ADDIS ABABA UNIVERSITY

COLLEGE OF NATURAL AND COMPUTATIONAL SCIENCES

DEPARTMENT OF SPORT SCIENCE

EFFECTS OF PLYOMETRIC TRAINING ON SELECTED PHYSICAL FITNESS VARIABLES AND SKILL PERFORMANCE: WITH SPECIFIC REFERENCE TO SILTE ZONE KEMAL AND SADAT FOOTBALL ACADEMY PLAYERS

BY: MUBAREK NASER

ADVISOR: ASCHENAKI TADDESE (PHD)

THE TESIS SUBMITTED TO THE SCHOOL OF GRADUATE STUDIES OF ADDIS ABABA UNIVERSITY IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN FOOTBALL COACHING

JUNE 2021

ADDIS ABABA, ETHIOPIA

ADDIS ABABA UNIVERSITY, COLLEGE OF NATURAL AND COMPUTATIONAL SCIENCES, SCHOOL OF GRADUATE STUDIES, DEPARTMENT OF SPORT SCIENCE

EFFECT OF PLYOMETRIC TRAINING ON SELECTED PHYSICAL FITNESS VARIABLES AND SKILL PERFORMANCE: WITH SPECIFIC REFERENCE TO SILTE ZONE KEMAL AND SADAT FOOTBALL ACADEMY PLAYERS

BY:

MUBAREK NASER

ASCHENAKI TADDESE (PHD). _____ _____

Name of Advisor Signature Date

Name of Chair Man Signature Date

_____ _____ _____

Name of Internal Examiner Signature Date

_____ _____ _____

Name of External Examiner Signature Date

_____ _____ _____

DEDICATION

I dedicate this thesis to all, who give me their Support on this thesis and my life journey, and I need to dedicate this thesis to my wife Fetiya Naser, for her generous love and faithfulness she had sacrificed in her dedicated partnership in the success of my life.

AUTHOR DECLARATION

First, I declare this thesis on the title of Effects of Plyometric Training On Selected Physical Fitness Variables and Skill Performance: With Specific Reference to Silte Zone Kemal and Sadat Football Academy Players is my original work and which all sources of materials used are duly acknowledged. I solemnly declare that this thesis is not submitted to any other institution anywhere for the award of any academic degree, diploma, or certificate.

Name: Mubarek Naser

Place: Addis Ababa University

Department: Sport Science

Date of Submission: ____/_____/_____

Signature: _____

BIOGRAPHICAL SKETCH

The author Mubarek Naser was born on May 4, 1994, G.C in Kilto Woreda of Silte Zone. He started his Elementary school at Addis Ababa Hawariyawu Petros Elementary school, Secondary at Zeryakob Elementary and Secondary school, and preparatory School education at Abiyot Kirs preparatory School and then, he joined Bahir Dar University Sports Academy Department of sports science in 2014 G.C and graduated with BSc Degree in sport science on June 30, 2017, G.C. The author began practiced his career by Youth and Sport office at Silte Zone Hulbareg Wereda after 1 year He was Join Werabe University department of sports science since 2018 G.C. Being served for 1 year and 5 Month, he joined Addis Ababa University School of graduate studies to pursue his MSC in Sports Science in the regular program (specialization in football Coaching) in 2019 G.C

ACKNOWLEDGEMENTS

First of all, I would like to thank almighty Allah for the success of all my works. And I would like to give heartfelt thanks to my advisor **Dr. Aschenaki Taddese** for his insightful and constructive suggestions and feedback, patience, as well as guidance in this thesis. I extend my special thanks to my wife Fetiya Naser for her Special support on this thesis and on each and every step of my life. And I give my thanks to all my Families who devoted their money, time, and energy to my success in life and academic career. Again I would like to express my deepest gratitude to my best Teachers and friends for their advice, encouragement and moral support for the last two marvel years.

To accomplish this thesis, I got different support my gratefulness goes to Kemal and Sadat Football academy to facilitate all project Players' who are participated in the research work and giving information for the project profile. and Werabe University sports science department for their material and moral support. last but not the list, I would like to thank all project members who give their time and cooperation in the completion of this paper.

Table of Contents Page

LIST OF FIGURES

Figure **Page**

LIST OF TABLES

LIST OF ABBREVIATIONS AND ACRONYM

COG	Control Group
COGCA	Control Group Chronological age
COGH	Control Group Height
COGPOT	Control group Post- test
COGPRT	Control group pre test
COGTA	Control Group Training age
COGW	Control Group Weight
EGPOT	Experimental group Post- test
EGPRT	Experimental group Pre- test
EXG	Experimental Group
EXGCA	Experimental group chronological age
EXGH	Experimental Group Height
EXGTA	Experimental group Training Age
EXGW	Experimental Group weight
FIFA	Federation International Football Association
H_0	Null hypothesis
H_1	Alternative hypothesis
MD	Mean Difference
POT	Post- Test
PRT	Pre- test
PT	Plyometric Training
SD	Standard Deviation
SPSS	Statistical package for social science
SSC	Stretching Shortening Cycle
U-17	Under Seventeen (Age category)

ABSTRACT

The purpose of this study was to investigate the effect of 12 weeks plyometric training on selected physical fitness variables and skill performance with specific reference to Kemal and Sadat Football Academy players found in Silte Zone. To attain the purpose of the study, the researcher used Quasi experimental design *within 12-week plyometric training program. The Football Academy had a total N 90 players grouped into three age categories: U-13, U-15 and, U-17. The researcher selected the U-17 age category by using purposive sampling method and all the 30 players in this age category were clustered as control and experimental group by using simple random sampling method. The control group (n=15) registered mean scores of 15.72 and 1.87 for the chronological and Training age respectively while the experimental group (n=15) had mean scores of 15.85 and 1.64 chronological and Training age respectively. Only the experimental group was made to receive a 60 minutes plyometric training for12 consecutive weeks with frequency of 3 days per week. However, both groups engaged in the regular football training program that was given by the Academy. The selected physical fitness and football skills were strength, speed, power, accurate pass, and accurate shoot. Field tests were taken as data gathering instruments. These were wall sit test to measure lower body strength, vertical jump test to measure explosive lower body power, 30-meter sprint test to measure maximum speed, passing accuracy test to measure accurate pass, shooting accuracy test to measure accurate shoot. To determine the difference between pre training and post training mean values, a paired-samples t-test was computed by using SPSS software version 23 at 95% significance level for both experimental and comparison groups. The results of the paired samples t-test for the experimental and control groups respectively were wall sit Test P = 0.00 and P = 0.357, Vertical jump Test P = 0.01 and P = 0.06, 30 Meter Acceleration Test indicate P = 0.00 and P = 0.568, passing Accuracy Test P = 0.07 and P = 0.599, Shooting Accuracy Test P = 0.023 and P = 0.325. Generally, after the analysis of the study the researcher observed improvements on the selected physical fitness variables and skill performance of the experimental groups. Based on this finding, the researcher concluded that 12-weeks Plyometrics training had positive effect on the selected physical fitness variables and skill performance of the football players.*

Keywords: plyometric training, physical fitness, football skills

CHAPTER ONE

1. INTRODUCTION

1.1 Background of the study

The origin of the term plyometric is assumed to be derived from the Greek word "pleythyein." desiring to augment or to extend, or from the Greek root words "plio" means more and "metric," is about measure, and “Today plyometric training denotes to exercises categorized by powerful muscular contractions in response to rapid, dynamic loading or stretching of the involved muscles”. (Wang and Zhang,2016)

Explosive plyometric may be a sort of explosive training wont to increase speed, quickness, and power. Although this sort of coaching has been around for over 40 years, it's only within the last decade that plyometric has become a "buzz" word. However, its application remains generally misunderstood. many of us erroneously believe that explosive plyometric, or speed-strength training because it is usually called, is employed mainly to develop strength, as a warm-up or wont to develop jump endurance. Some even believe it's dangerous and can cause injury. In reality, explosive plyometric is required to enhance skill execution, game performance, and to forestall injury. Because most sports skills are executed in an explosive manner, you want to train to duplicate these conditions so as to become a much better competitive player. Thus, explosive plyometric may be a key training method that may improve your gameplay skills, the maximum amount as if no more than, strength or the other one sort of training. (Yessis, 2009)

According to (Keison, 2006) Plyometric training is meant for developing maximal force production in an exceedingly very short time ground contact. additionally, to vertical and horizontal forward jumps and hops, single lateral jumps and hops with quickly changing directions and turns should be adopted for soccer players.

To improve explosive movements’ coaches can use different types of coaching methods; among those trainings plyometric training is that one which includes different physical exercises that improve fitness components especially speed, strength, and power for football players. (Markovic, 2007)

Plyometric exercise could be a popular style of training accustomed improve athletic performance. It involves a stretch of the muscle-tendon unit immediately followed by a shortening of the muscle unit.

The benefits of those training strategies are observed for both young and professional players as they promote a rise in neuromuscular strength, aerobic performance, change of direction, kick and sprinting speed improved sprint and agility performance in addition to explosive force and vertical jump performance. (Meylan and Malatesta, 2009). For sports like Football that need powerful, propulsive movements, athletes apply a special style of exercise training termed Plyometrics or explosive jump training.

1.2 Statement of the problem

Nowadays within the arena of international competitions, one among the essential needs of all sports organizations, federations, and other concerning bodies have an excellent responsibility to make well-skilled and qualified players. Having this in mind, it's important to think about the actual fact that the advance of a player's performance is based on the involvement of their workout with maintaining all components of fitness because now a day's football is a function of quality training.

Quality training could be a complex but important issue in competitive sport, especially in sports like football during which the power to prepare training has significant commercial implications for clubs and players as well as for the country. However, Research results showed that in the Ethiopian case little is understood about how coaches conceptualize quality training for successful performance and there was no satisfactory achievement on physical performance of football players Because of lack of normal physical activities, scientific training, coaching knowledge unawareness of fitness tests, and other factors, which limit the physical performance of football players.

So as to develop their player's physical performance and to realize the advantages mentioned within the above most of the countries apply Plyometric Training into their fitness training programs. But when the researcher observes the training programs that given in to different clubs and conduct a pilot study in Kemal and Sadat football academy Plyometric Training are not a part of their training program and mostly coaches and trainers give less attention to fitness training

programs and they give more attention to ball contact drills only throughout their training programs. Within the researcher point of view, that's why, most of our country's players have a limitation in their level of condition so as to playing 90minutes games, which affects their football skill performance ability likewise as our country football standard.

Because of the above point of view and because of lack of enough investigation associated with effect of plyometric training on Physical fitness variables and skill performance of Ethiopian football players case the researcher was concerned to fill the gap by conducting research on this area. Therefore, the central drive of this study was identifying effects of plyometric training on selected Physical fitness variables and skill performance of football players with specific reference of Silte Zone Kemal and Sadat football academy.

1.3 Hypotheses

To identify effect of plyometric training on selected physical fitness variables and skill performance with specific reference to Silte Zone Kemal and Sadat football academy players. The researcher was try to testify the following hypotheses: -

1. H 0: There is no improvement in the strength of football players after plyometric training.
2. H_0: Plyometric training has no significant effect on the power of football players.
3. H_0: There is no Effect on the speed of football players after plyometric training.
4. H_0: There is no incremental Change on agility of football players after plyometric training.
5. H_0: There is no change on accurate pass of football players after plyometric training.
6. H_0: There is no Change on accurate shoot of football players after plyometric training.

1.4 Objectives of the Study

General Objective

The general objective of the study was to examining the effect of plyometric training on selected physical fitness variables and skill performance

Specific Objectives

In addition to the general objective that mentioned in the above, the study also intends to be address the following specific objectives:

- ✓ To examine the effect of plyometric training on the strength, of football players,
- ✓ To measure the effect of plyometric training on the power of football players,
- ✓ To evaluate the effect of plyometric training on the speed of football players,
- ✓ To identify the impact of plyometric training on the agility of football players,
- ✓ To determine the effects of plyometric training on the accurate passing skill of players,
- ✓ To find out the effects of plyometric training on accurate shoot skill performance of players.
- ✓ To compare the relative change in physical fitness and skill performance of experimental and control group.

1.5 Significance of the Study

The Significance of a study indicates how the research will refine, or revise, the existing knowledge in the area under investigation. This study mainly focuses on effect of plyometric training on selected physical fitness variables and skill performance of football players. The researcher understood that there is no enough investigation on the effect of plyometric training on physical fitness variables and skill performance of football players especially in our country (Ethiopia). Thus, this study may bring improvements on performance efficiency of our football players. In addition, this study could be significant in many ways.

- ✓ It will help to understand the effect of plyometric training on physical fitness variables and skill performances of football players, which in turn might help to implement more effective strategies of fitness training programs in Ethiopia.
- ✓ It can be providing proper a fertile ground for football coaches and fitness trainers to allot time for plyometric training when they design football training programs for the improvement of their player's physical fitness and skill performance,
- ✓ It can be also being used to motivate players to engage in plyometric exercises regularly for the improvement of their physical fitness and skill performance.
- ✓ It will serve as a guideline for other researchers who may want to conduct further researches on this area.

1.6 Delimitation of the study

Investigating a research on all soccer related fitness components and skill performance with related to effect of plyometric training on all this in the entire country cases was challenging and unmanageable for the researcher. Because of that, this study was Delimited and designed to be examining the effect of plyometric training on selected physical fitness variables and skill performance. The Selected dependent physical fitness variables included only strength, power, speed and agility; and for football skill performance only accurate pass, and accurate shoot and The independent variable was plyometric trainings (plyometric trainings with different types of exercises).

The area coverage in this study also delimited. So that this study was conducted at Southern region, Silte zone at Worabe Town, in Kemal and Sadat Football Academy. Based on manageability Participants for this study was select only in Kemal and Sadat Football Academy U-17 age category and all 30 players, (15 experimental and 15-control groups).

- ✓ Only field tests that may easily administer were used to measure the selected physical fitness variables and skill performances, The tests used in this study mentioned as follow to know the performance level of Lower body strength by using Wall-sit test, Explosive lower body power by Sergeant Jump (Vertical jump test), Speed by 30 Meter Acceleration Test, Agility by Illinois agility test, Accurate pass with Passing accuracy test and, Accurate shoot, by Shooting accuracy test and The designed plyometric training program was, delimited to a total of 12 weeks training, only 3days per week with 60 minutes duration per session**.** This Research only applied on male football players and Finally, this research was conducted in 2020 – 2021 G.C

1.7 Limitations of the Study

- ✓ Nutrition,
- ✓ Rests habits,
- ✓ Players daily routine work,
- ✓ Participant life style and
- ✓ Climatic condition was beyond the control of the researcher and may be having their own effect on the total result of the investigation.

