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THE EFFECTS OF CIRCUIT TRAINING ON SELECTED PHYSICAL FITNESS COMPONENTS OF MALE STUDENTS FOOTBALL PLAYER ON ALEMBER PREPARATORY SCHOOL.

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DEPARTMENT OF SPORT SCIENCE

THE EFFECTS OF CIRCUIT TRAINING ON
SELECTED PHYSICAL FITNESS COMPONENTS OF
MALE STUDENTS FOOTBALL PLAYER ON
ALEMBER PREPARATORY SCHOOL.

BY

BAYE ENGDW

AUGUST 2019

BAHIR DAR UNIVERSITY ETHIOPIA

THE EFFECTS OF CIRCUIT TRAINING ON
SELECTED PHYSICAL FITNESS COMPONENTS OF
MALE STUDENTS FOOTBALL PLAYER ON
ALEMBER PREPARATORY SCHOOL.

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A THESIS SUBMITTED TO BAHIRDAR UNIVERSITY SPORT ACADEMY IN
PARTIAL FULLFILMENT FOR THE REQUIERMENT OF THE DEGREE OF MASTER
OF EDUCATION IN PHYSICAL EDUCATION.

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DECLARATION OF AUTHORSHIP

I hereby that this Thesis for the in partial fulfillment of the requirement for the Degree of Masters of Science in sport Science Specialization MED on the title of THE EFFECTS OF CIRCUIT TRAINING ON SELECTED PHYSICAL FITNESS COMPONENTS OF MALE STUDENTS FOOTBALL PLAYER ON ALEMBER PREPARATORY SCHOOL. Is my real original work. it has not previously formed the basis for the award of any Degree, Diploma of a University or Other Institution of higher learning, except where due acknowledgement is made in acknowledgements.

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DEDICATION

This thesis is dedicated to my families and parent for their constant physical, emotional, and financial support throughout my educational career and life. Without their tolerance, understanding, support and most of all love, the completion of the work would have been impossible.

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LIST OF ABBREVIATION

ACSM- American College of sport medicine

COG- control group

EXG- experimental group

MD- mean difference

ME- muscular endurance

MS- muscular strength

SD- standard division

SPSS- statistical package for social science

USDHHS- U.S department of health and human services

ABSTRACT

The purpose of this study was to evaluate the effects of circuit training on selected physical fitness components of male students' football player on Aember preparatory school. The training which was given to the trainees was insufficient to develop endurance, agility, strength, flexibility and speed. Quais experimental research design was used for this study. The researcher selected 42 preparatory school male students with age range between 15-18years through simple random sampling method. This sample also grouped in to experimental (n=21) and control group (n=21) by using simple random lottery system. The experimental group engaged in exercise program (3days per week for 40-60 minutes in three months). However, the control group did not perform circuit training, both groups undergone normal football training program. The two groups took the test items included modified 8 levels sit up, 1miniut sit up, sit and reach, Illinois and 30mater dash run tests as pre and post-test. These test items used to determine muscular strength, muscular endurance, flexibility, agility and speed of the respondents. The data collected were analysed using statistical package for social sciences (SPSS) version 20 to evaluate the significance difference ($P<0.05$) of pre and post-test results of each variable. After analysis the pre-post mean difference of each variable the experimental group muscular strength, muscular endurance, flexibility, agility and speed improved significantly. This was due to the effects of circuit training on selected physical fitness component.

Key words: *circuit training, muscular endurance, muscular strength, flexibility, agility and speed.*

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Training is a key part of preparing to play soccer at any level, but organizing a genuinely effective training program requires both an understanding of the physiological principles involved and a practical knowledge of the demands of the game. Bridging theory and practice, this book explains the design of scientifically sound fitness programs (Thomas, 1978).

Football is the world's leading team sport at the professional level of play which is performed by men and women, children and adults with different level of proficiency in every nation (Shephard, 1999). Football is one of the team games which required the entire developments of physical fitness functions. As the players have to cover a big area in the ground during attack and defense therefore, the game demands for aerobic as well as anaerobic fitness (Reilly, 1996). Designing essential and specific programs plays undeniable role for production of athletes with enough physical, mental and skill developments to achieve peak performance required for games and competitions (Bell & Rhodes, 1975). Football training is a terrifically physical sport that requires advanced methods of training in order for the players to compete even at the school level. These modern football-training methods have designed to increase the strength of the players, the agility of the players, and their knowledge of the game. The methods are also of course, designed to increase their skill as it specifically relates to football ball skills, passing, and the like.

Circuit training is simply defined as a series of physical, resistance-based on aerobic activities, separated by short defined time period to complete each station. Circuit training is a method of fitness training that is designed to develop general, all-round physical and cardiovascular fitness. It is based on sound anatomical, kinesiological and physiological principles designed to increase strength, power, flexibility, quickness and cardiovascular endurance. Circuit training provides a strenuous workout entirely suited to

an individual's specific needs, existing capacity and rate of adjustment to progressive vigorous exercises. They also stressed the principles of overload and progression. It consists of a series of exercises arranged in order and designed to develop general fitness, physical fitness and/or skill-related fitness specific to a particular sport, depending on the exercises chosen. The great advantage of circuit training is that depending on the exercises chosen, it can be used to develop strength, power, muscular endurance, agility, aerobic endurance and anaerobic endurance (the ability to work without burning oxygen for an extended period of time; top class 800m runners can work an-aerobically for approximately 90 seconds) in a limited time and limited space. It can also involve large numbers of Participants in a relatively small space and participants of different fitness levels can train to get her. The basic assumption underlying circuit training is that improvement takes place either by doing the same amount of work in a shorter period of time or by doing more work in a given time. It utilizes three variables of load, repetition and time and this places it on an advantage over other training methods. The circuit training program is given in the form of number of exercises for different body parts in single circuit training. Single circuit training may involve the exercise for various fitness components (Scholich, 1990; Howell & Morford, 1998; Hockey, 1981).

Circuit training is a program in an athlete moves from one exercise station to another planned sequence and in the shortest possible form. In planning a circuit training programme exercise are chosen to fit the needs of the individuals each of these exercise them numbered and assigned to a certain area called station (Neal, 1969).

The term circuit training describes the way a workout is structured rather than the type of exercise performed. It typically consists of a series of exercises or stations completed in succession with minimal rest in between. Circuit routines allow the athlete or coach to create an endless number of workouts and add variety to routine training programs. Through circuit training the athletes may increasing their strength and endurance by in area sing the repetitions of exercise at each station or by doing the required frequencies of exercise in a shorter length of form. If the work load is kept constant, the athletes can develop strength and endurance by gradually decreasing the time taken to go through the circuit (Morgan, 1957).

Circuit training is formal type of training in which an athlete goes through a series of selected exercises or activities that are performed in sequences or in a circuit. Circuits can be setup inside gymnasiums, exercise rooms, or outside on courts and fields. There are usually six to ten stations in a circuit (Robert Kulu, 1963).

Speed is the ability to move from one pace to another in the shortest possible time. It is primarily innate yet it can be improved through practice for technique and movement efficiently, (Gabbard, 1987). Agility is the ability to change the direction of the body in an efficient and effective manner, (Prenticce, 1994)

1.2 Statements of the Problem

To become successful football player physical fitness requires many attributes like, muscular endurance, muscular strength, flexibility, speed, agility, skills and tactical knowledge. Unless problems are not carefully identified and possible solutions formulated in school football game, the performance of player are not executing efficiently throughout the game and may continue without improvement and also becoming the problem of successful and efficient performance implementation by male student football players. So, one of the great means to achieve student's performance is through giving a great attention of fitness of trainees with incorporating in a training program properly. In Alember preparatory school male football player students usually three days of training per week is being delivered, however this training has basic problems; from the researcher's observation point of view, the training which was given to the trainees was insufficient to develop endurance, agility, strength ,flexibility and speed. As a result in Ethiopia today; it is become difficult to get youth players who are physically fit to permanently replace players to woreda, zonal, national clubs and national football teams. In the researcher's point of view; lack of physical fitness is one of the commonly mentioned reason for losing once achievement in many games in Ethiopia and the same that of in our Woreda. Due to these reasons in case of Alember an attempt was made to evaluate the effects of circuit training on football skill performance and related physical fitness component of male student football players on Alember preparatory school.

The researcher has carried out this research in South Gondar zone Fogera Woreda specifically in Alembor preparatory school and got a chance to observe the level of male football player students' performance in this area. Even though there are school teams, and when the researcher observed the team training situation trainers have given less attention for trainee's fitness and trainees yet not enough to fit to implement football efficiently. Due to these reason players show limitations on their performance when the researcher observes for more than three years in inter school competition. This really shows there were physical fitness problem of football player of male students. So, the researcher thinks that if the coach gives great attention to physical fitness on their training session it would have influence on player's selected physical fitness performance otherwise the situation made male student's football players continue to have poor performance.

1.3 Objectives of the Study

This study was conducted to attain the following general and specific objectives

1.3.1 General Objective

The general objective of this study was to evaluate the effects of circuit training on selected physical fitness components of male students' football player on Alembor preparatory school.

1.3.2 Specific Objective

The study mainly focuses on the following objectives

1. To find out the effect of circuit training program on muscular endurance.
2. To find out the effect of circuit training program on muscular strength.
3. To investigation the effect of circuit training program on speed.
4. To find out the effect of circuit training program on agility.
5. To examine the effect of circuit training program on flexibility.

1.4 Hypothesis

Null Hypothesis (Ho)

1. Circuit training has no significant effect on student's muscular endurance.
2. Circuit training has no significant effect on student's muscular strength.
3. Circuit training has no significant effect on student's flexibility.
4. Circuit training has no significant effect on student's agility.
5. Circuit training has no significant effect on student's speed.

1.5 Delimitation

This research was delimited to:-

- Amhara region South Gondar Zone, Fogera district Alember Preparatory Schools only.
- Football players, age between 15 to 18 years.
- 12 weeks of training time.
- The physical fitness component's: muscular endurance, muscular strength, flexibility, speed, agility.

1.6 Limitation

The researcher believed that the following conditions might be limiting factors that influence the process of the investigation and the findings of the study

- All the students attended this study from their respective homes, therefore diet, food habit and rest is beyond the control of researcher.
- Atmosphere, climatic conditions and percentage of humidity could not be controlled.
- Regular activities pertaining to their day-to-day affairs, which might affect the results, were one of the limitations of this study.

1.7 Definition of basic Terms

Agility: - is the ability to rapidly change the position of the entire body in time and space with speed and accuracy (Verschuren,et al 2009)

Circuit training: - is scientific arrangement of proven exercise, in which athletes perform the activities systematically moving from one station to another as circuit and repeat them many times as a circuit. (Novice & Taylor, 1970)

Flexibility: - is the ability of a joint to move through its full range of motion (ROM), from a flexed to an extended position (Fitness, 2005)

Muscular endurance (ME): - is the ability of a muscle or muscle group to resist fatigue and to make repeated contraction against a defined sub maximal resistance. (David K. Miller 1998)

Muscular strength (MS) is the amount of force that can be exerted by a muscle, or a group of muscles, in one single, maximal effort (Exercise Science & Wellness Department, 2012).

Physical fitness: - is the development and maintenance of a strong physique and soundly functioning organ, to the end that the individual realize his capacity for physical activity, unhampered by physical drain or by a body lacking in strength and vitality (clarike&clarike, 1963)

Speed: - is the ability to perform a movement within a short period of time.

1.8 Significance of the Study

The significances of the study was designing suitable training program and procedure are needed in recurring and producing potential students. Such type of training program was use full for the physical development of physical fitness and tactical performance. The studies were various significance to design such type of suitable training program.

In general the finding of this research helps to:

- Circuit training programme to improve selected physical fitness variables of preparatory school football players.
- As a guideline for those who were participants in this study which are involve in regular physical activities program.

- The study was given an opportunity and encouragement to the interested researcher to conduct further studies on efficacy of circuit training in relation to other variables in school students.
- Provide the benefits of circuit training effects for trainers to apply in their coaching process.

