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# EFFECT OF CONTINUOUS AND INTERVAL TRAINING ON PHYSICAL FITNESS VRAIBLES AMONG FEMALE FOOTBALL PLAYERS BY ABERA SOLOMON

ABERA, SOLOMON

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**BAHIR DAR UNIVERSITY**

**SPORT ACADEMY**

**DEPARTMENT OF SPORT SCIENCE**

**EFFECT OF CONTINUOUS AND INTERVAL TRAINING  
ON PHYSICAL FITNESS VARIABLES AMONG FEMALE  
FOOTBALL PLAYERS**

**BY**

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**AUGUST, 2019**

**BAHIR DAR UNIVERSITY**

**EFFECT OF CONTINUOUS AND INTERVAL TRAINING  
ON PHYSICAL FITNESS VRAIBLES AMONG FEMALE  
FOOTBALL ACADEMY PLAYERS**

**BY**

**ABERA SOLOMON**

**A Thesis Submitted To**

Bahir Dar University, Sport Academy, Sport Science Department  
in Partial Fulfillment of the Requirements of the Degree of Master  
of Science in Football Coaching

**AUGUST, 2019**

**BAHIR DAR UNIVERSITY**

## **Declaration**

I, **Abera Solomon**, hereby declare that the material contained within this research now submitted to the Sport Academy of Bahir Dar University in partial fulfillment for the award of Degree of **Master of Science in Football Coaching** is entirely my own work. I have followed all ethical principles of research in the preparation, data collection, data analysis and completion of this thesis. Any materials accessed and utilized and ideas acquired in the process of conducting this research have been cited and acknowledged. I affirm that I have cited and referenced all sources used in this research document.

Candidate's Name.....

Signature.....

Date.....

## Certificate

This is to certify that the thesis entitled "**The Effect of Continuous and Interval Training on Physical Fitness Variables among Female Football Academy Players in Dangila Town**", submitted to Bahir Dar University in partial fulfillment of the requirements for the award of the degree of **Master of Science in Football Coaching** is the original research work done by **Mr. Abera Solomon** during the period 2018 to 2019 of his research in Sport Academy, Bahir Dar University, under our guidance and Supervision. It has not formed on the basis of other works of award to the Candidate of any previous Degree, Diploma, and Associate ship, Fellowship or other similar title of University.

Advisor's

Name.....Signature.....Date.....

# Approval Sheet

A Thesis Entitled

The Effect of Continuous and Interval Training on Physical Fitness Variables among  
Female Football Players

By:

Abera Solomon

We hereby certify that this Thesis submitted by Abera Solomon conforms to acceptable standards, and as such is fully adequate in scope and quality. It is therefore approved as the fulfillment of the Thesis requirements for the degree of Master of Science in Football Coaching.

## Examining Boards:

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External Examiner:	-----	-----	-----
Internal Examiner:	-----	-----	-----
Chairperson:	-----	-----	-----

## **Dedication**

This work is dedicated to my beloved parents ‘Dasash Asheber’ who growth me being as a mother and ‘Asfaw Begosew’ who growth me being as a Father and also to my beloved uncle ‘Truneh Begosew’ and to all my family’s.

## **Acknowledgments**

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I would like to thank all the subjects for their participation and commitment to the study and gratefully acknowledge to Ewunetu Tale who is the coach of Dangila town to allow their female football Academy players to participate in the study and helped my career at large.

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My genuine pleasure is also extended to Bahir Dar University for giving me this opportunity to pursue my education and providing me with the required financial support for the thesis research work

Eventually, to the above-mentioned people and to those who have not been mentioned, your sacrifice and encouragement are greatly appreciated and will always be in my memory. This thesis would not have been possible without constant support from all of you.



## Table of Contents

<b>Contents</b>	<b>page</b>
Declaration .....	i
Certificate .....	ii
Approval Sheet .....	iii
Dedication .....	iv
Acknowledgments .....	v
Table of Contents .....	vi
List of Tables .....	x
List of Figures .....	xi
List of Abbreviations .....	xii
Abstract .....	xiii
CHAPTER ONE .....	1
INTRODUCTION .....	1
1.1 Background of the Study .....	1
1.2 Statement of the Problem .....	4
1.3 Hypotheses .....	6
1.4. Objectives of the Study .....	6
1.4.1. General Objective .....	6
1.4.2. Specific Objective .....	7
1.5. Significance of the Study .....	7
1.6. Delimitation of the Study .....	8
1.7. Limitation of the Study .....	8
1.8. Operational Definitions of Key Terms .....	9

1.9. Organization of the Study.....	9
CHAPTER TWO .....	11
REVIEW OF RELATED LITRATURE .....	11
2.2. Interval Training.....	11
2.2.1. Aerobic Interval Training .....	12
2.2.2. Anaerobic Interval Training.....	12
2.2.3. Effects of Interval Training.....	13
2.3. Continuous Training.....	14
2.3.1 Slow Continuous Training .....	15
2.3.3 Variable Pace Continuous Training .....	16
2.4 Interval and Continuous Training Variables .....	16
2.5. Effect of Training on Player’s Physical Fitness .....	19
2.6. Comparative Analysis - Interval Training and Continuous Training.....	21
2.7. Basic Concepts of Physical Fitness .....	23
2.8. Components of Physical Fitness.....	23
2.8.1. Muscular Endurance .....	24
2.8.2. Power .....	24
2.8.3. Agility .....	26
2.8.4. Speed.....	27
CHAPTER THREE .....	30
RSEARCH METHODS.....	30
3.1. Introduction .....	30
3.2. Geographical Location of the Study Area .....	30
3.3. Research Design.....	31
3.4. Population, Sample Size and Sampling Techniques .....	32

3.5. Source of Data .....	33
3.6. Data Gathering Instruments.....	33
3.7. Training Procedures .....	34
3.7.1. Super Shuttles .....	34
3.7.2. Over-Under Hurdle .....	36
3.7.3 Bounding with Rings .....	37
3.7.4. Hurdle Jump.....	38
3.7.5. Hollow Sprints with Ball .....	39
3.8. Test Procedures .....	40
3.8.1. 60 Seconds Sit- ups test .....	42
3.8.2. Standing Long Jump test.....	43
3.8.3. Illinois Agility test .....	44
3.9. Validity of the Test.....	47
3.10 Methods of Data Analysis .....	48
3.11. Ethical Considerations.....	48
CHAPTER FOUR.....	49
RESULTS AND DISCUSSION .....	49
4.1. Results of the study .....	49
4.1.1 Characteristics of study participants and physical fitness variables .....	49
4.2 Discussions .....	65
CHAPTER FIVE .....	71
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS.....	71
5.1. Summary .....	71
5.2. Conclusions .....	73
5.3. Recommendations .....	73

REFERENCES .....	75
APPENDICES .....	82
Appendix A: some selected physical fitness test norms.....	82
Appendix B: Dangila Town Ewnetu Tale Female Football Academy continuous and interval training program female football player’s personal profile .....	83
Appendix C: Selected physical fitness variables.....	84
Appendix D: Pre and Post Test results of continuous training Group .....	85
Appendix E: pre and post test result of interval training group .....	86
Appendix F: Two-month interval training program.....	92
Appendix G: Two-month continuous training plane.....	96
Appendix H: Interval Training Group Session Plan .....	101
Appendix I: Continuous Training Group Session Plan .....	104

## LIST OF TABLES

<b>Table No</b>	<b>Title</b>	<b>page</b>
Table 1:	the study design layout .....	32
Table; 2.	60 seconds sit- ups test .....	42
Table; 3.	Normative data for the standing long jump test.....	43
Table; 4.	The following normative data is available for this test.....	45
Table 5.	Normative data for the 30meter test. ....	47
Table 6:	Personal Profile of the Players.....	49
Table 7:	Independent Sample t-Test Statistics of Pre-Test Result between Two Groups	50
Table 8:	Independent Sample t-Test Pre- Test Result Measured Between Two Groups..	52
Table 9:	Post- Test Result Independent Sample t-Test to Know the Effect between Two Groups .....	54
Table 10:	Independent Sample t-Test Post Result Measured Between Two Groups .....	56
Table 11:	Comparison Paired Sample t-Test Statistics between Pre and Post Test Results of Interval Training Group .....	58
Table 12:	Comparison Paired Sample t-Test Differences Pre-Post Results Measured of Interval Training Group.....	59
Table 13:	Comparison Paired sample t-test statistics between pre and post test results of continuous training group.....	62
Table 14:	Paired Sample t-Test Differences Pre-Post Results Measured of Continuous Training Group .....	63
Table 15:	List of personal profile of the players for continuous training group.....	83
Table 16:	List of personal profile of the players for interval training group .....	83
Table 17:	Selected physical fitness variables.....	84
Table 18:	Pre and Post Test results of muscular endurance, power, agility and speed for continuous training Group.....	85
Table 19:	Pre and Post Test results of muscular endurance Power, Agility and Speed for interval training Group .....	86
Table 20:	8 weeks of interval training plane.....	92
TABLE 21:	8-WEEK continuous TRAINING PLANE .....	96
Table 22:	Daily session training plan for interval training group.....	102
Table 23:	Daily session training plan for continuous training group.....	105
Day one	.....	105

## LIST OF FIGURES

<b>Figure No</b>	<b>Title</b>	<b>Page</b>
Figure 1:	Location map of Dangila town.....	31
Figure 2:	Super Shuttle Training Drill .....	35
Figure 3:	Over –Under Hurdle Training Drill.....	36
Figure 4:	Bounding with Rings Training Drill .....	37
Figure 5:	Hurdle Jumps Training Drill .....	38
Figure 6:	Hollow Sprint with Ball Training Drill .....	39
Figure 7:	60second sit- up test picture .....	42
Figure 8:	standing long jump test picture .....	44

## LIST OF ABBREVIATIONS

ACSM	American College of sport medicine
ATP	Adenosine Triphosphate
BPM	Beat per Minute
CMJ	Counter movement Jump
CTG	Continuous Training Group
HIIT	High Intensity Interval Training
HIT	High Interval Training
HVET	High Volume Endurance Training
HVT	High Volume Training
ITG	Interval Training Group
KM	Kilometer
LT	Lactate Threshold
MAS	Maximal Aerobic Speed
MHR	Maximum Heart Rate
MICT	Moderate Intensity Continuous Training
N	Number of players
NASPE	National Association for Sport and Physical Education
PC	Phosphocreatine
SD	Standard Deviation
SIT	Sprint Interval Training
SPSS	Statistical Package for Social Sciences
VJ	Vertical Jump
VO 2max	Maximal Aerobic Capacity
WHR	Waist-To-Hip Ratio

## **Abstract**

*The purpose of the present study was to determine the effect of continuous and interval training on physical fitness variables among female football players at Dangila town. To achieve the purpose, Experimental design was used. The target population of this study was 28 females under 17 football project players in Dangila Town; these players were taken by using comprehensive sampling techniques their age was lies in between 14 and 17 years. The participants of this study were classified in to two groups namely; Continuous training group (n=14) and interval training group (n=14) performed continuous and interval training respectively three days per week for 2-month and 60minet per session. Both groups undergone normal training program. And both groups had taken pre and post-tests. So, all subjects participated in 4 selected physical fitness performance tests: 60 second sit-up test, standing long jump test, Illinois agility test and 30meter sprinting test. The data collected from the study subject was analyzed using SPSS version 21 software by paired sample t-test and independent sample t- test of significant at 0.05 level of confidence. Both groups were significantly increased on muscular endurance, power, agility and speed. However, the results of the study indicated that, continuous and interval training group were not significant difference in level of muscular endurance. Whereas, in the level of agility, power and speed there was a significant difference between groups, since interval training group were better performed than continuous training group. As it was assessed by Levene's test for equality of variances at the level of 60sec sit-up test ( $P = .459$ ,  $MD = -1.5000$ ) standing long jump test ( $P = .000$ ,  $MD = -0.4221$ ) Illinois agility test ( $P = .011$ ,  $MD = .6000$ ) 30m sprinting test ( $P = .002$ ,  $MD = .4507$ ). So it can be concluded that continuous training as effective as interval trainings for enhancement of muscular endurance. Whereas, interval training is more effective than continuous training in the improvement of power, agility and speed of fitness in eight weeks training programs of female football project players. But additional longer-term study with follow-ups should be required to confirm this.*

**Keywords;** Continuous training, Interval training, Muscular Endurance, Power, Agility and Speed



# CHAPTER ONE

## INTRODUCTION

### 1.1 Background of the Study

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, R.1999)

Football is the world's most popular sport: approximately 265 million players and 5 million referees and officials are actively involved or 4% of the world population, according to FIFA, the International Federation of Association Football.

Today, football is a highly demanding match in which the participants are subjected to various actions that require an overall strength and power production, speed, agility, balance, stability, flexibility and the adequate level of endurance (Bloomfield et al., 2007).

Therefore, today soccer is intermittent sport which involves different activities, irregular movement patterns and complex load patterns. Elite soccer players cover a distance of 9-12 km during the game with approximately 1350 activities (Mohr et al. 2003) and perform about 50 powerful turns (Stolen et al., 2005). So, football is needed a highly physical demanding game in which the participants are subjected to numerous action that endurance, speed, strength, agility, power, balance, flexibility thus making the conditioning of players' a complex process for high levels of physical fitness for players can (Reilly 1997).

The primary purpose of any training program is to optimize performance during competition. To accomplish the goal, the coach/trainer needs to design and implement a comprehensive conditioning program that allows players to cope with the physical demands of the game while taking account of the large inter-individual variation in physiological response to training. Cellular, organ and systemic alterations occur in a relatively predictable and uniform manner when conditioning programs are appropriately designed and implemented (Cathal, 2013).

Several factors are associated with success in sport performance and training method is a major part of it. In fact, athlete's endurance, according to the type of exercise is affected by factors such as aerobic power, efficiency, biomechanical, neuromuscular and cardiovascular adaptations, anaerobic power, and lactate threshold adaptation of the endocrine system. So much of the physiological differences between elite and novice athletes' endurance depend on training methods they use. Aerobic interval training is one of the most common training methods to improve athletes' endurance and performance in pre-competition's season. The continuous training also works on endurance performance, but continuous exercise may increase Vo<sub>2</sub>max, capillary density, oxidative enzyme activity and plasma volume in untrained individuals but are not effective on athletes in which interval training is more efficient (Tahere, 2013).

Different training methods have been developed and used based on the science of physiology and exercise science. Continuous and interval training are long used in practice to increase aerobic and anaerobic capacity of athletes. Continuity exercises that have a longer history than interval exercises commonly use to increase aerobic capacity and endurance of cardio-respiratory system. Example of continuous practices is when the athlete runs continuously without a break from long distance during a given workout, or run continuously up to the given time. Another type of exercise which is commonly used in various sports is interval training. This training method is alternate periods of exercise - rest - exercise - rest. These exercises are performed with a greater intensity than continuous exercises and anaerobic energy producing systems are being pressurized as well as aerobic systems in this kind of exercises. And also because of rest periods between exercises there is time for energy sources such as Creatin Phosphate (CP) and Adenosine Tri-Phosphate (ATP) to be replaced and the athlete can continue with less fatigue. Many benefits that can be gained by doing interval training are improving levels of anaerobic capacity, lactate pathway enzymes and anaerobic energy creating enzymes (Tahere, 2013).

Continuous training as the name implies, involves continuous activity, without rest intervals. This has varied from high intensity, Continuous activity of moderate duration to low intensity activity of an extended duration, i.e. long, slow distance training is probably the most widely used form of endurance conditioning for jogger who want to stay in condition

for health-related purpose, the athlete who participate in team sports and endurance-trains for general condition, and the athlete who wants to maintain his endurance condition during the off-season (Ajmer, 2003).

Interval training is a type of training that involves a series of low- to high-intensity workouts interspersed with rest or relief periods. (MacInnis, et.al. December 2016). The high-intensity periods are typically at or close to anaerobic exercise, while the recovery periods involve activity of lower intensity. Martin J. (2016). Varying the intensity of effort exercises the heart muscle, providing a cardiovascular workout, improving aerobic capacity and permitting the person to exercise for longer and/or at more intense levels. (Atkins, & William June 2015).

Interval training can refer to the organization of any cardiovascular workout (e.g., cycling, running, rowing). It is prominent in training routines for many sports, but is particularly employed by runners. (Atkins, & William June 2015).

A soccer game is just like 90 minutes of interval training - running full speed, slowing down when you reach the ball, weaving between defenders, and sudden stops to shoot or change directions, note the former pros at the online site Soccer Training Info. You must train your body to perform according to the demands of a soccer game.

Fitness had always been a concern of man from prehistoric times. People were not agreed as to what constitute physical fitness though it is important to everyone. The expression "Physically fit" is very much common it is as old as humankind. Throughout the history of mankind physical fitness has been considered an essential element of everyday life. The ancient people were mainly dependent upon their individual strength, vigor and vitality for physical survival. This involved mastery of some basic skill like strength, speed, endurance, agility, power, flexibility, balance and cardiovascular fitness for running, jumping, climbing and other skills employed in hunting for their livings (Kassahun, 2016).

The physical fitness level for football players is crucial as it determines both game efficiency and tactical performance. On the field, football requires explosive bursts of energy and physical fitness in the form of sprinting, jumping, kicking, changing directions

and maintaining balance. To attain an appropriate fitness level for such tasks, it is recommended that players train according to the demands of the game. As such, football training should improve performance by inducing adaptations of physiological as well as in the neuromuscular system, whereas the level of this adaptation depends on the type of training (Alekhya, 2014).

Participation in sports is one of the common traits of human character and it starts to develop from the very beginning of childhood. The characteristics of an athlete mainly depend upon physical fitness, having components like muscular strength, muscular endurance, cardio- respiratory endurance, flexibility, speed, power, agility, balance etc. But, these components may vary in sportspersons involving different sports activities. The purpose of the present investigation is to assess effect of continuous versus interval training on selective physical fitness variables among female football project players

Performance on physical fitness, the results of fitness assessments should be used to develop player's activity that tests should not be the primary goal of practicing fitness; however, support the development of all players (Zemenu, 2017). Continuous and /or interval training should focus on a wide range of activities that help players develop appropriate physical fitness performance enable them to understand fitness concepts and their application, and foster confidence in and an appreciation of physical activity as well as physical fitness variables. This Framework provides numerous activities of training in support of the goal.

The researcher was selected the all total number of 28 players were directly participated by this study in the pre & post field test. The main aim of conducting this research was investigation the effect of continuous and interval training on physical fitness variables among Awi zone Dangila town Ewnetu Tale Academy female football players.

## **1.2 Statement of the Problem**

“Effects of 8 weeks of continuous and interval training with some selected exercise on physical fitness variables in the case of Dangila town among Ewnetu Tale Academy female football players”, this research was conducted to show that scheduled some selected exercise on the use of continuous training and interval training programs for female football

project players may lead to increase muscular endurance, power, agility and speed of physical fitness performance.