1.8 Operational definition of terms

Agility can be defined as the accuracy and speed with which an individual integrates his body parts in various ways (Cratty and Hutton, 1969). And/or Agility is the ability to change and control the direction and position of the body while maintaining a constant, rapid motion.

Explosive Power: The ability to exert maximum muscular contraction instantly in some explosive movements. (Yakup et.al, 2017, p 17).

Explosive power; the movements that require a maximum or near maximum power output from the athlete in a short amount of time (Elizabeth Quinn, 2018).

Football skills: techniques need that to play football game and it incorporates passing shooting, dribbling and receiving

Muscular strength: the ability of muscle to exert force and it is the amount of force a muscle can produce with a single maximum effort

Physical Fitness- refers to one's ability to perform physical tasks effectively and efficiently relate to sport or occupation

Physical fitness training: - is a conditioning training, which improves the player's physical fitness abilities such as body composition, endurance, speed, agility, flexibility, (Quade, 1993).

Plyometric training: refers to an effective mode of training as it enhances motor learning and neuron muscular efficiency and reactivity to increase the rate of producing force

Power: the capacity to do a given amount of work as rapidly as possible

Project: A serious and long term task that are carefully planned in order to enhance Football player's performance level.

Speed: a person ability to move fast or to cover a distance in a short period of time

Training: Systematic process of athletic preparation for the greatest and highest sports achievements.

1.9 Organization of the Study

The content of the research paper was organized into five chapters.

Chapter 1: Introduction deals about introduction part which comprises the following topics Background of the study; Statement of the problem; Hypothesis; Objectives of the Study with; General Objective; Specific Objectives; Significance of the Study; Delimitation of the study; Limitations of the Study; Operational definition of basic terms and Organization of the Study. **Chapter 2:** The second chapter deals with the review of related kinds of literature of Theoretical Review and Empirical Reviews are there. **Chapter 3:** Research Methodology Research Approach, Research Design, Variables of the Study, Description of the Study Area, Population, Sample, Sampling Techniques and sample size determination technique, Inclusion and Exclusion Criteria, Sources of Data and Data Gathering Instruments, Experimental Materials, Protocol of Physical Fitness and Skill Performance Tests, Method of Data Analysis, Training Procedures, data quality control (QC) and Ethical Considerations. **Chapter 4:** Deals about Results and Discussion and Chapter. and finally **Chapter 5:** Is About Summary, Conclusion, and Recommendation. And also on the last pages References and Appendices available.

CHAPTER TWO

2. REVIEW OF RELATED LITRATURE

2.0 INTRODUCTION

Literature review is prepared in two parts, i.e. the theoretical review and the empirical review part. In the theoretical review part, the theories that states about the Plyometric Training and the variables that is claimed to affect it are discussed and The empirical literature part discusses past studies that were conducted on the area of factors determining Plyometric Training. In this part the variables that were included, the methodology that is used to undertake the study and the results of the study under review are discussed.

2.1 Theoretical Review

In this part the researcher tries to discuss different information on the issue of the Plyometric Training by review different books, articles, and journals let trying to see each sub topics in detail as follow;

2.1.1 Introduction to Plyometric Training

There are different scholar's ideas are her in order to give introduction about plyometric training the researcher select the following ones: - According to (Chu, 1992) Plyometric training is a specific exercise regime that is needed to develop muscles that contract maximally in the shortest possible time. And it is important to improve jump activity and leg power (Ates, 2007). And (Marcovic, 2007) put this idea "Plyometric training involves practicing plyometric movements to toughen tissues and train nerve cells to stimulate a specific pattern of muscle contraction so the muscle generates as strong a contraction as possible in the shortest amount of time".

According to (Fukunaga,etal.,2002) All types of plyometric movement happen during three sequential phases: "the first phase consists primarily of stretching or eccentric muscle activity, which is marked by a high concentration of elastic muscle energy, the second phase is known as the amortization phase and begins with the end of the first phase and ends with the beginning of the concentric muscle action, and finally the third phase, the final phase of muscle contraction, which is primarily manifested as the jump, hit or throw".

” Soccer rapid movements such as accelerate deceleration of the body, changes of direction well as jumps are often performed and high of dynamic muscular performance is requiring all levels of training status. In invest mostly elite soccer players were recurring demonstrate the effects of PT on m performance” (Chimera et al., 2004.) The benefits of these training strategies are observed for both young and professional players as they promote an increase in neuromuscular strength, aerobic performance, change of direction, kick and sprinting speed improved sprint and agility performance as well as explosive force and vertical jump performance (Meylan and Malatesta (2009). In another study conducted by Vaczi et al. (2013), it was aimed to examine the effects of short-term high-intensity plyometric studies on motor performance parameters, and it was found that there was a statistically significant improvement in the agility performance of footballers in parallel with the training program applied at the end of the research. In similar studies in the literature, it was found that there was no significant difference in the agility performance of eccentric contraction training

When we try to discuss about plyometrics and its development we should give a countless credit for one person named Yuri Verkhoshansky. He was the coach of Russian track and field team and later a scientist of different training types. At the end of the 1950s, Yuri Verkhoshansky have appreciated the importance of maximizing power in jumping, throwing, and running by linking the strength and speed of movement. Yuri Verkhoshansky contributed the idea of plyometric training and experimented with "depth jumping" and the "shock" method. (Natalia, 2012)

According to (Markovic G, 2010.) “A popular and an effective way for improving power and sprint performance is plyometric training Plyometric exercises are a specific training methodology largely supported by scientific literature”.

“Plyometric training (PT) consists of the dynamic and rapid stretching of muscles (eccentric action) immediately followed by a concentric of shortening action of the identical muscles and connective tissues This training focuses on learning to move from a muscle extension to a contraction in a very rapid or ‘explosive’ manner, like in specialized repeated jumping. Exercises are of high-intensity, explosive muscular contractions combining strength and speed for acquisitions of advantages in power. PT involves hops and jumps wont to maximize the stretch-shortening cycle of the muscle” (Häkkinen K, 1985).

According to (Witzke and Snow, 2000) “All movement patterns that occur during functional activities involve a series of repetitive stretch-shortening cycles. The neuromuscular system must react quickly and efficiently following an eccentric muscle action to provide a concentric contraction and impart the mandatory force (or acceleration) within the appropriate direction. Therefore, specific functional exercises that emphasize a rapid change in direction must be utilized to organize each athlete for the functional demands of a selected activity”.

2.1.2 Characteristics of plyometric training

Plyometric exercise includes practicing plyometric activities to strengthen tissues and train nerve cells to arouse a selected pattern of shortening therefore the muscle generates as strong a contraction as possible within the shortest amount of some time. (Marcovic, 2007).

According to (Baechle and Earle,2000) Plyometrics training is kind of exclusively applied to extensor of the legs, and consists of a brisk lengthening of the active extensor muscles (eccentric contraction) directly followed by a maximal concentric contraction and “It contains of a quick stretching of a muscle (eccentric action) directly followed by a concentric or shortening action of the identical muscles”

All types of plyometric movement occur during three consecutive phases: the first phase consists primarily of stretching or eccentric muscle activity, which is marked by a high concentration of elastic muscle energy, the second phase is known as the amortization phase this phase starts at the end eccentric action and ends with the starting of the concentric muscle action, and eventually the third phase, the last word phase of contraction, which is primarily manifested because the jump, hit or throw(Fukunaga,etal.,2002). These phases in plyometric movement are known by one name: the stretch shorten cycle of muscle work. This cycle is characterized by two patterns. the first is that the mechanical pattern of movement which has muscles, joints, and tendons which are elongated within the stretch cycle only to decrease long during the shorten phase, so on revert back to their original state after the action. (Herzog,2005).

The jump, hit or give this case are the components of the muscle-joint-tendon elastic component. (Rassier and Herzog, 2005) The second pattern of plyometric movement is characterized by a neuro-muscular pattern and thus the role and performance of the reflex, the so-called “myotatic reflex” (Pašić, 1993, as cited in Nikola, et al.,2012), which primarily includes a protective

function to help prevent injury. “This action of deceleration to acceleration is believed because the stretch shortening cycle” (Leubbers, et al., 2003)

2.1.2.1 The eccentric phase

“The first stage of a plyometric movement is commonly classified thanks to the eccentric phase, but it is also being called the deceleration, loading, yielding the countermovement, or cocking the phase. This phase increases muscle spindle activity by pre-stretching the muscle before the activation. A slower eccentric phase prevents taking optimum advantage of the myotonic reflex” (Kubo et al., 2007).

2.1.2.2 The amortization phase

According to (Wilk et al., 1993 cited in Mesfin 2014) called that “This phase involves dynamic stabilization and also the time between the tip of the eccentric contraction (the loading or deceleration phase) and also the initiation of the concentric contraction”. And “A rapid switch from an eccentric contraction to a concentric contraction results in a more powerful response”

2.1.2.3 The concentric phase

According to (Rassier and Herzog, 2005) this phase called that “active muscle switching from a rapid eccentric muscle action to a rapid concentric muscle action or from a rapid deceleration to a rapid acceleration helps the players or the athletes to try to different movements” also other researcher put their idea let we try to see each of them, “The concentric phase (or unloading phase) occurs immediately after the amortization phase and involves a concentric contraction” (Ishikawa et al., 2005).

“leading to enhanced muscular performance following the eccentric phase of muscular contraction. this happens secondary to boost summation and re-utilization of elastic mechanical energy, muscle potentiating, and contribution of the myotatic reflex” (Fukunaga et al., 2002).

2.1.3 Benefits of Plyometric Training for Physical development and skill performance

According to William Kayson (2006), "Plyometric training is an efficient mode of coaching because it enhances motor learning and neuromuscular efficiency promoting the excitability, sensitivity, and reactivity of the neuromuscular systems to increase the speed of force production (power), motor- unit recruitment and synchronization. Muscles produce the desired force to change the direction of an object's center of mass. All movement patterns that occur during functional activities involve a series of repetitive stretch-shortening cycles. The neuromuscular system must react quickly and efficiently following an eccentric muscle action to produce a concentric contraction and impart the specified force (acceleration) within the suitable direction. Therefore; specific functional exercises that emphasize a rapid change in direction must be utilized to rearrange each athlete for the functional demands of a selected activity".

Plyometric exercises are the way of power training employed by many team and individual sports. within the only of terms, plyometrics are exercises that involve a jumping movement. an example, skipping, bounding, jumping rope, hopping, lunges, jump squats, and clap push-ups are all samples of plyometric exercises. Plyometric exercises use the stretch-shortening cycle to return up with quick, powerful pre-stretch or counter-movements. Muscles are loaded with a lengthening (eccentric) action, followed immediately by a shortening (concentric) action to attain their optimum force within the fastest time possible. Plyometric exercises strengthen muscle tissue and train nerves to produce the actual muscle contraction. (Brad & Walker 2003).

Plyometric is an exercise that reinforces the performance ability by improving speed, agility, and strength and muscle power in an athlete. It exerts a stretch followed by contraction of the muscle which later produces more power. Plyometric is used within the training of varied dynamic sports which involves speed and coordination. it's totally effective when it involves soccer-based training so on enhance balance and endurance especially if it's done at a young age. Plyometric training increases the explosive movements that are employed in soccer by improving speed and strength, and it's both eccentric furthermore because the concentric contraction occurring during a brief amount of sometime successively produces the energy more quickly. The mechanism of plyometric training involves elongation of the muscles followed by an immediate strength

shortening contraction which utilizes the energy stored during the stretching phase. Soccer requires changing of direction frequently, shuffling, sprinting, and jumping, and for any of these movements to occur a player needs strong lower leg power still as control finally. (Mohin & Vadiwala 2015),

Plyometric training also provides the prospect to teach specific movement patterns in an exceedingly bio-mechanically correct manner at a more functionally appropriate speed. This provides functional strengthening of the muscle, tendon, and ligaments specific to the strain of everyday activities and sports. the ultimate word goal of plyometric training is to boost the time interval of the muscle spectrum (eccentric-deceleration, isometric stabilization, and concentric acceleration). (Eskandar, et al.,2014).

The fundamental reason to educate with plyometrics is to chop back the underside contact time that an athlete spends when running or jumping. this time is reduced because the athlete matures, gets stronger, and practices the talents of their game. To further enhance resistance training the athlete spends considerable time practicing the actual movement skills they have to improve; namely, running and jumping. These two movement patterns are often thought of as genetic endowments and affected little by outside influences like training programs. (Cometti, et al., 2005).

- ✓ Let us see the results of plyometric training on each of physical performances separately: -

2.1.3.1 Effect of plyometric training on strength

Lower body strength is required for kicking, jumping, tackling, twisting, and turning. It also forms the inspiration for explosive speed. Upper body strength is required for shielding the ball, holding off opponents, throw-ins and also contributes to overall power and explosiveness. Regular football playing builds strength by using the whole body allow us to try to see different author's ideas on the Effect of plyometric training on strength. Effects of Plyometric training on lower extremity strength are characterized in various populations, and in an exceedingly recent Meta-analysis, a conclusion was made that PT Improved one repetition maximum measured in isometric or slow velocity contractions in leg muscles (Vaczi, et al., 2013).

According to (Bullard, et al., 2002). On different researches “plyometric training, when used with a Periodization strength program, can contribute to improvements in vertical jump performance, acceleration, leg strength, muscular power, increased joint awareness, and overall proprioception”

the researchers put their ideas about the importance of plyometric training they put different positive ideas as mentioned on the above. The plyometric method is used as an honest method for the event of explosive strength. it's dominated by the plyometric movement of the athlete during exercise. Marullo (1999) stated that "Plyometrics is speed-strength training, a mix of strength and speed"

Plyometrics refers to exercise characterized by powerful contraction in response to the eccentric-concentric activity which loads (stretches) the elastic and contractile components of muscles. the combo of both eccentric and concentric training is believed to spice up muscular strength and power to a greater degree than concentric alone (Kevin, etal.,2009).

2.1.3.2 The effect of plyometric training on power

Plyometrics is critical for the event of the neuromuscular reflexes, stretch reflexes, explosive power, and ballistic movements (Chu, 1998). additionally, to this idea Leubbers et al, (2003) stated that plyometrics is also a variety of training methodology that may increase power output and explosiveness. "Today the soccer is becoming more dynamic and so the facility has become an important aspect of condition for soccer players of all ages. Exercises are of high-intensity, explosive muscular contractions combining strength and speed for acquisitions of benefits in power". (Poulos, et al., 2004).

Reilly (2007) discussed the contribution of Plyometric exercises on the facility of the players as follows "plyometric exercises are often used during the late preseason period or within the season so on maintain or develop further muscular power". Many researchers agreed about the effect of plyometric training on the power of athletes they stated that plyometrics is taken under consideration by a high-intensity conditioning program. "It consists of explosive exercises that require muscles to adapt rapidly from eccentric to concentric contractions.