CHAPTER TWO

REVIEW OF LITERATURE

2.1 The Concept of Physical fitness

According to Ahpert (1980), Physical fitness is a component that constitutes total fitness that is constantly being used in acting or in any order form of action. In addition, a person who is fit enough able to face challenges of emergencies that may arise in the future . Physical exercise is one of the main determinants of fitness (Andersen, 2003). Physical educators also classify physical fitness as skill related (related to sport performance) which are speed, power, balance, agility, coordination and reaction time. And health related fitness (associated with disease prevention and health promotion) which includes components such as cardio-respiratory endurance, muscular strength and endurance, body composition and flexibility (Hawley, 2001).

Some people think that being physically fit means being in good general health. Other people think it means being able to lift a certain amount of weight or being able to run a particular distance in a certain time. There is no single measure of physical fitness and no single way of achieving it. However, these are three major qualities which contribute to overall fitness; they are strength, stamina and flexibility. Jackson (1985) has pointed out that “the achievement of total fitness depends upon combining these three main strands, strength, stamina and flexibility”.

According to Mathews (1967) “Total fitness refers to individual capacity to measure and live effectively in the environment. Most authors define ‘physical fitness’s the capacity to carry out every day activities without excessive fatigue and with enough energy in reserve for emergencies. Emphatically this definition is inadequate for a modern way of life. By such a definition almost anyone can classify himself as physically fit Gatchell (1977). According to Clarke (1971), Physical fitness is the ability to carry out daily task with vigor and alertness without undue fatigue and ample energy to enjoy leisure time pursuits and to meet unforeseen emergencies.

According to Wuest & Lombardo (1994), Physical fitness is most easily understood by examining its components, or parts. There are two major components of physical fitness. These are health related fitness components such as cardiovascular endurance, muscular strength, muscular endurance, flexibility, and body composition and skill related fitness components such as agility, power, coordination, balance, reaction time, and speed, each of which contributes to total quality of life.

2.2 Benefits of physical fitness

According to Gordon Jackson (1985), the benefits of are numerous; the person who is physically fit has greater amount of strength, energy and stamina an improved sense of wellbeing better protection from injury because strong well developed muscles safeguard bones, internal organs and joints and keep moving parts limbers and improved cardio respiratory function. Physical fitness contributes a lot to maintain an optimal state of health. Among the many benefits, it prevents the occurrence of a variety of diseases, develops a capacity to fight infections and certain other diseases, and helps to prevent many of the major cardio vascular disease. Moreover, physical fitness is responsible for the postponement of the process of aging. A healthy body contributes a lot for a healthy mind. Physical fitness prevents mental disease by facilitating a sound psychological state (Corbin, 1997).

Bucher & Prentice (1985) have pointed out that it is necessary for every individual to be physically fit to perform their daily work with ease and to take part in various activities effectively. Everyone should be fit enough through participation in physical activities to develop the different physical fitness components.

2.3 Components of physical fitness

According to National Association for sport and physical education (NASPE, 2009), Physical fitness is divided into health and skill related physical fitness. Skill - related physical fitness are fitness types which enhance one's performance in sport settings. Health - related physical fitness is the ability to become and stay physically healthy. It also focuses on factors that promote optimum health and prevent the onset of disease and problems associated with in activity. Agility and power are skill-related physical fitness

components which are basic skills in performing different sport activities in speed, acceleration, changing direction, jumping and weight lifting. Cardio respiratory endurance, muscular strength and muscular endurance are health- related physical fitness components. The level of Cardio respiratory endurance, muscular strength and muscular endurance affects an individual's ability to perform daily functions and various physical activities throughout the entire life of an individual. They also assist in preventing chronic diseases, injuries and osteoporosis.

Players need to maintain their Cardio respiratory endurance, muscular strength and muscular endurance to be elite sport women and preventing themselves from chronic diseases as well as to maintain their health. They also need to be agile, speedy and power full to apply their skill in a proper way (American College of sport medicine, 2003 (ACSM, 2003)

2.3.1 Health related physical fitness components

According to Bucher & Prentice (1985), health-related physical fitness consists of those components of physical fitness that have a relationship with good health. The components of health related fitness are a basis from which to measure our general wellbeing. It is the aim of exercise to improve our capabilities in each of these areas. Different sports will be more demanding in some, and less demanding in others, but athletes usually strive to achieve a reasonable level of health fitness in each area. Unless you are focusing on perfecting your body performance for a particularly demanding sport, a balanced level of achievement in each of these fitness components should be your goal. Your fitness program should include activities and exercises that promote each of these health related fitness components. The components are body composition, cardiovascular fitness, flexibility, muscular endurance and muscular strength.

According to Wuest (1987) “Health related physical fitness is concerned with the development of those qualities that often protect against disease and frequently are associated with physical activity. Then health related physical fitness is important to everyone and should be stressed by physical educators”.

Flexibility

Flexibility is a health-related component of physical fitness that relates to the range of motion available at a joint. According to Franks (1997) & Intel (2001) specify that flexibility requires range of motion without discomfort or pain. Flexibility as the ability to move the joints through their full range of motion. Another form of flexibility training is known as Self-Myofascial Release, which involves putting pressure on tight muscles in order to work out knots. Yoga and Pilate's classes' also great ways to gain flexibility (Tyler Read 2017). Explosive strength, dance, gymnastics improve flexibility (viski, et al 2007)

Muscular endurance

Muscular endurance is a health-related component of physical fitness that relates to the muscle's ability to continue to perform without fatigue. According to Corbin (2003), muscular endurance as the maximum number of repetitions or muscle contractions one can perform against a given resistance. Muscular endurance is specific in nature. For true assessment of muscular endurance it would be necessary to test each major muscle group of the body. Lab and field tests of muscular endurance are similar and are based on the number of repetitions that can be performed by the specific muscle group being tested (example: repetitions of push-ups or abdominal curls). Muscular endurance can be measured isometric ally (static contractions) or isotonic ally (dynamic contractions). (Lee et al., 1997) also defined Muscular endurance can be developed through push-up, sit-up, rope skipping, jogging, and others. As the ability to sustain a given level of muscle tension i.e., to hold a muscle contraction for a long period of time, or to contact a muscle over and over again.

Muscular Strength

According to Insel & Roth (2002), muscular strength is health-related component of physical fitness that relates to the ability of the muscle to exert force and it is the amount of force a muscle can produce with a single maximum effort. Strong, powerful muscles are important for the smooth and easy performance of everyday activities, such as carrying groceries, lifting boxes, and climbing stairs, as well as for emergency situations. They help keep the skeleton in proper alignment, preventing back and leg pain and

providing the support necessary for good posture and it can be developed by training with weights or by using the weight of the body for resistance during callisthenic exercises such as push-ups and sit-ups.

Strength and performance have direct relationship; according to the research result conducted on skeletal muscle mass and muscle strength in relation to extremity performance of older men and women suggest that low muscle mass, low muscle strength is associated with poor physical function (Pual, 2000).

According to Stephens (1988) & Stone (1990), muscular strength exercises helps to reduce the occurrence of joint and muscle injuries that may occur during physical activity. Muscular strength is improved by performing strength training. Associated with increased muscular tone and strength, it improves personal appearance and self-esteem. This type of exercise is developed by performing different activity like push-up, sit-up, to lift heavy weight, and others.

According to Battinelli (2007), the generality and specificity of muscle force production is influenced by the relationship of muscle groups and muscle function relative to strength training, fiber type used, the speed of muscular contraction, the amount of force produced, and the designated pattern of movement utilized. Strength is exhibited during tackling, heading, and in shooting for power. McEachen (2004) has point out that strength is specific in nature and for true assessment it would be necessary to test each major muscle group of the body. Lab and field tests are similar and involve the assessment of one repetition maximum (the maximum amount of resistance you can overcome one time). 1RM tests are typically conducted on resistance machines. Strength can also be assessed using dynamometers. In the absence of the above measurement we can also use field tests such as wall-sit test. In this case we simply hold in the correct position as much as possible, and record the time (in seconds). Muscular strength is improved by performing strength training (olesen, 1988). Associated with increased muscular tone and strength, it improves personal appearance and self-esteem. This type of exercise is developed by performing different activity like push-up, sit-up, to lift heavy weight, and others (Stephens, 1988).

2.3.2 Skill-related physical fitness

KoKo (1985) has pointed out that skill-related physical fitness is components of fitness that have a relationship with enhanced performance in athletic activities. Skill-related fitness abilities increases one's ability to perform in various activities and only has an indirect connection with health. The skill-related components of physical fitness are considered to be agility, balance, coordination, power, speed, and reaction time.

Agility

Barrow (1979) stated that agility is one components of skill related physical fitness. It refers to a person's ability to move their body quickly and easily. This also includes their ability to quickly change their direction while maintaining their balance or the ability to quickly change body position and make directional changes in body movement. Agility is the ability to rapidly change the position of the entire body in time and space with speed and accuracy (Verschuren,et al 2009). Agility as the ability of the body or parts of the body to change directions rapidly and accurately. This is the combination of speed and coordination. It allows you to efficiently change direction and body position at speed.

Speed

According to Cronin & Hansen (2005) Speed refers to a person's ability to move fast or to cover a distance in a short period of time. When speed combined with strength it provides power. Running a fast break basketball, moving a racquet fast through hitting zone to hit the ball harder in racquet game, sprinting in short sprint running and fast reaction in soccer needs speed. Speed can be improved by increasing a play's power by using training like counter movement jumps, and squat jumps are effective for improving speed. Mackenzie (2001) pointed out speed enables a player to move from one point to another with faster response time. It has been shown that to improve speed each athlete needs to work on acceleration, starting ability, stride rate, speed endurance, and stride length.

Most sports require acceleration from a static state or when transitioning between movements, straight-line speed is still a valuable asset that athletes should focus on when testing and training for sports (Jay, Mark & Editors, 1961).

It makes more sense for these athletes to focus their attention on training to accelerate. Acceleration is the rate of change in velocity, so this phase of sprinting is critical for changing directions as rapidly and efficiently as possible (Jay et al, 1961). Among athletes a 30 meter dash is often used to measure speed. There are a wide variety of tests of speed that are specific to different movements and activities. Some examples of speed are: running a fast-break in basketball, moving a racquet fast through the 'hitting zone' to hit a ball harder, running fast to catch a Frisbee during an ultimate Frisbee game (Jay et al, 1961). Arun kumar (2016) Selected motor abilities among male football players improve speed.

2.4 Fitness Training for Football

Regular training has needed for all areas of fitness. Here are some important factors to remember for an effective training program. Have a good plan. The training had directed to achieve specific goals and individualized to maximize the physical capabilities of particular players. In order to improve, the physical load needs has increased over time, as the players get fitter. By using cross training and by incorporating fitness into the training drills it will keep it interesting and maintain the motivation of the players. There is more information about training for sports, and an article about training for speed in football (Robert, 2008).

Physical fitness is one of the most important aspects of soccer performance. A skillful player will go a long way in the sport, but without the fitness part of their game, they will not be the complete player. Aerobic endurance fitness is one of the most important physical fitness attributes for soccer players. Players need to be able to maintain a high level of intensity throughout the 90-minute game. Another very important fitness component is anaerobic fitness, which means running speed and particularly repeat sprint ability. Players also need good endurance, strength, speed, agility, power and flexibility. See more discussion on the fitness components for soccer (Robert, 2008).

2.5 Basic Concepts of Football

Football is presently the most popular sport throughout the world in terms of spectators and participants because of this large number of people use their leisure time, and participate in football activity. It is one of those rare games which demands not only speed but agility, strength, power, and endurance along with skill (Reilly, 1996). Soccer is a game that requires combined fitness qualities of strength, speed, agility, and endurance. The objective of playing the game is to score more goals than the opposing team. Goals are scored by getting a ball across the goal line under the crossbar and between the goal posts. The game consists of two halves with a brief intermission (Chrisman, 2009). A soccer team consists of 11 individuals all of which must undertake specific roles and associated functions in each specific position in order to make a successful team (Hughes, 2012).

2.6 Circuit Training

Circuit training is a number of routine with specified objectives which takes into consideration its design, rationing, and resistance difference in principle of individual difference among the clients. This can be succeed either by time-specific exercises with continuous rest periods, or by time routines involved during the shortest possible time within the whole circuit of routines (cycle), where the first goal of the performance is succeeding it within the shortest possible period (Reddy & Jyoti, 2012). When planning the circuit training units, converting the resistance through the stations should be taken into consideration in a manner well-matched to the basic muscle groups.