Coaches and players are always looking for the traditional training methods to improve physical capabilities of football players more and more. Therefore, different training methods have been developed and used based on the science of physiology and exercise science. Continuous and interval training are long used in practice to increase aerobic and anaerobic capacity of players. Continuity exercises that have a longer history than interval exercises commonly use to increase aerobic capacity and endurance of cardio-respiratory system. Example of continuous practices is when the player runs continuously without a break from long distance during a given workout, or run continuously up to the given time (Tahere, 2013).

Another type of exercise which is commonly used in various sports is interval training. This training method is alternate periods of exercise - rest - exercise – rest. These exercises are performed with a greater intensity than continuous exercises and anaerobic energy producing systems are being pressurized as well as aerobic systems in this kind of exercises. And also because of rest periods between exercises there is time for energy sources such as Cretin Phosphate (CP) and Adenosine Tri-Phosphate (ATP) to be replaced and the players can continue with less fatigue. Many benefits that can be gained by doing interval training are improving levels of anaerobic capacity, lactate pathway enzymes and anaerobic energy creating enzymes (Tahere, 2013).

Football practitioner requires many attributes to become successful players. This includes cardio respiratory fitness, flexibility, muscular strength, muscular endurance, agility, speed, power, balance, and coordination. They need also technical, psychological and tactical knowledge (Thomas, 2003). According to Dangila town sport office report, it is a good source of football player center. But, based on my observation and other related professionals during the game; most of players have lack of physical fitness. Since player's fitness performance in the first half of the game did not repeated in the second half of the game, they cannot run in speed, repeated movement, changing direction when nearer to the defender, acceleration and jumping properly and effectively in the football game. The causes of these problems are limitation of training method on physical fitness improvement

that hinders performance of the players to execute efficiently and effectively. So, one of the great means to achieved player's physical fitness is through giving a great attention on training method. Therefore, the researcher is concerning to fill the gap of some selected physical fitness variables by systematically conducting on the Effect of continuous and interval training towards Ewnetu Tale Academy female football players.

### **1.3. Hypotheses**

**Ho1:- There is no significant difference on muscular endurance of female football player as the result of continuous and interval training method.**

**Ho2: -**There is no significant difference on power of female football players as the result of continuous and interval training method.

**Ho3: -**There is no significant difference on agility of female football players as the result of continuous and interval training method.

**Ho4: -**There is no significant difference on speed of female football players as the result of continuous and interval training method.

### **1.4. Objectives of the Study**

#### **1.4.1. General Objective**

The general objective of the study is to investigate the effect of continuous and interval training on selected physical fitness variables among female football players at Ewnetu Tale Football Academy at Dangila town.

### **1.4.2. Specific Objective**

In line with the general objective, this study is organized under the following specific objectives.

1. To assess effect of 8 weeks continuous training and interval training on the fitness of muscular endurance.
2. To examine effect of 8 weeks of continuous training and interval training on the fitness of power.
3. To evaluate effects of 8 weeks continuous training and interval training on the fitness of agility.
4. To measure effect of 8 weeks continuous training and interval training on the fitness of speed.

### **1.5. Significance of the Study**

The improvement of football player's performance efficiency is depending on involvements of training method with maintaining of physical fitness. The study will be concentrated on continuous and interval training method relatively the same fitness efficiency among Dangila town female football players. This brings physical fitness efficiency change for our country young and junior female football players, so, this study is hoped to be important in different ways.

Firstly, it may have a great contribution to help for coaches, players, and football federations to understand the influential training method that develops physical fitness of players. Besides, to formulate as well as to implement more effective strategies of continuous and/or interval training programs.

Secondly, it will provide meaningful information for players who involves on continuous and/or interval training programs for the improvement of physical fitness.

Thirdly, it may serve as an important resource for other researchers who want to conduct studies on the different aspects of the variables consider in this study. Moreover, to help coaches to know further about continuous and interval training programs and apply

effectively in their training method. Furthermore, to provide a proper and fertile ground for academy football coaches to utilize the training method on the development of physical fitness. Finally, it helps to motivate, encourage, and aware female youth football players to engage in training programs and serves as a base line or reference for future studies.

## **1.6. Delimitation of the Study**

In order to investigate the effect of continuous and interval training on physical fitness among female football project players, which were delimited to:

- The study was delimited by the need for field based tests with standardize protocols. Such as, 60 second sit-up test, standing long jump test, Illinois agility test, and 30meter sprint test
- Using only continuous training and interval training method with supper shuttle, over- under hurdle, bounding with rings, hurdle jump, and hollow sprint with ball.
- Physical fitness variables which are muscular endurance, power, agility and speed.
- Subjects were concerned at Dangila town female football players and were volunteered to participate in the study.
- Only for two months training, three days per a week and for 60 minutes per session

## **1.7. Limitation of the Study**

The following limitations have been faced in the study. Metrological variations such as air temperature, atmospheric pressures, relative humidity etc. during testing periods may not be control and their possibility will influence on the result. Lack of experienced professional man and comprehensive local previous research literature in the area. The researcher did not control the player's extraneous variables like diet, sleep, education, nutrition, time management and socioeconomic status. The researcher did not include other physical fitness variables, off course it requires for football players but it is a wide, if I will study all physical fitness variables, it requires quality experts, relevant materials, sufficient economy, laboratory measurement protocol and condensate environment etc. However, the researcher



was tackling such kind of the problems with the help of my advisor and had come this result.

## **1.8. Operational Definitions of Key Terms**

**Soccer:** It is also referred to as football. It is a competitive team sports categorized among the ball games.

**Test:** is involves a series of measurement with different physical fitness performance variables.

**Training:** is the conditional exercise program related with objective to train physical exercise.

**Continuous training:** exercising at a continuous, steady pace with moderate intensity.

**Interval training:** Shorter bouts of moderate intensity separated by rest intervals.

**Physical Fitness:** is defined as a condition in which an individual has enough energy to avoid fatigues and enjoy life.

Under 17 Football Academy players

## **1.9. Organization of the Study**

The content of the study organized into five chapters. The first chapter deals with background of the study, statement of the problem, hypotheses, objectives of the study, significance of the study, delimitation of the study, limitation of the study, operational definition of key terms, organization of the study and ethical consideration in order to give essential information on the general picture of the study.

Chapter two deals with review of related literature and related points of basic concept of continuous and interval training on physical fitness performance variables.

Chapter three is deals about methods and procedure which includes research methodology, study area, research design, population and sampling techniques, inclusion and exclusion

criteria, Source of data, data gathering instruments, training procedures, test procedures, method of data analysis.

Chapter four includes analyses and interpretation of data. In doing so it presented all findings of the study with their implication and chapter five presents the summery, conclusions and recommendation parts of the study.

## **CHAPTER TWO**

### **REVIEW OF RELATED LITRATURE**

#### **2.1. Introduction**

Most studies done in sport and exercise agreed that regular training is an important component in the process of football player's physical fitness improvement. However, researchers do not agree on the most beneficial method of training for physical fitness improvement.

It has been found that continuous training is considered as beneficial training modality for physical fitness quality than interval training method (Powers & Howely, 2006). Conversely interval training interspersed with active recovery between intervals above lactate threshold for short period of time has been found to be more beneficial for improving physical fitness (Wilmore,et. al., 2008).

Thus, this chapter focused on reviewing various literatures and research findings which is assumed to have relevant to the study. Topics covered in this chapter are, first, describing interval and continuous training method and their difference in relation with training variables and method of doing. Next, types of interval and continuous training and their effect on physical fitness and comparative analysis were discussed. Finally, basic concept of physical fitness, component of physical fitness and factors that affect fitness are outlined.

#### **2.2. Interval Training**

Researchers, coaches and athletes defined as interval training in varies ways. The most acceptable definition given by (Kenney,et.al. 2012) states interval training as a type of training method which is repeated, brief exercise bouts interspersed with short rest intervals between bouts. In this type of training as with other forms of physiological conditioning, exercise intensity must over load the specific energy system which is desired for improvement through sport- specific muscle activation (Katch, & McArdle, 2011).

Interval training consists of repeated bouts of moderate to high-intensity exercise interspersed with periods of rest or reduced intensity exercise. The German coach Woldemar Gerschler has been credited with formalizing interval training in the 1930's. Interval training is based on the concept that a greater amount of work can be performed at higher exercise intensities with the same or less fatigue compared to continuous training. Interval training can be manipulated by altering the, i) distance of the run, ii) recovery duration, iii) number of repetitions, iv) time of the run and v) actions undertaken during recovery. Athletes can perform a considerably greater volume of exercise by breaking the total exercise period into shorter more intense bouts with rest or active recovery intervals inserted between the intense bouts (Cathal, 2013). This type of training can be done in aerobic and anaerobic method.

### **2.2.1. Aerobic Interval Training**

Aerobic interval training is an interval training which elicits aerobic metabolism at higher ratio than anaerobic metabolism which can perform either in short aerobic interval training (10-30 second each exercise interval) form or in long aerobic interval training (30-60 second each exercise interval) form (Billat, 2001a). Sometimes aerobic interval training is also known as repeated maximal sprints or maximal dynamic exercise sprint training.

### **2.2.2. Anaerobic Interval Training**

(Billat 2001b) defined anaerobic interval training as energy expenditure that uses anaerobic metabolism (without the use of oxygen) that last less than 90 seconds, utilizing and exhaustive effort. This type of interval training can be done in to two ways. In the first method of training the variables which are going to be measured in the time limit or the number of repetition that an individual was able to sustain for different pause durations. And the intensity used in these method should not maximal but at about 130% to 160% of maximal oxygen with work period of 10 to 15 seconds interrupted by short rest intervals (15 to 40 seconds) (Margaria, 1969). The second method which is recently used and athlete repeat maximal bouts with different pause durations (30seconds to 4 to 5 minutes). In this

method the changes in maximal dynamic power during successive exercise period and characterized the associated metabolic changes in muscle (Balsom, 1992).

### **2.2.3. Effects of Interval Training**

Some experts believe that aerobic interval training may benefit exercisers by allowing them to burn more calories in a shorter period, and by improving aerobic capability at a faster rate, when compared with continuous-intensity exercise. In overweight and obese individuals, high intensity interval training employing 4 sets of 4-minute intervals has been shown to improve VO<sub>2</sub>max to a greater extent than isocaloric moderate continuous training, as well as to a greater extent than with a protocol using shorter, 1-minute intervals. Some exercisers find interval training less monotonous than continuous-intensity exercise. A number of studies confirm that in young and healthy individuals, sprint interval training appears to be as effective as continuous endurance training of moderate intensity, and has the benefit of requiring a reduced time commitment. There is some evidence that interval training is also beneficial for older individuals and for those with coronary artery disease, but further study is required.

Interval training can improve many aspects of human physiology. In athletes, it can enhance lactate threshold and increase VO<sub>2</sub>max. Lactate threshold has been shown to be a significant factor in determining performance for long distance running events. An increase in an athlete's VO<sub>2</sub>max allows them to intake more oxygen while exercising, enhancing the capability to sustain larger spans of aerobic effort. Studies have also shown interval training can induce endurance-like adaption, corresponding to increased capacity for whole body and skeletal muscle lipid oxidation and enhanced peripheral vascular structure and function

There is increasing evidence that interval training assists in managing risk factors of many diseases, including metabolic syndrome, cardiovascular disease, obesity and diabetes. It does this by improving insulin action and sensitivity. Generating higher insulin sensitivity results in lower levels of insulin needed to lower glucose levels in the blood. This helps individuals with type2 diabetes or metabolic syndrome control their glucose levels. A combination of interval training and continuous exercise increases cardiovascular fitness

and raises HDL-cholesterol, which reduces the risk of cardiovascular disease. This type of training also decreases waist circumference, waist-to-hip ratio (WHR), and the sum of skin folds on the body.

### **2.3. Continuous Training**

Continuous training which is also known as continuous moderate exercise, continuous cardiovascular exercise, steady state run, long steady distance and traditional endurance training is any type of training which is done without having rest intervals (Kenney; et.al. 2012) states that, “continuous training involves continuous activities without rest interval. This can vary from long slow distance training to high intensity endurance training”. Since its sub maximal intensity in nature continuous training requires sustained, steady state aerobic exercise and lies on considerable time in relative comfort distance with a given intensity for players rather than their speed. Most of the time this type of training is ideal for people beginning an exercise program to have good general endurance.

This type of (continuous) training method can be performed at low-intensity (approximately 60%to 70% of maximum heart rate), moderate- intensity (approximately 70%to 85% of maximum heart rate) and high-intensity (approximately 85%to 90% of maximum heart rate). According to (Smart & Steele 2012) this type of training method is widely used as a traditional training techniques to develop different physical fitness element like to improve and increase the capacity of the various sources of cardio vascular and respiratory fitness, increase maximum oxygen uptake, increase capillary network and increases endurance mitochondrial enzymes in aerobic energy systems and also increase the energy producing system enzymes generally.

In addition to this form of training has been consistently shown to an improvement of works on endurance performance, but continuous exercise may increase Vo<sub>2</sub>max, capillary density, oxidative enzyme activity and plasma volume in untrained individuals (Tahere, 2013). Continuous training can be classified in to three training methods based on the objectives that an individual want to achieve.

### **2.3.1 Slow Continuous Training**

Slow continuous training involves, running over long distance at slow speed without any rest period. The amount of distance covered in this type of training is generally determined by the individual's competitive event, the season of training annual plan, physical fitness level etc. for instance, a 6 miler might run between 12 and 18 miles while a miler might run between 3 and 5 miles. Most of the time long distance runners and 90minute football players using this kind of training method to improve their physical fitness (Boot & Military Fitness Institution, 2017).

(Lorry 1981) this type of training is being used, the speed by which it takes to bring the heart rate up to between 60% and 80% of maximum heart rate will depend upon the fitness level of the individual players. For example, for elite players the heart rate during the exercise should be from 140-160 bpm and the volume should not be less than 30 minutes up to 2 hours and more.

Furthermore, this kind of training has its own advantage for player's performance improvement by increasing physiological adaptations. Some of the most important changes are, increase muscle endurance, increase the quantity of oxidative enzymes, increase the number and size of mitochondria, better thermos-regulation and improvement movement economy. It also positively affects fat metabolism for exercise control and regulation of endurance activity, finally, it improves power, agility, balance and ability to work under progressively increasing fatigue for long duration (Wilmore, et al. 2008; Smart & Steele, 2012).

### **2.3.2 Fast Continuous Training**

Fast continuous training is more strenuous and exhaustive than slow continuous training method Most of the time elite players should done with a heart rate of about 175- 180 bpm i.e. about 90-100% of VO<sub>2</sub> max for better performance during competitions. Higher intensity and involvement of glycol tic mechanism to some extent, this training method has positive effect on anaerobic capacity. It also does increase in muscle size, strength and

speed. It is strong stimulus for structural change in the heart and lungs (Boot & Military Fitness Institute 2017).

### **2.3.3 Variable Pace Continuous Training**

This type of training method is done continuously but with change pace or speed. Tempo pace (threshold) running is designed to train runners at their lactate threshold (i.e. the level of intensity where lactic acid begins to accumulate rapidly in the blood) which can be maintained for 20-30minutes at pace about 20 to 40 seconds per mile slower than 5 km race pace with heart rate between 140-180 beat per minute by including warm-up and cool-down activity before and after the main activities. Since change of speed, this type of training is very strenuous and can be used by well-trained athletes and used to improve aerobic or anaerobic capacity or both at the same time which will enable the athlete to maintain a faster race pace with no greater accumulation of lactic acid (Daneil2018).

### **2.4 Interval and Continuous Training Variables**

Throughout the process of training, volume and intensity are the major training variables which largely determined the efficiency of any training program. When designing the training plan, training variables should be manipulated according to the functional, physiological and psychological requirement of the training goal or competition which leads to noticeable training-induced outcomes that can be significantly affect the player's performance (Bompa & Haff, 2009).

According to Bompa & Haff (2009), training volume is the total quantity of performed in training. It can be considered the sum of work performed during a training session, since it is mandatory for high technical, tactical and physical achievement. The volume of training includes time of training, the distance covered, and the number of repetition of an exercise. E.g. when planning interval training program, it is important to considered distance of each speed interval, interval of recovery between speed interval, repetition of speed interval and time of each repetition.



Other variable for training is intensity. It is qualitative component of training load for a given training. There are different methods to quantify and establish the training intensity. E.g., if an athlete completes a 100 m dash in 10s which correspond to a velocity of 10 m/s. If an athlete can generate a high velocity (e.g., 10.2 m/s) over a shorter distance, the intensity would be considered as super maximal, since it is more than 100% of his maximal velocity (Bompa & Haff, 2009).

The relationship between volume and intensity of the exercise is inverse relationship. When the exercise of intensity increased the volume becomes decreased. Thus, to produce visible improvement in physiological and physical fitness adaptation it is necessary to examine this inverse relationship.

According to Kenney, et.al. (2012) it is important to consider the following training variables when under taken training programs. Distance of exercise interval: Refers to the distance to be covered during each work period and determined by the specific event that an individual participate. E.g., individuals who participate in a short period of events may practice short exercise interval of 30 to 200meters. 1, 500meter runner may run exercise intervals as short as 200meters to increase speed; but most of training should focus at distance of 400 to 1,500 meters. Number of repetition and sets during each training session: These variables should also highly determine by the type of sport event that athlete participants. During short and more intense exercise interval, they will greater number of repetition and sets. The exercise interval is lengthened in both distance and duration; the number of repetition and sets should be correspondingly reduced.

Duration of the rest or active recovery: The duration of recovery interval (whether active or passive) depend on how rapidly the individual recovers from the exercise interval. The extent of recovery is best determined by the reduction of the individual's heart rate to a predetermined level during the recovery interval. For younger player's heart rate is generally allowed to drop between 130 -150 bpm before the next exercise interval begins. The recovery interval duration represents a multiple of exercise interval, and is known as the Work -to- Rest ratio (WR ratio) or exercise -to- relief interval.

According to Katch, et.al.(2011) for ATP-PC energy system the WR ratio will be 1:3. Therefore, a person to runs 10 second interval, the recovery interval equals 30 seconds. For training a short – term glycol tic energy system, the WR ratio is 1:2 (i.e. a 2minute recovery interval follows a 1minute exercise interval). On the other hand, long – term training aerobic energy system, the WR ratio usually equals 1:1 or 1:1.5. For HIIT type session utilizes a 2:1 WR ratio (i.e. for a person who exercises 20 second intervals, the recovery interval equals 10 seconds). A consecutive repeat exercise relief interval insures that cardiovascular response and aerobic metabolism eventually maintain near – maximal levels throughout the exercise intervals and recovery intervals.