Muscles, when stretched during an eccentric contraction, store P.E. for an awfully brief period of sometime". And "Plyometric exercises use explosive movements to develop muscular power, the pliability to come back up with an outsized amount of force quickly. Plyometric training acts on both the muscular tendinous and neurological levels to increase an athlete's power output without necessarily increasing their maximum strength". (Thomas, 2009). Plyometrics exercises are suitable for improving various measures and components of muscle power like

vertical jumping ability, speed, and acceleration). Plyometric training can improve the jumping power of athletes (Mathise, 2014).

2.1.3.3 Effect of plyometric training on speed

According to Siddihhi (2017) “effect of plyometric educational program on agility of football players,” and “plyometric training is popular among individual involve in dynamic sports and plyometric exercises like jumping, hopping, skipping, and bounding are executed with a goal to extend dynamic muscular performance” Plyometric are techniques utilized by athletes altogether sorts of sports to extend strength and explosiveness.

Movement speed or the shifting of a body in space may be a function determined by numerous factors (motor coordination, external conditions, strength, muscle endurance, the stretch shorten cycle, relaxation skills, reaction skills and speed which incorporates response time and movement time). “Nevertheless, just speed, like an action with none additions has nothing in common with the speed necessary to perform complex movements in sport.” (Siff, 2000,) In many definitions and studies on speed abilities, the connection between speed and also the occurrence of force, strength, flexibility, precision, or balance is emphasized. “First and foremost, it's well-known that speed is largely the results of force functioning on mass. Second, speed usually represents movement with a relentless speed frequency. Body movement (be it a personality's body or the other kind) with constant speed frequency requires enough motor force to equal out the forces which oppose movement.” (Disalvo, et al., 2007)

Short sprints are quite common in many team sports including soccer, rugby, basketball, hockey, etc. High intensity activities are defined as people who are dispensed from 5.3 to 6.3 m•s-1 and, specifically, sprinting activities are those performed at over 7 m•s-1 (Amelia, et al.,2014)

Plyometric drills are recommended in soccer training due to the fast force production and explosive actions with change of directions, and their needs for the flexibility to start out and stop quickly (Little and Williams, 2005). Plyometric training has been shown to boost performance in 10-30-meter line speed in young male athletes. (Impellizzeri, 2008)

The energy stored, followed quickly by a concentric contraction, produces greater force than a concentric contraction alone. Therefore, training muscles to adapt from an eccentric to a concentric

contraction should enable them to extend the speed and force with which they perform. (Reilly, 2007).

2.1.3.4 Effect of plyometric training on Agility

Agility may be described as changing movement velocity and performing locomotion models modes apart from linear sprinting. Both agility and balance require strength, power and endurance. When athlete develops speed and power, they'll become more agile. Agility also requires game knowledge. Basic motor skills, like running, jumping, throwing and catching requires coordinative abilities like agility, balance and rhythm. Through these abilities, all the components and features of movement are organized as smooth moving. In basketball, there are plenty of situations where a player must change his moving direction effectively, balanced and explosively so, that the movement rate maintains or accelerates. (Kiiskinen et al 2005.)

Agility in football has been defined because the ability of speed of leg movement to perform a method still as quick change of direction with a ball and without ball. it's recommended that agility drills must be trained progressively and slowly with a stress on technique mastery, before learning the speed of movements and adding complex variations, like open or non-programmed agility training. (Dawes, 2008)

Agility are often described as changing movement velocity and performing locomotion models modes aside from linear sprinting. Both agility and balance require strength, power and endurance. When athlete develops speed and power, they'll become more agile. Agility also requires game knowledge. Basic motor skills, like running, jumping, throwing and catching requires coordinative abilities like agility, balance and rhythm. Through these abilities, all the components and features of movement are organized as smooth moving. In court game, there are plenty of situations where a player must change his moving direction effectively, balanced and explosively so, that the movement rate maintains or accelerates. (Kiiskinen et al 2005.)

According to Bullard, et al., (2002) described plyometric exercises as explosive callisthenic-like exercises which involve the “conditioning of the neuromuscular system to allow faster and more powerful changes of direction like moving from up and down in jumping or switching leg positions as in running. The stored potential energy within the muscle is employed to provide more force than is provided by a concentric action alone”.

Also here let us try to see additional supportive idea “It has been previously suggested that PT improves sport specific agility in sports where sudden movements (accelerations, stops and direction changes) are required” (Yap and Brown, 2000). The Illinois agility test (IAT) was accustomed measure agility during sprints including direction changes no end, and running at different angles (Miller et al., 2006).

2.1.3.5 Effect of plyometric training on Accurate Pass

According to (Callaway, 2017) soccer is also a sport unlike the bulk of others because the feet are needed for technical skills quite the hands. a spread of fundamental skills is needed to play soccer, with advanced players ready to repose on the essential skills for more complex and precise dribbling, passing, and shooting. the skills of a jock also vary from one position to a unique one, with a goalkeeper needing many alternative skills than a field player. to keep with (Chapman, 2008) passing and shooting are fundamental techniques of soccer. These must consider within the method of coaching.

Passing skills are vital to good play. the trend of play is restricted if a player isn't ready to a teammate in open space, bend a ball around opponents, or chip a shock a wall of defenders. Good passing is totally essential to play a soccer game. The art of passing is basically the art of doing simple things quickly and well. Good passing is generally a matter of judgment. (Chapman, 2008)

2.1.3.6 Effect of plyometric training on Shooting accuracy.

Shooting a ball for a goal takes concentration and much practice to be effective and accurate, but all soccer players can master this youth soccer skill with some tips. To shoot the ball, players should plant their weak foot next to the ball. The foot should be pointing within the overall direction that the ball goes to be kicked, but it doesn't must be perfectly aligned, because the kicking foot will do the aiming. When practicing basic soccer skills, athletes should practice properness. For shooting, athletes should let the strong leg swing back and forward toward the ball, making contact with the within of the foot. The player’s foot should be pointed down so as that they will aim. Aiming is difficult because it happens with the toe. If the massive toe points to the correct, the ball will move to the right, or vice-versa (Callaway, 2017).

2.1.4 The Effect of Plyometric on Football

Today Football is becoming more energetic and the power has become an important feature of condition for the players of all ages. ‘’If we take a look at typical movement sequences in football (abrupt stops and changes of direction, quick sprints, ball kicking and explosive shots) makes it clear that depend on the stretch-shortening cycle (SSC) characteristics of the involved muscles’’. (Manolopoulos, et al., 2004). Throughout a 90-minute football match, professional football players make a several explosive bursts, like kicking, turning, sprinting, tackling, jumping, and changing pace (Bangsbo, et al.,2006).

According to (Thomas, et al., 2009) Many research has shown that ‘‘a muscle stretched before contraction will contract more forcefully and rapidly. And that is basically what plyometric exercises do. They stretch muscles rapidly and then immediately demand a powerful concentric contraction’’.

Plyometric training has to be an effective means of training for the development of both sprinting and jumping ability (Saez, et al., 2015) and “it has also been reported to improve running economy, joint stability and reduce the severity of knee injuries. For these reasons, soccer training commonly includes this form of muscular power training”. (Impellizzeri et al., 2008)

2.1.5 Physical Fitness and its Demand for Football Players

Physical Demands data elements provide a scientific way of describing the physical activities that occupation requires of a worker. consistent with (Corbin 2003), good condition has been defined because the capacity to try and do physical work within granted levels of performance quantitatively and qualitatively. The quantitative training parameters are health-related and skill-related components of muscular strength, muscular endurance flexibility, and cardiovascular endurance whereas the qualitative training parameters are skill-related in nature and include the components of agility, speed, balance, coordination, and power. additionally, fitness for living within the house, on the farm, at the office, in the factory, in workplaces, or in any service implies freedom from disease, enough strength, endurance, and other abilities to fulfill the stress of daily living. Doing physical activity every day contributes to optimum health and quality of life. Lifestyles may be changed to enhance health and fitness through daily exercises.

Physical fitness is usually outlined in 2 categories: health-related and motor-related. The health-related parts of excellent condition are of nice importance as a result of they produce a personal match, useful and productive for everyday living. Motor-related parts create an individual successful in athletics or motor-developed activities.

Education, Sports & Health. Performance in soccer may be a construct requiring myriad skills however is extraordinarily dependent upon a refined mixture of player's physical, tactical, technical, and socio-psychological skills. At elite levels, the explore for accomplishment incessantly leads practitioners, researchers, and sports scientists to explore totally different means that to measure and improve these main areas of performance, each separately and, a lot of impactful, together. reciprocally of these indices, match analysis provides a factual record of game events underpinning each individual and team performance in competition. (Stolen et. al.., 2005).

2.1.6 Fitness testing

Players struggle to be at the associate best plan of action, technical, physical, psychological, and state for competition. Hence, it seems that coaches and trainers have bit by bit become a lot hospitable to scientific approaches in preparation for soccer golf. Such approaches embrace physical testing to assess fitness and to observe coaching to make positive optimum performance. Aspects like body composition, agility, speed, flexibility, endurance, the balance between anaerobic power and aerobic power, are of primary importance at intervals in the analysis of soccer performance. (Reilly, 1996) Fitness assessment is very important for every coach at every stage of coaching unless the coach assess his/her athlete's performance he/she cannot give the appropriated training for the players

Having this in mind, in doing so all tests ought to for that reason be specific (designed to live associate athlete's fitness for the activity in demand), valid (Test what they purpose to test), reliable (capable of consistent repetition), and objective (produce the identical result notwithstanding the tester). The results from the associate analysis check are wont to predict future performance, indicate weaknesses, and place the jock at intervals the suitable program. in addition, a coach should often check players to substantiate that their program is achieving the performance objectives.

2.1.7 Important Guidelines for Plyometric Training

Plyometric exercises carry increased risk of injury due to the powerful forces generated during training and performance, and should only be performed by well-conditioned individuals who are

under supervision. Good levels of physical strength, flexibility and proprioception should be achieved before commencement of this training. (Faigenbaum and Yap, 2000)

Here are some very important guidelines to bear in mind before commencing plyometrics for soccer...

- ✓ Warm up with 5-10 minutes of light aerobic activity followed by 5-10 minutes of stretching to all major muscle groups.
- ✓ Perform plyometrics for soccer at the start of a training session before endurance training or lots of ball work. Muscles should be fresh.
- ✓ Plyometric training will not leave you out of breath or even feeling tired. Athletes often feel the urge to do more. Don't. Stick to your program to avoid injury and severe muscle soreness 34 hours later. (Faigenbaum and Yap, 2000)

2.2 Empirical Review

Diallo et. al.., (2001) investigated the effectiveness of plyometric coaching on the physical performance of football game players. They maintained that stretch-shortening cycle exercises (plyometric exercises) were usually accustomed improve leg muscle power and vertical jump performance in adults however restricted data is out there concerning the impact of such exercises on kids.

Most analysis has been undertaken to point the positive effects of plyometric coaching on sports performance. Chief (2012), the impact of a high-intensity circuit plyometric program on the running and jumping ability of male handball players, Twenty-two male handball players aged over twenty years were allotted into a pair of clusters: experimental cluster (n=11) and management group (n=11). The findings of the study indicate that an extra plyometric program between sprint repetition and vertical jump at intervals a similar coaching session influence absolutely the jumping ability of handball players.

Boleach, (1986) examined the impact of plyometric coaching on the vertical jump capability of male high school basketball players (N=26). These players were every which way allotted to associate experimental coaching cluster (the plyometric cluster) and a swaying group. The experimental coaching cluster performed 3 sets of 10 depth jumps, while the management cluster solely performed regular basketball coaching. Results showed that the plyometric cluster showed

vital improvement ($p<0.05$) at intervals the vertical jump with arm help compared to the management cluster.

Hermassi, et. al.., (2014) examine the results of eight weeks short in-season plyometric program on continual sprint ability leg power, and jump performance of elite handball player. at intervals, the experimental study, with 24 participants (age20 ± zero.3 years, body mass eighty-nine.1 ± 2.1 kg, height 1.88± 0.07 m, body fat thirteen.2± 1.3%) were every which way allotted to a sway cluster (CG; n = ten, handball coaching only) or associate experimental cluster (PG; n = fourteen, plyometric coaching and handball training). Plyometric coaching improved experimental cluster performance ($p<0.05$), leg power, and jumping performance throughout the season in elite male handball players and no amendment at intervals in the management cluster.

Naidu (2016) investigates the impact of Plyometric coaching and Intensive Interval coaching on Speed endurance. The study includes forty-five male students (N=45) World Health Organization was selected from province state in Republic of India Junior National level representative athletes. throughout the year 2015-16, were selected each that approach The subject's age, height, and weight ranged from eighteen to twenty years,165 cm to 175cm,55kgs to sixty-five kegs severally. the chosen subjects were divided into 3 equal teams of fifteen subjects every. Group-I below combined Speed and Plyometric coaching, group-II below combined Speed and Intensive Interval coaching for six weeks, and group-III acted as management wasn't given any exercise throughout the tutorial program. The results of ANCOVA indicate that with combined speed and plyometric coaching and combined speed and intensive interval coaching the speed endurance of subjects is considerably improved. And there are no vital variations exist between combined Speed and Plyometric coaching and combined Speed and Intensive interval coaching teams in improved Speed endurance.

CHAPTER THREE

3. METHODS OF THE STUDY

This chapter briefly explain about the methodology used by the researcher to overcome the problem and gather the genuine information, Hence the researcher was use some techniques in order to minimize the existed problem under this research.

3.1 Description of the Study Area

This study was conducted within the Silte zone, which is among a zone within the southern nation, status, and regional state (SNNPRS) of the Ethiopian nation. The Zone is found within the south of one hundred seventy-five kilometers away from the capital town of an African nation (Addis Ababa) and 156 KMs from the Regional Capital town, Hawassa. Silte zone is finite on the south by Gurage Zone, within the west, Oromiya Regional stat, on the north by Hadiya zone, on the northeast, by Halaba Zone. the executive center of the Silte zone is Worabe city. (Silte Zone Communication Office).