Circuit training is the best ground for the enhancement of the educational aspects. In this concern, self-dependence, work, and self-assessment are broadly available in the circuit training. Circuit training has various educational benefits such as availing mutual respect opportunity among the individuals and respecting those with lower abilities and capabilities equally at the same level of respect to those of higher abilities (Reddy& Jyoti, 2012).

The circuit training mode is one of the ways that take into account the individual differences, the trainees' levels and capabilities, and the possibility of gradually progressing the load grade. Additionally, it offers a chance to focus on a specific physical

fitness component which needs to be endorsed; there by it gain chances for self-assessment. In addition, it is a system that helps in saving time and effort. Various individuals can be trained at the same time, because achieving the performance in the shortest time possible is the initial objective of the performance (Oudat & Ghassab, 2007).

The literature review Hamoudat, (2008), Oudat & Ghassab (2007), Al-Rashidi (2006) reveals that there is a decline of the physical fitness components among the college students. The researcher, through his work within the education and training domains, finds a decline in the components of the physical fitness among students who are enrolled in the Faculty of Physical Fitness and Sports Science. The current study fills the gap in the professional literature. Therefore, the researcher applied a training program using the circuit training method to identify the improvement degree in the components of the physical fitness of the students. This was achieved by taking pre/post measurements of the tests that measured the physical fitness components.

According to Taskin H, (2009) conduct a study to determine the effect of circuit training directed toward motion and action velocity over the sprint-agility and anaerobic endurance. A total of 32 healthy male physical education students with a mean age of 23.92 (plus or minus) 1.51 years were randomly allocated into a circuit training group (CTG; n = 16) and control group (CG; n = 16). A circuit training consisting of 8 stations was applied to the subjects 3 days a week for 10 weeks. Circuit training program was executed with 75% of maximal motion numbers in each station.

The FIFA Medical Assessment and Research Centre (F-MARC) test battery, which was designed by FIFA, was used for measuring sprint-agility and anaerobic endurance. Pre- and post-training testing of participants included assessments of sprint-agility and anaerobic endurance. Following training, there was a significant ($p < 0.05$) difference in sprint-agility between pre and post testing for the CTG (pre-test = 14.76 (plus or minus) 0.48 seconds, post-test = 14.47 (plus or minus) 0.43 seconds). Also, there was a significant ($p < 0.05$) difference in anaerobic endurance between pre and post testing for the CG (pretest = 31.53 (plus or minus) 0.48 seconds, post-test = 30.73 (plus or minus) 0.50 seconds). In conclusion, circuit training, which is designed to be performed 3 days a week during 10 weeks of training, improves sprint-agility and anaerobic endurance.

2.7 Benefit of circuit training on physical fitness variable

Circuit training helps women to achieve to their goals and maintain them longer than other forms of exercise of diet. Morgan and Anderson (1953) claim from a health perspective is that this investigation clearly shows that performance of this circuit of exercise. this level of intensity elicited oxygen consumption value (39% to 51.5% of Vo_{2max}) that meet establish guidelines of America collage of sport medicine (ACSM) for the recommended intensity (40% to 85% of Vo_{2max}) of exercise for developing and maintaining cardio respiratory fitness (klika 2013). Thus this circuit not only provides a suitable muscular fitness stimulus but also helps to meet ACSM cardio vascular guidelines and the newly published dietary guidelines for America 2005 to physical activity (kraviz, 1996). One disadvantage is that reduced station time will encourage the participant to lift heavier weight, which means they can achieve overload with smaller number of repetition, typically in the range of 25 to 50 depending on their training goals (Robert 2005).

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 Study Area

Geographically Alember town is located at 11° 18' - 12° 30' latitudes north and 37° 35' - 37° 58' longitudes east. And 646 km far from Addis Ababa to the North- East direction with average Temperature 19°C and 2700m height above sea level. Specifically, it is found in South Gondar Zone in the Amhara Regional State. The location of Alember district is bordered by Farta woreda in the East, Woreta in the West, Lebo Kemkem in the South and Dera in the North. This school is found in Alember Kebele, which is located 78 km far away from Bahirdar to the East, the capital city of Amhara Region and 20 km far away from Debretabor to the West and the school almost 8km far away from especial community (Awuraba) in east direction and the school located in front of Alember Health Center.

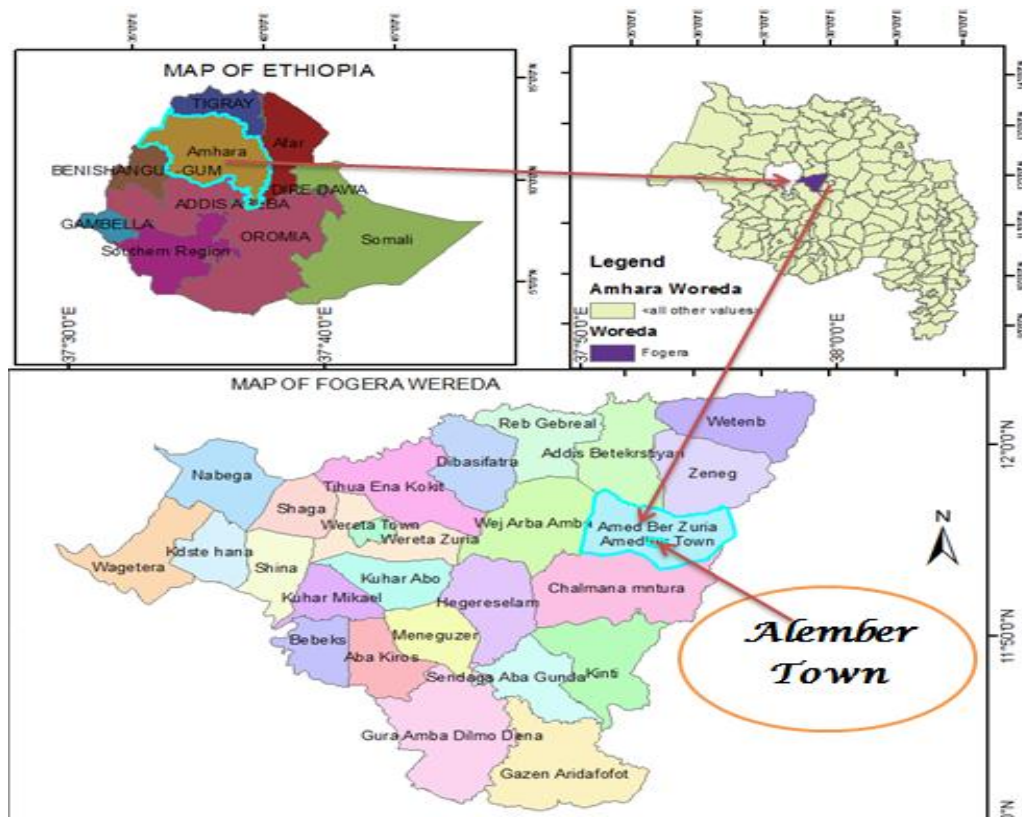


FIGURE 3.1 MAP OF ALEMBER TOWN

3.2. Design of the Study

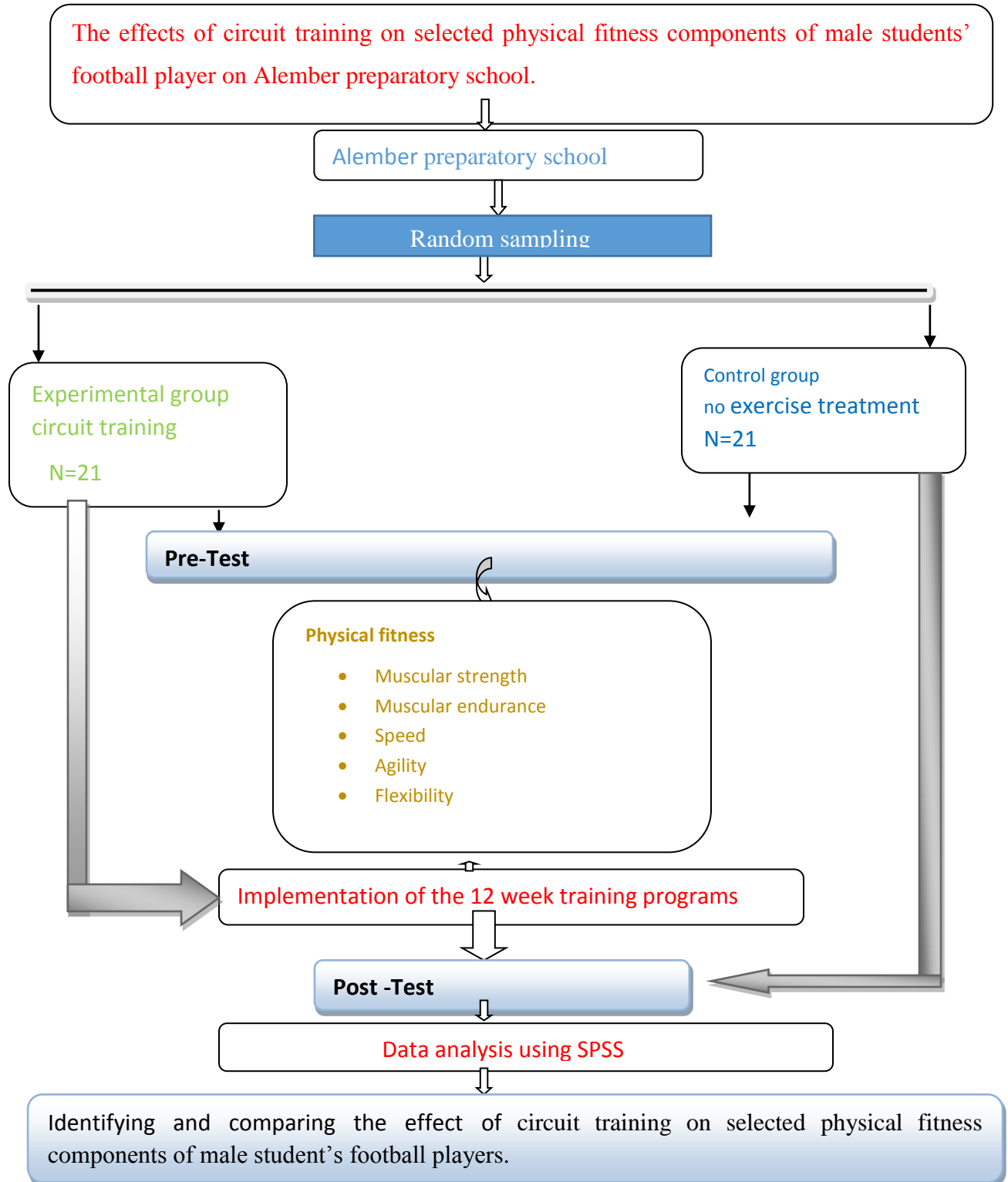
To conduct this study quasi experimental research design was used. This method had selected because it is helpful to identify the student health related physical fitness variables level with pre-test and post- test of muscular endurance, muscular strength, flexibility, agility and speed with their average score result. The physical fitness exercise training was scheduled for twelve weeks. The intensity for exercises are moderate to high, for three days per week (Monday, Wednesday and Friday) before their regular classes for experimental group. There were no exercise treatment for control group but both the pre and post tests were taken from them. The research was employed quasi-experimental study through practically testing the selected population with field test.

TABLE 3.1: THE STUDY DESIGN LAY OUT

| | |
|------------------|---------------------------|
| Treatment | Circuit training |
| Frequency | 3 days/week |
| Total duration | 12 weeks |
| Duration/Session | 40-60 minutes |
| Intensity | Low -high |
| Exercise days | Monday, Wednesday, Friday |
| Time of training | Morning |

3.3 Follow Chart

The researchers was design as follow



3.4 Population, Samples and Sampling Techniques

From the total population of 72 male students in Alembor preparatory school the researcher was select 42 students from the total population randomly. Random sampling technique was also used again to assign experimental and control group. From the total 42 players 21 players grouped under EXG and 21players grouped as COG of the study.

3.5 Inclusion and Exclusion Criteria

The Subjects who fulfill the health history questionnaires were included in this study. Individuals with cardiac conditions such as hypertension or uncontrolled diabetes or other conditions that would be contraindicated for exercise testing and training were not admitted to the study. Individuals having bone and joint problem, diabetes mellitus, bad habits and those taking medications were not included into the study.