Even though the WR ratio states in such condition, the onset of fatigue, or inability to continue exercise at a given intensity depend on fitness level and training status, exercise intensity, and environmental condition (Porcari, et.al. 2015). Type of activity during active recovery interval: During the recovery interval the type of activity performed by an individual may vary from complete rest, passive recovery to slow walking and active recovery rapid walking to slower running to roll-on.

In support, Katch, et.al.(2011) confirm that recovery interval also known as recovery period may done either passively, known as rest –relief or passive recovery; or actively, known as exercise –relief or active recovery. Generally, the more intense the exercise interval, the less intense the activity performed in the recovery interval. When an individual has a good physical fitness, she/he will be able to increase the intensity of the exercise interval or decrease the duration of the recovery interval, or both.

Rate of exercise interval: Determine the intensity of exercise interval either by establishing a specific duration for asset distance or by using a fixed percentage of the individual's maximum heart rate (MHR).

Frequency of training per week: The frequency of training highly depends on the fitness level of an individual and the purpose of the interval training Most of elite football player's exercise for five to seven days a week.

## **2.5. Effect of Training on Player's Physical Fitness**

The final goal of players and coaches all through the process of sport is to produce successful performance within specific periods of time during competition. So as to produce improvement in sport performance examining training variables like intensity, volume, frequency, repetition, and set are very important in order to prescribe optimal training programs. In addition, delivering appropriate training load for players avoids both under and over training and increase the chance of achieving desired performance within a given period of time (Daneile2018).

Exercise is a subcategory of physical activity which defined as a physical activity that is planned, structured, repetitive and purposive in the sense that intended for improvement or maintenance of physical fitness. Modern exercise physiology, however, distinguishes between acute and chronic exercise, where acute exercise refers to a single bout of physical activity and chronic exercise to repeated performance of acute exercise. Chronic exercise is also known as habitual physical exercise, physical training or just training (Caspersenet, 1985; Tipton & Franklin, 2006).

Regular physical exercising has many beneficial effects on health and was key factors in primary and secondary prevention of health problems, chronic diseases and age-related loss of functional capacity. However, beyond the age of 40 the amount and intensity of physical activity or specific sport activities decreases and sedentary behavior increases with adverse effects on health, physical fitness and motor performance. Physical activity is only on many factors that may affect the growing child and that a significant amount of knowledge on the effects of physical activity on the developing organism is derived by extrapolation from studies of experimental animals. The evaluations of physical growth have relied on application of anthropometric techniques (Baileyet, 1978; WHO, 2004; Hagstromeret, 2007; USDHHS, 2010; Helakorpiet, 2010; & Warburton, 2010).

The ability to maintain pace and tempo of an exercise during training and completion is unthinkable without having the request level of physical fitness. Good fitness also ensures high quality or skill of movement execution in accuracy precision, rhythms, consistency

under fatigue condition when the players tends to be lose co-ordination, concentration, mental alertness etc. physical fitness is very important fitness element for tactical efficiency (Daniel, 2018).

To improve player's level of physical fitness both continuous and interval training are widely used by players and coaches. According to (Powers & Howley 2006) traditional programs to improve aerobic fitness and thus endurance performance focus on high – volume of long duration and low intensity exercise (E, g. 20 to 60 minute, 3-5 times a week at 50 to 85% VO<sub>2</sub>max). Energy production with this type of training is almost exclusively from aerobic metabolic pathway.

In support, Smart & Steele (2012) suggest that doing continuous exercises improve capacity of the various sources of cardio vascular and respiratory system. Increase maximum oxygen up take, increase capillary network and increase mitochondrial enzymes in aerobic energy systems and also increase the energy production system enzymes and finally physical fitness of players.

The researcher in the field suggest that interval training which is performed with a greater intensity than continuous exercise and anaerobic energy production systems are become better training modality for player's anaerobic fitness. On the other hand, continuous training techniques are better modality for player's aerobic fitness (Billat, 2001; Kubukeli, 2002; & Daussin, 2008).

Because of rest period between exercises in interval training there is time for energy sources such as Creatine Phosphate (CP) and Adenosine Tri-Phosphate (ATP) to be replaced and the players can continue with less fatigue. Many benefits that can be gained by doing interval training are improving level of anaerobic fitness, lactate pathway and anaerobic energy creatine enzymes (Billal, 2001; Kubukeli, 2002; & Daussin, 2008).

In addition, Tanish & Hirakawa (2009) confirms that the physical stress and as consequence the physiological adaptation is more pronounced in interval training due to recovery period that enables the execution of elevated intensity and as consequence, higher work load performed in relation to continuous training.

(Hussain, et.al. 2016) previously, the use of Moderate-Intensity Continuous Training (MICT) has generally been considered the most beneficial exercise treatment modality for the prevention/management of metabolic type disease. More recently, however, High-Intensity Interval Training (HIIT) has emerged into the clinical setting as a potential alternative to traditional MICT in the management of such diseases, but the comparative effects are not well understood. Use of HIIT has the potential to induce favorable physiological remodeling that is similar or even superior to MICT, despite a considerably lower exercise volume and time commitment. Many studies have therefore examined the efficacy of HIIT relative to MICT with respect to reducing the development of numerous metabolic conditions including obesity, type 2diabetes, and the metabolic syndrome.

## **2.6. Comparative Analysis - Interval Training and Continuous Training**

According to Cathal (2013) it appears that HIIT is a more effective and time efficient training method than HVET for improving aerobic capacity and maintaining speed and power in club level Gaelic football players. In agreement with our stated hypothesis, there was a similar increase in aerobic capacity in both the HIIT and HVET groups following 6 weeks of training. It was also hypothesized that 5 m and 20 m running speed would increase and CMJ and VJ would decrease significantly in club level Gaelic football players following 6 weeks of HVET. In contrast, it was hypothesized that both speed and power would remain unchanged following 6 weeks of HIIT. Although performance in the 5 m sprint and CMJ were unchanged following the HVET program, the time required to complete the 20 m speed test increased significantly and performance in the VJ test decreased significantly. All measured indices of speed and power were maintained in the HIIT group. These findings indicate that HVET is appropriate for the development of aerobic capacity but lacks the specificity required to maintain 20 speed and VJ performance. The fact that peak power output and mean power output during the Wingate test were not related to performance in any of the jump tests or sprints test indicates that the Wingate test may lack specificity for field based sports.

Besides, the research work of Sperlich (2011) compared the effects of 5 weeks of HIIT and HVT on VO<sub>2</sub>max, 1000 m run, sprinting and jumping performance in 14-year-old soccer

players. Participants trained 4 times per week (1 - 1.5 h) and played 1 game. Each session started with a 5-10 min warm-up involving some soccer specific drills. The HIIT involved bouts of interval training without a soccer ball at >90%HRmax interspersed with 1-3 min jogging at 50-60%HRmax. The total exercise time, including rest, did not exceed 30 min. The HVT group undertook 45–60 min training sessions at 50–70%HRmax without playing soccer. VO<sub>2</sub>max increased significantly and 1000 m time decreased significantly in the HIIT group only. Sprint performance improved significantly in both groups and there was no change in jumping performance.

Moreover, Eddy (1977) reported a similar increase in VO<sub>2</sub>max, endurance and endurance performance in response to 7 weeks of continuous cycling training and interval cycling training in men and women. The CT group trained 4 weeks at 70 VO<sub>2</sub>max. The IT group trained with an interval training method at 100% VO<sub>2</sub>max. The duration of each training session was assigned so that participants completed 10,000kpm of work per session during the first week and the workload was increased by 3000kpm/wk.

In other words, Tuimil (2011) examined the effects of 8 weeks of continuous and interval running on endurance performance and jump capacity in physically active men. The IT and CT group trained at 90-100% and 65-70% maximal aerobic speed (MAS), respectively. MAS improved significantly and similarly for both groups and CMJ did not change significantly in either group.

In recreationally active young men and women, 6 weeks of combined endurance and interval training significantly increased VO<sub>2</sub>max and running velocity at maximal lactate steady state, lactate threshold and blood lactate concentration of 3mmol/l. Similarly, (Jones 1999) found significant improvements in running economy, lactate threshold and VO<sub>2</sub>max in college aged students in response to a 6 week combined continuous and interval running at intensity close to Lactate Threshold (LT).

## **2.7. Basic Concepts of Physical Fitness**

Physical fitness has defined by many scholars in different literature. (Baltimore, 1995) defined physical fitness as, the ability of the body to perform moderate to vigorous levels of physical activity without undue fatigue and capability of maintaining such abilities throughout the life. American College of Sports Medicine has also defined physical fitness as a set of characteristics (i.e. the work capacity of heart and lungs, the strength and endurance of muscles and the flexibility of joints) that relate to the ability to perform physical activities (Singh, 1999). Physical fitness is associated with a person's ability to work effectively, enjoy leisure time, be healthy, resist hypo kinetic diseases or conditions, and meet emergency situation (Corbin, 2006). So, it is the basic requirement of life, which is achieved through participating in regular movement.

## **2.8. Components of Physical Fitness**

Fitness is defined as a condition in which an individual has enough energy to avoid fatigues and enjoy life. 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 (National Association for Sport and Physical Education (NASPE, 2009). 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.

### **2.8.1. Muscular Endurance**

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

Regular activities should be used to develop muscular endurance. Basically aerobic activities are those in which a sufficient amount of oxygen is available to meet the body's demands. During the performance of elevated level for an extended period this activity typically involves vigorous and repetitive whole body or large muscle and movements that sustained for an extended period. Popular aerobic activities including running, walking, rowing, swimming, cycling, aerobic dancing, jogging, tread mill and somewhat continuous in nature the intensity of work load can be easily regulated by controlling the pace (Yilikal, 2017).

### **2.8.2. Power**

Power is a combination of strength and speed as well as a measurement of an ability to exert force at higher speeds. It is the product of the force exerted on an object and the velocity of the object in the direction in which the force is exerted. Understanding power capacity and how it can be created is one of the primary keys to optimizing athletic performance. Power is the capacity to do a given amount of work as rapidly as possible. It includes the elements of strength and speed. Speed is the ability to apply force rapidly when snatching, cleaning, throwing or sprinting. There are a few lifts that qualify as an evaluation for power is the Olympic style lifts: the snatch, push jerk and the power clean (Baechle, 1994; O'Shea, 1999).

Power-is “a measurement of the ability to exert force at higher speeds. More precisely, power is the product of the force exerted on an object and the velocity of the object in the



direction in which the force is exerted or it is the capacity to do a given amount of work as rapidly as possible including the elements of speed and strength” (Baechle, 1994).

Football requires many different qualities, such as kicking, shooting, passing and trapping the ball, throwing in, goalkeeping, tackling, falling behavior, jumping, running, sprinting, starting, stopping and changing direction (Lees & Nolan, 1998). A variety of training methods are used to increase strength and power in sports in order to enhance physical performance and thereby specific team sport performance, such as sprinting and jumping (Gabbett, & Mulvey, 2008).

Especially modern soccer requires a high level of physical conditioning throughout a competitive season. Therefore, one of the most important aims of training programs in the preparation (pre-season) period is to improve soccer-specific power. Soccer-specific power is a concept, which is extensively used in training practice and can be defined as the ability of a soccer player to use muscle power effectively and consistently within a game and a whole season (Bangsbo, 1994). Soccer practice suggests that a soccer player needs to develop a level of maximum power, which is utilized effectively within the game. The instep kick constitutes a basic element of a soccer game. It is on various factors, such as the maximum strength and power of the muscles activated during the kick.

Several researchers used plyometric training has shown that it improves power output and increase explosiveness (Adams, et al., 1992). According to (Moorth 2004) after plyometric training exercises there was a significantly improvement of speed, leg explosive power and leg strength and at the same time there is a significantly improvement of accuracy shooting, therefore explosive leg power has their own effect about the development of accurate shooting. The faster the muscle is stretched; the greater the force produced and the more power full the muscle movement (Clutch et al., 1988). The increase in strength or speed or both can cause an increase in power and this leads to the athlete can do more work in shorter time (Salimi, 2000). So the relationship between power and speed is expected.

### **2.8.3. Agility**

Agility refers to the ability to change body direction and position rapidly and can involve a whole body change of direction in the horizontal plane, whole body change of direction in the vertical plane (Jumping) and, rapid movement of parts (Patrick, 2004). Even more confusing has been the introduction of the term “quickness” (Moreno, 1995; Baker, 1999), which is seemingly used interchangeably for both agility and change of direction speed. Quickness has been identified as “a multi-planar or multi-directional skill that combines acceleration, explosiveness, and creativeness” (Moreno, 1995). This definition suggests that quickness consists of cognitive and physical reactive abilities and explosive acceleration.

At present, there is no consensus among the sports science community for a clear definition of agility. Agility has classically been defined as simply the ability to change direction rapidly (Clarke, 1959; Mathews, 1973; Bloomfield, Ackland, & Elliot, 1994), but also the ability to change direction rapidly and accurately (Johnson & Nelson, 1969; Barrow & McGee, 1971). In more recent publications, some authors have defined agility to include whole-body change of direction as well as rapid movement and direction change of limbs (Draper & Lancaster, 1985; Baechle, 1994).

Most research on agility testing has applied the term “agility” to describe any dynamic sporting action that involves a change in body position (Draper & Lancaster, 1985; Fulton, 1992; Hastad & Lacy, 1994). The application of the term agility varies, but has included lunges (Cronin, McNair, & Marshall, 2003), a 3-yard run forward and back from a stationary start (Hoyle & Holt, 1983), climbing over and under a track and field hurdle (Alricsson, et.al.2001), sprinting forward, stopping and returning from a 180 turn (Draper & Lancaster, 1985), simple hopping movements (Booher, et.al.1993), but most commonly sprinting with directional changes; (Reilly, 2000; Meir, 2001; Gabbett, 2002).

According to Chelladurai (1976), all of these movements could be classified as simple agility only, in that there is no temporal or spatial uncertainty involved.

Instead, Young, et.al. (2002) outlined a comprehensive definition of agility as it related to running sports such as football codes. The researchers addressed the multi-faceted

influences involved in agility performance. In particular, the authors outlined that there are two main components of agility – change of direction speed and perceptual and decision-making factors.

According to Gaeini & Rajabi (2004) the nature of agility movements is very close to the speed. In fact, agility is one of the components of the velocity, which is done based on tension –shortening cycle for rapid increase in power and the power- time curve transfer to the left and up sides. So a relationship between these two factors can be expected. But according to (Buttifant et al., 1999) there is no a relationship between agility & speed, the reason that it depends on the age and types of exercise. Agility is important in all activities and sports. Individual and team sports involve quick start and stops, rapid change of direction, efficient footwork, and quick adjustments of the body or body parts. Individuals with good agility have a better chance of success in physical activity than individuals with poor agility (Miller, 1998). Agility is one of the many attributes required to become a successful football player. Complex movements such as dribbling, turning, passing and intercepting often necessitate quick and a large change in speed and direction and correctly executing skills requires good body coordination. Running technique and strength and d power of the players have been identified as a key factor affecting change of direction speed (Young et al., 2002).

#### **2.8.4. Speed**

Speed-is “the displacement per unit time and is typically quantified as the time taken to cover a fixed distance or it is the ability to apply force rapidly when snatching, cleaning, throwing, or sprinting” (Baechle & Earle,2000). In soccer, we distinguish between several categories of speedy action, that in some specific order allow for the player to move faster and fulfill his tasks. Before some movement happens, it is necessary to quickly understand and anticipate the situation and make a decision. Speed of reaction, then appears as the fourth sub model, also known as explosiveness, and it takes place in the first three to four steps. After that, we have the speed of movement, actions and activities (Bangsbo, 1994). Many studies were dealing with the speed in football, often through a variety of programs for its development (Impellizzeri et al., 2008) or in relations with other anthropological

areas and physical indicators (Aziz et al., 2007). Speed is highly genetically inherent motor ability of as quickly as possible passing from one place to another. Even with well-designed training that takes into account the individual abilities of players, it is very small chance of developing this capability in its original "pure" form.

Athletes who can move faster than their opponents have an advantage. For example, a faster athlete may be able to get to a ball more quickly than a competitor or may even outrun a pursuer. For this reason, athletes in most sports value speed highly. Speed is often measured by using linear (straight line) sprinting over a distance between 40 and 100 yards (37–91 m). However, it is important to remember that in most sports, athletes rarely sprint more than 30 yards (27 m) in a straight line before they must make some type of directional change. Unless an athlete is a 100-meter sprinter, focusing a great deal of time and attention on straight-ahead speed may not result in optimum performance. On the other hand, since 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, et.al. 1961).

Linear sprinting is a physical skill that most people have performed since their second year of life with some level of proficiency. For decades, many coaches believed that linear speed was mostly related to genetics and could not be significantly improved by training. However, appropriate training does improve running speed, even at the elite level. The combination of stride rate (the number of strides per unit of time) and stride length (the distance covered in a single stride) primarily determines linear speed. So, athletes can improve linear speed by increasing stride rate while maintaining stride length, increasing stride length while maintaining stride rate, or doing a combination of both. Most sports, with the exception of track-and-field sprinting, involve short sprints (<30 yards) and rapid changes of direction, followed by rapid accelerations. For this reason, it makes little sense to focus a large proportion of training time on improving speed capabilities for athletes who will rarely reach maximum speed in competition. 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).

Optimal technique for linear sprinting in the acceleration phase involves four factors that maximize stride length and frequency

1. The body should have a pronounced forward lean that results in a lower center of mass. Consequently, momentum in a linear direction increases. This position initiates foot contact with the ground under or slightly behind the center of mass, reducing forces that cause an athlete to slow down or brake.
2. When pushing off the ground during the propulsion phase, the foot touches the ground in a cocked position, with the ankle flexed upward at approximately 90 degrees (dorsiflexion) and the toes pointed back toward the shin. Once the foot makes contact with the ground, the athlete extends the hip, knee, and ankle simultaneously with as much force as possible. This movement is known as triple extension.
3. During the recovery phase, the ankle of the free leg should be dorsiflexed while the knee and hip are bent, or flexed. This allows the foot to pass directly under the buttocks and a more rapid turnover at the hip.
4. The athlete should make certain to initiate arm swing at the shoulder with the elbow flexed to 90 degrees. He should work on swinging the arm forcefully backward to let the body's stored elastic energy and stretch reflex provide much of the arm's forward propulsion (Jay, et.al.1961).