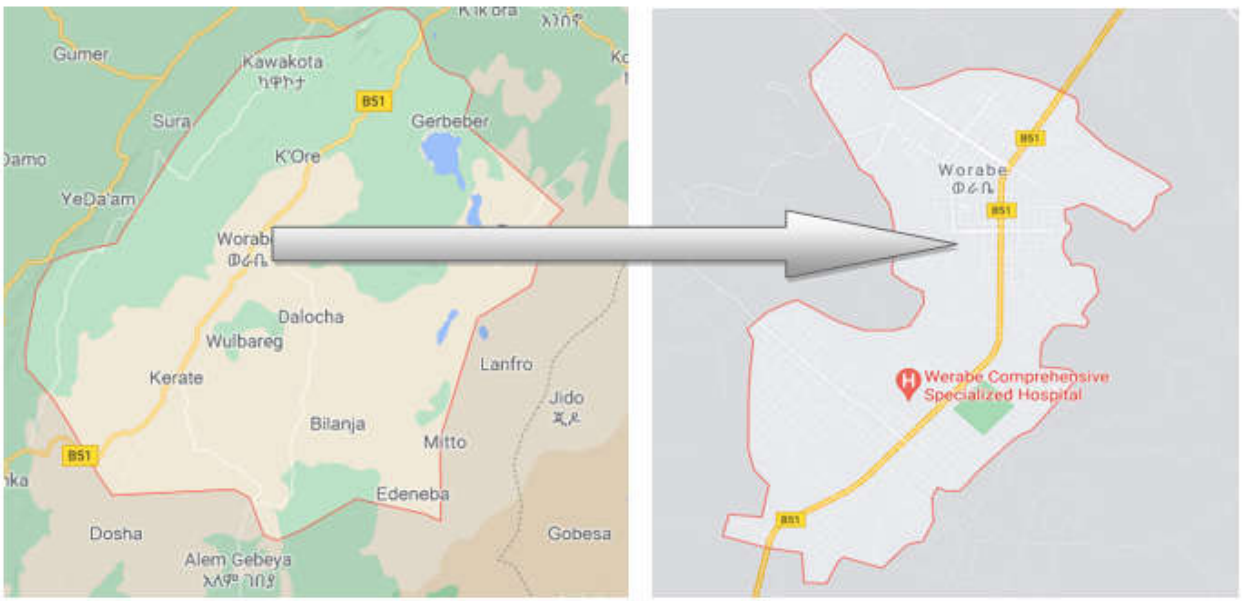

Figure 1 Map of study area, Silte Zone and Worabe town Adopted from Google map

3.2 Research Approach

"On scientific studies, there are different research approaches to achieve the stated objectives". Even though there are different research approaches of scientific studies, this study follows quantitative or structured research approach and used systematic measurement and statistical analysis of the data.

3.3 Research Design

The main focus of this study was to examine the effect of plyometric training on selected physical fitness variables and skill performance: with specific reference to silte zone Kemal and Sadat football academy players. Because of the experimental nature of the studies, the researcher used a quasi-experimental research design because there are variables that are not under the control of the researcher. To know the effect of the independent variable (12 weeks plyometrics training) on dependent variables (strength, power, speed, and agility and also accurate pass and, accurate shoot) Which have two groups (experimental and control groups) Manipulating the treatment on the independent variable to see the change on the dependent variable. Pre and post-test was given to the experimental groups and control groups as well.

Table 1 The study design layout

Treatments	Plyometric training	Remark
Total duration	12 weeks	
Frequency	3days/week	
Duration /session	60 minutes	
Intensity	Low to high	
Exercise days	Monday, Wednesday and Friday (afternoon)	
Time of training	Afternoon (4:30 -5:30 P. m)	

3.3.1 Variables of the Study

- **Dependent variables:**
  - ✓ Selected physical fitness: - strength, power, speed and agility.
  - ✓ Selected football Skills: - accurate pass and, accurate shoot

- **Independent variables:**

✓ Plyometric training: - Squat jump, jumping lunges, Skater jump, tuck jumps, Lateral jumps, Vertical Jumps, High knees, Sid-to-Sid Hops, Forward- backward hops, Single leg Sid-to-Sid Hops Skipping, Box drills, bounding speed.

3.4 Population

Based on that The source of the population for this study was N= 90 male Football players with three age categories (U-13, U-15, and U-17) they taking training at Kemal and Sadat football Academy Silte Zone Worabe Branch.

3.5 Sample, Sampling Techniques and sample size determination technique

From the above population, the researcher selects the U-17 age category by using the purposive sampling method. Based on their minimal number the researcher decides to use the entire group and/or all n= 30 players on this age category as a sample. The researcher cluster/categorized 30 players in to parallel groups, and also used a simple random-lottery sampling technique to select the samples for the experimental and control groups. Of the 30 male football players, 15 players were in the experimental group and the remaining 15 players control group.

3.6 Inclusion and Exclusion Criteria

Inclusion Criteria

The subjects included in this study were only U-17 football players at Kemal and Sadat football Academy Silte Zone Worabe town branch and the players who fulfill the health history questionnaires. For this, the researcher prepared the health history and physical fitness readiness questionnaire for the study participants with the aim of identifying their health status and to know how much they active in the training program.

Exclusion Criteria

According to their health history questionnaire result, participants who had medical problems and resent injury status or other multiple conditions that may be contraindicated for exercise and training will be excluded from this study.

3.7 Sources of Data and Data Gathering Instruments

To conduct this study, the researcher used primary and secondary data sources, the primary data was collected by administering field tests for control and experimental groups as per and post-test before and after 12 weeks of plyometric training, and secondary data was collected with different documents that the Academy used to record the player's information and the Academy's reports. To attain the objectives of the study, the researcher used physical fitness field tests and football skill tests measurement as data gathering instruments to get quantitative data before and after the intervention.

Quantitative data was collected through the appropriate physical fitness test measures such as the Wall-sit test for lower body strength, Sergeant Jump (vertical jump test) for Explosive power, 30 Meter Acceleration Test for speed, and Illinois agility test for the agility test. In addition, football skill tests such Passing accuracy test and Shooting accuracy-test were tested as pre and post-training. Prior to starting the tests, the close-ended questionnaires were prepared with the aim of identifying whether they are free from any diseases and injury was used as one-selection procedures.

3.7.1 Experimental Materials

The following materials were used throughout the study as marking cones; plastic Ladders, football-ball, stopwatch, wooden blocks, measuring tape, Ropes, flag posts, and whistle, pen, paper so on may use as instruments for the training as well as collect the data during the test. The data were recorded by the investigator with the help of two assistance data recorders who have a BSc degree in Sports science and an MSc. degree in football coaching specialization.

Based on the availability and feasibility of the instruments, the selected variables were tested by using test measurements as shown in table 2 below: -

Table 2 Selected variables, Test tools and their unit of measurements

No	Measurable variables	Test tools	Unit of measurement
1	Lower body strength	Wall-sit test	Second
2	Explosive lower body power	Sergeant Jump (Vertical jump test)	Centimeter reach
3	Speed	30 Meter Acceleration Test	Second

4	Agility	Illinois agility test	Second
5	Accurate pass	Passing accuracy test	Number of scores
6	Accurate shoot	Shooting accuracy test	Number of scores

3.8 Protocol of Physical Fitness and Skill Performance Tests

The following physical fitness and skill performance tests were selected and the Changes recorded especially before and after 12 weeks of plyometric training. And also all the following physical performance tests Adopted from Mackenzie 101 Performance Evaluation Tests, (2005)

3.8.1 Wall Sit Test

According to Mackenzie, (2005),

The objective of this take a look at

- ✓ Is to observe the event of the athlete's extensor muscle strength endurance

Required resources

To undertake this, take a look at, you may require:

- ✓ Warm dry location – gymnasium
- ✓ Smooth wall
- ✓ Stopwatch
- ✓ Assistant

How to conduct the test?

- ✓ Stand comfy on each foot together with your back against a swish wall
- ✓ Slide your back off the wall to assume the position shown within the diagram
- ✓ There is to be a 90° angle at the hip and knee
- ✓ When you're prepared
- ✓ Lift one foot 5cm off the bottom
- ✓ The assistant starts the timer
- ✓ Balance for as long as potential
- ✓ The watch is stopped after you place your foot back on the bottom
- ✓ Take a rest so repeat the take a look at with the opposite leg.

Analysis

- Analysis of the results by scrutiny it with the results of previous tests. it's expected that with applicable coaching between every takes a look at, the associate analysis would indicate an improvement.
- This may be an easy take look at lower body muscular strength and endurance.

Target cluster

- This takes a look at is appropriate for active people however not for those wherever the take a look at would be contraindicated.

Reliability

- Reliability would rely upon however strict the take a look at is conducted and therefore the individual's level of motivation to perform the take a look at.

Validity

- There square measure printed tables to relate results to the potential level of fitness and therefore the correlation is high.

3.7.2 Sergeant Jump take a look at (Vertical jump test)

According to Mackenzie, (2005),

The objective of this take a look at

- ✓ Is to look at the event of the athlete's high jump performance and
- ✓ To live the leg muscle power of subjects

Required resources;

To undertake this, take a look at, the investigator was required: -

- ✓ Assistant and necessary equipment's like
- ✓ Wall,
- ✓ 1-meter tape,
- ✓ Chalk,
- ✓ Data recording forms and
- ✓ Pen

Procedures

The take a look at is conducted when warming up as follows: -

- ✓ The athlete's sub front of the wall, raise their hands upward and chalk the top of their fingertips. In alternative words, stands aspect onto the wall, keeping each foot remaining on the bottom, reaches up as high as potential with one hand, and marks the wall with the ideas of the fingers (m1).
- ✓ From a static position jumps as high as potential and marks the wall with the chalk on his fingertips (m2).

The coach:

- ✓ Measures the space from M1 to M2,
- ✓ The take a look at is performed as again and again because the jock needs.

Analysis;

- ➢ Analysis of the results by scrutiny it with the results of previous tests. it's expected that with applicable coaching between every takes a look at, the associate analysis would indicate an improvement.

Target cluster

- ➢ This takes a look at is appropriate for active people however not for those wherever the take a look at would be contraindicated.

Reliability;

- ➢ Reliability would rely upon, however strict the take a look at can conduct and therefore the individual's level of motivation to perform the take a look at.

Validity

- ➢ There square measure printed tables to relate results to the potential level of fitness and therefore the correlation was high.

3.7.3, 30 Meter Acceleration Test

Objective;

- ✓ The objective of this take look is to observe the event of the player's ability to effectively and, with efficiency accelerate from a standing begin or from beginning blocks to most speed.

Required resources;

- ✓ To undertake this, take a look at, the research worker was needed
- ✓ 400m track with a 30m marked section on the straight,
- ✓ Stopwatch and
- ✓ Two assistants
- ✓ How to conduct the test;
- ✓ The take a look at includes three x 30m runs from a standing begin or from beginning blocks and with a full recovery between every run. The assistant ought to record the time for the contestant to finish the 30m.

Analysis;

- ➢ Analysis of the results, by comparison, with the results of previous tests. it's expected that with applicable coaching between every takes a look at, the associate analysis would indicate an improvement.

Target cluster

- ➢ This takes a look at is appropriate for sprinters however not for people wherever they take a look at would be contraindicated.

Reliability;

- ➢ Reliability would depend on, however strict the take a look at can conduct and therefore the individual's level of motivation to perform the take a look at.

Validity

- Their area unit revealed tables to relate results to the potential level of fitness and therefore the correlation was high.

3.7.4 Illinois agility test

Objective;

- ✓ The objective of the Illinois Agility Run Test is to monitor the development of the athlete's speed and agility.

Required resources

To undertake this test, you will require:

- ✓ Flat surface or 400-meter track
- ✓ 8 cones
- ✓ Stopwatch and
- ✓ Assistant
- ✓ The Illinois course
- ✓ The length of the course is 10 meters and the width (distance between the start and finish points) is 5 meters. On the track, you could use 5 lanes.
- ✓ 4 cones can be used to mark the start, finish, and two turning points. Each cone in the center is spaced 3.3 meters apart.

How to conduct the test;

- ✓ The athlete warms up for 10 minutes, the assistance set-up the course as detailed in the diagram.
- ✓ The athlete lines face down on the floor at the ‘’start’’ cone. The assistant gave the command ‘’Go’’ and start the stopwatch.
- ✓ The athlete jumps to his feet and negotiates the course around the cones following around the straight and zigzag line route shown in the diagram to the finish.

- ✓ The assistant was stopwatch and records the total time when the athlete passes the ‘’finish’’ cone.

Analysis;

- ➢ Analysis of the result is by comparing it with the results of previous tests. It is expected that, with appropriate training between each test, the analysis would indicate an improvement.

Target group

- ➢ This test is suitable for team sports but not for individuals where the test would be contraindicated.

Reliability;

- ➢ Reliability would depend upon, how strict the test will conduct and the individual's level of motivation to perform the test.

Validity;

- ➢ There are published tables to relate results to a potential level of fitness and the correlation is high.

Football Skill Test Items Administration Procedures

3.7.5 Passing accuracy test

Passing accuracy test (Ground passes a stationary ball 15 yards or 13.716 meters)

Purpose: -

- ✓ To measure the ability of passing the ball accurately to the target,

Facilities and equipment’s: -

- ✓ soccer balls,
- ✓ 10 flag post, and
- ✓ Marking for the test

Procedure: -

- ✓ 10, flag posts were fixed in a straight line as the target.
- ✓ The distance between the two middle flag posts was 1 yard.
- ✓ The remaining 8 flag posts were fixed equally on either side of the two middle flag posts with a gap of 0.5 yard in between.
- ✓ 15 yards away and opposite to the middle flag posts, a line was marked from where the ball was kicked forwards the target as shown figure 5.
- ✓ To start the test, the subject will ask to kick the ball, lying on the line, towards the target along the ground. The subject will permit to use any parts of his foot.
- ✓ 10 trails were given to the participant.

Instruction: -

- ➢ If the ball did not pass inside the target zone, 0 point will give to the subject only. Scoring: Points will give according to the area where the ball passes inside of the two flag posts which is shows in figure5.
- ➢ The ball hit any of the flag posts; the adjacent higher point was give.
- ➢ The total point of 10 trails was taking as the score of the participant.

3.7.6 Shooting accuracy test

Shooting accuracy take a look at (Shooting a stationary ball within the goal twenty yards or eighteen.288meters)

Purpose: -

- ✓ To live the accuracy of shooting the ball within the goal

Facilities and equipment's: -

- ✓ Soccer balls,
- ✓ Soccer goal (post) and
- ✓ Rope

Procedure: -

- ✓ The whole goal can divide by rope into seven (7) elements as shown in figure
- ✓ Outside the penalty space, a shooting arc was submerged.
- ✓ This arc can have created with a distance of twenty yards within the extension of roughly 450 angles from every goal post.
- ✓ To begin the take a look at, the topic was asked to kick (shoot) the ball, that was unbroken behind the shooting, arc (20 yards), to the goal.
- ✓ A total of, ten kicks got (3 kicks every from each angle and one kick from any of those angles).
- ✓ The subject can allow using any elements of his foot.

Scoring: -

- ➢ 3 different points as 5, 3 and 1 were given according to the area where the ball went through, which is shown in figure6.
- ➢ If, the ball hits the rope, the adjacent higher point was given.
- ➢ The total numbers of point from 10 successive kicks will record as the score of the participant.