3.6 Sources of data

To do this study the researcher used primary data sources to get adequate amount of information regarding the effect of circuit training on players' football skill performance. So the primary data were taken from football player students pre-test and post-test measurements throughout the training program (three months).

3.7 Data collection instruments

To achieve the objectives of the study, the researcher has collected valuable and reliable information from the target group of the study by using selected fitness tests and skill tests as data collecting tool. Predominantly pre and post selected physical fitness tests were sit up test(endurance), sit and reach test(flexibility) , 8 level sit up test(strength), 30m dash(speed) and Illinois(agility) test have used as the major data collection instruments.

3.8 Data Collection procedure

Pre-test and post-test on the selected physical fitness variable measuring tests was chosen as data collection instrument. These selected physical fitness tests were had five test batteries (8 level sit up, sit up, 30m dash run, Illinois and sit and reach test). The

researcher were collected all the information from the male student football players through test batteries and the information obtained through selected physical fitness was analyzed. For data collection first permission was take from respective sources. All the necessary information about the study (purpose, procedures etc.) were explain for the participants primarily. Having experts, instruments for measuring purposes, facilities, and sufficient warming up exercises, necessary data was collect with standardized procedure by administering physical fitness tests; and physical education department teacher was direct participant during practical test to help the researcher. Tests were administrate in proper sequence on the same time of each day in a way that they can accomplish comfortably. Standardized equipment's was used for the tests.

TABLE 3.2: DEPENDENT AND INDEPENDENT VARIABLES

| Physical fitness variables | | |
|----------------------------|---------------------|-----------------------|
| No | Dependent variables | Independent variables |
| 1 | Muscular endurance | Circuit training |
| 2 | Muscular strength | |
| 3 | Flexibility | |
| 4 | Speed | |
| 5 | Agility | |

3.9 Test Administration

3.9.1. Evaluating muscular strength (8-level sit-up test)

Purpose:-The 8-levelsitup test measure abdominal strength, which is important in back support and core stability.

Equipment:- flat surface, 2.5kg and 5kg weight, record sheet and pen.

Procedure:-The trainee's warms up for 10 minutes and the subject lay son their back, with their knees at right angles and feet flat on the floor. The subject then attempts to

perform one complete sit-up for each level in the prescribed manner, starting level 1. Each level is achieved if a single sit-up is performed in the prescribed manner, without the feet coming off the floor. As many attempts as necessary can be made.

Scoring: - there are 8 levels of ranging in difficulty from very poor to elite. The highest level sit-up correctly completed is recorded.



FIGURE 3.2 8 LEVEL SIT UP TEST

Source: // www.google.com.search

3.9.2 Evaluating Flexibility (*Sit and Reach Test*)

Purpose: -To measure the development of the trainees lower back and hamstring flexibility.

Equipment: -Meter Ruler, tape, box or bench about 30-40cm high and assistant.

Procedure:-The trainees warm up for 10 minutes and then remove their shoes, the assistant secures the ruler to the box top with the tape so that the front edge of the box lines up with the 15cm mark on the ruler and the zero end of the ruler points towards the athlete, the athlete sits on the floor with their legs fully extended with the bottom of their bare feet against the box, the athlete places one hand on top of the other, slowly bends forward and reaches along the top of the ruler as far as possible holding the stretch for two seconds, the assistant records the distance reached by the athlete's finger tips(cm), the athlete performs the test three times.

Scoring:-The assistant, add the three distances and uses the best for this value to assess the athlete.



FIGURE 3.3 SIT AND REACH TEST

Source: // www.google.com.search

3.9.3 Evaluating muscular endurance (*1minute Sit ups*)

Purpose:-To measure muscular endurance of players.

Equipment: - a stop watch and assistant.

Procedure:-The trainees warm up for 10 minutes and the student lies flat on the back with knees bent and a foot on the floor with heels no more than foot from the buttocks. The knee angle should be not less than 90 degrees. The fingers are interlocked and placed behind the neck with elbows touching the ground. The feet are held securely by partner. The students then curl up to a sitting position and touch the elbow to knees. This exercise was repeated as much time possible in the time of requirement.

Instruction: - your finger must remain interlocked and in contact with the back of your neck at a time. You curl up from the starting position but you may not push off the floor with an elbow when you return your elbow should be flat on the ground.

Scoring: - one point were scored for each correct sit up. The score were the maximum number of the sit ups completed within 60 seconds.



FIGURE 3.4 1MINUTE SIT UP TEST

Source: // www.google.com.search

3.9.4 Evaluating Speed (30meter dash/maximum)

Purpose: - to measure speed of the players.

Equipment: - stop watch, cone markers, flat and clear surface of at least 50 meters.

Procedures:-after warming up the subject starts from a stationary position, with one foot in front of the other. The front foot must be on or behind the starting line. This starting position held for 2 seconds prior to starting and run as much as possible with speed sprint until the finished line.

Instruction: - subject must run with maximizing speed (such as keeping low, driving hard with the arms and legs) and encouraged to continue running hard through the finish line. No rocking movement allowed.

Scoring: - three trials are allow, and the best time is record. The timing were start from the first movement and was finish when the chest crosses the finishing line.

3.10 Training protocol on circuit training

The training programme was lasted for 40-60 minutes for session in a day, 3 days in a week for a period of 12 weeks duration. These 40-60 minutes included 10 minutes warm up, Circuit training 20-40 minutes and 10 minutes warm down allotted for a training programme. Every three weeks of training 10% of intensity of load was increases from 60% to 75% of work load. Volume of circuit training is prescribed based on the number of sets and repetition. The equivalent in circuit training is the length of the time each action is held for and the number action in total 6 sessions per weeks at morning the exercise namely Skipping, shoulder flection, diagonal square, Squat, Push-ups, toe touch, Sit-ups, Shuttle run and wall sit.

3.11 Method of data analysis

All the quantitative data that were gathered before and after treatment through physical fitness test measures were tabulated, interpreted and analyzed. Measures of central tendency like mean and measures of dispersion like standard deviation were used to summarize and describe the findings. To determine the effect of circuit training on selected football skill performance and related physical fitness components. The researcher use t-test (paired sample) for data entry and analysis the statistical software package SPSS was used.

3.12 Ethical Consideration

This study was deal with the ethical issues related to the investigation. Making guarantees and confidentiality on the information that were be given to the study, and risk of harm due to participation. All actions based on the school rules, code of conduct and policies concerning to research ethics.

CHAPTERFOUR

RESULTS AND DISCUSSION

4.1 Overview

This chapter deals with the analysis of data collected from the group under the study. The purpose of this study was to evaluate the Effects of circuit Training on Selected physical fitness Components of Male students football players. To achieve the purpose of study the researcher was use 42 students of the school; all students were research group as control or experimental group. Random sampling was used to identify experimental and control group of the study. Their ages were 15-18 years. They were assigned into two groups, half experimental group and half control group. Experimental group was experimented with muscular endurance, muscular strength, flexibility, speed and agility. Group subject on selected physical fitness variables and score were recorded .the collected data were analyzed on SPSS version 20. The results for each variable are describe analysis below.

4.2 Analysis Interpretation and Discussion

To manner this study respected data was composed from the target groups of this study. The target groups of the study were students. In this section the data that obtained from respondents regarding their personal profile were presented in the following table.

TABLE 4.1: CHARACTERISTICS OF THE STUDY PARTICIPANTS

| Groups | N o. | Sex | Age | | Height | | Weight | |
|--------------|---------|------|-------|-------|--------|-------|--------|------|
| | | | Mean | SD | Mean | SD | Mean | SD |
| Experimental | 21 | Male | 15.57 | 0.676 | 1.651 | 0.091 | 54.99 | 3.85 |
| Control | 21 | Male | 15.29 | 0.845 | 1.61 | 0.349 | 54.30 | 3.88 |

As shown from above Table 4.1 Descriptive characteristics of 42 study participants from Alembor preparatory school Football player students mean of age (EXG=15.57,

COG=15.29), height (EXG=1.65, COG=1.61) and weight (EXG=54.99, COG= 54.30). Subjects were relatively was almost similar age, height and weight at the beginning of exercise.

4.2.1 Selected physical Fitness Test Result

TABLE 4.2: DESCRIPTIVE STATISTICS OF THE GROUPS FOR MUSCULAR ENDURANCE

Descriptive statistics

| | | Mean | N | Std. Deviation | Std. Error Mean |
|--------|---------|-------|----|-------------------|-----------------------|
| Pair 1 | Co-post | 21.29 | 21 | 3.393 | .740 |
| | Co-pre | 21.43 | 21 | 3.075 | .671 |
| Pair 2 | Ex-post | 34.62 | 21 | 3.369 | .735 |
| | Ex-pre | 21.62 | 21 | 2.837 | .619 |

Note; ME= Muscular endurance, co=control group, ex= experimental group, pre= pretest, post= post test

As can be seen in table 4.2 showed that the pre-test of experimental and control group mean value of muscular endurance was 21.62 and 21.43 which indicates the pre-test mean value was almost similar for the two groups of endurance fitness level. Before training there was no change between those groups. But the post-test mean value of experimental and control group was 34.62 and 21.29 which shows there was mean value change between the 1minute sit up endurance level of the experimental and control groups of post test results because of three months training which shows there is an improvement of endurance fitness level of the experimental group.

FIGURE 4.1 GRAPHICAL PRESENTATION OF MEAN COMPARISON BETWEEN EXPERIMENTAL AND CONTROL GROUPS PRE AND POST TEST ON MUSCULAR ENDURANCE

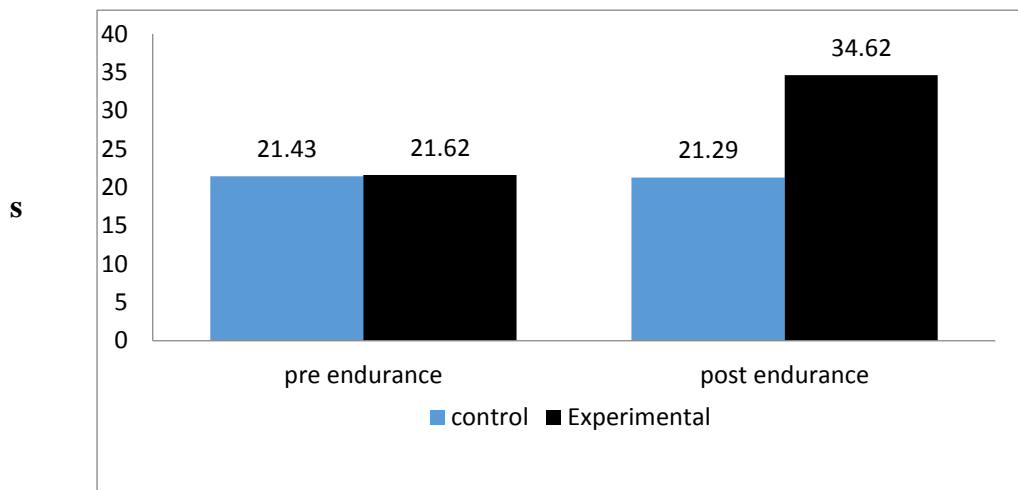


TABLE 4.3: PAIRED SAMPLE T-TEST RESULTS ON 1 MINUIT SIT UP ENDURANCE MEASURE OF GROUPS

Paired Samples Test

| | Paired Differences | | | | | T | df | Sig. (2-tailed) |
|------------------|--------------------|----------------|-----------------|---|--------|--------|----|--------------------|
| | Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference | | | | |
| | | | | Lower | Upper | | | |
| Co-post – co-pre | -.143 | 1.236 | .270 | -.706 | .420 | -.530 | 20 | .602 |
| Ex-post – ex-pre | 13.000 | 4.278 | .934 | 11.053 | 14.947 | 13.926 | 20 | .000 |

Note; co= control group, ex= experimental group, and post-pre= post- pre test

As indicate table 4.3 a paired sample t-test was conducted to compare the effect of circuit training on exercise and no exercise conditions. According to the data presented in the table above, there was no significant difference between the pre and post-tests of control group because (MD=-.143, SD=1.236, T (20) =-.530, & P=.602 so $p > 0.05$)

which indicate that pre and post-test of control group was about the same level. In the other words 1minuit sit up endurance of fitness level of the group within pre & post-test did not show any difference which indicates that comparison at the experimental groups could be possible. Thus, one can understand that endurance of student was displayed in the t-test at the same level.