## **CHAPTER THREE**

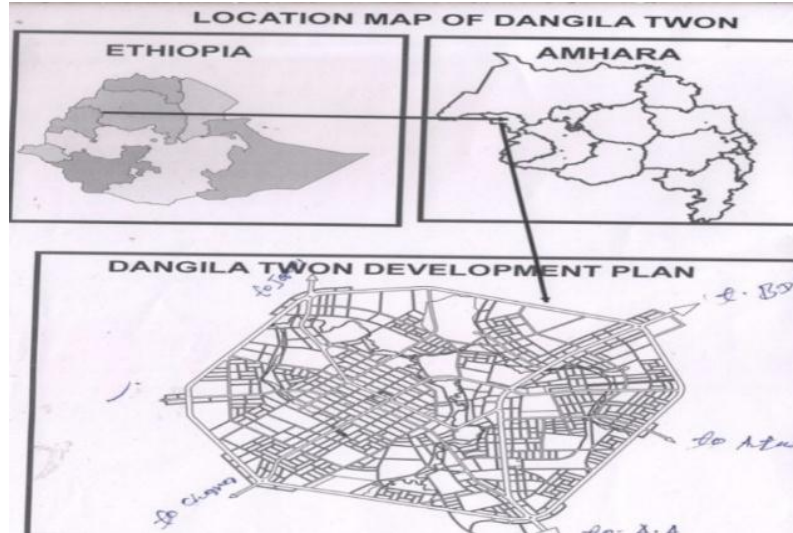
### **RESEARCH METHODS**

#### **3.1. Introduction**

This chapter presented the research methodology which was employed in the study. The issues such as area of study, research design, population and sampling techniques, source of data, data gathering instrument, training procedures, test procedures and data analysis are presented in separate sections. The method is particularly important for the study since it will have intended to make detail description and analysis on the effect of continuous and interval training on physical fitness variables among Ewnetu Tale Academy female football players.

#### **3.2. Geographical Location of the Study Area**

The study was conducted at Dangila town, Awi Zone, Amhara region. Dangila is the first town in Awi zone that introduce a city living people, it is established at 1911 E C. This town is about 78 kilometers away from Bahir Dar and 470km away from Addis Ababa. Geographical location of Dangila is 11.16N and 36.50E and 2137 above sea level. Its air condition is 'weynadega' and according to Dangila's Meteorological station its annual rainfall is 1577.6ml. Dangila town has five kebeles, the research focusing on kebele 05 training field. Adopted from Dangila urban development and Housing Construction Office (2012).



**Figure 1: Location map of Dangila town**

**Source:** *Adopted from Dangila urban development and Housing Construction Office (2012).*

### **3.3. Research Design**

The research design in the study was employed pure experimental method, since it determinant helps to measure, assess, evaluate and analyze the effect of variables (Creswell, 2012). therefore, this research study will be examined the effect of continuous and interval training on physical fitness variables of 28 Ewnetu Tale female football Academy players with age of 14-17 years old. In the study the researcher was employed to continuous training group (n=14) and interval training group (n=14). Training programs plan for a period of 8 weeks and were administered 3 days a week and for 60 minute each training session. Exercises involving the use of large muscles groups that can be enhancing physical fitness on the use of continuous and interval training method. Those exercises included supper shuttle, over under hurdle, bounding with ring, hurdle jump, hollow sprint with ball, ball game (football) and stretching exercises. The exercise session consists of warm - up period of 10 minute, and cool down period of 10 minute were keep it. Before implemented the above program I have taken pre-test and after completed the program I have taken post-test from continuous training trainees group and interval training trainees group. Fitness

parameters are muscular endurance, power, agility and speed. Test variables are 60 sec sit-up test, standing long jump test, Illinois agility test and 30meter sprint test.

**Table 1:** *the study design layout*

Treatment	Continuous training program	Interval training program
Frequency	3 days/week	3 days/week
Total duration	8 weeks	8 weeks
Duration	60 minutes	60 minutes
Intensity	Moderate(70-85HRmax)	moderate (70-85HRmax)
Exercise days	Monday, Wednesday, Friday	Monday, Wednesday, Friday
Time of training	Afternoon 10:00-11:00 local time	Morning 12:00-1:00 local time

### **3.4. Population, Sample Size and Sampling Techniques**

The study was conducted on Ewnetu Tale Academy female football players at Dangila town since the research is experimental to monitor in training method as well as manageable in test administrations, the total populations of the players are 28. In order to select the samples for this experimental study, first, population (comprehensive) sampling techniques were used. The total samples selected for the study was 28 Ewnetu Tale Academy female football players. Second, the total 28 Ewnetu Tale Academy female football players were divided in to two groups by using random sampling techniques with continuous training group (n=14) and interval training group (n=14), based on their pre-test results the researcher is used to assign continuous training group and interval training group, which means the players who have got relatively the same score, one of the players assign in to continuous training group and the other players assign in to interval training group. Since this kind of sampling technique is very important for player’s performance level equally distributed in to two groups and the research did not face fallacy by the level of physical fitness between intervention groups.



### **3.5. Source of Data**

The researcher had used primary and reference sources according to the nature of the study. The primary data were taken from pre-test and post-test measurements in the field at the beginning and at the end of the training program. The related reference was obtained from different sources such as different documents, like books, journals, articles, thesis work and internet sources were to get relevant and sufficient information regarding the study area.

### **3.6. Data Gathering Instruments**

The types of data source in the study were used Experimental pre and post field test types of data collection tools for the purpose of gaining appropriate evidence from the targeted populations.

The stated problem need to measured selected physical fitness variables to evaluate the effect of continuous and interval training; In the Academy level, field-based fitness tests are a practical and feasible option to assess physical fitness variable, field based fitness tests are easy to administer, involve minimal equipment, low cost and a larger number of participants can be evaluated in a relatively short period of time. The field tests had 1). Muscular endurance (60 second sit-up test in repetition), 2). Power (standing long jump test in distance/meter), 3). Agility (Illinois agility test in second), 4). Speed (30meter sprint test in second). In the procedure of the study pre- test and post- test was taken before and after 2 month continuous and interval training program for continuous training group and interval training group.

Before test regarding to data collection all necessary track and field marking were done. All players may ask to go for proper warm up & exercise. The tests for physical fitness variables were demonstrated and completed instructions regarding all tests were given to Female football project players. When Female football project players can ready for the test, the data was recorded by the administering the test.

### **3.7. Training Procedures**

The research, continuous training group and interval training group were engaged through continuous training and interval training method respectively with some selected exercise on physical fitness development. The warm up activities consisted: Running on the spot, arm circling, skipping jump, a stride jumping, one knee raising and pressing to the chest with assistance of hands (lift/ press/ lower), free walking, kicking out-stretched hand with one foot every third step and back pushing. The main exercise which includes supper shuttle, over –under hurdle, bounding with ring, hurdle jump and hollow sprint with ball.

According to Davies (2005) recommended that the training programs were design 3 days per a week and one-hour span per session for two to three months, intensity and volume of exercise using set, repetitions and 60meter distance of exercise for interval training group. Without using set and repetition with moderate intensity of exercise for continuous training group. Therefore, the researcher was prepared two-month training plan for continuous training group and interval training group in addition to the normal training plan.

However, both groups of players were undergone the normal training programs that are prepared by the coach since the part of the study. Training volume ranged from, 3-6 sets, 8 – 10 repetitions, 2-3minute rest, the load of trainee is bodyweight with a minimum of 65 and a maximum of 160 ground contacts per session based on moderate intensity for interval training group. The load of trainee is bodyweight with a minimum of 65 and a maximum of 160 ground contacts per session based on moderate intensity without set, repetition and resting time for continuous training group. At the end of the training program, subjects were cool down by jogging, walking and static stretching. Finally, all subjects can take a post-test then differentiate the effect of continuous trained and interval trained subjects on physical fitness variables.

#### **3.7.1. Super Shuttles**

This drill had typically utilized objectively test an athlete's speed, agility, and change of direction. However, to find the drill to be extremely effective in training for football performance and recommend keeping the total number of rep's low and provide ample rest

between attempts. When undertaking specific agility and quickness training, the drills should preferably mimic the movements and demands of your position on the football field, e.g. central defenders tend to undertake more sideways and backwards running. In addition, drills had carried out at full speed to simulate game situations. Concentrate on deceleration, change of direction and acceleration to make these movements as efficient and automatic as possible.



**Figure 2: Super Shuttle Training Drill**

**Source:** Adopted from (Davies 2005).

Procedures to perform super shuttle:

- 1) Set a series of cones out in a cross formation. See the diagram above.
- 2) Run backwards to the center cone, side step to the right cone (or your left as you look at it on the diagram), Side step back to the center cone still facing the same way.
- 3) At the center cone turn and sprint forward to the end cone.
- 4) Now run back to the center cone, side step to the right, side step back to the center, then turn and sprint back to the start.

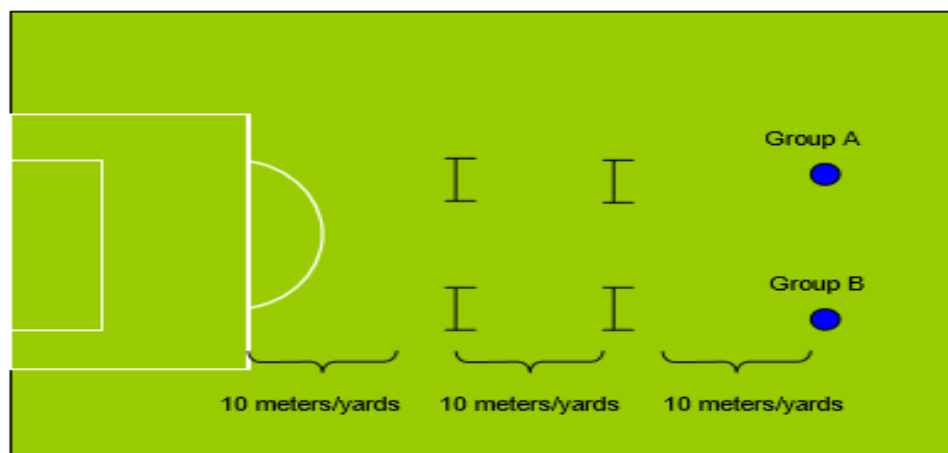
Super shuttle 8-10 repetition, 3-4 sets, 2-3minutes rest and the load is bodyweight for interval training group and without using repetition, set and resting time, with the load of bodyweight throughout the given time for continuous training group do it.

### 3.7.2. Over-Under Hurdle

This drill had typically utilized objectively test an athlete's speed, agility, power, and change of direction. However, to find the drill to be extremely effective in training for football performance and recommend keeping the total number of rep's low and provide ample rest between attempts. When undertaking specific agility and quickness training,

the drills should preferably mimic the movements and demands of your position on the football field, e.g. attacker and mild field players tend to undertake more accelerate, change of direction, vertical and horizontal jump. In addition, drills had carried out at full speed and jumping to simulate game situations. Concentrate on deceleration, horizontal jump and acceleration to make these movements as efficient and automatic as possible.

**Figure 3: Over –Under Hurdle Training Drill**



**Source:** Adopted from (Davies 2005).

Procedures to perform over-under hurdle:

- 1) Set up a course according to the diagram above.

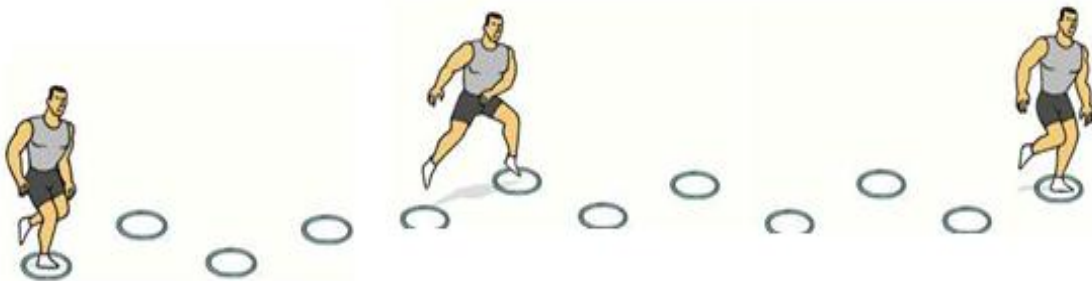
- 2) Two sets of hurdles are placed 10 meters/yards outside the penalty area.
- 3) Group A is designated attackers and group B defenders.
- 4) On the coach's command, a player from each group sprints to the first hurdle jumps it, sprints to the next hurdle and crawls under it before sprinting to a ball on the edge of the box.
- 5) If the defender wins they clear the ball. If the attacker wins they shoot at goal.

**Variation:** Add alternate starts such as lying, sitting on hands, facing backwards etc.

Over-under hurdle 8-10 repetition, 3-4 sets, 2-3minutes rest and the load is bodyweight for interval training group and for continuous training group without using repetition, set and resting time, with the load of bodyweight throughout the given time do it.

### **3.7.3 Bounding with Rings**

This is simply to incorporate a wider range of plyometric exercises. The drills in the advanced routine are slightly higher impact and more intense. They will help to generate greater explosive power but they are only suitable for players who have been weight training for some time.



**Figure 4: Bounding with Rings Training Drill**

**Source:** Adopted from (Davies 2005).

How to perform Bounding with Rings?

- 1) Jog into the start of the drill for forward momentum.
- 2) After a few feet, forcefully push off with the left foot and bring the right leg forward. At same time swing left arm forward and land into the first ring, which is 3-4 feet out and to the left with the right foot.
- 3) Continue and repeat with other leg and arm into the second ring, which is now 3-4 feet up and to the right.
- 4) This exercise is an exaggerated running motion focusing on foot push-off and airtime.

Bounding with rings 8-10 repetition, 4-6 sets, 2-3minutes rest and the load is bodyweight for interval training group and for continuous training group without using repetition, set and resting time, with the load of bodyweight throughout the given time do it.

#### **2.7.4. Hurdle Jump**

This is simply to incorporate a wider range of ply metric exercises. This drills in the advanced routine are slightly higher impact and more intense. They will help to generate greater explosive power but they are only suitable for players who have been weight training for some time.



**Figure 5: Hurdle Jumps Training Drill**

**Source:** Adopted from (Davies 2005).

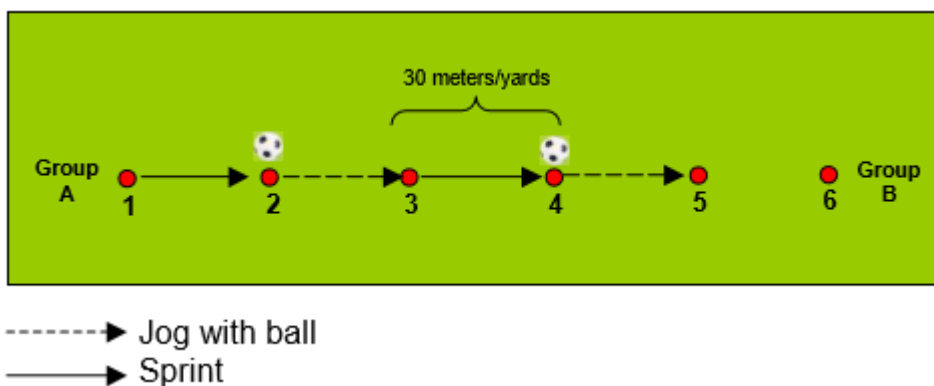
Tips for completing hurdle jumps drill:

- 1) Stand 1-2 feet away from hurdle. Feet should be slightly wider than hip-width apart in a semi-squat position.
- 2) Driving the arms up and jump over hurdle.
- 3) Upon landing, quickly jump over next hurdle keeping ground contact time to a minimum.

Hurdle jumps 8-10 repetition, 3-4 sets, 2-3 minutes rest and the load is bodyweight for interval training group and without using repetition, set and resting time, with the load of bodyweight throughout the given time do it for continuous training group.

### 3.7.5. Hollow Sprints with Ball

This drills are often more effective without the involvement of a ball. In order to become faster, players must concentrate on sprinting as quickly as possible and a ball usually hinders this. If a ball is incorporated, keep contact minimal. A typical speed session might consist of approximately five sets of ten repetitions. Speed and quickness separates the outstanding players from the average. As you progress to a higher and higher standard the speed of the game will increase. To excel you must be a quick player. However, in football being quick means much more than simply the ability to run fast.



**Figure 6: Hollow Sprint with Ball Training Drill**

**Source:** Adopted from (Davies 2005).

Procedures to perform hollow sprint with ball:

- 1) Set up five markers about 30 meters/yards apart.

2) Place a ball at marker 2 and marker 4.

3) Starting on marker 1, sprint to marker 2, dribble the ball to marker 3, sprint to marker 4, and dribble the ball to marker 5.

4) Walk back to the start replacing the balls as you do.

**Note:** To make this drill work for a larger group, simply add an extra marker to one end and have two equal groups at either end. A player from group A performs the drill leaving the balls at cones 3 and 5. They join the back of group B. A player from group B performs the drill leaving the balls at cones 4 and 2 and joins the back of group A. See the diagram above.

Hollow sprint with ball 8-10 repetition, 3-5 sets, 2-3minutes rest and the load is bodyweight for interval training group and without using repetition, set and resting time, with the load of bodyweight throughout the given time do it for continuous training group.