3.8 Training Procedures

Before plyometric training, the researcher administered per-tests for control and experimental groups to know the fitness level of both control and experimental groups. Then, experimental groups engaged in plyometric training in addition to their normal football training. These plyometric training were Squat jump, jumping lunges, Skater jump, tuck jumps, Lateral jumps, Vertical Jumps, High knees, Sid-to-Sid Hops, Forward-backward hops, Single leg Sid-to-Sid Hops Skipping, Box drills, bounding speed. The training program was three times a week 60 minutes per session for continuative three months. The training program was conducted on Monday, Wednesday, and Friday afternoons (10:30 – 11:30 pm). All training programs were conduct based on the FITT principle. The researcher prepares a three-month training plan for the experimental group. However, both groups of players engage in the normal training program prepared by the Football Academy. The control group did not participate in plyometric training like the

experimental group. Finally, all subjects will be taken a post-test then differentiate the test results of trained and non-trained subjects.

3.9 Method of Data Analysis

The quantitative data was collected by administering field tests for control and experimental groups and A paired-samples t-test was conducted to compare the mean score. The data were analyzed by using Statistical Package for Social Sciences (SPSS) version 23. The level of significance value $P \leq 0.05$ level of confidence to describe the analyzed data mean, mean difference, and standard deviation was employed. Finally, the researcher determined the statistically significant change of the analyzed data at 95% of the level of confidence. Finally, possible summary, conclusion, and recommendations forward.

3.10 Data Quality Control (QC)

To ensure the data quality all the test procedures, collection of data and handling information were carry out in accordance with standard protocols and measurements. The researcher uses two assistances to collect data.

To ensure quality of the data validity and reliability of the tests the researcher try to ensure through different techniques like those that standardized tests and methods was used. To reduce the mistakes, occur during data collection, the assistants was train about how to collect the appropriate data and all instruments of the test were calibrating with accurate devices. A test was conducted for three times and the average results used for this study. Additionally, those tests were record with video and photograph for further check on the test procedure.

3.11 Ethical Considerations

This study deal with the ethical issues related to the investigation. It protected the privacy of research participants and Ethical standards require that researchers should get permission from participant's parent and, not put participants in a situation where they might be at risk of harm because of their participation. Prior to the beginning of the study, the researcher was explaining the purpose of the study, the procedures that were used, the possible benefits and risks of participation for the participants of the study and their parents. Therefore, this study was conduct based on, codes of conduct and policies concerning research ethics.

CHAPTER FOUR

4. RESULTS AND DISCUSSION

4.1 Introduction

This part of the research is presented in to two parts, the first part is analysis of quantitative pre and post-test data collected from the experimental group (n= 15) and the comparison group (n= 15) on the study for selected physical fitness variables and skill performance and, the second part is about desiccation of the result on this study from other related research findings. The collected data were analyzed. A paired-samples t-test was conducted to compare the mean score by using SPSS software version 23 at 95% significant level for both experimental and comparison groups and the results are listed below.

4.2 Results of the Study

4.2.1 Demographic Data of players

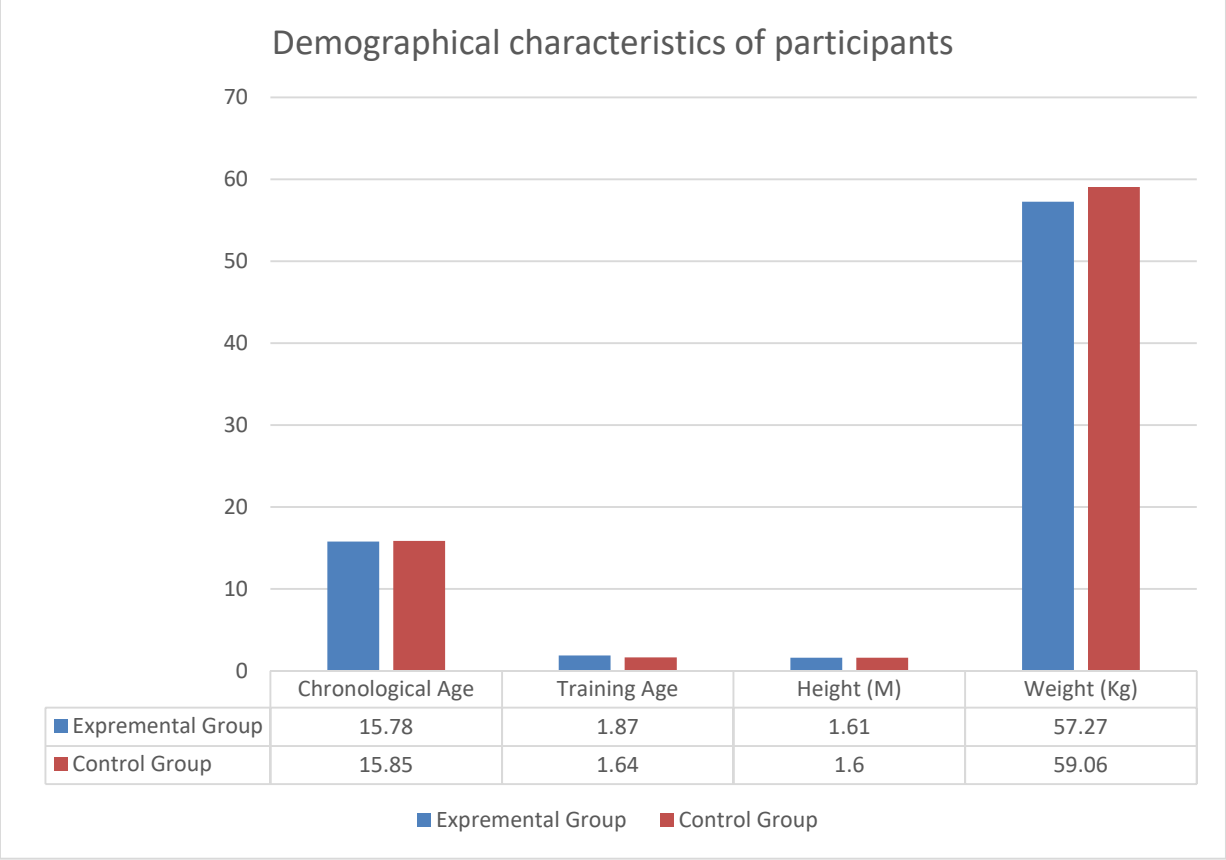

Figure 2 Demographical characteristics of participants

4.2.2 Each test results

In this section we try to see six test results independently and each tests result for both experimental and control groups let we try to see: -

1. **wall sit Test**

Paired Samples Statistics

	wall sit Test.	Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Experimental group Pre- test	1.6707	15	.91540	.23636
	Experimental group Post-test	2.4687	15	.66891	.17271
Pair 2	Control Group Pre- test	1.8907	15	.99987	.25817
	Control Group Post- test	2.1840	15	.76932	.19864

Table 3 Paired Samples Statistics of wall sit Test

Paired Samples Test

wall sit Test		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Experimental group Pre- test - Experimental group Post- test	-.79800	.68665	.17729	-1.17825	-.41775	-4.501	14	.000
Pair 2	Control Group Pre- test - Control Group Post- test	-.29333	1.19307	.30805	-.95404	.36737	-.952	14	.357

Table 4 Paired Samples Test of wall sit Test

A paired-samples t-test was conducted to compare the mean score of the wall-sit test in pre-test and post-test for both experimental and control groups. The result as indicated in table 4 there is a significant average difference between pre-test and post-test for the experimental group (t14=-4.501, p=000). The 95% ci of the difference is [-1.17825, -0.41775]. This implies that 95% confidence that the population means is between -1.17825 and -0.41775. However, there is no significant average difference between pre-test and post-test for the control group (-.95404, and .36737).

These results suggest that 12-week plyometric training improves the strength of football players significantly. Therefore, the null hypothesis (h0: there is no improvement in the strength of football players after plyometric training) is rejected because the alternative hypothesis (h1: plyometric training improves the strength of football players.) Is accepted for performance improvement.

For additional analysis purpose we can compare both experimental and control groups alpha value with our significance level , p = .357 > significant level of p = 0.05 for control group and p = .000

< significant level of p = 0.05 for experimental group. So that as we have seen on the table the experimental group have improved on their strength after 12 weeks of plyometric training.

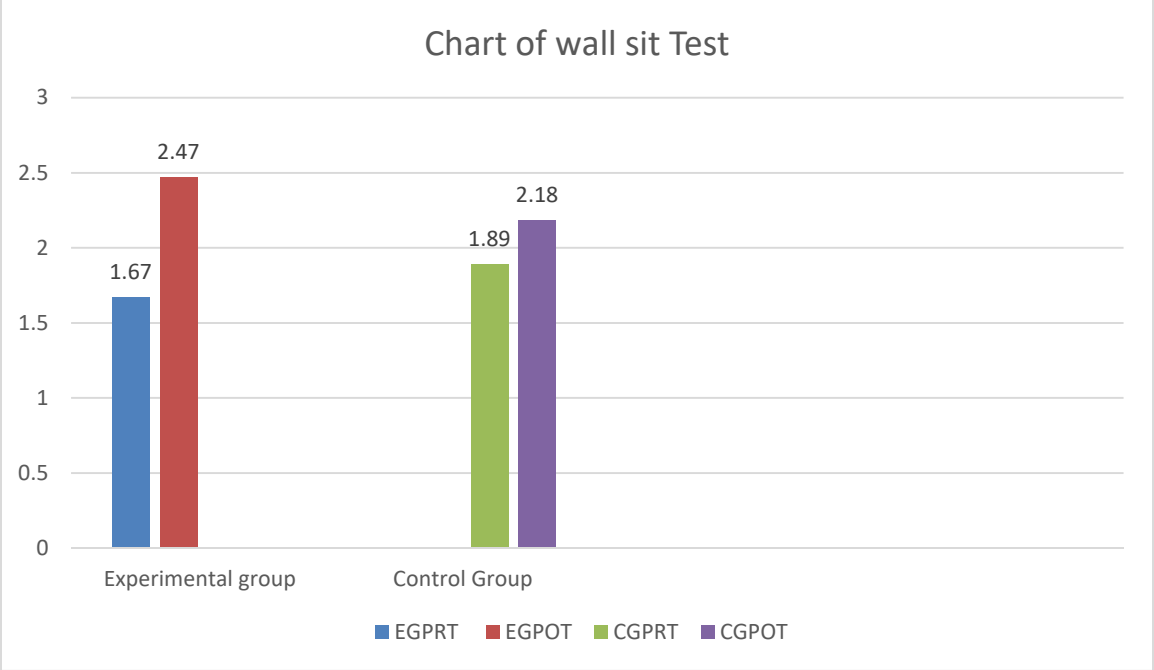

Figure 3 Graphic presentation of pre-test and post-test mean scores for wall sit Test

EGPRT = Experimental group Pre- test **EGPOT** = Experimental group Post- test

CGPRT = Control Group Pre- test **CGPOT** = Control Group Post- test

2. Sergent Jump (Vertical jump) Test

Paired Samples Statistics

	Sergent Jump (Vertical jump) Test	Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Experimental group Pre- test	35.3333	15	7.37434	1.90405
	Experimental group Post- test	42.4667	15	7.33501	1.89389
Pair 2	Control Group Pre- test	33.0000	15	7.91021	2.04241
	Control Group Post- test	34.9000	15	8.01828	2.07031

Table 5 Paired Samples Statistics of Sergent Jump (Vertical jump) Test

Table 5 indicates that the average vertical jump test of an experimental group of pre-test and post-test is 35.3333 and 42.4667 centimeter with a standard deviation of 7.37434 and 7.33501 centimeter respectively. And similarly, the average vertical jump test of a control group of pretest and posttest is 33.0000 and 34.9000 centimeter with a standard deviation of 7.91021 and 8.01828 centimeter respectively.

Paired Samples Test

Sergent Jump (Vertical jump) Test		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Experimental group Pre- test - Experimental group Post- test	-7.13333	6.79408	1.75422	-10.89577	-3.37090	-4.066	14	.001
Pair 2	Control Group Pre-test - Control Group Post- test	-1.90000	2.28504	.59000	-3.16542	-.63458	-3.220	14	.006

Table 6 Paired Samples Test of Sergent Jump (Vertical jump) Test

As we have seen in table 6, a paired-samples t-test was conducted to compare the mean score of the sergent jump (vertical jump) test in pre-test and post-test for both experimental and control groups. There is a significant average difference between pre-test and post-test for the experimental group (t14=-4.066, p=001). The 95% ci of the difference is [-10.89577, -3.37090]. This implies that 95% confidence that the population means is between -10.89577 and -3.37090. Similarly, there is a significant average difference between pre-test and post-test for the control group (t14=-3.220, p=006). The 95% ci of the difference is [-3.16542, -0.63458]. This implies that 95% confidence that the population means is between -3.16542 and -0.63458. These results suggest that there is a significant increase in the power of football players after the plyometric training program is applied. Therefore, the null hypothesis (h0: plyometric training has no significant effect on the power of football players.) Is rejected because of the alternative hypothesis (h1: there is a significant increase in power of football players after the plyometric training

program is applied.) Is accepted for the athlete's performance improvement after 12-weeks plyometric training.

For additional analysis purpose we can compare both experimental and control groups alpha value with our significance level, p = .006 □ significant level of p = 0.05 for control group and p = .01 < significant level of p = 0.05 for experimental group. So that as we have seen on the table the experimental group has improved on their power after 12 weeks of plyometric training.

Both control and experimental groups have improved on their power but relatively experimental groups result is beater one.