Table 4.3 above displays the statistical test for the variance of the experimental group in the post- test and pre-test showed a statistically significant difference (MD =13.00, SD=4.278, T (20) =13.926 & p= .000 so $p < 0.05$) which indicates that the group members who had 12 week circuit training programmed (experimental group) were significantly outer performed better than the control group who had not participated in 12 week circuit training programmed in the former table (table 4.2) it was seen that the mean score of post-test was 34.62 and pre-test was 21.62. There is of course a gap between these two figures. The mean difference as can be seen table 4.3 above is 13.00 implying that which existed this much difference between the endurance fitness levels of the experimental group pre and post-test. So, the post-test had high mean score than the pre-test. The implication therefore was the programmed circuit training exercise the one has better physical fitness level of the endurance. The same happened in this study, students who engaged in programmed circuit training showed change significantly in endurance fitness than those students who are not engaged circuit training program.

TABLE 4.4: DESCRIPTIVE STATISTICS OF THE GROUPS FOR STRENGTH

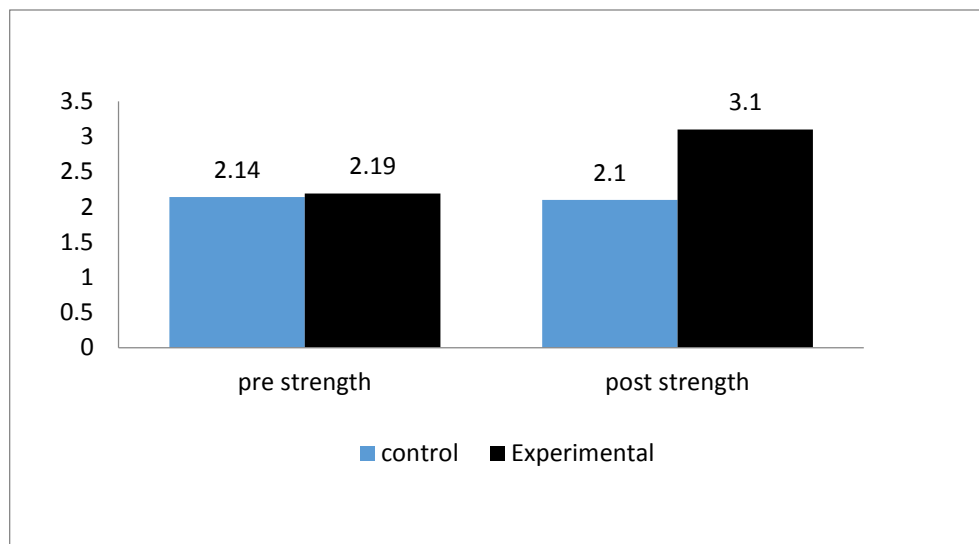
Descriptive Statistics

| | | Mean | N | Std. Deviation | Std. Error Mean |
|-----------|---------|------|----|----------------|-----------------|
| Pair 1 | Co-post | 2.10 | 21 | 1.091 | .238 |
| | Co-pre | 2.14 | 21 | 1.424 | .311 |
| Pair 2 | Ex-post | 3.10 | 21 | 1.338 | .292 |
| | Ex-pre | 2.19 | 21 | 1.601 | .349 |

Note; MS= Muscular strength, co=control group, ex= experimental group, pre= pretest, post= post test

The above table 4.4 showed that the pre-test of experimental and control group mean value of muscular strength was 2.19 and 2.14 which indicates the pre-test mean value was almost similar for the two groups of strength fitness level. Before training there was no change between those groups. But the post-test mean value of experimental and control group was 3.10 and 2.10 which shows there was mean value change between the 8-level sit up strength of the experimental and control groups of post test results because of three months training which indicates there is an improvement of strength fitness level of the experimental group.

FIGURE 4.2 GRAPHICAL PRESENTATION OF MEAN COMPARISON BETWEEN EXPERIMENTAL AND CONTROL GROUPS PRE AND POST TEST ON STRENGTH



**TABLE 4.5: PAIRED SAMPLE T-TEST RESULTS ON 8-LEVEL SIT UP STRENGTH
MEASURE OF GROUPS**

Paired Samples Test

| | | Paired Differences | | | | | t | df | Sig. (2-tailed) |
|---------|---|--------------------|-----------------------|-----------------------|--|-------|-------|----|--------------------|
| | | Mean | Std. Deviati on | Std. Error Mean | 95% Confidence Interval of the Difference | | | | |
| | | | | | Lower | Upper | | | |
| Co-post | – | -.048 | .805 | .176 | -.414 | .319 | -.271 | 20 | .789 |
| co-pre | | | | | | | | | |
| Ex-post | – | .905 | .889 | .194 | .500 | 1.309 | 4.663 | 20 | .001 |
| ex-pre | | | | | | | | | |

Note; co= control group, ex= experimental group, and post-pre= post- pre test

Table 4.5 in the above displays a paired sample t-test was conducted to compare the effect of circuit training on exercise and no exercise conditions. According to the data presented in the table above, there was no significant difference between the pre and post-tests of control group because (MD=-.048, SD= .805, T (20) = -.271, & P= 0.789 so, $P > 0.05$) this implies that pre and post-test of control group was about the same level. In the other words 8-level sit up strength of fitness level of the group within pre & post-test did not show any difference which indicates that comparison at the experimental groups could be possible. Thus, one can understand that strength of students was displayed in the t-test at the same level.

Table 4.5 above displays the statistical test for the variance of the experimental group in the post- test and pre-test showed a statistically significant difference (MD =.905, SD=.889, T (20) = 4.663 & P= .001so $P < 0.05$) which indicates that the group members who had 12 week circuit training programmed (experimental group) were significantly outer performed better than the control group who had not participated in 12 week circuit training programmed in the former table (table 4.4) it was seen that the mean

score of post-test was 3.10 and pre-test was 2.19. There is of course a huge gap between these two figures. The mean difference as can be seen table 4.5 above is .905 implying that which existed this much difference between the strength fitness levels of the experimental group pre and post-test. So, the post-test had high mean score than the pre-test.

The implication therefore was the programmed circuit training exercise the one has better physical fitness level of the strength. The same happened in this study, students who engaged in programmed circuit training showed change significantly in strength fitness than those students who are not engaged circuit training program.

TABLE 4.6: DESCRIPTIVE STATISTICS OF THE GROUPS FOR FLEXIBILITY

Descriptive Statistics

| | | Mean | N | Std. Deviation | Std. Error Mean |
|--------|---------|--------|----|----------------|-----------------|
| Pair 1 | Co-post | 10.815 | 21 | 4.4329 | .9673 |
| | Co-pre | 11.062 | 21 | 6.4068 | 1.3981 |
| Pair 2 | Ex-post | 14.307 | 21 | 5.8195 | 1.2699 |
| | Ex-pre | 10.586 | 21 | 5.4686 | 1.1933 |

Note; co=control group, ex= experimental group, pre= pretest, post= post test

The above table 4.6 showed that the pre-test of experimental and control group mean value of flexibility was 10.586 and 11.062 which indicates the pre-test mean value was almost similar for the two groups of flexibility fitness level. Before training there was no change between those groups. But the post-test mean value of experimental and control group was 14.307 and 10.815 which shows there was mean value change between the sit and reach test of the experimental and control groups of post test results because of three months training which indicates there is an improvement of flexibility fitness level of the experimental group.

FIGURE 4.3 GRAPHICAL PRESENTATION OF MEAN COMPARISON BETWEEN EXPERIMENTAL AND CONTROL GROUPS PRE AND POST TEST ON FLEXIBILITY

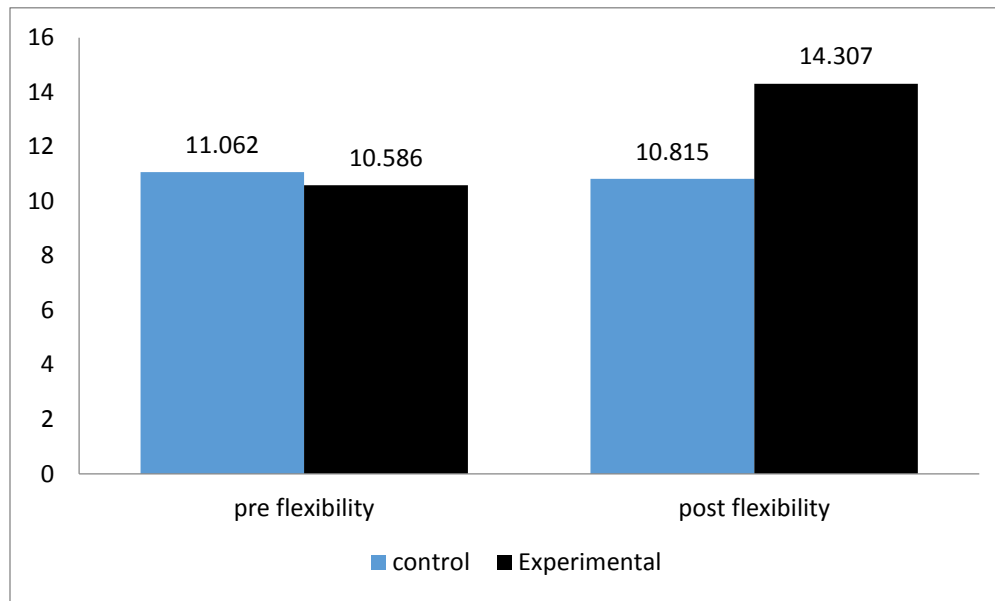


TABLE 4.7: PAIRED SAMPLE T-TEST RESULTS ON SIT AND REACH TEST MEASURE OF GROUPS

Paired Samples Test

| | Paired Differences | | | | | t | Df | Sig. (2-tailed) |
|------------------|--------------------|----------------|-----------------|---|--------|-------|----|--------------------|
| | Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference | | | | |
| | | | | Lower | Upper | | | |
| Co-post – co-pre | -.2467 | 2.9411 | .6418 | -1.5854 | 1.0921 | -.384 | 20 | .705 |
| Ex-post – ex-pre | 3.7210 | 2.6664 | .5819 | 2.5072 | 4.9347 | 6.395 | 20 | .002 |

Note; co= control group, ex= experimental group, and post-pre= post- pre test

As indicate table 4.7 a paired sample t-test was conducted to compare the effect of circuit training on exercise and no exercise conditions. According to the data presented in the table above, there was no significant difference between the pre and post-tests of control group because (MD= -.2467, SD= 2.9411, T (20) = -.384 & P= .705 so, $P > 0.05$. This implies that pre and post-test of control group was about the same level. In the other words sit and reach test flexibility of fitness level of the group within pre & post-test did not show any difference which indicates that comparison at the experimental groups could be possible. Thus, one can understand that flexibility of students was displayed in the t-test at the same level.

Table 4.7 above displays the statistical test for the variance of the experimental group in the post- test and pre-test showed a statistically significant difference (MD =3.7210, SD=2.6664, T (20) = 6.395 & P= .002 so $P < 0.05$) which indicates that the group members who had 12 week circuit training programmed (experimental group) were significantly outer performed better than the control group who had not participated in 12 week circuit training programmed in the former table (table 4.6) it was seen that the mean score of post-test was 14.307and pre-test was 10.586. There is of course a huge gap between these two figures. The mean difference as can be seen table 4.7 above is 3.7210 implying that which existed this much difference between the flexibility fitness levels of the experimental group pre and post-test. So, the post-test had high mean score than the pre-test.

The implication therefore was the programmed circuit training exercise the one has better physical fitness level of the flexibility. The same happened in this study, students who engaged in programmed circuit training showed change significantly in flexibility fitness than those students who are not engaged circuit training program.