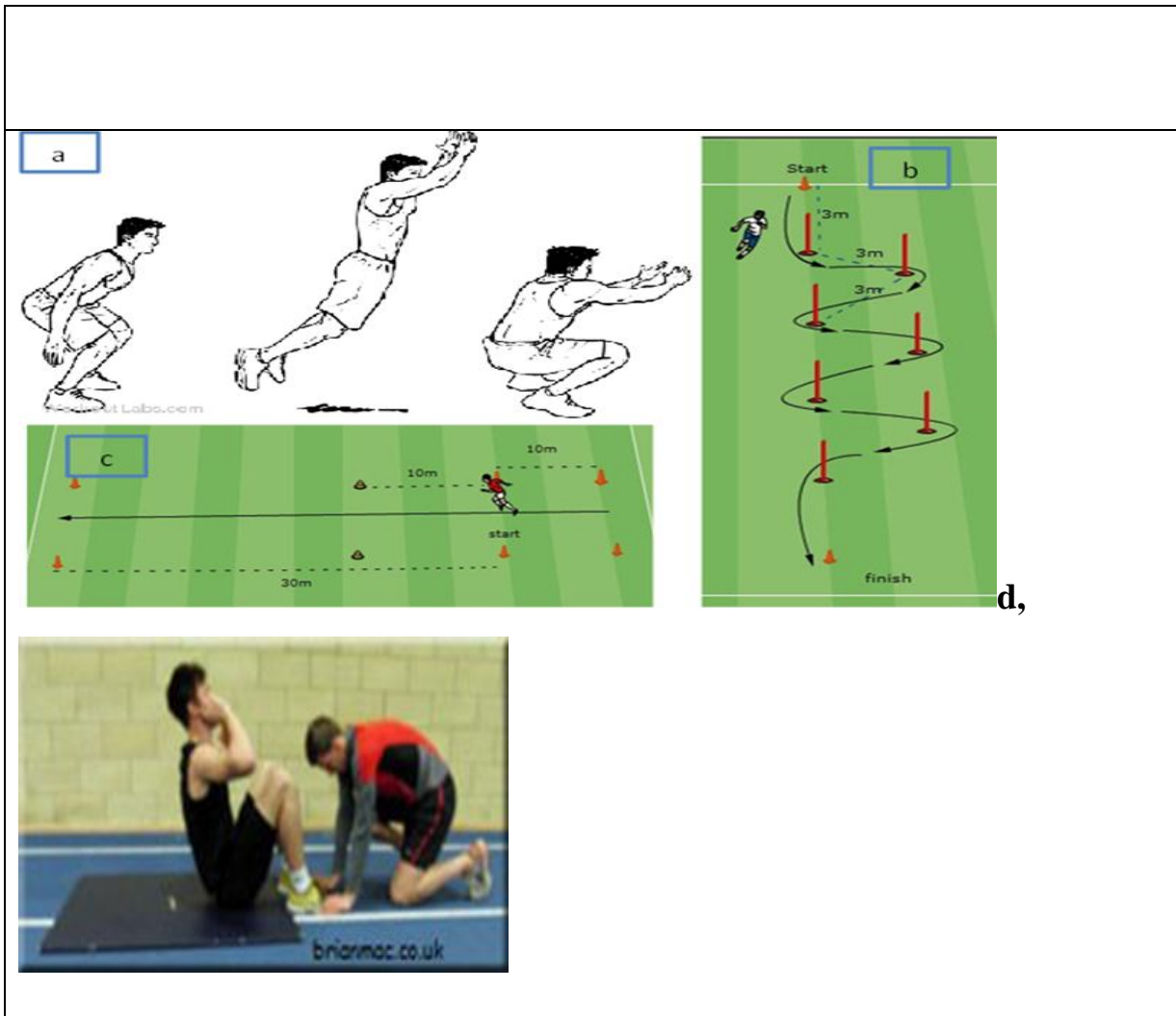
### **3.8. Test Procedures**

In order to evaluate the effect of continuous and interval training method on physical fitness variables among female football academy players. The total testing session was approximately 25 minutes for each subject, which included warm-up, five-minute rest times between tests. Each test had been explained and demonstrated before testing subjects had given practice trials about two minutes to become familiar with the testing procedures. The following physical fitness tests had been used before and after 8 weeks training program.

The tests were conducted two days.

- All players (participants) were considered to exert their maximal effort
- In the first day, 60 seconds sit- ups test(repetition/60second) and standing long jump test and
- In the second day Illinois agility test and 30meter sprint test were taken.
- All players were refrained from any additional training outside of the study.





### Functional Warm Up

All participants should do a functional warm up to reduce the possibility of injury and to help increase their performance during the test. The following is an example of a functional/dynamic warm up that could use.

1. 5 minutes light aerobic activity, jogging preferred
2. Walking lunges: 10 per leg, two times
3. Bounding with rings 8
4. Forwards/Backwards sprints: 10 meters, three times
5. Dynamic and static stretching (neck, arms swing and circle, walking lunges, arm across chest, high Knees, back, side bends, and inside Leg)

### 3.8.1. 60 Seconds Sit- ups test

**Purpose:** completed number of sit- ups reps/60 seconds was used to measure the muscular endurance of abdominal.

**Equipment and field organization:** stopwatch, mat and partner, putting the mat on the floor and the participants lie on the mat with the back position.

**Test Administration:** A demonstration of the sit-up was given to a group of subjects to be tested. The participants were asked to take the supine position with back on the floor and raises knees to approximately 90 degrees. The hands were placed beside ears without locking the fingers together. On the command of investigator, they started sit-up movement. The administrator starts the timing device when the athlete first start sit-up. They completed as many sit-ups as possible in 60 seconds. Each sit-up started with the back on the floor and the body raised up to the 90degrees position.

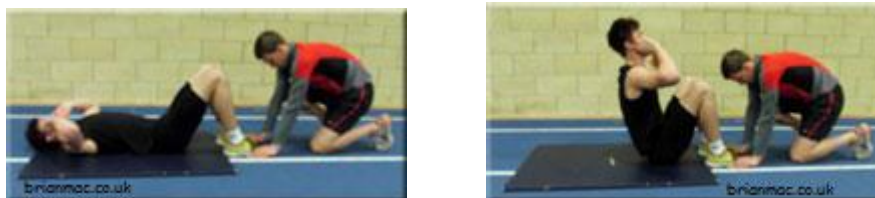
**Scoring:** The total number of sit-ups successfully completed in 60 seconds was taken as participants score.

**Table; 2.** 60 seconds sit- ups test

Gender	Excellent	Above Average	Average	Below Average	Poor
Male	>30	26 - 30	20 - 25	17 – 19	<17
Female	>25	21 - 25	15 - 20	9 – 14	<9

Source: (Kesshaun 2016).

**Figure 7: 60second sit- up test picture**



### 3.8.2. Standing Long Jump test

**Purpose:** Along with the standing vertical jump the long or broad jump is an accepted assessment for ultra-short term explosive power of legs.

**Equipment and field organization:** Floor, mat or long jump pit may be used, measuring tape, marking-tape/chalk. Set up line by marking-tape/chalk at starting point and mat at end points.

**Test Administration:** A demonstration of the standing long jump was given to a group of subjects to be tested. The participants were kept all parts of the feet just behind the take-off line. Then, without moving the feet, swung the arms back, bent the knees and moved the body forward to perform a standing long jump as far as possible. They landed with both feet together and continued moving forward. The distance from the take-off line to the heels landed mark was measured by measuring tape. They performed the test again if they fell backwards. The subject was given rest fully and repeat for a total of three trials.

**Scoring:** The distance between the take-off line and the heels landed mark was taken the score of the test. The best (maximum distance) trial was used as the final score of the test.

**Table; 3.** *Normative data for the standing long jump test*

<b>Rating</b>	<b>Male(cm)</b>	<b>Female(cm)</b>
Excellent	>250	>200
Very good	241-250	191-200
Above average	231-240	181-190
Average	221-230	171-180
Below average	211-220	161-170
Poor	191-210	141-160
Very poor	<191	<141

Source: (Davies 2005).

**Figure 8: standing long jump test picture**



### **3.8.3. Illinois Agility test**

**Purpose:** To assess technique and speed during straight sprinting and changes in direction quickly.

**Equipment and field organization:** stopwatch, measuring tape, 8 cones or markers, and a flat, nonslip surface. Set up four cones in a rectangle 10 meters (10.9yd) long and 5 meters (5.5yd) wide. The two cones at one end (A and D) mark the start and finish of the test. Cones B and C are at the other end. Place the remaining four cones (numbered 1 through 4) down the center of the testing area 3.3meters apart.

**Test administration:** A demonstration of Illinois agility test was given to a group of subjects to be tested. The athlete should begin by lying on the belly with hands flat on the floor, elbows up in the air, and head facing the starting line at cone A. On the go signal, the athlete gets up as quickly as possible and sprints 10 meters (10.9yd) to cone B. The administrator starts the timing device when the athlete first moves. The athlete then sprints to cone 1 in the center of the testing area, weaves in and out of cones 1 through 4 using a zigzag motion, circles cone 4, and then returns to cone 1, weaving through the center cones in the opposite direction. After turning around cone 1, the athlete sprints 10 meters (10.9yd) to cone C and then back across the starting line between cones A and D. The administrator stops the timing device when the athlete reaches cone D. The training partner record the time. Rest fully and repeat three times.

**Table; 4.** The following normative data is available for this test.

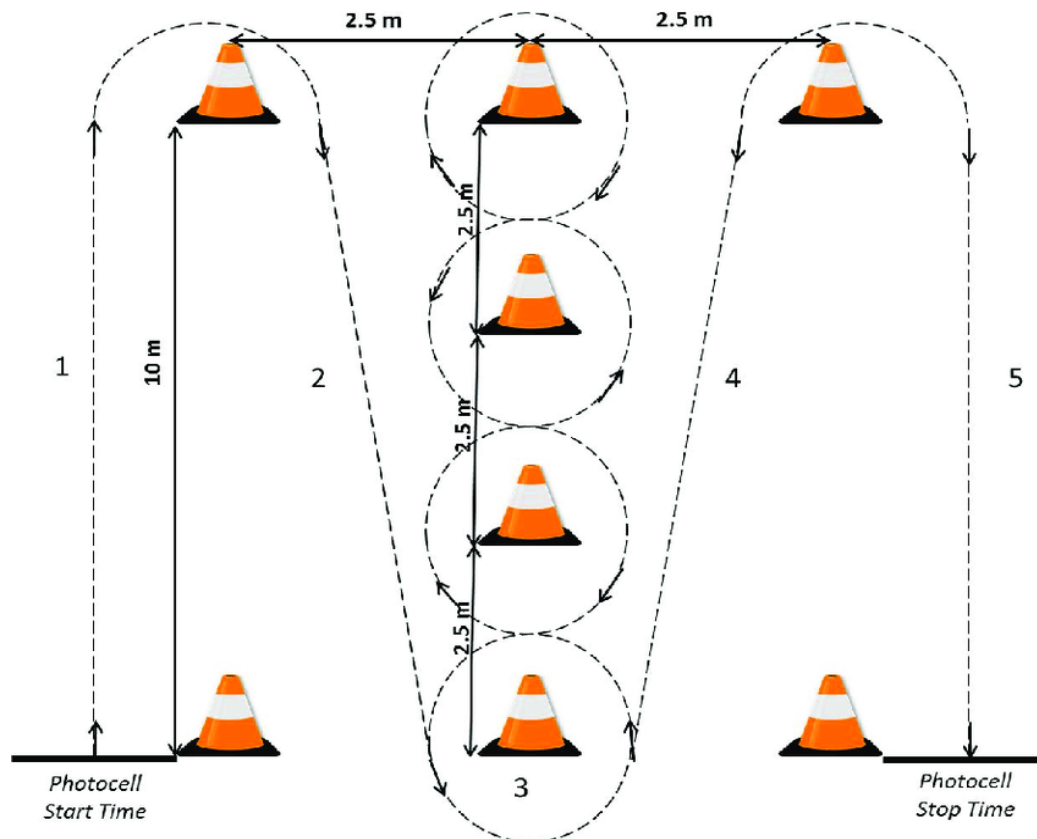
For 16 to 19-year-olds (Davis et al. 2000).

Gender	Excellent	Above Average	Average	Below Average	Poor
Male	<15.2 secs	15.2 - 16.1 secs	16.2 - 18.1 secs	18.2 - 19.3 secs	>19.3 secs
Female	<17.0 secs	17.0 - 17.9 secs	18.0 - 21.7 secs	21.8 - 23.0 secs	>23.0 secs

**Scoring:** Take your best time as the result three trials.

Source: (Davies 2005).

**Figure 9:** Illinois Agility test Picture



#### **3.8.4. Test of Speed (30meter acceleration run test)**

Speed was measured using the 30 meters accelerate run test. The objective of this test is to evaluate the development of the athletes' ability to effectively and efficiently accelerate from a standing start or from starting blocks to maximum speed. To take this test measure distance of 30 meters and placed a cone\marker at the start and finish lines. The players sprint the 30meter from a sprint start. The assistance records the time the athlete takes to complete the 30meter. Repeat these tests three trials per players with a fully recovery between each run and the best of 3\*30 meter accelerate its record to the nearest one hundredth of a second (Davis, 2000).

**Purpose:** This test is used to measure acceleration and speed off the mark. A longer distance isn't relevant to football where players rarely run flat out for more than 20-30 meters/yards.

**Equipment and field organization:** measuring tape (meter), stop watch, marking-tape/cone whistle. Set up two marking-tape /cones, measuring 30 meters apart starting at one cone

**Test administration:** The trainees standing at starting line of one cone. On a signal of "Marks – Set – Go "by the administrator, the administrator starts the timing device when the athlete first moves. The participants sprint to the other cone as quickly as possible. The administrator stops the timing device when the athlete finish. The training partner record the time. Rest fully and repeat three times.

**Scoring:** Take your best time as the result three trials. Any time less than 5.0 seconds is good. Professional football players average 4.0 seconds.

Source: (Davies 2005).

The following are national norms for 16 to 19 year olds from the reference



**Figure 10. 30meter acceleration runs a speed test**

**Table 5. Normative data for the 30meter test.**

Gender	Excellent	Above average	Average	Below average	Poor
Male	<4.0	4.2-4.0	4.4-4.3	4.6-4.5	>4.6
Female	<4.5	4.6-4.5	4.8-4.7	5.0-4.9	>5.0

### **3.9. Validity of the Test**

Refers to the degree that at test measure what it's supposed to. If the test was not properly controlled, it lacks its validity. To standardize the testing procedure and ensure accuracy and ability of the testes and measurements, the following condition were controlled during test administration.

- A warm up exercise were done thoroughly before performing physical fitness tests for about 5-10 minutes of light aerobic exercise followed by stretching to all the major muscle groups.
- The order of the fitness tests was kept. For example, and Sit up test (Muscular endurance), Standing long jump test (Power) and Illinois agility test, 30meter Sprinting test (speed) respectively.
- The tests were administered at the same time of the day and in similar environmental condition.
- The same equipment was used through the testing schedule making sure it is properly calibrated before each testing session.
- The test measurements were taken the same examiner.
- The participants were advised to take meal before three hours of the test administration.

### **3.10 Methods of Data Analysis**

The researcher was analyzed by using Statistical Package of Social Sciences (SPSS) for software, version 21.0. The level of statistical significance for the study was set at  $p \leq 0.05$ . To examine whether there was significant difference in female football player's physical fitness response to continuous and interval training, independent sample t-test was used. In addition, to evaluate the pre-post training effect of each training modality, paired sample t-test was employed.

To assist in understanding the magnitude of observed differences between groups, effect sizes were also calculated for test results. The magnitude differences between groups were expressed as standardized mean differences (i.e., Cohen effect sizes = difference in means divided by between subject standard deviation). And the criteria to interpret the magnitude of the effect sizes was;  $<0.2$  trivial,  $0.2-0.6$  small,  $0.6-1.2$  moderate,  $1.2-2.0$  large, and  $>2.0$  very large (Batterham & Hopkins, 2006).

### **3.11. Ethical Considerations**

The study was designed in such way that ethical issues were properly addressed to the subjects, so the coach and players were volunteered to participate in the study like during training, during testing and other activities. And also, privacy of the participants and confidentiality were strictly observed and maintained throughout the study. In addition, the written consent document which included description of the testing and training procedures is given and informed to coaches and the players.



## CHAPTER FOUR

### RESULTS AND DISCUSSION

#### 4.1. Results of the study

##### 4.1.1 Characteristics of study participants and physical fitness variables

To conduct this study valuable data was collected from the target groups. The target groups of the study were Ewnetu Tale female football Academy players. The players were asked to indicate their personal profile. Therefore, in this section the data that obtained from respondents regarding their personal profile were presented in the following

**Table 6:** *Personal Profile of the Players*

Group	N	Age		Height		Weight		Playing Experience	
		Mean	S.D	Mean	S.D	Mean	S.D	Mean	S.D
(CTG)	14	15.7	1.139	1.57	0.066	45.60	6.64	2.43	0.65
(ITG)	14	15.6	1.34	1.57	0.065	46.1	6.28	2.5	0.52

CTG: continuous training group, ITG: interval training group, SD: standard deviation, N=Number of football players.

As shown from above Table Descriptive characteristics of 28 Ewnetu Tale Academy female football players from Dangila town mean of age (CTG=15.7, ITG=15.6), height (CTG=1.57, ITG=1.57), weight (CTG=45.60, ITG=46.1) and playing experience (CTG=2.43, ITG=2.50). Subjects were relatively had the same age, height, weight and playing experience at the beginning of continuous and interval training method.

**Table 7: Independent Sample t-Test Statistics of Pre-Test Result between Two Groups**

<b>Group Statistics</b>					
Test variables	Group	N	Mean	SD	Std.Error Mean
Muscular Endurance	CTG	14	36.00 reps	5.189	1.387
	ITG	14	36.07 reps	6.220	1.66
Power	CTG	14	1.53 m	.0642	.0172
	ITG	14	1.51 m	.0794	.0212
Agility	CTG	14	18.825seco	.8052	.2152
	ITG	14	19.166seco	.3830	.1024
Speed	CTG	14	5.880seco	.4316	.1154
	ITG	14	6.093seco	.3848	.1029

CTG=Continuous training group, ITG= Interval training group, N=number of football players, SD=standard deviation, MIN= minute, REPS= repetitions, M= meter, SECO = second.

The above table also displays the pre- test results of 60second sit-up test for both continuous training group and interval training group. As indicates in the table the pre- test mean value of CTG were found to be 36.00 reps with SD= 5.189 and ITG pre- test mean value were found to be 36.07 reps with SD= 6.220. So, the mean value score of 60second sit-up test indicated that there is the same between two intervention groups on the fitness of muscular endurance performance before beginning the training program.

The table above also indicates the pre- test results of standing long jump test for both intervention groups. As indicate in the table the pre- test mean value of CTG were found to be 1.53m with SD= 0.0642 and ITG pre- test mean value were found to be 1.51m with SD= 0.0794. Therefore, the mean value score of standing long jump test shows there is almost the same performance between two groups on the fitness of power before beginning the training program.

The above table also displayed that the pre- test results of Illinois agility test for both continuous training group and interval training group. From the data we can see that in the table the pre- test mean value of CTG were found to be 18.825seco with SD= 0.8052 and ITG pre- test mean value were found to be 19.166seco with SD= 0.3830. However, the mean value score of Illinois agility test indicate that, there is relatively the same performance between two groups on the fitness of agility before starting the training program.

The table above also revealed that the pre- test results of 30meter sprint test for both intervention groups. As shown in the table the pre- test mean value of CTG were found to be 5.880 with SD= 0.4316seco and ITG pre- test mean value were found to be 6.0923seco with SD= 0.3848. So, the mean value score of 30meter sprint test indicate that, there is relatively the same performance between two groups on the fitness of speed before beginning the training program.

**Note:** from the above explanation of four physical fitness test variables, we can say that there was still the same. But, it is impossible to tell here if the similarities are statistically significant between two groups. Hence independent sample t-test comparing pre-test between groups and which was computed to examine whether this number show statistical similarities or not for each physical fitness test variables of female football players between groups, the t-test results presented in the table which is follows.