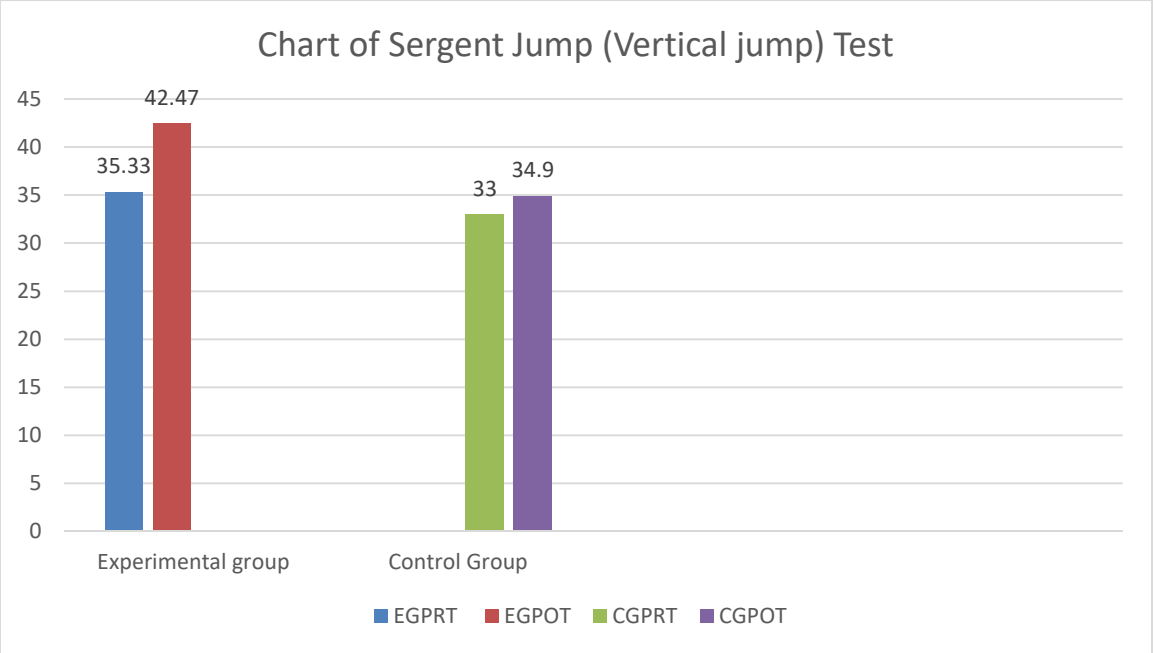

Figure 4 Graphic presentation of pre-test and post-test mean scores for Sergent Jump (Vertical jump) Test

EGPRT = Experimental group Pre- test **EGPOT** = Experimental group Post- test

CGPRT = Control Group Pre- test **CGPOT** = Control Group Post- test

3. 30 Meter Acceleration Test

Paired Samples Statistics

	30 Meter Acceleration Test	Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Experimental group Pre- test	4.9753	15	.38849	.10031
	Experimental group Post- test	4.3073	15	.37988	.09808
Pair 2	Control Group Pre- test	5.1360	15	.28650	.07397
	Control Group Post- test	5.0480	15	.50915	.13146

Table 7 Paired Samples Statistics of 30 Meter Acceleration Test

Table 7 shows the average paired sample statics of the 30-meter acceleration test of an experimental group of pretest and posttest is 4.9753 and 4.3073 seconds with a standard deviation of 0.38849 and 0.37988 seconds respectively. And similarly, the average 30-meter acceleration test of the control group of pretest and posttest is 5.1360 and 5.0480 second with a standard deviation of .28650 and .50915 second respectively.

Paired Samples Test

	30 Meter Acceleration Test	Paired Differences					t	Df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Experimental group Pre- test - Experimental group Post- test	.66800	.56004	.14460	.35786	.97814	4.620	14	.000
Pair 2	Control Group Pre- test - Control Group Post- test	.08800	.58344	.15064	-.23510	.41110	.584	14	.568

Table 8 Paired Samples Test of 30 Meter Acceleration Test

Table 8 a paired-samples t-test was conducted to compare the mean score of the 30-meter acceleration test in pre-test and post-test for both experimental and control groups. There is a significant average difference between pre-test and post-test for the experimental group (t14=-4.62, p=000). The 95% ci of the difference is [0.35786, .97814]. This implies that 95% confidence that the population means is between 0.35786 and .97814. However, there is no significant average difference between pre-test and post-test for the control group.

These results suggest that 12-week plyometric training has a positive effect on the speed of football players. Therefore, the null hypothesis (h0: there is no effect on the speed of football players after plyometric training.) Is rejected because of the alternative hypothesis (h1: plyometric training has a positive effect on the speed of football players.) Is accepted for performance improvement on the speed of football players.

For additional analysis purpose we can compare both experimental and control groups alpha value with our significance level, p = .568 > significant level of p = 0.05 for control group and p = .000 < significant level of p = 0.05 for experimental group. So that as we have seen on the table the

experimental group have improved on the speed of football players after 12 weeks of plyometric training.

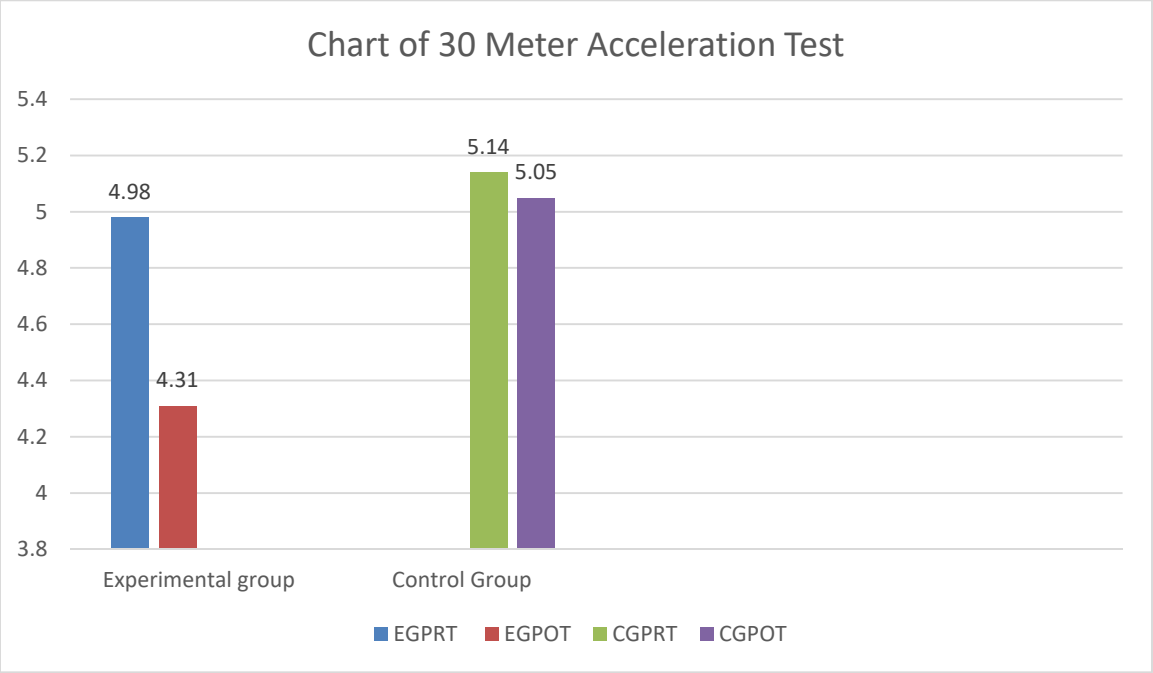

Figure 5 Graphic presentation of pre-test and post-test mean scores for 30 Meter Acceleration Test

EGPRT = Experimental group Pre- test **EGPOT** = Experimental group Post- test

CGPRT = Control Group Pre- test **CGPOT** = Control Group Post- test

4. Illinois Agility Test

Paired Samples Statistics

	Illinois Agility Test	Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Experimental group Pre- test	18.1787	15	.94491	.24397
	Experimental group Post- test	17.1267	15	.84755	.21884
Pair 2	Control Group Pre- test	18.5340	15	.65249	.16847
	Control Group Post- test	18.2107	15	1.38656	.35801

Table 9 Paired Samples Statistics of Illinois Agility Test

Paired samples statistics (table 9) indicates the average Illinois agility test of an experimental group of pretest and posttest is 18.1787 and 17.1267 second with a standard deviation of .94491 and .84755 second respectively. And similarly, the average Illinois agility test of the control group of pretest and posttest is 18.5340 and 18.2107 second with a standard deviation of .65249 and 1.38656 seconds respectively.

Paired Samples Test

Illinois Agility Test		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Experimental group Pre-test - Experimental group Post- test	1.05200	1.01141	.26115	.49190	1.61210	4.028	14	.001
Pair 2	Control Group Pre- test - Control Group Post- test	.32333	1.09369	.28239	-.28233	.92900	1.145	14	.271

Table 10 Paired Samples Test of Illinois Agility Test

A paired-samples t-test was conducted to compare the mean score of the Illinois agility test in pre-test and post-test for both experimental and control groups. There is a significant average difference between pre-test and post-test for the experimental group (t14=-4.028, p=001). The 95% ci of the difference is [.49190, 1.61210]. This implies that 95% confidence that the population means is between .49190 and 1.61210. However, there is no significant average difference between pre-test and post-test for the control group.

These results suggest that 12-week plyometric training has an incremental effect on the agility of football players. Therefore, the null hypothesis (h_0: there is no incremental change on agility of football players after plyometric training.) Is rejected because of the alternative hypothesis (h_1: plyometric training has a positive impact on agility of football players) is accepted for performance improvement on the speed of football players.

For additional analysis purpose we can compare both experimental and control groups alpha value with our significance level, p = .271 > significant level of p = 0.05 for control group and p = .001 < significant level of p = 0.05 for experimental group. So that as we have seen on the table the experimental group have improved on the agility of football players after 12 weeks of plyometric training.

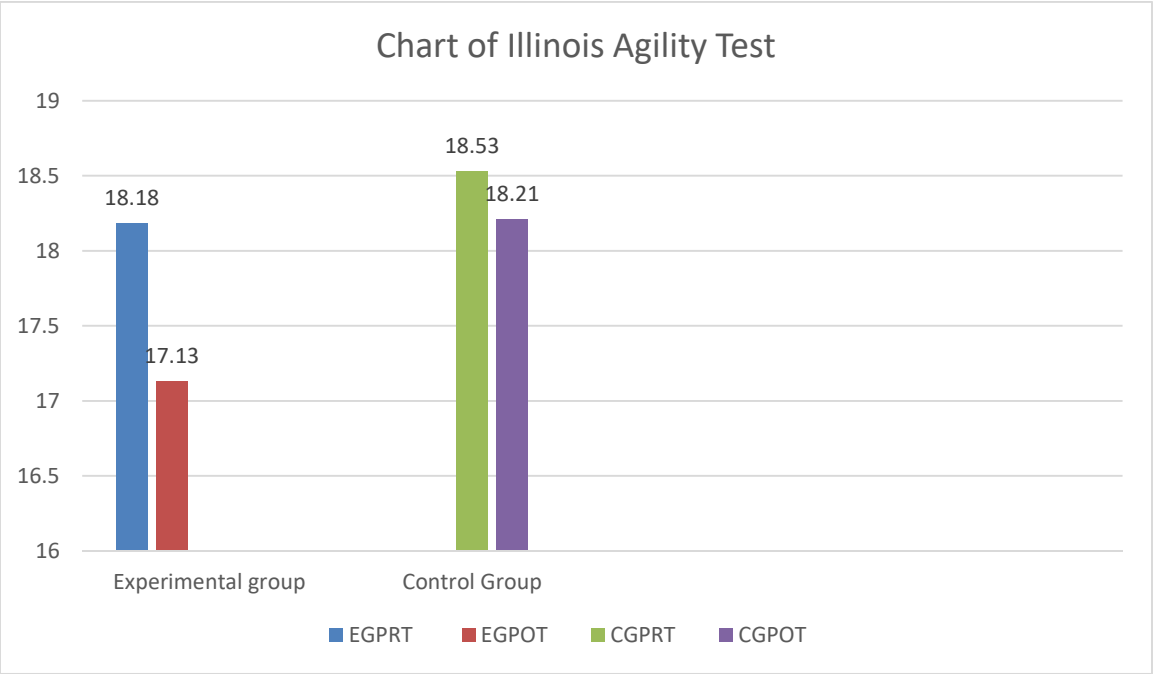

Figure 6 Graphic presentation of pre-test and post-test mean scores for Illinois Agility Test

EGPRT = Experimental group Pre- test **EGPOT** = Experimental group Post- test

CGPRT = Control Group Pre- test **CGPOT** = Control Group Post- test

5. Passing Accuracy Test

Paired Samples Statistics

	Passing Accuracy Test	Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Experimental group Pre- test	40.0667	15	5.53517	1.42917
	Experimental group Post-test	44.2667	15	1.70992	.44150
Pair 2	Control Group Pre- test	39.0667	15	3.34806	.86447
	Control Group Post- test	38.4667	15	4.56488	1.17865

Table 11 Paired Samples Statistics of Passing Accuracy Test

Table 11 shows the average passing accuracy test of experimental group of pretest and posttest is 40.0667 and 44.2667 point with standard deviation of 5.53517 and 1.70992 point respectively. And similarly the average passing accuracy test of control group of pretest and posttest is 39.0667 and 38.4667 point with standard deviation of 3.34806 and 4.56488 point respectively.

Paired Samples Test

Passing Accuracy Test		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Experimental group Pre- test - Experimental group Post- test	-4.20000	5.19890	1.34235	-7.07906	-1.32094	-3.129	14	.007
Pair 2	Control Group Pre- test - Control Group Post- test	.60000	4.32270	1.11612	-1.79383	2.99383	.538	14	.599

Table 12 Paired Samples Test of Passing Accuracy Test

As we have seen On the above (Table12) A paired-samples t-test was conducted to compare the mean score of the Passing Accuracy Test in pre-test and post-test for both Experimental and control groups. There is a significant average difference between pre-test and post-test for the experimental group (t14=-3.129, p=007). The 95% ci of the difference is [-7.07906, -1.32094]. This implies that 95% confidence that the population means is between -7.07906and -1.32094. However, there is no significant average difference between pre-test and post-test for the control group.

These results suggest that 12-week plyometric training has an incremental change on the accurate pass of football players. Therefore, the null hypothesis (h0: there is no change on the accurate pass of football players after plyometric training.) Is rejected because of the alternative hypothesis (h1: plyometric training has an incremental change on the accurate pass of football players.) Is accepted for performance improvement on the accurate pass of football players.

For additional analysis purpose we can compare both experimental and control groups alpha value with our significance level, p = .599 > significant level of p = 0.05 for control group and p = .007 < significant level of p = 0.05 for experimental group. So that as we have seen on the table the experimental group have improved on the accurate pass of football players after 12-weeks plyometric training was given.