TABLE 4.8: DESCRIPTIVE STATISTICS OF THE GROUPS FOR SPEED**Descriptive Statistics**

| | | Mean | N | Std. Deviation | Std. Error Mean |
|--------|---------|-------|----|----------------|-----------------|
| Pair 1 | Co-post | 4.648 | 21 | .1750 | .0382 |
| | Co-pre | 4.643 | 21 | .1805 | .0394 |
| Pair 2 | Ex-post | 4.186 | 21 | .1493 | .0326 |
| | Ex-pre | 4.543 | 21 | .1599 | .0349 |

Note; =speed, control group, ex= experimental group, pre= pretest, post= post test

The above table 4.8 showed that the pre-test of experimental and control group mean value of speed was 4.543 and 4.643 which indicates the pre-test mean value was almost similar for the two groups of speed fitness level. Before training there was no change between those groups. But the post-test mean value of experimental and control group was 4.186 and 4.648 which shows there was mean value change between the 30meter dash run test of the experimental and control groups of post test results because of three months training which indicates there is an improvement of speed fitness level of the experimental group.

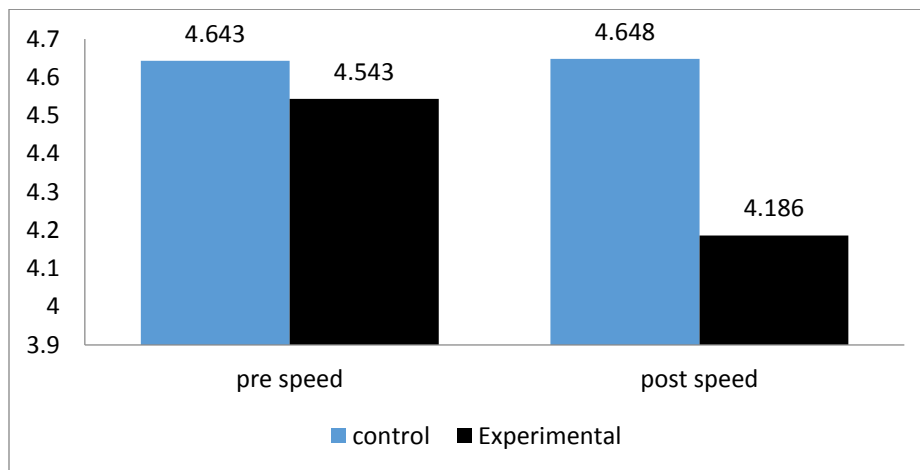
FIGURE 4.4 GRAPHICAL PRESENTATION OF MEAN COMPARISON BETWEEN EXPERIMENTAL AND CONTROL GROUPS PRE AND POST TEST ON SPEED

Table 4.9: Paired Sample T-Test Results On 30metter Dash Run Test Measure Of Groups

Paired Samples Test

| | Paired Differences | | | | | t | Df | Sig. (2-tailed) |
|---------------------|--------------------|----------------|-----------------|---|--------|--------|----|--------------------|
| | Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference | | | | |
| | | | | Lower | Upper | | | |
| Co-post – co-pre | .0048 | .1774 | .0387 | -.0760 | .0855 | .123 | 20 | .903 |
| Ex-post – ex-pre | -.3571 | .1964 | .0429 | -.4465 | -.2677 | -8.333 | 20 | .001 |

Note; co= control group, ex= experimental group, and post-pre= post- pre test

Table 4.9 in the above displays a paired sample t-test was conducted to compare the effect of circuit training on exercise and no exercise conditions. According to the data presented in the table above, there was no significant difference between the pre and post-tests of control group because (MD=.0048, SD= .1774, T (20) = .123 & P= .903 so, $P > 0.05$. This implies that pre and post-test of control group was about the same level. In the other words 35meter dash run test speed fitness level of the group within pre & post-test did not show any difference which indicates that comparison at the experimental groups could be possible. Thus, one can understand that speed of students was displayed in the t-test at the same level.

The table displays the statistical test for the experimental group in the post- test and pre-test displayed a statistically significant difference (MD =-.3571, SD, .1964, T (20) = -8.333 & P= .001 so $P < 0.05$) which indicates that the group members who had 12 week circuit training programmed (experimental group) were significantly outperformed better than the control group who had not participated in 12 week circuit training programmed in the former table (table 4.8) it was seen that the mean score of post-test was 4.186 and pre-test was 4.543. There is of course a huge gap between these two

figures. The mean difference as can be seen table 4.9 above is -.3571 implying that which existed this much difference between the speed fitness levels of the experimental group pre and post-test. So, the post-test had high mean score than the pre-test.

The implication therefore was the programmed circuit training exercise the one has better physical fitness level of the speed. The same happened in this study, students who engaged in programmed circuit training showed change significantly in speed fitness than those students who are not engaged circuit training program.

TABLE 4.10: DESCRIPTIVE STATISTICS OF THE GROUPS FOR AGILITY

Descriptive Statistics

| | | Mean | N | Std. Deviation | Std. Error Mean |
|--------|---------|--------|----|-------------------|--------------------|
| Pair 1 | Co-post | 12.490 | 21 | .2682 | .0585 |
| | Co-pre | 12.438 | 21 | .3413 | .0745 |
| Pair 2 | Ex-post | 12.010 | 21 | .2488 | .0543 |
| | Ex-pre | 12.438 | 21 | .3442 | .0751 |

Note; =agility, co=control group, ex= experimental group, pre= pretest, post= post test

The above table 4.10 showed that the pre-test of experimental and control group mean value of agility was 12.438 and 12.438 respectively which indicates the pre-test mean value was similar for the two groups of agility fitness level. Before training there was no change between those groups. But the post-test mean value of experimental and control group was 12.010 and 12.490 respectively which shows there was mean value change between the Illinois test of the experimental and control groups of post test results because of three months training which indicates there is an improvement of agility fitness level of the experimental group.

FIGURE 4.5 GRAPHICAL PRESENTATION OF MEAN COMPARISON BETWEEN EXPERIMENTAL AND CONTROL GROUPS PRE AND POST TEST ON AGILITY

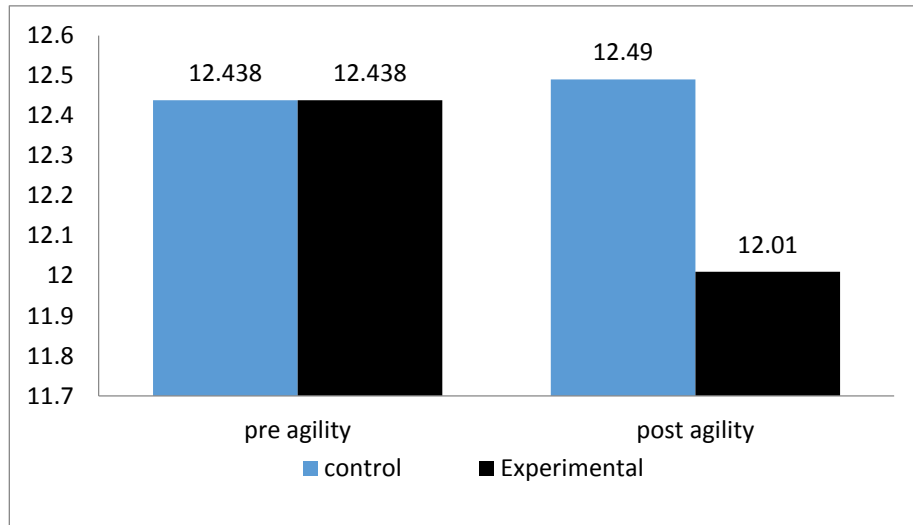


TABLE 4.11: PAIRED SAMPLE T-TEST RESULTS ON ILLINOIS AGILITY TEST MEASURE OF GROUPS

Paired Samples Test

| | Paired Differences | | | | | t | Df | Sig. (2-tailed) |
|---------------------|--------------------|-------------------|-----------------------|--|--------|--------|----|--------------------|
| | Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference | | | | |
| | | | | Lower | Upper | | | |
| Co-post – co-pre | .0524 | .4167 | .0909 | -.1373 | .2420 | .576 | 20 | .571 |
| Ex-post – ex-pre | -.4286 | .2283 | .0498 | -.5325 | -.3246 | -8.601 | 20 | .000 |

Note; co= control group, ex= experimental group, and post-pre= post- pre test

As indicate table 4.11 a paired sample t-test was conducted to compare the effect of circuit training on exercise and no exercise conditions. According to the data presented in the table above, there was no significant difference between the pre and post-tests of control group because (MD= .0524, SD= .4167, T (20) =.576 & P= .0571 so, P >0.05.

This implies that pre and post-test of control group was about the same level. In the other words Illinois test agility of fitness level of the group within pre & post-test did not show any difference which indicates that comparison at the experimental groups could be possible. Thus, one can understand that agility of students was displayed in the t-test at the same level.

Table 4.11 above displays the statistical test for the variance of the experimental group in the post- test and pre-test showed a statistically significant difference (MD =-.4286, SD= .2283, T (20) =-8.601 & P= .000 so $P < 0.05$) which indicates that the group members who had 12 week circuit training programmed (experimental group) were significantly outperformed better than the control group who had not participated in 12 week circuit training programmed in the former table (table 4.10) it was seen that the mean score of post-test was 12.010 and pre-test was 12.438. There is of course a huge gap between these two figures. The mean difference as can be seen table 4.11 above is -.4286 implying that which existed this much difference between the agility fitness levels of the experimental group pre and post-test. So, the post-test had high mean score than the pre-test.

The implication therefore was the programmed circuit training exercise the one has better physical fitness level of the agility. The same happened in this study, students who engaged in programmed circuit training showed change significantly in agility fitness than those students who are not engaged circuit training program.

4.3 Discussion of Finding

The present study evaluates on the effect of circuit training on selected physical fitness component of male student football players on Aember preparatory school. Subjects participated throughout the treatment period and cooperated for the success of collection of necessary data. The experimental or training group participated in a 12-week circuit training program performing the selected physical fitness exercises designed to the football players, while the control group did not participate in the 12 week training program of exercises. The subjects of experimental & control groups were to instruct not to start any programs during the 12-week period and only perform their normal regular

football training. Prior to the study, procedures and guidelines had presented orally and Subjects were agreeing to participate.

The analysis done with the appropriate statistical tools on the research problem have brought out significance findings as a circuit training outcome through selected variables of the study such as health and skill performance related variables. The findings of this study in each variable are discussed as follows.

In case muscular endurance fitness, there was significant difference in-between the pre to post test score in EXG when assessed in 1 minute sit up test. The result suggests that EXG significantly improved endurance fitness ($MD = 13.000$, $SD = 4.278$, $T(20) = 13.926$ & $P = .000$), significant at 0.05 level of confidence. But in COG no significant difference was found ($MD = .143$, $SD = 1.236$, $T(20) = -.530$ & $P = .602$). The improvement of EXG in performance was due to the circuit exercise in which they were engaged in. When we compare the mean score of EXG before circuit training with the mean score of after 12 weeks circuit exercise, the mean difference value increased by 13.000. This result indicated that effective change was observed on players who engaged in twelve weeks circuit training endurance fitness level. So, the formulated null hypothesis was rejected, but the alternative hypothesis was accepted at 0.05 level of confidence when assessed in 1 minute sit up test. This indicates that twelve weeks circuit training program proved to be a useful exercise modality for improving endurance fitness variable significantly among experimental group. Depend on the result agree to the idea of "Circuit training appears to have multiple benefits on health and fitness, as various studies have shown that it may elicit significant increases in aerobic capacity muscular strength and muscular endurance (Klika and Jordan (2013). In addition to this result has been supported by Lee et al (1997) who recorded the effect of set circuit training program on strength and endurance of college age men that analyzed the impact of circuit training on the development of muscular endurance and found significant development.

In case muscular strength fitness, there was significant difference between the pre to post test score in EXG when assessed in 8 level sit up strength test. The result suggests that EXG significantly improved strength fitness ($MD = .905$, $SD = .889$, $T(20) = 4.663$

& $P = .001$), significant at 0.05 level of confidence. But in COG no significant difference were found ($MD = .048$, $SD = .805$, $T(20) = -.271$ & $P = .789$). The improvement of EXG in performance was due to the circuit exercise in which they were engaged in. When we compare the mean score of EXG before circuit training with the mean score of after 12 weeks circuit exercise, the mean difference value increased by .905. This result indicated that effective change was observed on players who engaged in twelve weeks circuit training strength fitness level. So, the formulated null hypothesis was rejected, but the alternative hypothesis was accepted at 0.05 level of confidence when assessed in 8 level sit up test. This indicates that twelve weeks circuit training program proved to be a useful exercise modality for improving strength fitness variable significantly among experimental group. Depend on the result agree to the idea of “Circuit training appears to have multiple benefits on health and fitness, as various studies have shown that it may elicit significant increases in aerobic capacity muscular strength and muscular endurance (Klika and Jordan (2013). In addition to this result has been supported by olesen (1981) who recorded the effect of set circuit training program on strength and endurance of college age men that analyzed the impact of circuit training on the development of muscular strength and found significant development.