**Table 8: Independent Sample t-Test Pre- Test Result Measured Between Two Groups**

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Muscular Endurance	EVA	.923	.346	.033	26	.974	.071	2.165	-4.378	4.521
	EVNA			-.033	25.190	.974	.071	2.165	-4.385	4.528
Power	EVA	.127	.725	-.864	26	.396	.0236	.0273	-.0797	.0325
	EVNA			-.864	24.912	.396	-.0236	.0273	-.0798	.0327
Agility	EVA	4.151	.052	1.433	26	.164	.3414	.2383	-.1484	.8313
	EVNA			1.433	18.597	.169	.3414	.2383	-.1581	.8409
Speed	EVA	.452	.507	-1.377	26	.180	-.2129	.1545	-.1048	.5305
	EVNA			-1.377	25.665	.180	-.2129	.1545	-.1050	.5307

EVA= equal variance assumed, EVNA= equal variance not assumed, M= meter

An independent sample t-test was conducted as the result of pre- test to compare the average sit-up number of repetition/60second between two groups (continuous and interval training group). As it was assessed by Levene's test for equality of variances ( $p = .346$ ) homogeneity of variance was not violated, so equal variance assumed were used;  $T = .033$ ,  $Df = 26$ ,  $P = .974$  two tailed, Mean Diff = .071, SE Diff = 2.165, the 95% CI is

(4.521, -4.378). Which does contain 0; this result does violate P value of the significant test. So, there is not a significant difference between continuous and interval training groups ( $P > .05$ ).

The above table pre- test results revealed that standing long jump power test were not found to be statistically significant difference between two group (continuous and interval group). As it was assessed by Levene's test for equality of variances ( $p = .725$ ) homogeneity of variance was not violated, so equal variance assumed were used;

$T = -.864$ ,  $Df = 26$ ,  $P = .396$  two tailed, Mean Diff = .0236, SE Diff = -.0273, the 95% CI is (.0325, -.0797). Which does contain 0; this result does violate P value of the significant test. Therefore, there were not a significant difference between two intervention groups ( $P > .05$ ).

An independent sample t test result indicated that Illinois agility pre- test results were not found to be statistically significant difference between two group (continuous and interval group). As it was assessed by Levene's test for equality of variances ( $p = .052$ ) homogeneity of variance was not violated, so equal variance assumed were used;  $T = -1.433$ ,  $Df = 26$ ,  $P = .164$  two tailed, Mean Diff = .3414, SE Diff = .2383, the 95% CI is (.8313, -.1484). Which does contain 0; this result does violate P value of the significant test. However, there was not a significant difference between continuous and interval training groups ( $P > .05$ ).

An independent sample t-test was conducted pre- test result to compare the average time taken to finished 30meter sprint test between two groups (continuous and interval training group). As it was assessed by Levene's test for equality of variances ( $p = .507$ ) homogeneity of variance was not violated, so equal variance assumed were used;  $T = -1.377$ ,  $Df = 26$ ,  $P = .180$  two tailed, Mean Diff = -.2129, SE Diff = .1545, the 95% CI is (.5305, -.1048). Which does contain 0; this result does violate P value of the significant test. Therefore, there were not a significant difference between two intervention groups ( $P > .05$ ).

**Table 9:** *Post- Test Result Independent Sample t-Test to Know the Effect between Two Groups*

<b>Group Statistics</b>					
Test variables	Group	N	Mean	SD	Std. Error Mean
Muscular Endurance	CTG	14	41.71reps	4.890	1.307
	ITG	14	43.21reps	5.646	1.509
Power	CTG	14	1.8393m	.0526	.0140
	ITG	14	2.2614m	.1288	.0344
Agility	CTG	14	17.28157seco	.7433	.1987
	ITG	14	17.2157seco	.2602	.0696
Speed	CTG	14	5.1786seco	.3627	.0969
	ITG	14	4.7279seco	.3476	.0929

CTG=Continuous training group, ITG= Interval training group, N=number of football players, SD=standard deviation, MIN= minute, REPS= repetition, M= meter, SECO= second.

The table above displays the post test results of 60second sit-up test for both continuous training group and interval training group. As shown in the table the post- test mean value of CTG were found to be 41.71reps with SD= 4.890 and ITG post- test mean value were found to be 43.21reps with SD= 5.646. So, the mean value score of 60second sit-up test indicate that, after exposed continuous and interval training with selected exercise the subjects were performed 60sec/repetition with deference between two groups. One can see that there was still a difference. Yet, we cannot determine here if this difference was statically significant.

The table above also indicated the post test results of standing long jump test for both intervention groups. As indicate in the table the post- test mean value of CTG were found to be 1.8393m with SD= 0.0526 and ITG post- test mean value were found to be 2.2614m with SD= 0.1288. Therefore, the mean value score of standing long jump test indicate that, after intervention continuous and interval training the subjects were performed standing long jump in distance with deference between two groups. We can see that there was still a difference. But, we cannot determine here if this difference was statically significant.

The above table revealed that the post test result of Illinois agility test for both continuous training group and interval training group. From the data we can see that in the table the post- test mean value of CTG were found to be 17.8157seco with SD= 0.7433 and ITG post- test mean value were found to be 17.2157seco with SD= 0.2602. So, the mean value score of Illinois agility test indicate that, after intervention continuous and interval training with selected exercise the subjects were performed the given test protocol relatively the same second between two groups. One can see that there was still the same. However, we cannot determine here if this similarity was statically significant.

The above table also shows the post test results of 30meter sprint test for two intervention groups. As indicate in the table the post- test mean value of CTG were found to be 5.1786seco with SD= 0.3627 and ITG post- test mean value were found to be 4.7279seco with SD= 0.3476. So, the mean value score of 30meter sprint test indicated that, after intervention continuous and interval training method the subjects were performed the given distance with deference seconds between two groups. We can see that there was still a difference. Yet, we cannot determine here if this difference was statically significant. Hence independent sample t-test comparing post- test between groups and which was computed to examine whether this number show statistical difference or not for each physical fitness test variables of female football players between groups, the t-test results presented in the table which is follows.

**Table 10: Independent Sample t-Test Post Result Measured Between Two Groups**

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Muscular Endurance	EVA	.365	.551	.751	26	.459	1.500	1.996	-2.603	5.603
	EVNA			.751	25.481	.459	1.500	1.996	-2.607	5.607
Power	EVA	4.525	.043	11.357	26	.000	.4221	.0372	.3457	.4986
	EVNA			11.357	17.212	.000	.4221	.0372	.3438	.5005
Agility	EVA	12.697	.001	-2.851	26	.008	-.6000	.21048	-1.03264	-.16736
	EVNA			-2.851	16.140	.011	-.6000	.21048	-1.04588	-.15412
Speed	EVA	.135	.716	-3.357	26	.002	-.4507	.1343	-.7267	-.1748
	EVNA			-3.357	25.953	.002	-.4507	.1343	-.7267	-.1747

EVA= equal variance assumed, EVNA= equal variance not assumed, M= meter

Independent sample *t- test* post results revealed that an average repetition to finish 60second sit-up test between interval training group and continuous training group. As it was assessed by Levene's test for equality of variances ( $p = .551$ ) homogeneity of variance was not violated, so equal variance assumed was considered;  $t = 0.751$ ,  $Df = 26$ ,  $P = .459$  two tailed, Mean Diff = 1.500, SE Diff =1.996, the 95% CI is (5.603, -2.603). Which does contain 0; this result does violate P value of the significant test. So, there was not a significant difference between continuous and interval training groups ( $P >.05$ ) with small effect size (Cohen's  $d = 0.28$ ).



Independent sample t- test standing long jump test post result indicates that, there is statistically significant difference. As it was assessed by Levene's test for equality of variances ( $p = .043$ ) homogeneity of variance was violated, so equal variance not assumed were used;  $t = -11.357$ ,  $Df = 17.212$ ,  $P = 0.000$  two tailed, Mean Diff = 0.4221, SE Diff = .0372, the 95% CI is (0.5005, 0.3438) which does not contain 0; this agree with P value of the significance test. However, it is possible to say that, there were significant difference between interval and continuous training group ( $P < 0.05$ ) with very large effect size (Cohen's  $d = 4.29$ ).

Based on independent sample t-test, Illinois agility test post result was found to be statistically significant. As it was assessed by Levene's test for equality of variances ( $p = .001$ ) homogeneity of variance was violated, so equal variance not assumed were used;  $t = -2.851$ ,  $Df = 16.140$ ,  $P = .011$  two tailed, Mean Diff = -.6000, SE Diff = .21048, the 95% CI is (-.15412, -1.04588) which does not contain 0; this result does not violate P value of the significance test. These results had shown that, players who involved in the interval training group significant difference from players who involved in the continuous training group ( $P < .05$ ) with moderate effect size (Cohen's  $d = 1.08$ ).

Based on independent sample t-test, 30meter sprint test for fitness of speed post result was found to be statistically significant. As it was assessed by Levene's test for equality of variances ( $p = .716$ ) homogeneity of variance was not violated, so equal variance assumed were used;  $T = -3.357$ ,  $Df = 26$ ,  $P = .002$  two tailed, Mean Diff = -.4507, SE Diff = .1343, and the 95% CI is (-.17476, -.7267) which does not contain 0; this result agreed with P value of the significance test. The result indicates that players who involved in the interval training group significant difference from players who involved in the continuous training group ( $P < .05$ ) with large effect size (Cohen's  $d = 1.27$ ).

**Table 11:** Comparison Paired Sample t-Test Statistics between Pre and Post Test Results of Interval Training Group

<b>Paired Samples Statistics</b>				
Test variables	N	Mean	SD	Std. Error Mean
Muscular Endurance pre test	14	36.07reps	6.22	1.66
Muscular Endurance post test	14	43.21reps	5.65	1.51
Power pre test	14	1.5086m	.0794	.0212
Power posttest	14	2.2614m	.1288	.0344
Agility pretest	14	19.1664seco	.3830	.1024
Agility post test	14	17.2157seco	.2602	.0696
Speed pre test	14	6.0929seco	.3848	.1029
Speed post test	14	4.7279seco	.3476	.0927

N = number of Football players, SD = standard deviation, MIN= minute, REPS= repetition, M= meter, SECO= second.

As shown the above table the paired sample statistics results of pre – posttest of interval training group under comparison before and after 8week training programs, the pre-test and post-test were compared the level of 60sec sit –up test performance. Accordingly, the outcome, the mean value of pre-test was found to be 36.07reps with SD = 6.22, the mean value of post-test was found to be 43.21reps with SD = 5.65. At the level of standing long jump test performance, the outcome, the mean value of pre-test was found to be 1.5086m with SD = .0794, the mean value of post- test was found to be 2.2614m with SD = .1288.

At the level of Illinois agility test performance, the outcome, the mean value of pre -test was found to be 19.1664seco with SD = .3830, the mean value of post- test was found to be 17.2157seco with SD = .2602 and at the level of 30meter sprint test performance, the outcome, the mean value of pre- test was found to be 6.0929seco with SD = .3848, the mean value of post- test was found to be 4.7279seco with SD = .3476. Those each test protocol indicated that, there were mean difference between the pre and post- tests of interval training group. Yet, it is impossible to tell here if the differences are statistically significant. Hence a paired sample t-test comparing the pre- test and post test scores of within the group and which was computed to examine whether those number show statistical difference for each test protocol level of Ewnetu Tale academy female football players, the t- test results presented in the table which is follows.

**Table 12:** *Comparison Paired Sample t-Test Differences Pre-Post Results Measured of Interval Training Group*

Paired Samples Test								
Test variables	Paired Differences					T	Df	Sig. (2-tailed)
	Mean	Std. Devi.	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Muscular endurance pretest- Muscular endurance post-test	-7.143	2.507	.670	-8.590	-5.695	-10.66	13	.000
Power pretest – Power posttest	-.7529	.0908	.0243	-.8053	-.7005	-31.04	13	.000
Agility pretest – Agility posttest	1.9507	.2258	.0604	1.8203	2.0811	32.323	13	.000
Speed pretest– Speed posttest	1.3650	.2715	.0726	1.2082	1.5218	18.811	13	.000

The table above (12) revealed that the test of significance differences between pre and post test results within the group. According to the data presented in the table, the pre and post test result of muscular endurance performance levels in 60second sit-up test indicated a statistically significant difference. The result suggests that interval training group was significantly improved muscular endurance performance (MD = -7.143, SD = 2.507, p = 0.001) when engaged to 8 weeks of interval training with selected exercise. Hence, (P <0.05) Post-training value in muscular endurance performance was significantly enhanced in 60second sit-up test than pre-training value. In the former table (11) it was indicated that the mean score of 60second sit-up test after giving interval training method was higher than that of before giving the training. The mean value of 60second sit-up test before training was 36.07reps and it increased 43.21reps after training. The mean value difference was 7.14reps. This value showed that the performance of ITG was significantly increased from pre-posttests in repetition. We can see that eight weeks' interval training could have a great effect on the enhancement of abdominal muscular endurance performance.

The above table (12) displays the test of significance differences between pre and post test results within the group. According to the data presented in the table, the pre and post test result of fitness of power in standing long jump test indicated a statistically significant difference. The result suggests that interval training group was significantly improved the fitness of power (MD = -.7529, SD = .0908, p = 0.001) when exposed to 8 weeks of interval training method with selected exercise. Hence, (P <0.05) Post- test value of power was significantly increased in standing long jump test than pre- test value. In the former table (11) it was indicated that the mean score of standing long jump test after giving interval training method was higher than that of before giving the exercise. The mean value of standing long jump test before training was 1.5086m and it increased 2.2614m after intervention interval training. The mean value difference was .7528m. This value showed that the performance of ITG was significantly increased from pre-posttests in distance measured by meter. This indicates that eight weeks' interval training could have a beneficial modality of the improvement of power.

The table above (12) revealed the test of significance differences between pre and post-test agility results within the group. According to the data presented in the table, the pre and post test results indicated a statistically significant difference. The result suggests that ITG significantly increased level of agility (MD = 1.95071, SD = .2258,  $p = 0.001$ ) when engaged to 8 weeks of interval training with selected exercise. Thus, ( $P < 0.05$ ) Post-test mean value was significantly reduced than pre-test mean values. In the former table (11) it was indicated that the mean score of Illinois agility test after giving of interval training method was lower than that of before giving exercise. The mean value was 19.1664sec before training and it reduced to 17.2157sec after giving training. The mean value difference was 1.9507sec reductions. This implies that interval training method is a useful modality to improve the fitness of agility.

The above table (12) also displayed that the test of significance differences of the ITG between pre and post-test speed results. According to the data presented in the table, the pre and post test results had shown a statistically significant difference. The result suggests that ITG significantly increased level of speed (MD = 1.3650, SD = .2715,  $p = 0.001$ ) when engaged to 8 weeks of interval training method with selected exercise. Thus, ( $P < 0.05$ ) Post-test value was significantly reduced than pre-test values. In the former table (11) it was indicated that the mean score of 30meter sprint test after intervention of interval training with selected exercise was lower than that of before giving exercise. The mean value was 6.0929sec before training and it reduced to 4.7279sec after giving exercise. The mean value difference was 1.3650sec reductions. We can see that interval training method is a beneficial modality to improve the fitness of speed.

**Table 13:** Comparison Paired sample t-test statistics between pre and post test results of continuous training group

Paired Samples Statistics				
Test variable	N	Mean	SD	Std. Error Mean
Muscular Endurance pre test	14	36.00reps	5.189	1.387
Muscular Endurance post test	14	41.71reps	4.890	1.307
Power pre test	14	1.5321m	.0642	.0172
Power posttest	14	1.8393m	.0526	.0140
Agility pretest	14	18.825seco	.8052	.2152
Agility post test	14	17.8157seco	.7433	.1987
Speed pre test	14	5.8800seco	.4316	.1154
Speed post test	14	5.1786seco	.3627	.0969

N= number of football players, SD = standard deviation, MIN= minute, REPS= repetition, M= meter, SECO = second.

As indicated the table above 13 the paired sample statistics results of pre-posttest of continuous training group under comparison before and after 8-week training program, the pre and posttest were compared at the level of 60sec sit-up test performance of football project players, the outcome, the mean value of pretest was found to be 36.00reps with SD = 5.189, the mean value of posttest was found to be 41.71 reps with SD = 4.890. The pre and posttest were compared at the level of standing long jump test performance of football academy players, the outcome, the mean value of pretest were found to be 1.5321m with SD = .0642, the mean value of posttest was found to be 1.8393m with SD = .0526. The pre and posttest were compared at the level of Illinois agility test performance of football project players, the outcome, the mean value of pre-test was found to be 18.825seco with SD = .8052, the mean value of post- test were found to be 17.8157seco with SD = .7433.

and The pre and post-test were compared at the level of 30meter sprint test performance of football project players, the outcome, the mean value of pre-test was found to be 5.8800seco with SD = .4316, the mean value of post-test was found to be 5.1786seco with SD = .36267. Each level of test protocol indicated that, there were mean difference between the pre and post-tests within the group, yet it is impossible to tell here if the differences are statistically significant. Hence a paired sample t-test comparing the pre and post test scores of the continuous training group and which was computed to examine whether those number show statistical difference or not on each test protocol performance levels of the football academy players pre and posttest of within the group, the t- test results presented in the table which is follows.

**Table 14:** *Paired Sample t-Test Differences Pre-Post Results Measured of Continuous Training Group*

Paired Samples Test								
Test variables	Paired Differences					T	Df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Muscular endurance pretest – Muscular endurance posttest	-5.714	2.614	.699	-7.224	-4.205	-8.178	13	.000
Power pretest- Power posttest	-.3071	.0421	.0113	-.3315	-.2828	-27.271	13	.000
Agility pretest- Agility post test	1.0093	.1645	.0440	.9143	1.1043	22.960	13	.000
Speed pretest – Speed posttest	.70143	.12805	.0342	.6275	.7754	20.495	13	.000

The table above 14 revealed that significance differences between pre and post test results in the CTG. According to the data presented in the table, the pre and post test result of muscular endurance performance levels of 60second sit-up test indicated a statistically significant difference in the CTG. The result suggests that CTG was significantly improved muscular endurance performance (MD = -5.714, SD = 2.614,  $p = 0.001$ ) when exposed to 8 weeks of continuous training method with selected exercise. Hence, ( $P < 0.05$ ) Post-training mean value of muscular endurance performance was significantly increased in 60second sit-up test than pre-test values. In the former table (13) it was revealed that the mean score of 60second sit-up test after intervention of continuous training method was higher than that of before giving the training. The mean value of 60second sit-up test before training was 36.00reps and it increased 41.71reps after training. The mean value difference was - 5.714reps. This value showed that the performance of CTG was significantly increased from pre-posttests in repetition. This shows that eight weeks continuous training method could have an effective modality on the improvement of muscular endurance performance.