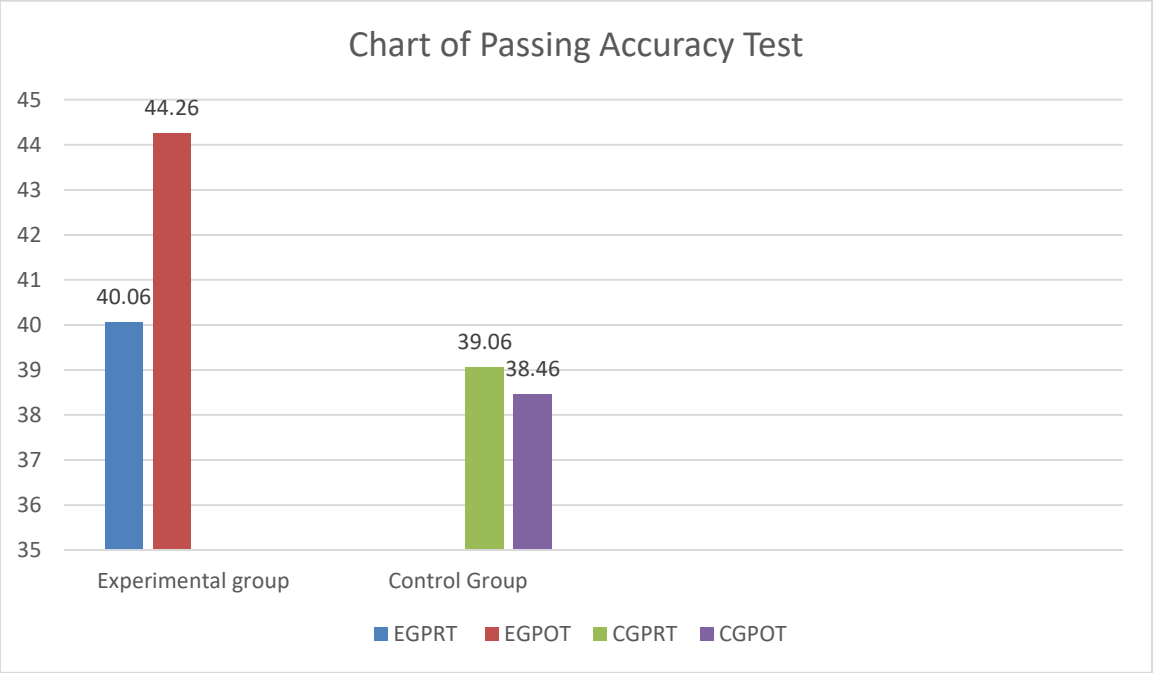

Figure 7Graphic presentation of pre-test and post-test mean scores for Passing Accuracy Test

EGPRT = Experimental group Pre- test **EGPOT** = Experimental group Post- test

CGPRT = Control Group Pre- test **CGPOT** = Control Group Post- test

4. Shooting Accuracy Test

Paired Samples Statistics

	Shooting Accuracy Test	Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Experimental group Pre-test	25.9333	15	7.37241	1.90355
	Experimental group Post-test	32.0667	15	6.40833	1.65462
Pair 2	Control Group Pre- test	23.2667	15	6.83966	1.76599
	Control Group Post- test	25.0000	15	6.64401	1.71548

Table 13 Paired Samples Statistics of Shooting Accuracy Test

Table 13 paired the average samples statistics of shooting accuracy test indicate the result of shooting accuracy test of experimental group of pre-test and post-test is 25.9333 and 32.0667 point with standard deviation of 7.37241 and 6.40833 point respectively. And similarly the average shooting accuracy test of control group of pretest and posttest is 23.2667 and 25.0000 point with standard deviation of 6.83966 and 6.64401 point respectively.

Paired Samples Test

Shooting Accuracy Test		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Experimental group Pre- test - Experimental group Post- test	-6.13333	9.31870	2.40608	-11.29386	-.97281	-2.549	14	.023
Pair 2	Control Group Pre- test - Control Group Post- test	-1.73333	6.58425	1.70005	-5.37957	1.91290	-1.020	14	.325

Table 14 Paired Samples Test of Shooting Accuracy Test

A paired-samples t-test was conducted to compare the mean score of the shooting accuracy test in pre-test and post-test for both experimental and control groups. There is a significant average difference between pre-test and post-test for the experimental group (t14=-2.549, p=023). The 95% ci of the difference is [-11.29386, -.97281]. This implies that 95% confidence that the population means is between -11.29386 and -.97281. However, there is no significant average difference between pre-test and post-test for the control group.

These results suggest that 12-week plyometric training has an incremental change in the accurate shooting of football players. Therefore, the null hypothesis (h0: there is no change in the accurate shoot of football players after plyometric training.) Is rejected because of the alternative hypothesis

(h1: plyometric training has an incremental change on the accurate shoot of football players.) Is accepted for performance improvement on the accurate shooting of football players.

For additional analysis purpose we can compare both experimental and control groups alpha value with our significance level, p = .599 > significant level of p = 0.05 for control group and p = .007 significant level of p = 0.05 for experimental group. So that as we have seen on the table the experimental group have improved on the accurate shooting of football players after 12-weeks plyometric training was given.

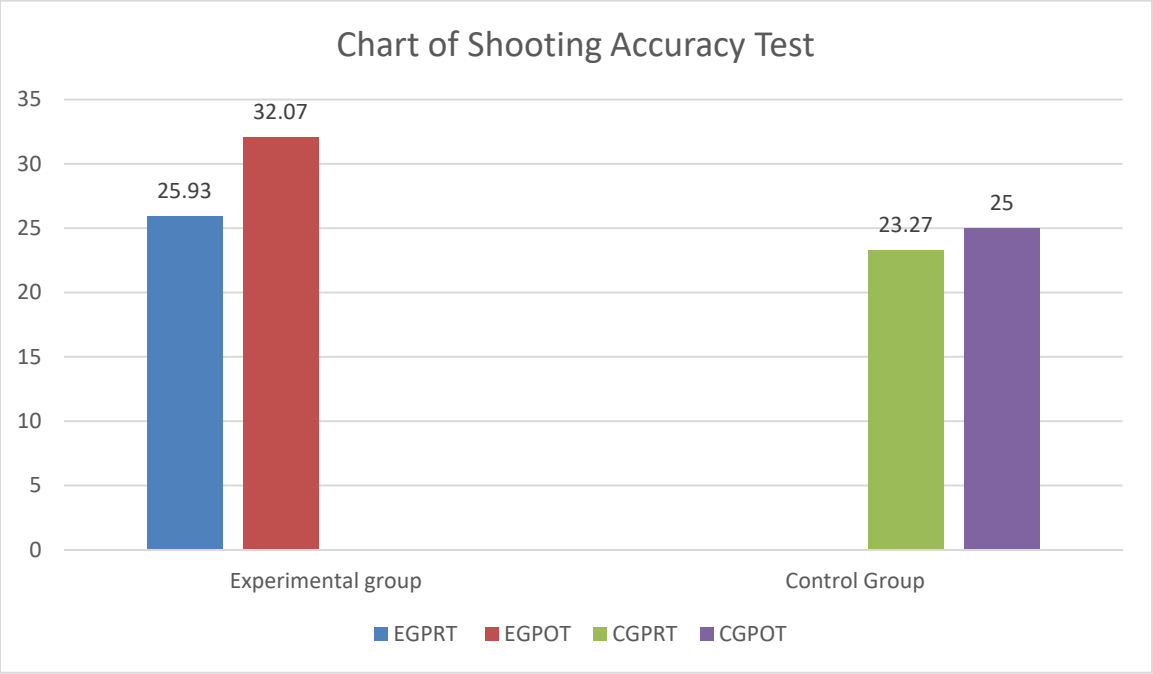

Figure 8 Graphic presentation of pre-test and post-test mean scores for Shooting Accuracy Test

EGPRT = Experimental group Pre- test **EGPOT** = Experimental group Post- test

CGPRT = Control Group Pre- test **CGPOT** = Control Group Post- test.

4.3 DISCUSSION

The result of this study was also matched and/or supported with the finding of (Reilly and Williams et al., 2000) "They conducted their study on the effect of Plyometric exercise programs on health-related and skill-related physical fitness components of young male football projects and found improved speed and agility among the experimental group of young male football projects after 12 weeks of the training program".

"Plyometrics refers to exercise characterized by powerful contraction in response to the eccentric-concentric activity which loads (stretches) the elastic and contractile components of muscles. the combo of both eccentric and concentric training is believed to spice up muscular strength and power to a greater degree than concentric alone". (Kevin, etal.,2009)

Plyometrics exercises are suitable for improving various measures and components of muscle power like vertical jumping ability, speed, and acceleration). Plyometric training can improve the jumping power of athletes. (Mathise, 2014)

Plyometric drills are recommended in soccer training due to the fast force production and explosive actions with change of directions, and their needs for the flexibility to start out and stop quickly. (Little and Williams, 2005)

According to (Bullard, et al., 2002) described plyometric exercises as explosive callisthenic-like exercises which involve the "conditioning of the neuromuscular system to allow faster and more powerful changes of direction like moving from up and down in jumping or switching leg positions as in running. The stored potential energy within the muscle is employed to provide more force than is provided by a concentric action alone"

This research finding are also supported with the finding of (Wang and Zhang., 2016) "Plyometric training is a technique used to increase strength and explosiveness. It consists of physical exercises in which muscles exert maximum force at short intervals to increase dynamic performances. In such a training, muscles undergo a rapid elongation followed by an immediate shortening (stretch-shortening contraction), utilizing the elastic energy stored during the stretching phase. There is consensus on sport-specific skills. Consequently, PT which was primarily used by martial artists, sprinters and high jumpers to improve performances has gained in popularity and has been used by athletes in all types of sports. However, although PT has been shown to increase performance

variables in many sports, little scientific information is currently available to determine whether PT actually enhances skill performance in soccer players, considering that soccer is an extremely demanding sport. Soccer players require dynamic muscular performance for fighting at all levels of training status, including rapid movements such as acceleration and deceleration of the body, change of direction, vertical and horizontal jumps, endurance, speed as well as power for kicking and tackling".

CHAPTER FIVE

5. SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 SUMMARY

The purpose of this study was to investigate the effect of plyometric training on selected physical fitness variables and skill performance: with specific reference to Silte Zone Kemal and Sadat Football Academy Players. to accomplish this drive, the researcher, give 12-weeks and 3-days per-week plyometric training for U-17 male football players on this academy. And for this purpose, the researcher reviewed the available literatures in order to settle on the focus of the study. and

In order to attain the general objective of the study, the following specific research objectives were formulated.

- ✓ To examine the effect of plyometric training on the strength of football players,
- ✓ To measure the effect of plyometric training on the power of football players,
- ✓ To evaluate the effect of plyometric training on the speed of football players,
- ✓ To identify the impact of plyometric training on the agility of football players,
- ✓ To determine the effects of plyometric training on the accurate passing skill of players,
- ✓ To find out the effects of plyometric training on accurate shoot skill performance of players.
- ✓ To compare the relative change in physical fitness and skill performance of the experimental and control group. In addition, to test the effect and when it is positive to recommend a plyometric training program for coaches, football players, and physical fitness trainers, and for club managers so on.

Based on the above specific objectives, hypotheses were also formulated.

1. H 0: There is no improvement in the strength of football players after plyometric training.
2. H0: Plyometric training has no significant effect on the power of football players.
3. H0: There is no effect on the speed of football players after plyometric training.
4. H_0: There is no incremental Change on agility of football players after plyometric Training
5. H0: There is no change in the accurate pass of football players after plyometric training.
6. H0: There is no Change in the accurate shoot of football players after plyometric training.

The purpose of this study was to investigate effect of 12 weeks plyometric training on selected physical fitness variables and skill performance with specific reference to Kemal and Sadat Football Academy players found in Silte Zone. To attain the purpose of the study, the researcher used Quasi experimental design within 12-week plyometric training program. The Football Academy had a total N 90 players grouped into three age categories: U-13, U-15 and, U-17. The researcher selected the U-17 age category by using purposive sampling method and all the n= 30 players in this age category were clustered as control and experimental group by using simple random sampling method. The control group (n=15) registered mean scores of 15.72 and 1.87 for the chronological and Training age respectively while the experimental group (n=15) had mean scores of 15.85 and 1.64 chronological and Training age respectively. Only the experimental group was made to receive a 60 minutes plyometric training for12 consecutive weeks with frequency of 3 days per week. However, both groups engaged in the regular football training program that was given by the Academy. The selected physical fitness and football skills were strength, speed, power, accurate pass, and accurate shoot. Field tests were taken as data gathering instruments. These were wall sit test to measure lower body strength, vertical jump test to measure explosive lower body power, 30-meter sprint test to measure maximum speed, passing accuracy test to measure accurate pass, shooting accuracy test to measure accurate shoot. To determine the difference between pre training and post training mean values, a paired-samples t-test was computed by using SPSS software version 23 at 95% significance level for both experimental and comparison groups.

The results of the paired samples t-test for the control and experimental groups respectively were:

- ✓ wall sit Test P = 0.00 and P = 0.357,
- ✓ Vertical jump Test P = 0.01 and P = 0.06,
- ✓ 30 Meter Acceleration Test indicate P = 0.00 and P = 0.568,
- ✓ passing Accuracy Test P = 0.07 and P = 0.599,
- ✓ Shooting Accuracy Test P = 0.023 and P = 0.325.

Generally, after the analysis of the study the researcher observed improvements on the selected physical fitness variables and skill performance of the experimental groups.

5.2 Conclusion

In the present investigation the researcher hypothesized and try to testify 12-weeks of plyometric Training would produce improvements in strength, and power speed, Agility, Accurate pass, and Accurate Shoot of Football players, and give the plyometric training for experimental groups for the last 12-quensicuative weeks. Based on the major findings and with the possible limitation of the study, the following points were stated as a conclusion;

- ✓ It was found that the 12 weeks plyometric training program significantly improved Selected Physical Fitness variables and Skill Performance of football players.
- ✓ Twelve weeks of plyometric training has a significant effect on the improvements of lower body strength fitness, Power, speed, and agility of football players
- ✓ Plyometric training has a significant effect on improvements of accurate Pass and accurate shoot skill performance of football players,
- ✓ Due to the multifaceted nature of physical requirements in soccer, including strength, endurance, power, and agility, soccer training must be able to fulfill the needs of improvement on these variables.
- ❖ Based on this finding, the researcher concluded that 12-weeks Plyometrics training had positive effect on the selected physical fitness variables and skill performance of the football players.

5.3 Recommendation

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

- ❖ It is highly expected from professionals of sports science, physical trainers, and related fields to educate and to create awareness of the values of well-planned plyometric training on the performance of football players. Accordingly, plyometric training can be advised for football trainers, who work for development football teams and football clubs, as it contributes to on strength, power, speed, and agility of their player's development and for the best Shill performance also.
- ❖ It is necessary to raise awareness among trainers about the importance of plyometric exercises in raising the physical fitness and skillful performance of Football players.

- It's feasible and effective using plyometric training for soccer players in addition to their regular football training programs, but the training needs to be continuous throughout the season with proper recovery time. To become more beneficial from the training program the coaches and physical trainers need to assess the players' performance, health status and it needs to be supported by a good nutritional status.
- Further research should be conducted for analyzing the effects of the plyometric Training programs for a longer duration of the training and its tapering or termination impacts on various fitness variables among players in the same area of different ages, gender, levels of fitness, and nature of the game.
- In addition to these, the researchers highly suggest Kemal and Sadat Football Academy, coaches, and other concerned bodies have to give attention to the player's development especially they must assess and profile of the trainer's progress in every aspect due to unexpected results during pre and post-tests many players on this Academy are below the norms of the test protocol. This implies working hard and put an objective to reach the standard and become competent. Finally, Kemal and Sadat Football Academy may become the first to apply the study finding and implement for their training programs.