In case flexibility fitness, there was significant difference in-between the pre to post test score in EXG when assessed in sit and reach test. The result suggests that EXG significantly improved flexibility fitness ($MD = 3.7210$, $SD = 2.6664$, $T(20) = 6.395$ & $P = .002$), significant at 0.05 level of confidence. But in COG no significant difference were found ($MD = .2467$, $SD = 2.9411$, $T(20) = -.384$ & $P = .705$). The improvement of EXG in performance was due to the circuit exercise in which they were engaged in. When we compare the mean score of EXG before circuit training with the mean score of after 12 weeks circuit exercise, the mean difference value increased by 3.7210. This result indicated that effective change was observed on players who engaged in twelve weeks circuit training flexibility fitness level. So, the formulated null hypothesis was rejected, but the alternative hypothesis was accepted at 0.05 level of confidence when assessed in sit and reach test. This indicates that twelve weeks circuit training program proved to be a useful exercise modality for improving flexibility fitness variable significantly among experimental group. The finding of this study is in agreement with

the findings of Viskic, et.al. (2007) who analyzed the impact of special programmed physical education including dance, aerobics and rhythmic gymnastics on the development of motor and function abilities and found significant development of coordination/agility, function aerobic activity, explosive strength and flexibility.

In case agility fitness, there was significant difference in-between the pre to post test score in EG when assessed in Illinois agility test. The result suggests that EXG significantly improved agility fitness ($MD = -.4286$, $SD = .2283$, $T(20) = -8.601$ $P = .000$), significant at 0.05 level of confidence. But in COG no significant difference were found ($MD = .0524$, $SD = .4167$, $T(20) = .576$ & $P = .0571$). The improvement of EXG in performance was due to the circuit exercise in which they were engaged in. When compare the mean score of EXG before circuit training with the mean score of after 12 weeks circuit exercise, the mean difference value increased by $-.4286$. This result indicated that effective change was observed on players who engaged in twelve weeks circuit training agility fitness level. So, the formulated null hypothesis was rejected, but the alternative hypothesis was accepted at 0.05 level of confidence when assessed in Illinois test. This indicates that twelve weeks circuit training program proved to be a useful exercise modality for improving agility fitness variable significantly among experimental group. According to Taskin (2009) conduct a study to determine “the effect of circuit training directed toward motion and action velocity over the sprint-agility and anaerobic endurance”. From this result it is possible to conclude that training program has positive effects on agility performance and also the present study is agreement with the finding of Verschuren, *et al* (2009) conducted the study on the effects of 12 week conditioning program involving speed, agility and its effect on agility performance in young soccer players.

In case speed fitness, there was significant difference in-between the pre to post test score in EXG when assessed in 30meter dash run test. The result suggests that EXG significantly improved speed fitness ($MD = -.3571$, $SD = .1964$, $T(20) = -8.333$ & $P = .001$), significant at 0.05 level of confidence. But in COG no significant difference were found ($MD = .0048$, $SD = .1774$, $T(20) = .123$ & $P = .903$). The improvement of EXG in performance was due to the circuit exercise in which they were engaged in. When we compare the mean score of EXG before circuit training with the mean score of after 12

weeks circuit exercise, the mean difference value increased by -.3571. This result indicated that effective change was observed on players who engaged in twelve weeks circuit training speed fitness level. So, the formulated null hypothesis was rejected, but the alternative hypothesis was accepted at 0.05 level of confidence when assessed in 30meter dash run test. This indicates that twelve weeks circuit training program proved to be a useful exercise modality for improving speed fitness variable significantly among experimental group. According to Taskin (2009) conduct a study to determine “the effect of circuit training directed toward motion and action velocity over the sprint-agility and anaerobic endurance”. From this result it is possible to conclude that training program has positive effects on speed performance. The findings are also in agreement with the results of Arun, Kumar (2016) investigated the effect of circuit training on selected motor abilities among male football players. The study showed that there was a significant improvement on physical variable speed.

Generally, the result of the present study in accordance with the result of other findings proved that circuit training would have significant effect on endurance, strength and agility for health related component and speed and agility for skill (performance) related in Alembur preparatory school male student's football player.

CHAPTER FIVE

SUMMARY CONCLUSION AND RECOMMENDATION

The primary purpose of this study was to evaluate the effects of circuit training on selected physical fitness components of male student football players. To this end, this chapter deals summary, conclusion and recommendation.

5.1 Summary

The overall purpose of this study was to evaluate the effects of circuit Training on Selected Physical Fitness Components of Male student Football Players in Alembur preparatory school. To achieve the purpose of the study all 42 player students (age 15-18 years) were participated on the research as experimental and control group. The subjects were assigned randomly in to two groups of twenty one (N=21) in each group. The experimental group received treatments on circuit training respectively and control group did not receive any treatment or special training. The study was focused on experimental study with in 12 week training. Training was done 3 days per week from 40-60 minutes per session. The selected fitness variables were strength, endurance, flexibility, agility and speed. Test was taken from the participant at pre and post training programs. Before the training program pre-test were taken for each variable and at the end of the training also post-test was taken from the participant. Raw data was statically analyzed by use SPSS version 20 and paired sample t- test was used to find out the significance difference (< 0.05) post training and pre training results of each variable. After analysis the pre-post mean difference of each variable the experimental group improved significantly.

Generally the result obtained in the study showed significance improvements in selected variables in the participation of the study. This was due to effects of circuit training there were engaged in.

5.2 Conclusions

Based on the result and the findings of this study the following conclusions were drawn

- ❖ Experimental group showed significance improvement in muscular endurance, muscular strength, flexibility, agility and speed variables after the training, while there is no significance difference from the control group in muscular endurance, muscular strength, flexibility, agility and speed variables following post-test.
- ❖ As the test result indicated there was a progressive improvement in the students health related physical fitness level from pre-test to post-test due to the exercise training program.
- ❖ Circuit training greatly aroused Aember football player student's endurance, strength, flexibility, agility, and speed performance by developing necessary ability's

Generally, the circuit training has showed significance change in improving the selected fitness and skill variables of the experimental group when compare to control group.

5.3 Recommendation

Based on the findings of the study it is important to state the following points as recommendations:

- ♥ The trainer would be familiar with the component of physical fitness and process of circuit training, so that they can evaluate training program and determine their adequacy in maintaining football player's fitness and skill improvement.
- ♥ Physical education teachers as a means of coach to improve football skill status of preparatory school students' football players would encourage physical fitness exercises.
- ❖ Recommendation for future research
- ♥ Other researchers could conduct similar research for further investigation on other training method to improve physical fitness variables.
- ♥ Circuit training would be included in all trainings programs that involve the development of physical fitness either for competition, or rehabilitation purposes.
- ♥ This research program was focused for 12 week, but other researchers may be extended the program for a better performance enhancement in selected health related and skill related fitness variables.
- ♥ Similar study would be conducted by employing other subjects of other age, group and sex.

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APPENDIXS

TABLE 1 APPENDIX-A SELECTED PHYSICAL FITNESS VARIABLES PRE AND POST TEST RESULT OF BOTH GROUPS

MUSCULAR ENDURANCE: 1minuet sit-up (in seconds)

| Subject | Control group | | Subject | Experimental group | |
|---------|---------------|-----------|---------|--------------------|-----------|
| | Pre-test | Post-test | | Pre-test | Post-test |
| 10 | 25 | 26 | A | 25 | 37 |
| 11 | 24 | 23 | B | 23 | 36 |
| 12 | 23 | 24 | C | 24 | 33 |
| 13 | 16 | 17 | D | 27 | 30 |
| 14 | 17 | 17 | E | 24 | 39 |
| 15 | 27 | 26 | F | 16 | 35 |
| 16 | 15 | 16 | G | 21 | 31 |
| 17 | 22 | 21 | H | 21 | 39 |
| 18 | 19 | 18 | I | 20 | 35 |
| 19 | 21 | 20 | J | 23 | 35 |
| 20 | 22 | 21 | K | 21 | 29 |
| 21 | 20 | 19 | L | 23 | 31 |
| 22 | 25 | 26 | M | 22 | 35 |
| 23 | 22 | 21 | N | 17 | 36 |
| 24 | 23 | 22 | O | 21 | 35 |
| 25 | 20 | 19 | P | 20 | 27 |
| 26 | 20 | 18 | Q | 20 | 36 |
| 27 | 25 | 28 | R | 23 | 38 |
| 28 | 23 | 24 | S | 23 | 39 |
| 29 | 21 | 20 | T | 24 | 37 |
| 30 | 20 | 21 | U | 16 | 34 |

MUSCULAR STRENGTH: 8 level sit-up (in number)

| Subject | Control group | | Subject | Experimental group | |
|---------|---------------|-----------|---------|--------------------|-----------|
| | Pre-test | Post-test | | Pre-test | Post-test |
| 10 | 2 | 3 | A | 1 | 1 |
| 11 | 6 | 4 | B | 2 | 3 |
| 12 | 1 | 1 | C | 2 | 4 |
| 13 | 0 | 0 | D | 3 | 3 |
| 14 | 2 | 3 | E | 0 | 1 |
| 15 | 2 | 2 | F | 1 | 1 |
| 16 | 2 | 2 | G | 2 | 4 |
| 17 | 3 | 2 | H | 1 | 3 |
| 18 | 1 | 1 | I | 2 | 4 |
| 19 | 2 | 2 | J | 5 | 5 |
| 20 | 1 | 2 | K | 5 | 5 |
| 21 | 2 | 2 | L | 5 | 5 |
| 22 | 5 | 4 | M | 5 | 5 |
| 23 | 3 | 3 | N | 2 | 4 |
| 24 | 2 | 2 | O | 2 | 2 |
| 25 | 3 | 2 | P | 0 | 2 |
| 26 | 3 | 4 | Q | 0 | 2 |
| 27 | 1 | 1 | R | 2 | 2 |
| 28 | 0 | 1 | S | 2 | 3 |
| 29 | 2 | 2 | T | 2 | 3 |
| 30 | 2 | 1 | U | 2 | 3 |

FLEXIBILITY: sit and reach (in cm)

| Subject | Control group | | Subject | Experimental group | |
|---------|---------------|-----------|---------|--------------------|-----------|
| | Pre-test | Post-test | | Pre-test | Post-test |
| 10 | 23 | 22 | A | 13 | 13 |
| 11 | 9.7 | 10.2 | B | 12.6 | 25 |
| 12 | 9.3 | 9.4 | C | -1 | 2.04 |
| 13 | 7 | 7 | D | 8.2 | 12.2 |
| 14 | 12.2 | 10.6 | E | 5.5 | 7.5 |
| 15 | 26 | 18 | F | 8.4 | 10.2 |
| 16 | 14.4 | 10.5 | G | 15.9 | 17.4 |
| 17 | 14.5 | 12.5 | H | 10.8 | 17.6 |
| 18 | -4.3 | 3.4 | I | 14.5 | 16.1 |
| 19 | 15.5 | 14.6 | J | 5.6 | 9.7 |
| 20 | 9.2 | 9 | K | 5.2 | 9 |
| 21 | 5.3 | 4.4 | L | 10.6 | 13.6 |
| 22 | 11.8 | 10.5 | M | 6.3 | 10.2 |
| 23 | 8.7 | 10.5 | N | 10.2 | 14.2 |
| 24 | 11.2 | 14.3 | O | 4.5 | 8.3 |
| 25 | 12.5 | 12.9 | P | 10 | 15.3 |
| 26 | 16.4 | 15.2 | Q | 10.2 | 17.6 |
| 27 | 3.3 | 5.8 | R | 20.7 | 22.2 |
| 28 | 9 | 10.5 | S | 14.8 | 16.4 |
| 29 | 7.1 | 6.4 | T | 14.3 | 17.2 |
| 30 | 10.5 | 9.42 | U | 22 | 25.7 |