The above table (14) displayed that significance differences between pre and post test results within the group. According to the data presented in the table, the pre and post test result of power in standing long jump test indicated a statistically significant difference. The result suggests that CTG was significantly improved the fitness of power (MD = -.3071, SD = .0421,  $p = 0.001$ ) when exposed to 8 weeks of continuous training with selected exercise. Hence, ( $P < 0.05$ ) Post-test mean value of power was significantly enhanced in standing long jump test than pre-training value. In the former table 13 it was showed that the mean score of standing long jump test after giving continuous training modality was higher than that of before giving the exercise. The mean value of standing long jump test before training was 1.5321m and it increased 1.8393m after giving continuous training with selected exercise. The mean value difference was .3071. This value showed that the performance of CTG was significantly increased from pre-posttests in distance measured by meter. This indicates that eight weeks continuous training could have an effective method to improving fitness power.

The above table 14 displayed that, the test of significance differences between pre and post test results in the CTG. According to the data presented in the table, the pre and post test



results indicated a statistically significant difference. The result suggests that CTG significantly increased level of agility (MD = 1.0093, SD = .1645,  $p = 0.001$ ) when exposed to 8 weeks of continuous training method with selected exercise. Thus, ( $P < 0.05$ ) Post-test mean value was significantly reduced than pre-test mean values. In the former table 13 it was showed that the mean score of Illinois agility test after giving of continuous training method was lower than that of before giving exercise. The mean value was 18.8250sec before exercise and it reduced to 17.8157sec after giving exercise. The mean value difference was 1.0093sec reductions. We can see that continuous training method is an effective modality to improve the fitness of agility.

The above table 14 also revealed that the test of significance differences in the CTG between pre and post test results. According to the data presented in the table, the pre and post test results showed a statistically significant difference. The result suggests that CTG significantly increased level of speed (MD = .70143, SD = .12805,  $p = 0.001$ ) when engaged to 8 weeks of continuous training method with selected exercise. Thus, ( $P < 0.05$ ) Post-test mean value was significant reduced than pre-test values. In the former table (13) it was indicated that the mean score of 30meter sprint test after giving continuous training with selected exercise was lower than that of before giving exercise. The mean value was 5.8800sec before training and it reduced to 5.1786sec after training. The mean value difference was .7014sec reductions. This implies that continuous training is beneficial modality to enhance the fitness of speed.

## **4.2 Discussions**

The purpose of this study was to investigate the effect of 8 weeks of continuous and interval training on selected physical fitness variables among female football academy players. Subjects participated throughout the treatment period and cooperated for the success of collection of necessary data. Both groups were performing activities of normal training by giving the academy coach and agreed not to change or increase their current exercise habits during the course of the study. The groups were to instruct not to start any programs during the 8-weeks period and only perform their daily living & regular football

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

Modern football requires the players to have high quality of physical fitness has become one of the main pillar in training plan either daily, weekly, seasonally & annually. Player's physical fitness significantly increased in the world in recent years & years ago, we found that their physical fitness quality has grown in a remarkable way (Farouk & saleh, 2004). Aerobic and anaerobic training helps to develop muscular endurance, speed, agility and power as well as skills and become more effective when giving to young players (Reilly, 2000; Strudick, 2002). In this study 8weeks continuous and interval training method indicated that the improvements of physical fitness variables of muscular endurance, power, agility and speed. The finding of this study in each variable are discussed as follows.

**In case of muscular endurance:** in the base line as the result of pre-test indicated that, there is no significant difference between two groups in the level of muscular endurance performance at 0.05 level of confidence ( $P = .974$ ) when assessed by 60second sit-up test. However, there was significant increment from the pre to post test results evaluated by 60second sit-up test in the ITG. The result suggests that ITG significantly increased muscular endurance performance ( $MD = -7.143$ ,  $SD= 2.507$ ,  $p= 0.001$ ), significant at 0.05 level of confidence. This increment of muscular endurance performance in the ITG was due to exposed of 8 weeks of interval training method. At the end of the study, the mean difference of ITG in muscular endurance performance was significantly increased by - 7.143 repetitions. This indicates that interval training plays a vital role in developing muscular endurance performance.

On the other point there was significant increment between the pre to post test results evaluated by 60second sit-up test within the group. The result suggests that CTG significantly increased muscular endurance performance ( $MD = -5.714$ ,  $SD= 2.614$ ,  $p = 0.001$ ), significant at 0.05 level of confidence. This increment of muscular endurance performance in the CTG was due to the exposed of 8weeks of continuous training method. At the end of the study, the mean difference of CTG in muscular endurance performance

was significantly increased by -5.714 repetitions. This indicates that continuous training plays a vital role in developing muscular endurance performance.

As we have seen the above explanation both groups were significantly increased in muscular endurance performance. But, ITG MD = -7.145reps. CTG MD = -5.714reps. These results indicate ITG score better than CTG score. Revealed that, as it was assessed by Levene's test for equality of variances  $P = .459$  two tailed, Mean Diff = 1.500. This result does violate  $P$  value of the significant test. Which means there were not a significant difference between two intervention groups on muscular endurance performance ( $p > .05$ ) with small effect size (Cohen's  $d = 0.28$ ). So, the formulated hypothesis that, there is no significant differences on muscular endurance of female football players as the result of continuous and interval training method was accepted at 0.05 level of confidence.

This finding agreed with (Eddy, 1977) reported a similar increase in  $VO_{2max}$ , endurance and endurance performance in response to 7 weeks of continuous cycling training and interval cycling training in men and women.

**In case of power:** before start training program, the result of pre-test indicated that, there is no significant difference between groups in the fitness of power at 0.05 level of confidence ( $P = .396$ ) when assessed by standing long jump test. on the other hand, the finding of this study on results presented in case of fitness of power proved that there were significant differences between the pre to post test scores in the ITG (MD = .752, SD = .09076,  $p = 0.001$ ), significant at 0.05 level of confidence. This result indicated that effective improvement was observed on football academy players in fitness of power who engaged in 8 weeks' interval training method. This indicates that interval training is an effective method of improving fitness of power.

On the other point of view, the finding of this study on results presented in case of fitness of power. Proved that there were significant differences between the pre to post test scores in the CTG (MD = -.30714, SD = .04214,  $p = 0.001$ ), significant at 0.05 level of confidence. We can see that effective improvement was observed on football project players in fitness of power that exposed in 8 weeks continuous training. So, continuous training method is an effective modality of improving fitness of power.

As we have seen the above explanation both groups were significantly increased in fitness of power. But, ITG MD = -.7529m and CTG MD=.30714m, this result indicated players who participate in the interval training score better result than players who participate in the continuous training. As it was assessed by Levene's test for equality of variances;  $P = 0.001$  two tailed, Mean Diff = -0.4214. The result agrees with p value of the significance test. So, it can say that there was significant difference between interval and continuous training group on fitness of power ( $p < 0.05$ ) with very large effect size (Cohen's  $d = 4.29$ ). Therefore, the formulated hypothesis that, there is a significant difference on fitness of power as the result of continuous and interval training method was accepted at 0.05 level of confidence.

This finding similar to Cathal (2013). It appears that HIIT is a more effective and time efficient training method than HVET for improving aerobic capacity and maintaining speed and power in club level Gaelic football players.

**In case of Agility:** in the base line as the result of pre-test displayed that, there is no significant difference between groups in the fitness of agility at 0.05 level of confidence ( $p = 0.169$ ) when assessed by Illinois agility test. Whereas, the finding of this study on results presented in case of fitness of agility, proved that, there were significant differences between the pre to post test scores in the ITG (MD = 1.9507, SD = .2258,  $p = 0.001$ ), significant at 0.05 level of confidence. This result indicated that effective improvement was observed on football project players in fitness of agility who engaged in 8weeks interval training. This indicates that interval training could have a great effect to enhancing fitness of agility.

On the other hand, the finding of this study on results presented in case of fitness of agility, proved that there were significant differences between pre to post test scores in the CTG (MD = 1.0093, SD = .1645,  $p = 0.001$ ), significant at 0.05 level of confidence. This result indicated that effective improvement was observed on football academy players in fitness of agility that exposed of 8 weeks continuous training method. We can say that continuous training is beneficial modality of improving fitness of power.

As we have seen the above description indicated that, both groups significantly enhanced fitness of agility. But, ITG MD=1.9507sec and CTG MD=1.0093sec. These results indicate that players who involved in the interval training group scores better result than players who involved in the continuous training group. As it was assessed by Levene's test for equality of variances;  $P = .011$  two tailed, Mean Diff = .6000. These result agreed with  $P$  value of the significance test. One can understand those number showed statistically significant difference between two intervention group on the fitness of agility ( $p < .05$ ) with small effect size (Cohen's  $d = 0.54$ ). So, formulated hypothesis that, there is no significant difference on fitness of agility as the result of continuous and interval training method were rejected at 0.05 level of confidence.

**In case Speed:** before start the training program as the result of pre-test had shown that, there is no significant difference between two groups in the fitness of speed at 0.05 level of confidence ( $p = .180$ ) when assessed by 30meter sprint test. However, there was a significant difference between the pre to post test score in the ITG when assessed by 30meter sprint test. The result suggests that ITG was significantly improved fitness of speed (MD = 1.3650, SD = .2715,  $p = 0.001$ ), significant at 0.05 level of confidence. The improvement of ITG in the fitness of speed was due to the interval training method in which they were engaged in. This result indicated that effective change was observed on football players who exposed in 8weeks interval training on the fitness of speed. So, Interval training is an effective method to enhancing fitness of speed.

On the other hand, there was significant difference between the pre to post test score in the CTG when assessed by 30second sprint test. The result suggests that CTG was significantly improved the fitness of speed (MD = .70143, SD = .12805,  $p = 0.001$ ), significant at 0.05 level of confidence. The improvement of CTG in the fitness of speed was due to continuous training with selected exercise in which they were engaged in. This result indicated that effective change was observed on football players who engaged in 8 weeks continuous training on the fitness of speed. Therefore, continuous training is an effective modality to develop fitness of speed.

As we have seen the above description indicated both groups significantly increased fitness of speed. But, ITG MD=1.3650sec and CTG MD=.70143sec. This result indicates

that players who involved interval training group scores better result than players who involved continuous training group. As it was assessed by Levene's test for equality of variances;  $P = .001$  two tailed, Mean Diff =  $-.4507$ . This result agreed with  $P$  value of the significance test. One can understand this number showed statistically significant difference between two intervention group on the fitness of speed ( $p < .05$ ) with large effect size (Cohen's  $d = 1.27$ ). So, formulated hypothesis that, there is a significant difference on speed of football players as the result of continuous and interval training method were accepted at 0.05 level of confidence.

This finding similar to (Sudhakar & Kumar, 2014) Speed was significantly improved by Continuous running group, Fartlek training group and Interval training group when compared with control group. Speed was significantly improved in Interval training group when compared with Continuous running group and Fartlek training group.

## **CHAPTER FIVE**

### **SUMMARY, CONCLUSIONS AND RECOMMENDATIONS**

#### **5.1. Summary**

The purpose of this study was to investigate the effect of 8 weeks continuous training and interval training with selected exercise on cardio respiratory fitness, muscular endurance, power, agility and speed among Ewnetu Tale female football academy players at Dangila town. For this purpose, the researcher reviewed the available literatures in order to decide the focus of the study and methodologies. In order to attain the general objective of the study, the following specific research objectives were formulated.

- To assess effect of 8weeks continuous training and interval training method on the fitness of muscular endurance.
- To examine effect of 8 weeks continuous training and interval training method on the fitness of power.
- To evaluate effects of 8 weeks continuous training and interval training method on the fitness of agility.
- To measure effect of 8 weeks continuous training and interval training on the fitness of speed.

Based on the above specific objectives, the hypothesis was formulated. In dealing with these basic objectives, the study conducted on female football academy players. Among the population of 28 female football players using based on pre-test result of mixed sampling techniques in order to assign continuous training group (14) and interval training group (14). The research focused on pure experimental study within 8 weeks continuous training and interval training with selected exercise. Training was done 3 times per week for 60 minutes per session. The selected physical fitness variables muscular endurance (60sec sit – up test), power (standing long jump test) agility (Illinois agility test) and speed (30meter sprint test) were taken from the participants at pre and post training programs. Before the training program, the pretests were taken from the players. At the end of the training program the

post test was taken from the players. Independent sample t- test and Paired sample t-test was used to find out the significant difference ( $p \leq 0.05$ ) between two groups and the post training result and pre training result of each variable respectively. In all cases, 0.05 level of confidence was fixed to test the significance, which was considered as appropriate. The result obtained in this study showed significant improvements in selected physical fitness parameters in the participants of the study and significant difference or not between two groups, after analyzing the pre-post mean difference of each variable. The study finally showed that there is a significant difference between continuous and interval training group on power, agility and speed. Therefore, continuous and interval training had a significant effect on the improvement physical fitness variables for Ewnetu Tale Academy female football players to play the game effectively and efficiently.

Through paired t-test and independent sample t-test the data was analyzed. Hence, the following findings were investigated.

- The finding of this study revealed that muscular endurance was significantly improved in both groups (interval and continuous training groups) after 8 weeks of continuous training and interval training. Muscular endurance performance level was increased in ITG as well as CTG. So, there is no a significant difference between continuous training and interval training groups on muscular endurance.
- Finding of this research showed that there is a significant difference between pre to post test in the ITG and CTG as a result of continuous training and interval training method. Both groups were significantly increased fitness of power. But there is a significant difference between continuous training and interval training groups on fitness of power. Therefore, ITG was better achieved than CTG in fitness of power.
- The finding of this study displayed that fitness of agility was significantly improved in both groups (ITG and CTG) after exposed to 8 weeks continuous training and interval training method. Which means significant change between pre to post test was observed. But there is a significant difference between continuous training and interval training groups on fitness of agility. Therefore, ITG was better out performed than CTG in fitness of agility.



- The finding of this research revealed that fitness level of speed was significantly improved in both groups (ITG and CTG) after exposed to 8 weeks continuous training and interval training method. Which means significant change between pre to post test was observed. But there is a significant difference between continuous training and interval training groups on fitness of speed. So, ITG was better performed than CTG in fitness of speed.

## **5.2. Conclusions**

Based on the major finding of this study, the following points were stated as a conclusion

- To improve female football player's physical fitness, programmed fundamental training method plays a great roll.
- The test can predict the current physical fitness performance of female football players.
- Eight weeks continuous training method and interval training method have the same positive effect on improvement of muscular endurance.
- Eight weeks continuous training method and interval training method has a positive effect on improvement of power, agility and speed.
- Interval training were better out performed than continuous training on fitness of power, agility and speed variables
- Concerned on the result of finding, female football players were interested without losing hop for better improvement of performance.

## **5.3. Recommendations**

Based on results, discussions and findings of the study, the following would be recommended:

1. For better improvement of power, agility and speed for female football players Coaches and football federation need to engage interval training at least 3 days per week for 60 minutes each day.
2. The coach shall to give emphases to interval as well as continuous training program to Ewnetu Tale Academy female football players and take actions to improve players' better physical fitness enhancement.

3. This study was conducted to examine the effect of continuous and interval training on Ewnetu Tale academy female football player's physical fitness improvement such as muscular endurance, power, and agility and speed only. So it is recommended for other researchers to evaluate the effect of these training methods on other fitness elements like strength, flexibility, coordination, balance, body composition, etc.

4. When designing training program using interval training, coaches and football player's necessary to consider the intensity and duration of the recovery activities based on the intensity of work intervals.

5. Coaches, football federation and sport administration need to incorporate and encourage interval training as well as continuous training at the academy level. This will help to improve the physical fitness of player's particularly muscular endurance, power, agility and speed.

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## APPENDICES

### Appendix A: some selected physical fitness test norms

#### Illinois Agility Test Norms

Gender	Excellent	Above Average	Average	Below Average	Poor
Female	<17.0 secs	17.0 - 17.9 secs	18.0 - 21.7 secs	21.8 - 23.0 secs	>23.0 secs

Source: (Phil Davies, 2005).

#### 60 Second Sit-Up Test Norms

Gender	Excellent	Above Average	Average	Below Average	Poor
Female	>25	21 - 25	15 - 20	9 - 14	<9

Source: (Phil Davies, 2005).

#### Standing Long Jump Test Norms

Rating	Female(cm)
Excellent	>200
Very good	191-200
Above average	181-190
Average	171-180
Below average	161-170
Poor	141-160
Very poor	<141

Source: (Phil Davies, 2005).

