	1.55	3
Subject-6	AMHARA	18	10	56	1.54	3
Subject-7	AMHARA	17	10	48	1.57	3
Subject-8	SNNP	18	10	58	1.65	3
Subject-9	SNNP	18	10	52	1.63	3
Subject-10	SNNP	18	10	55	1.60	3

APPENDIX II

LIST OF TIRUNESH DIBABA SPORT TRAINING CENTER TRAINEES PARTICIPATED IN THE STUDY (CODE LIST)

Serial codes of Subjects	Region came from	Age	Class Level	Weight	Height	Training age
Subject-1	SNNP	18	10	54	1.59	3
Subject-2	OROMIA	18	10	57	1.71	3
Subject-3	OROMIA	19	10	60	1.62	3
Subject-4	SNNP	18	8	54	1.63	3
Subject-5	SNNP	18	10	56	1.67	3
Subject-6	OROMIA	19	10	53	1.61	3
Subject-7	OROMIA	18	10	53	1.55	3
Subject-8	OROMIA	17	9	54	1.58	3
Subject-9	GAMBELE	18	10	57	1.74	3
Subject-10	TIGRAY	17	10	51	1.63	3

APPENDIX III

RAW DATA ON SIT AND REACH TEST OF ETHIOPIA YOUTH SPORT ACADEMY AND TIRUNESH DIBABA TRAINING CENTER TRAINEES IN CENTIMETER

Serial no of subjects	Ethiopia youth sport academy	Turunesh Dibaba sport training center
	Test result	Test result
1	16 cm	8 cm
2	12 cm	9 cm
3	14 cm	19 cm
4	18 cm	17 cm
5	15 cm	10 cm
6	22 cm	12 cm
7	16 cm	8 cm
8	18 cm	21 cm
9	9 cm	20 cm
10	10 cm	2 cm

APPENDIX IV

RAW DATA ON WALL SQUAT TEST OF ETHIOPIA YOUTH SPORT ACADEMY AND TURUNESH DIBABA SPORT TRAINING CENTER TRAINEES IN MINUTES

Serial no of subjects	Ethiopia youth sport academy	Turunesh Dibaba sport training center
	Test result	Test result
1	1.37m	1.30 m
2	.49m	.25m
3	2.20m	1.47m
4	.58m	.44m
5	1.55m	.59m
6	2.11m	1.18m
7	.59m	.36m
8	.53m	.47m
9	1.08m	1.56m
10	.44m	1.11m

APPENDIX V

RAW DATA ON STANDING BROAD JUMP TEST OF ETHIOPIA YOUTH SPORT ACADEMY AND TIRUNESH DIBABA SPORT TRAINING CENTER TRAINEES IN METER

Serial no of subjects	Ethiopia youth sport academy	Turunesh Dibaba sport training center
	Test result	Test result
1	1.81m	1.98m
2	2.10m	2.15m
3	1.94m	1.92m
4	1.89m	1.87m
5	2.03m	2.12m
6	2m	1.90m
7	1.76m	1.96m
8	1.92m	1.84m
9	2.11m	2.04m
10	1.79m	2.02m

APPENDIX VI

RAW DATA ON BODY MASS INDEX OF ETHIOPIA YOUTH SPORT ACADEMY AND TIRUNESH DIBABA SPORT TRAINING CENTER TRAINEES (KG/M^2)

Serial no of subjects	Ethiopia youth sport academy	Turunesh Dibaba sport training center
	Test result	Test result
1	20.32	21.42
2	21.39	19.52
3	20.58	22.90
4	21	20.37
5	22	20.14
6	23.62	20.46
7	19.51	22
8	21.32	21.68
9	19.62	19
10	21.48	21

APPENDIX VII

RAW DATA ON COOPER TEST OF ETHIOPIA YOUTH SPORT ACADEMY AND TIRUNESH DIBABA SPORT TRAINING CENTER TRAINEES IN METER

Serial no of subjects	Ethiopia youth sport academy	Turunesh Dibaba sport training center
	Test result	Test result
1	2283m	2606m
2	2528m	2753m
3	2523m	2855m
4	2526m	2593m
5	2283m	2647m
6	2419m	2740m
7	2435m	2321m
8	2436m	2224m
9	2528m	2598m
10	2389m	2507m