AGILITY: Illinois (in second)

| Subject | Control group | | Subject | Experimental group | |
|---------|---------------|-----------|---------|--------------------|-----------|
| | Pre-test | Post-test | | Pre-test | Post-test |
| 10 | 12.1 | 12.5 | A | 12.4 | 12 |
| 11 | 12.4 | 12.6 | B | 12.1 | 11.7 |
| 12 | 12 | 12.4 | C | 12.2 | 12 |
| 13 | 13 | 12.3 | D | 12.6 | 12.2 |
| 14 | 13 | 12.7 | E | 12.3 | 11.7 |
| 15 | 12.3 | 12.5 | F | 13.5 | 12.5 |
| 16 | 12.5 | 12.5 | G | 12.3 | 12.1 |
| 17 | 12.2 | 12 | H | 12.5 | 12.4 |
| 18 | 13 | 12.9 | I | 12.7 | 12.2 |
| 19 | 12.4 | 12.7 | J | 12.6 | 12.3 |
| 20 | 12.3 | 12 | K | 12.4 | 12 |
| 21 | 12.7 | 12.8 | L | 12.5 | 12 |
| 22 | 12.9 | 12.2 | M | 12.9 | 12.3 |
| 23 | 12.9 | 12.4 | N | 12.5 | 12 |
| 24 | 12.1 | 13 | O | 12.5 | 12 |
| 25 | 12.3 | 12.6 | P | 12.4 | 11.7 |
| 26 | 12.5 | 12.3 | Q | 11.9 | 11.6 |
| 27 | 12.1 | 12.4 | R | 12.4 | 11.7 |
| 28 | 12.2 | 12.4 | S | 12 | 12 |
| 29 | 12.1 | 12.8 | T | 12. | 11.8 |
| 30 | 12.2 | 12.3 | U | 12.5 | 12 |

SPEED: 30meter dash (in second)

| Subject | Control group | | Subject | Experimental group | |
|---------|---------------|-----------|---------|--------------------|-----------|
| | Pre-test | Post-test | | Pre-test | Post-test |
| 10 | 4.6 | 4.7 | A | 4.4 | 4 |
| 11 | 4.9 | 4.8 | B | 4.5 | 4.3 |
| 12 | 4.6 | 4.7 | C | 4.3 | 4.2 |
| 13 | 4.9 | 4.8 | D | 4.6 | 4 |
| 14 | 4.8 | 4.5 | E | 4.5 | 4.2 |
| 15 | 4.5 | 4.4 | F | 4.3 | 4.3 |
| 16 | 4.6 | 4.7 | G | 4.5 | 4.3 |
| 17 | 4.6 | 4.5 | H | 4.7 | 4.1 |
| 18 | 4.5 | 4.9 | I | 4.2 | 3.9 |
| 19 | 4.7 | 4.6 | J | 4.7 | 4.3 |
| 20 | 4.5 | 4.6 | K | 4.5 | 4.3 |
| 21 | 5.1 | 4.9 | L | 4.7 | 4.1 |
| 22 | 4.6 | 4.5 | M | 4.6 | 4 |
| 23 | 4.5 | 4.7 | N | 4.5 | 4.2 |
| 24 | 4.7 | 4.9 | O | 4.6 | 4.3 |
| 25 | 4.5 | 4.2 | P | 4.9 | 4.2 |
| 26 | 4.5 | 4.6 | Q | 4.6 | 4.1 |
| 27 | 4.6 | 4.7 | R | 4.7 | 4.3 |
| 28 | 4.3 | 4.5 | S | 4.5 | 4 |
| 29 | 4.7 | 4.7 | T | 4.5 | 4.3 |
| 30 | 4.8 | 4.7 | U | 4.6 | 4.5 |

**TABLE 2 APPENDIX B TRAINING SCHEDULE FOR EXPERIMENTAL GROUP
(CIRCUIT TRAINING)**

| Warm ing up | Exercise | No of set/repetiti on per session | No of circuit per session | Rest interval b/n sets | Rest interval b/n circuit | Intensity | Frequency | Cooling down |
|-------------------|--------------------------|--|---------------------------------|------------------------------|---------------------------------|-----------|-----------|-----------------|
| Week 1-3 | | | | | | | | |
| 10 min | Deceleration shuttles | 1x5 | 2 | 30 sec | 120 second | Low | 3 days | 10 min |
| 10 min | Shuttles | 1x5 | 2 | 30 sec | 120 second | Low | 3 days | 10 min |
| 10 min | Push up | 1x5 | 2 | 30 sec | 120 second | Low | 3 days | 10 min |
| 10 min | Wall sit | 1x5 | 2 | 30 sec | 120 second | Low | 3 days | 10 min |
| 10 min | Toe touch | 1x5 | 2 | 30 sec | 120 second | Low | 3 days | 10 min |
| 10 min | Diagonal square | 1x5 | 2 | 30 sec | 120 second | Low | 3 days | 10 min |
| Week 4-6 | | | | | | | | |
| 10 min | Shoulder flection | 2x8 | 2 | 30 sec | 120 second | Moderate | 3 days | 10 min |
| 10 min | Shuttles | 2x8 | 2 | 30 sec | 120 second | Moderate | 3 days | 10 min |
| 10 min | Skipping rope | 2x8 | 2 | 30 sec | 120 second | Moderate | 3 days | 10 min |
| 10 min | Wall sit | 2x8 | 2 | 30 sec | 120 second | Moderate | 3 days | 10 min |
| 10 min | Toe touch | 2x8 | 2 | 30 sec | 120 second | Moderate | 3 days | 10 min |
| 10 min | Diagonal square | 2x8 | 2 | 30 sec | 120 second | Moderate | 3 days | 10 min |

| War ming up | Exercise | No of set/repeti tion per session | No of circuit per session | Rest interval b/n sets | Rest interval b/n circuit | Intensity | Frequency | Cooling down |
|-------------------|-----------------|--|------------------------------------|------------------------------|------------------------------------|-----------|-----------|-----------------|
| Week 7-9 | | | | | | | | |
| 10 min | Sprint | 3x10 | 2 | 20 sec | 90 second | High | 3 days | 10 min |
| 10 min | Squat | 3x10 | 2 | 20 sec | 90 second | High | 3 days | 10 mi |
| 10 min | Push up | 3x10 | 2 | 20 sec | 90 second | High | 3 days | 10 min |
| 10 min | Wall sit | 3x10 | 2 | 20 sec | 90 second | High | 3 days | 10 min |
| 10 min | Toe touch | 3x10 | 2 | 20 sec | 90 second | High | 3 days | 10 min |
| 10 min | Diagonal square | 3x10 | 2 | 20 sec | 90 second | High | 3 days | 10 min |
| Week 10-12 | | | | | | | | |
| 10 min | Sprint | 4x10 | 2 | 20 sec | 60 second | High | 3 days | 10 min |
| 10 min | Squat | 4x10 | 2 | 20 sec | 60 second | High | 3 days | 10 min |
| 10 min | Push up | 4x10 | 2 | 20 sec | 60 second | High | 3 days | 10 min |
| 10 min | Wall sit | 4x10 | 2 | 20 sec | 60 second | High | 3 days | 10 min |
| 10 min | Toe touch | 2x8 | 2 | 30 sec | 120 second | Moderate | 3 days | 10 min |
| 10 min | Skipping rope | 2x8 | 2 | 30 sec | 120 second | Moderate | 3 days | 10 min |

TABLE 3 APPENDIX C DILLY PRACTICAL LESSON PLAN

| Date | Time | Parts | Set & rep | No of circuit per session | Intensity | Recovery time |
|---------------|-------------|---|----------------------|----------------------------------|------------------|----------------------|
| Monday | 10' | Warming-up | | | Low and Moderate | |
| | | Walking, Jogging Exercise& Synchronized movement of hands and leg , arm, and dynamic stretching exercise | | | | |
| | 40' | Main part/Work-out | | | High | 30sec b/n set |
| | | -deceleration shuttles | 2x8 | 2 | | |
| | | -shuttles | 2x8 | 2 | | |
| | | -diagonal square | 2x8 | 2 | | |
| | | -push up | 2x8 | 2 | | |
| | | -toe touch | 2x8 | 2 | | |
| | | -wall sit | 2x8 | 2 | | |
| | 10' | Cool-down | | | Low | |
| | | - participants perform light body movement with breathing meditation, and, static stretching exercise at the end of the session | | | | |

Bahir Dar University

Sport academy

Department of sport science

**APPENDIX D: HEALTH HISTORY AND PHYSICAL READINESS
QUESTIONNAIRE**

This questionnaire is designed to obtain information on the health status and physical readiness of the subjects participating for the research study. The information will be kept strictly confidential.

For students: please read the following question carefully and indicate your correct response to each question by encircling it on the choice letter given

1. Do you have a recent physical injury such as bone, muscle and joint which will be aggravated by physical exercise? A. Yes B. No

If yes indicate the type of injury that you
had _____

2. Do you have suffered with heart condition?

A. Yes B. No

3. Do you have upper or lower back pain which has been aggravated by exercise?

A. Yes B. No

4. Have you ever felt pain in your chest when you do physical exercise?

A. Yes B. No

5. Are you taking any prescription medicines recently?

A. Yes B. No

If yes, name them below: Name of drug Dosage

6. Have you ever suffered from shortness of breath at rest or with mild exercise?

A. Yes B. No

7. Is there any history of Coronary Heart Disease within your family?

A. Yes B. No

8. Do you ever feel faint, have spells of dizziness or have you ever lost consciousness?

A. Yes B. No

Table 4 APPENDIX E: STUDENTS PROFILE BOTH EXPERIMENTAL AND CONTROL GROUP

| No | Subject | Experimental group | | | Subject | Control group | | |
|----|---------|--------------------|-----------------|--------------|---------|---------------|-----------------|--------------|
| | | Age | Height in meter | Weight in kg | | Age | Height in meter | Weight in kg |
| 1 | A | 17 | 1.53 | 56.4 | 10 | 17 | 1.63 | 56 |
| 2 | B | 15 | 1.55 | 54.3 | 11 | 17 | 1.59 | 58.3 |
| 3 | C | 16 | 1.51 | 53.5 | 12 | 15 | 1.61 | 60.1 |
| 4 | D | 15 | 1.47 | 52.6 | 13 | 18 | 1.57 | 56.5 |
| 5 | E | 16 | 1.57 | 59.4 | 14 | 17 | 1.60 | 59.5 |
| 6 | F | 15 | 1.56 | 59.1 | 15 | 16 | 1.56 | 57.2 |
| 7 | G | 15 | 1.67 | 60.6 | 16 | 17 | 1.57 | 60.2 |
| 8 | H | 15 | 1.76 | 57.7 | 17 | 17 | 1.65 | 59.1 |
| 9 | I | 15 | 1.67 | 61.5 | 18 | 15 | 1.55 | 57.4 |
| 10 | J | 16 | 1.69 | 51.3 | 19 | 17 | 1.57 | 60.1 |
| 11 | K | 15 | 1.66 | 51.4 | 20 | 16 | 1.58 | 59.2 |
| 12 | L | 18 | 1.68 | 48.4 | 21 | 15 | 1.61 | 60.3 |
| 13 | M | 15 | 1.74 | 53.3 | 22 | 17 | 1.57 | 57.1 |
| 14 | N | 15 | 1.63 | 48.4 | 23 | 16 | 1.63 | 60.1 |
| 15 | O | 16 | 1.75 | 58.1 | 24 | 17 | 1.58 | 59.1 |
| 16 | P | 16 | 1.78 | 52.9 | 25 | 17 | 1.59 | 63.3 |
| 17 | Q | 16 | 1.67 | 51.2 | 26 | 16 | 1.62 | 61.2 |
| 18 | R | 15 | 1.60 | 53.5 | 27 | 15 | 1.56 | 57.2 |
| 19 | S | 16 | 1.73 | 55.9 | 28 | 15 | 1.60 | 61.1 |
| 20 | T | 15 | 1.67 | 59.6 | 29 | 15 | 1.65 | 61.3 |
| 21 | U | 15 | 1.78 | 55.8 | 30 | 17 | 1.64 | 61.2 |

FIGURE 1 APPENDIX-F: FIGURE OF PLAYERS DURING TEST

Figure during Illinois test



Figure during 1minuite sit up test



Figure during sit and reach test



Figure during 30meter run test



Figure during 8 level sit up test