#### 30meter Sprint Test Norms

Gender	Excellent	Above average	Average	Below average	Poor
Female	<4.5	4.6-4.5	4.8-4.7	5.0-4.9	>5.0

**Appendix B: Dangila Town Ewnetu Tale Female Football Academy continuous and interval training program female football player’s personal profile**

**Place-**, Keble - 05 training field

**Training Type** –continuous training, Particular Training Time – 10:00-11:00 after noon and interval training, Particular Training Time – 12: 00-1:00 Morning Local Time

**Age Category** 14-17

**Number of player** -28, of trainees –Female

**Table 15:** *List of personal profile of the players for continuous training group*

No	Name of the participants	Sex	Age (year)	Height (meter)	Weight (kg)	Experience in football(year)
1	A	Female	16	1.52	47	2
2	B	Female	16	1.60	44	3
3	C	Female	17	1.65	56	3
4	D	Female	16	1.52	42.3	2
5	E	Female	17	1.62	51.5	3
6	F	Female	14	1.51	38	2
7	G	Female	16	1.58	43	3
8	H	Female	14	1.47	35.8	2
9	I	Female	15	1.57	39.3	2
10	J	Female	17	1.73	56.1	3
11	K	Female	15	1.60	39	3
12	L	Female	14	1.55	50	2
13	M	Female	17	1.58	52	3
14	N	Female	16	1.53	44.5	1

**Table 16:** *List of personal profile of the players for interval training group*

No	Name of participants	Sex	Age (year)	Height (meter)	Weight (kg)	Experience in football(year)
1	a	Female	15	1.60	46.1	2
2	b	Female	17	1.57	47	3
3	c	Female	17	1.65	49.7	2
4	d	Female	16	1.57	49	3
5	e	Female	17	1.64	48.9	3
6	f	Female	14	1.58	38.7	2
7	g	Female	17	1.67	54	3
8	h	Female	17	1.60	51.2	3
9	i	Female	14	1.56	38.9	2
10	j	Female	14	1.50	38.2	2
11	k	Female	17	1.57	58.5	3
12	l	Female	14	1.63	44.8	2
13	m	Female	15	1.45	39.8	2
14	n	Female	15	1.47	40.6	3

### Appendix C: Selected physical fitness variables

**Table 17:** *Selected physical fitness variables*

No	Parameters	Type of test	Unit
1	Muscular endurance	60 seconds Sit- up test	Repetition/second
2	Power	Standing long jump test	Distance/ meter
3	Agility	Illinois agility test	Distance/second
4	Speed	30 meter sprint test	Distance/second

**Appendix D: Pre and Post Test results of continuous training Group**

**Table 18:** *Pre and Post Test results of muscular endurance, power, agility and speed for continuous training Group*

No	Continu ous training group(C TG)	Age	Variables									
			Muscular endurance Test				Power Test		Agility Test		Speed Test	
			Pre	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
1	A	16	42	1.58	1.83	0.25	18.00	17.00	-1.00	5.56	4.80	-0.76
2	B	16	41	1.60	1.89	0.29	18.34	17.26	-1.18	5.34	4.84	-0.50
3	C	17	36	1.61	1.89	0.28	18.20	17.20	-1.00	5.25	4.82	-0.43
4	D	16	39	1.54	1.85	0.31	18.26	17.36	-0.90	6.09	5.33	-0.76
5	E	17	37	1.52	1.78	0.26	18.19	17.17	-1.02	5.38	4.80	-0.58
6	F	14	38	1.50	1.76	0.26	18.34	17.18	-1.16	6.00	5.22	-0.78
7	G	16	42	1.51	1.82	0.31	18.40	17.35	-1.05	5.50	4.84	-0.66
8	H	14	35	1.46	1.86	0.40	18.68	18.03	-0.65	6.27	5.45	-0.82
9	I	15	24	1.60	1.88	0.28	18.87	18.00	-0.87	5.68	5.00	-0.68
10	J	17	38	1.61	1.92	0.31	19.00	18.00	-1.00	5.94	5.12	-0.82
11	K	15	38	1.53	1.87	0.34	19.25	18.22	-1.03	6.49	5.80	-0.69
12	L	14	35	1.52	1.86	0.34	19.31	18.45	-0.86	6.17	5.28	-0.89
13	M	17	29	1.48	1.79	0.31	19.71	18.55	-1.16	6.07	5.30	-0.88
14	N	16	30	1.39	1.75	0.36	21.00	19.65	-1.35	6.58	5.90	-0.78

**Appendix E: pre and post test result of interval training group**

**Table 19:** *Pre and Post Test results of muscular endurance Power, Agility and Speed for interval training Group*

No	Interval training group (ITG)	Age	Variables									
			Muscular endurance			Power			Agility			Speed
			Test			Test			Test			Test
			Pre	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
1	a	15	41	1.52	2.38	0.86	19.00	17.00	-2.00	5.48	4.36	-1.12
2	b	17	45	1.60	2.30	0.70	18.58	17.00	-1.58	5.95	4.44	-1.51
3	c	17	40	1.61	2.36	0.75	18.77	17.05	-1.72	6.00	4.47	-1.53
4	d	16	39	1.53	2.34	0.81	19.23	17.13	-2.10	5.65	4.33	-1.32
5	e	17	41	1.60	2.26	0.66	18.76	17.07	-1.69	5.83	5.00	-0.83
6	f	14	38	1.50	2.32	0.82	19.22	17.08	-2.12	6.49	5.11	-1.38
7	g	17	38	1.54	2.35	0.81	18.68	17.10	-1.58	6.39	4.34	-1.05
8	h	17	42	1.55	2.37	0.82	19.28	17.22	-2.06	5.58	4.37	-1.21
9	i	14	34	1.46	2.28	0.82	19.35	17.20	-2.15	6.35	5.07	-1.28
10	j	14	30	1.51	2.22	0.71	19.56	17.32	-2.24	6.23	5.03	-1.20
11	k	17	23	1.48	2.20	0.72	19.20	17.13	-2.07	5.95	4.65	-1.30
12	l	14	34	1.47	2.31	0.84	19.30	17.47	-1.83	6.55	5.10	-1.45
13	m	15	33	1.45	1.98	0.53	19.40	17.25	-2.15	6.10	4.67	-1.43
14	n	15	27	1.30	1.99	0.69	20.00	18.00	-2.00	6.75	5.25	-1.50

## Appendix F: Two-month interval training program

Place- Keble - 05 training field

Age- 14-17

**Objective-** Interval training for the improvement of physical fitness variables

The first month training plane for interval training group.

**Table 20:** 8 weeks of interval training plane

Day	Week-1	Set	Rep	Intensity	Time (60mint )	Load	Distance	Recovery time/Active rest/
Monday	<p><b>Warming up exercise</b> Walking, jogging &amp; Synchronized movement of hands and leg, arm, stretching exercise</p> <p><b>Main part</b> - Supper shuttle, Over- under hurdle</p> <p><b>Cooling down</b> Players perform Rehydrate, light movement, breathing meditation, static stretching at the end of the session.</p>	2-3 2-3	6-8	Low to Moderate  moderate  Low	10' 40' 10'	Bodyweight	40-60 meters (60m x 140seco)	2, or 3minuts b/n sets
Wednesday	<p><b>Warming up exercise</b> -Walking, jogging &amp; Synchronized movement of hands and leg, arm, stretching exercise</p> <p><b>Main part</b> -Bounding with ring, Hurdle jumps, Hollow sprint with ball</p> <p><b>Cooling down</b> Players perform Rehydrate, light movement, breathing meditation, static stretching at the end of the session.</p>	3-4 2-3 3-4	6-8	Low to Moderate  moderate  Low	10' 40' 10'	Bodyweight	40-60 meters (60m x 140seco)	2 or 3minuts b/n sets

Friday	<p><b>Warming up exercise</b> -Walking, jogging &amp; Synchronized movement of hands and leg, arm, stretching exercise</p> <p><b>Main part</b> -Supper shuttle, Over-under hurdle</p> <p><b>Cooling down</b> Players perform Rehydrate, light movement, breathing meditation, static stretching at the end of the session.</p>	2-3 2-3	6-8	Low to Moderate  moderate  Low	10' 40' 10'	Bodyweight	40-60 meters (60 x 140seco)	2-3minutsb /n sets
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### Week 2, 3 & 4

Monday	<p><b>Warming up exercise</b> Walking, jogging &amp; Synchronized movement of hands and leg, arm, stretching exercise</p> <p><b>Main part</b> -Supper shuttle, Over-under hurdle</p> <p><b>Cooling down</b> Players perform Rehydrate, light movement, breathing meditation, static stretching at the end of the session.</p>	3-4 3-4	8-10	Low to Moderate  moderate  Low	10' 40' 10'	Bodyweight	40-60 meters (60m x 140seco)	2-5minuts b/n sets
Wednesday	<p><b>Warming up exercise</b> -Walking, jogging &amp; Synchronized movement of hands and leg, arm, stretching exercise</p> <p><b>Main part</b> -Bounding with ring, Hurdle jumps, Hollow sprint with ball</p> <p><b>Cooling down</b> Players perform Rehydrate, light movement, breathing meditation, static stretching at the end of the session.</p>	4-6 3-4 3-5	8-10	Low to Moderate  moderate  Low	10' 40' 10'	Bodyweight	40-60 meters (60m x 140seco)	2-3minuts b/n sets



Friday	<b>Warming up exercise</b> -Walking, jogging & Synchronized movement of hands and leg, arm, stretching exercise			Low to Moderate	10'	Bodyweight	40-60 meters (60m x 140sec)	2-3minuts b/n sets
	<b>Main part</b> -Supper shuttle, Over-under hurdle	3-4 3-4	8-10	moderate	40'			
	<b>Cooling down</b> Players perform Rehydrate, light movement, breathing meditation, static stretching at the end of the session.			Low	10'			

**Week 5, 6, 7 & 8**

Monday	<b>Warming up exercise</b> Walking, jogging & Synchronized movement of hands and leg, arm, stretching exercise	3-4 3-4	8-10	Low to Moderate	10'	Body weight	40-60 meters (60mx 140sec)	2-3minutsb/n sets
	<b>Main part</b> -Supper shuttle, Over-under hurdle, Bounding with ring, Hurdle jumps, Hollow sprint with ball	4-6 3-4 3-5		moderate	40'			
	<b>Cooling down</b> Players perform Rehydrate, light movement, breathing meditation, static stretching at the end of the session.			Low	10'			

Wednesday	<p><b>Warming up exercise</b> -Walking, jogging &amp; Synchronized movement of hands and leg, arm, stretching exercise</p> <p><b>Main part</b> -Supper shuttle, Over-under hurdle, Bounding with ring, Hurdle jumps, Hollow sprint with ball</p> <p><b>Cooling down</b> Players perform Rehydrate, light movement, breathing meditation, static stretching at the end of the session.</p>	3-4 3-4 4-6 3-4 3-5	8-10	Low to Moderate moderate Low	10' 40' 10'	Body weight	40-60 meters (60m x140seco)	2-5minutsb/n sets
Friday	<p><b>Warming up exercise</b> -Walking, jogging &amp; Synchronized movement of hands and leg, arm, stretching exercise</p> <p><b>Main part</b> -Supper shuttle, Over-under hurdle, Bounding with ring, Hurdle jumps, Hollow sprint with ball</p> <p><b>Cooling down</b> Players perform Rehydrate, light movement, breathing meditation, static stretching at the end of the session.</p>	3-4 3-4 4-6 3-4 3-5	8-10	Low to Moderate moderate Low	10' 40' 10'	Body weight	40-60 meters (60m x 140seco)	2-3minutsb/n sets

**Appendix G: Two-month continuous training plane**

Four-week consecutive training plan for continuous training group.

**Place-** Keble - 05 training field

**Age-** 14-17

**Objective-** Continuous training for the improvement of physical fitness variables

**Table 21:** 8-week continuous training plane

Day	Week-1	Intensity	Time	Load	Distance	Recovery time/Active rest/
Monday	<p><b>Warming up exercise</b> -Walking, jogging &amp; Synchronized movement of hands and leg, arm, stretching exercise</p> <p><b>Main part</b> -Supper shuttle, Over-under hurdle</p> <p><b>Cooling down</b> players perform Rehydrate, light movement, breathing meditation, static stretching at the end of the session.</p>	Low to Medium moderate Low	10'  40'  10'	Body weight	40-60 meters (60m x 140seco)	No resting time

Wednesday	<p><b>Warming up exercise</b> -Walking, jogging &amp; Synchronized movement of hands and leg, arm, stretching exercise</p> <p><b>Main part</b> -Bounding with ring, Hurdle jumps, Hollow sprint with ball</p> <p><b>Cooling down</b> Players perform Rehydrate, light movement, breathing meditation, static stretching at the end of the session.</p>	Low to Medium Moderate Low	10' 40' 10'	Body weight	40-60 meters (60m x 160seco)	No resting time
Friday	<p><b>Warming up exercise</b> -Walking, jogging &amp; Synchronized movement of hands and leg, arm, stretching exercise</p> <p><b>Main part</b> -Supper shuttle, Over-under hurdle</p> <p><b>Cooling down</b> Players perform Rehydrate, light movement, breathing meditation, static stretching at the end of the session.</p>	Low to Medium Moderate Low	10' 40' 10'	Body weight	40-60 meters (60m x 140seco)	No resting time

**Week 2, 3 & 4**

Monday	<p><b>Warming up exercise</b> Walking, jogging &amp; Synchronized movement of hands and leg, arm, stretching exercise</p> <p><b>Main part</b> -Supper shuttle, Over-under hurdle</p> <p><b>Cooling down</b> Players perform Rehydrate, light movement, breathing meditation, static stretching at the end of the session.</p>	Low to Moderate moderate Low	10' 40' 10'	Bodyweight	40-60 meters (60m x 140seco)	No resting time
Wednesday	<p><b>Warming up exercise</b> -Walking, jogging &amp; Synchronized movement of hands and leg, arm, stretching exercise</p> <p><b>Main part</b> -Bounding with ring, Hurdle jumps, Hollow sprint with ball</p> <p><b>Cooling down</b> Players perform Rehydrate, light movement, breathing meditation, static stretching at the end of the session.</p>	Low to Moderate moderate Low	10' 40' 10'	Bodyweight	40-60 meters (60m x 140seco)	No resting time
Friday	<p><b>Warming up exercise</b> -Walking, jogging &amp; Synchronized movement of hands and leg, arm, stretching exercise</p> <p><b>Main part</b> -Supper shuttle, Over-under hurdle</p> <p><b>Cooling down</b> Players perform Rehydrate, light movement, breathing meditation, static stretching at the end of the session.</p>	Low to Moderate moderate Low	10' 40' 10'	Bodyweight	40-60 meters (60m x 140seco)	No resting time

The next four-week consecutive training plan for continuous training group.

**Week 5, 6, 7 & 8**

Monday	<p><b>Warming up exercise</b> -Walking, jogging &amp; Synchronized movement of hands and leg, arm, stretching exercise</p> <p><b>Main part</b> -Supper shuttle, Over-under hurdle, Bounding with ring, Hurdle jumps, Hollow sprint with ball</p> <p><b>Cooling down</b> players perform Rehydrate, light movement, breathing meditation, static stretching at the end of the session.</p>	Low to Medi um  mode rate Low	10'  40' 10`	Bodyw eight	40-60 meters (60m x 140seco)	No resting time
Wednesday	<p><b>Warming up exercise</b> -Walking, jogging &amp; Synchronized movement of hands and leg, arm, stretching exercise</p> <p><b>Main part</b> -Supper shuttle, Over-under hurdle, Bounding with ring, Hurdle jumps, Hollow sprint with ball</p> <p><b>Cooling down</b> Players perform Rehydrate, light movement, breathing meditation, static stretching at the end of the session.</p>	Low to Medi um  Mod erate Low	10'  40' 10`	Bodyw eight	40-60 meters (60m x 140seco)	No resting time

Friday	<b>Warming up exercise</b>	Low	10'	Bodyweight	40-60 meters (60mx140sec)	No resting time
	-Walking, jogging & Synchronized movement of hands and leg, arm, stretching exercise	to				
	<b>Main part</b>	Medium	40'			
	-Supper shuttle, Over-under hurdle, Bounding with ring, Hurdle jumps, Hollow sprint with ball	Mode	10'			
<b>Cooling down</b> Players perform Rehydrate, light movement, breathing meditation, static stretching at the end of the session.	Low					

## **Appendix H: Interval Training Group Session Plan**

**Name of Coach:** Abera Solomon

**Age:** 14-17 years' old

**Equipment:** Cones, watch, ring, hurdle, football and Whistle  
Friday

**Training Day:** Monday, Wednesday and

**Topic:** Interval Training

**No- of trainees:** 14

**Time allowed;** 60'

**Objectives:** At the end of this session, football players will be able to:

Cognitive –demonstrate an understanding for the beneficial of training on physical fitness.

Psychomotor – demonstrate supper shuttle, over-under hurdle for Day one. Hurdle jump, bounding with ring and hollow sprint with ball for Day two.

Affective- show positive attitude while practice in the football game.



**Table 22:** *Daily session training plan for interval training group*

Day one

No	Training activities	Time	Intensity	Re p.	Set	Description	Key points of training
1	Warm-up		Low to Moderate				
	Light Jogging, Running on spot, Skipping jump, Stride jump, High Knee to Ball, High Toe to Ball, Kicking out –stretched hand with one foot every third step, Straight leg volley and One knee raising and pressing to the chest	10'				Trainees Perform a specific part of the body that are relevant to the performance part of training	Each player should perform such activities appropriately and effectively
2	Performance part	40'	moderate				
	Supper shuttle	20`		6-8	2-3	Each player follows the step and phases are running Backward, side step and forward with arm-swing correctly and perform repeatedly	-Performing supper shuttle, players follow up: - a) Run backwards to the centre cone, side step to the right cone, Side step back to the centre cone still facing the same way. b) Turn and sprint forward to the end cone. c) Run back to the centre cone, side step to the right, side step back to the centre, then turn and sprint back to the start.

	Over-under hurdle	20`		6-8	2-3	Each player follow steps and phase with sprint run to the 1 <sup>st</sup> hurdle jump it , sprint the 2 <sup>nd</sup> hurdle and crawls under it before to a ball, to accomplish a short period of time to win and perform repeatedly	-Performing over-under hurdle, players follow up: a) On the coach's command, a player from each group sprints to the first hurdle jumps it, sprints to the next hurdle and crawls under it before sprinting to a ball on the edge of the box. b) If the defender wins they clear the ball. If the attacker wins they shoot at goal.
3	Cooling Down		Low				
	trainees perform Rehydrate, light movement, static stretching at the end of the session	10'				The phase of physical and mental relaxation. It usually takes place on the pitch and includes some light jogging& cooling	Each trainees should perform such cooling-down properly and effectively

## **Appendix I: Continuous Training Group Session Plan**

**Name of Coach:** Abera Solomon

**Age:** 14-17 years' old

**Equipment:** Cones, watch, ring, hurdle, football and Whistle

**Training Day:** Monday, Wednesday and Friday

**Topic:** Continuous Training

**No- of trainees:** 14

**Time allowed;** 60'

**Objectives:** At the end of this session, football players will be able to:

Cognitive –demonstrate an understanding for the beneficial of training on physical fitness.

Psychomotor – demonstrate supper shuttle, over-under hurdle for Day one. Hurdle jump, bounding with ring and hollow sprint with ball for Day two.

Affective- show positive attitude while practice in football game.

**Table 23:** *Daily session training plan for continuous training group*

Day one

No	Training activities	Time	Intensity	Description	Key points of training
1	Warm-up		Low to Medium		
	Light Jogging, running on spot, Skipping jump, Stride jump, High Knee to Ball High Toe to Ball, kicking out –stretched hand with one foot every third step Straight leg volley and One knee raising and pressing to the chest	10'		Trainees Perform a specific part of the body that are relevant to the performance part of training	Each player should perform such activities appropriately and effectively
2	Performance part	40'	Moderate		
	Supper shuttle	20`		Each player follows the step and phases are running Backward, side step and forward with arm-swing correctly and perform repeatedly	-Performing supper shuttle, players follow up: - a) Run backwards to the centre cone, side step to the right cone, Side step back to the centre cone still facing the same way. b) Turn and sprint forward to the end cone. c) Run back to the centre cone, side step to the right, side step back to the centre, then turn and sprint back to the start.

	Over-under hurdle	20'		Each player follow steps and phase with sprint run to the 1 <sup>st</sup> hurdle jump it , sprint the 2 <sup>nd</sup> hurdle and crawls under it before to a ball, to accomplish a short period of time to win and perform repeatedly	-Performing over-under hurdle, players follow up: - a) On the coach's command, a player from each group sprints to the first hurdle jumps it, sprints to the next hurdle and crawls under it before sprinting to a ball on the edge of the box. b) If the defender wins they clear the ball. If the attacker wins they shoot at goal.
3	Cooling Down		Low		
	trainees perform Rehydrate, light movement, static stretching at the end of the session	10'		The phase of physical and mental relaxation. It usually takes place on the pitch and includes some light jogging& cooling	Each trainees should perform such cooling-down properly and effectively