Reference

Amelia Ferro, Jorge Villacieros, Pablo Floría, Jose L. Graupera. (2014). Analysis of Speed Performance in Soccer by a Playing Position and a Sports Level Using a Laser System Analysis of speed performance in soccer. Journal of Human Kinetics - volume 44.

Baechle, T.R. and R.W.Earle. (2000). Essentials of Strength Training and Conditioning. 2ndedition. Champaign, IL: National Strength and Conditioning Association.

Beuster N, Herlyn PK, Fischer DC and Bruhn S. (2016). Plyometric training improves voluntary activation and strength during isometric, concentric and eccentric contractions. J Sci Med Sport 19: 170-176,

Biswas J. L. (2003) Physical fitness in plyometric training achievement in elementary school. Journal of Physical Activity and Health, P 99-104.

Brad & Walker. (2003) plyometric training guidelines for the elderly; Med Science sport exercise P12-17.

Brian Mackenzie, (2005).101 Performance Evaluation Tests Published by Electric Word plc. 67-71 Go's well Road London.

Bullard D.C, Miller, M.G., Berry, S., and R. Gilders. (2002). Comparisons of Land-Based and Aquatic Based Plyometric Programs During an 8-Week Training Period. J Sport Rehab, 11: 269-283

Cavagna G. (1977). Storage and utilization of elastic energy in skeletal muscle. Exercise Sports Science Review, 5: 89

Chimera, N.J., Swanik, K.A., Swanik, C.B., & Straub, S.J. (2004). Effects of Plyometric Training on Muscle-Activation Strategies and Performance in Female Athletes. Journal of Athletic Training, 39(1), 24-31.

Chu Donald A. (1998). Jumping into Plyometrics second edition Champaign, IL: Leisure Press

Cometti G. Maffuletti N. A Pousson M.chaterd J. C Maffuli.(2000). Isokenetic strength and an aerobic power of elite, subelite and amateur French soccer players, International journal of Medicine

Corbin, C.B. and R, Lindsey. (1997). Concepts of Physical Fitness. Dubuque: McGraw Hill.www.earlychildhoodnews.com/early childhood/article.

Dawes J. (2008). One on one: Creating open agility drills. Strength and Conditioning Journal of Sport Medicine.30: 5

Dr. Michael Yessis. (2009). Explosive Plyometrics book

Ekblom, B. (1994). Handbook of Sports Medicine and Science: Football (Soccer). Blackwell Scientific Publications, Oxford, UK

Eskandar Taheri, Asghar Nikseresht and Ebrahim Khoshnam. (2014). The effect of 8 weeks of plyometric and resistance training on agility, speed and explosive power in soccer players, European Journal of Experimental Biology, Department of Physical Education, Jahrom Branch, Islamic Azad University, Jahrom, Iran

FIFA. (2010). youth football training manual

Fukunaga, T., Y. Kawakami, K. Kubo, (2002). Muscle and Tendon Interaction During Human Movements. Exerc Sport Sci Rev., 30:106–110.

Gerhard Frank (2008). Soccer Training Programs book 2nd edition Meyer & Meyer Sport

Haftemaryam Kebede (2018). Assessment of football coaching problems: with specific reference to selected Addis Ababa city u-15 football projects which participate in Addis Ababa city football federation yearly tournament

Häkkinen K, Alén M and Komi PV. (1985). Changes in isometric force-and relaxation-time, electromyographic and muscle fibre characteristics of human skeletal muscle during strength training and detraining. Acta Physiol Scand 125: 573-585,

Hoff J, Helgerud J. (2004). Endurance and strength training for soccer players. Physiological considerations. Sports Med 34: 165–180,

https://www.topendsports.com/sport/soccer/fitness.htm

Impellizzeri FM, Rampinini E, Castagna C, Martino F, Fiorini S, Wisloff U. (2008), effects of plyometric training on sand versus grass on muscle soreness and jumping and sprinting

Impellizzeri,F.M.Rampinini,E. C.Castegna,Martino,F. Fiorini,S. Wisloff, U. (2008). Effect of Plyometric Training on Sand versus Grass on Muscle Soreness and Jumping and Sprinting Ability in Soccer Players. British journal of sport medicine; No 42: pp 4246.

Ishikawa, M., E. Niemelä, V. Komi, (2005). Interaction between fascicle and tendinous tissues in short-contact stretch-shortening cycle exercise with varying eccentric intensities. J Appl Physiology., 99:217–223.

István Juhász, Dr. Bíró Melinda, Imre Juhász, Péter Váczi, Tamás Vincze, Pál Hajdú EKC Líceum (2015) Ball Games. Press Eger

James C. Radcliffe and Robert C. Farentinos (2012) Explosive Power Training Second Edition

Journal of human kinetics (2016).

Jovanovic Mario, Goran Sporis Darija Omercan Fredi Fiorentini. (2011). Effects of Speed, Agility, Quickness Training Method on Power Performance in Elite Soccer Players, National strength and Conditioning Association, V25, no 5

Jullien H, Bisch C, Largouet N, Manouvrier C, Carling CJ, Amiard V. (2008). Does a short period of lower limb strength training improve performance in field-bases tests of running and agility in young professional soccer trainings J Strength Cond Res 22: 404–411,

Kiiskinen Sari. (2005). The Effect of Plyometric exercises on the young basketball players Journal of strength and conditioning Research sport sciences,5(8): pp125-128

Kubo K, Morimoto M, Komuro T, Yata H, Tsunoda N, Kanehisa H and Fukunaga T. (2007). Effects of plyometric and weight training on muscle-tendon complex and jump performance. Med Sci Sports Exerc 39: 1801-1810,

Locke, L.F., Spirduso, W.W., and Silverman, S.J. (1987). Proposals that work: A guide for planning dissertations and grant proposals (2nd edition). Newbury Park, CA: Sage.

Luebbers PE, Potteiger JA, Hulver MW, Thyfault JP, Carper MJ and Lockwood RH. (2003). Effects of plyometric training and recovery on vertical jump performance and anaerobic power. J Strength Cond Res 17: 704-709,

Markovic G. (2007). Does Plyometric Training Improve Vertical Jump Height? A Meta- Analytical Review. Br J Sports Med, 41: 349- 355

Markovic, G., Jukic, I., Milanovic, D., & Metikos, D. (2007). Effects of Sprint and Plyometric Training on Muscle Function and Athletic Performance. J Strength Cond Res, 21(2), pp.543-549

Matveyev, L. P. (1981). Fundamental of sport training. Moscow: Progress Publishers

McNeely/Sandler (2007) power plyometric The Complete Program. Meyer & Meyer Sport. UK

Mesfin Mengesh. (2014). Effects of Plyometric Training on Soccer Related Physical Fitness Variables of Haramaya University Intercollegiate Female Soccer Players, Haramaya University.

Meylan C, Malatesta D. (2009.) Effects of in-season plyometric training within soccer practice on explosive actions of young players. J Strength Cond Res 23: 2605–2613,

Meylan.C and Malatesta D, (2009), Effects of in-season plyometric training within soccer practice on explosive actions of young players, Journal of Strength and Conditioning Research V2 No 9.

Mohin &Vadiwal. (2015). benefits of plyometric exercises in human movement. Mosby, St Lovis, mo.

Natalia Verkhoshansky. (2012). Shock Method and Plyometrics: Updates and an In-Depth Examination. Verkhoshansky Special Strength Training Methodology. CVASPS,

Pasic, M. (1993). The Physiology of the Nervous System. 3rdedition. Belgrade: Naučna knjiga. Council of Europe (1983). Testing physical fitness EUROFIT experimental battery: provisional handbook

Rassier, E., W. Herzog. 2005. Force enhancement and relaxation rates after stretch of activated muscle fiber. Proc Biol Sci., 272: 475–480.

Reilly Thomas. (2007). The science of training soccer a scientific approach to developing strength, speed and endurance.

Reilly, T. (1996). Science and football, Spon Press, London, UK

Robert Wood (2008) plyometric physical activity and fitness training for soccer skill performance. Pediatric Exercise Science 9:113–26.

Ronnestad. B.R. Nils H. Kvamme, Arnstein Sunde, and Truls Raastad Short. (2008). Term Effects of Strength and Plyometric Training on sprint and jump performance in Professional Soccer Players.

Stolen, T., Chamari, K., Castagna, C., and Wisloff, U. (2005). Physiology of football: An update. Sports Medicine; 35: 501–536.

Stonkus, S., M. Balciunas, C. Abrantesand J. Sampaio, (2006). Long Term Effects of Different Training Modalities on Power, Speed, Skill and Anaerobic Capacity in Young Male Basketball Players. Journal of Sports Science and Medicine, 5 (2): pp 163- 170.

Thomas Reilly and A.Mark Williams Science and Soccer 2nd edition

William Kayson (2006) The Concept of Plyometric Training; Optimizing Training Programs and Maximizing Performance. Sport Medicine.

Witzke K.A.,and Snow C.M. (2000). Effects of Plyometric Jumping on Bone Mass in Adolescent Girls. Med Sci Sports Exercise; 32: 1051–1057.

Yiannis Michailidis October (2015). Effect of plyometric training on athletic performance in preadolescent soccer players Journal of Human Sport and Exercise 10(1)

Ying-Chun Wang and Na Zhang. (2016). Effects of Plyometric Training on Soccer Players (Review) Experimental and Therapeutic Medicine 12: 550-554,

APPENDICES

Appendix- A Information record form

The questionnaire prepared for studying the effect of plyometric training on selected physical fitness variables and skill performance: with specific reference to silte zone kemal and sadat football academy players. So you are kindly requested to give appropriate information for the following question regarding to your current health status.

THANK YOU!

I. PLAYERS INFORMATION

Name: _____Date of Birth____/____/_____

Chronological Age: _____Training age _____

Address: _____ _____ _____ _____

Phone: _____

Emergency Contact: _____

Address_____ phone no _____

II. Personal health status

Physical Readiness Questionnaires

This questionnaire is designed to obtain information on the health status and physical health statues readiness of the subjects participating for the research study. If one or more negative result is obtained from the participants, they will be examined by physician and their participation is depending on the decision of physician. The information will be kept strictly confidential. Furthermore, to make the questionnaires briefer and clear, it can be prepared in English and Amharic languages. If you are willing to your child become participate on this research, please read the following questions carefully and indicate your correct response to following questions below.

Firstly, thanks very much for your good response!!

INSTRUCTION: - Please read the following questions carefully and indicate your correct responses to each question by circling it: -

1. Are you taking any prescription medicines recently?

   A. Yes B. No

If your answer is yes, name them below: _

Name of drug Dosage

_____ _____

_____ _____

_____ _____

2. Do you have a recent physical injury such as bone, muscle and joint which will be aggravated by physical exercise?

A. Yes B. No

If yes indicate the type of injury that you had_____

3. Do you have suffered with heart condition?

   A. Yes B. No

4. Do you have upper or lower back pain which has been serious by exercise?

   A. Yes B. No

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

   A. Yes B. No

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

   A. Yes B. No

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

   A. Yes B. No

8. Do you currently smoke?

   A. Yes B. No

Appendix – B Fitness training and test consent form

Researcher's Name: MUBAREK NASER

Advisor's Name: ASCHENAKI TADDESE (PHD)

Thesis Title: THE EFFECT OF PLYOMETRIC TRAINING ON SELECTED PHYSICAL FITNESS VARIABLES AND SKILL PERFORMANCE: WITH SPECIFIC REFERENCE TO SILTE ZONE KEMAL AND SADAT FOOTBALL ACADEMY PLAYERS.

Purpose of the study: The purpose of this study was to assess effect of plyometric training on selected physical fitness variables and skill performance

Procedure and duration:

You are kindly requested to give permeation for your child to participate in this research study as described below. This study will be governed by the regulation on human beings. These regulations require that researcher should obtain a signed agreement (consent) from you/the players/ to participate in this research project.

Even if taking such type of fitness training and fitness test is one component of your regular soccer training program, the researcher will explain detail about the purpose of the project, the procedure will be used, the potential benefit and the possible risk of participation in this thesis. And you can ask the researcher any question and doubts that you have about the study and you shall expect satisfactory responses regarding your questions. So if you are interested and ready to participate. Please confirm your agreement by your signature. You can discontinue at any time from the study if you choose to do so. A basic explanation of the project will be summarized below.

Risk and safeguard:

Since subjects are somehow experienced and had regular soccer training for the last 1 and more years the expected injury in administering such fitness training and tests for you may be little. But while in application of the regular soccer trainings and administering the tests you may experience muscle fatigue, usually happened soccer related injuries such as: muscle soreness and sprain may exist due to intense demand of soccer game but not the training and test only.

But if any unexpected physical injuries occur, appropriate first aids will be provided, but no financial compensation will be given.

Appendix C: Subjects Fitness Assessment Record Drag Sheet

Name of the player ———————————————

Height _____Weight _____ Chronological Age _____

Training Age in project center _____

Name of the projects_____

Group: Experimental ☐ Control ☐

Variables	Unit of measurement	Trial 1	Trial 2	Trial 3	Best score of 3 trials	Remark
Wall Sit Test	Second					
Sergent Jump (Vertical jump) test (CM)	Cent-Mater					
30 m Acceleration run Test (sec)	Second					
Illinois agility test	Second					
Passing accuracy test	Number of score					
Shooting accuracy test	Number of score					

Appendix D Training protocol and training program

Training protocol

Month	week	Time	Type of plyometric training/ exercises	Set	Repetition	Recovery	Intensity	Frequency	Duration
February	1st week	11:00-12:00	Squat jump,	2	5	30 second for each	low	3day/week	1 hour
			jumping lunges,	2	5				
			Skater jump,	3	4				
			tuck jumps,	3	4				
March	2nd week	11:00-12:00	Lateral jumps,	3	5	30 second for each	low	3day/week	1 hour
			Vertical Jumps,	3	5				
			High knees,	3	5				
			Sid-to-Sid Hops,	3	5				
	3rd week	11:00-12:00	Forward- backward hops,	4	6	30 second for each	Moderate	3day/week	1 hour
			Single leg Sid-to-Sid Hops	4	6				
			Skipping,	3	7				
			Box drills,	3	7				
			Triple jump	3	7				
	4th week	11:00-12:00	Tuck jumps,	4	8	30 second for each	High	3day/week	1 hour
			Lateral jumps,	4	8				
			Box drills,	4	7				
			Bounding speed	4	7				
April	5th week	11:00-12:00	Squat jump,	3	7	30 second for each	Moderate	3day/week	1 hour
			Forward- backward hops,	3	7				
			Single leg Sid-to-Sid Hops	4	6				

			Skipping,	4	6				
			Triple jump	2	5				
	6th week	11:00-12:00	jumping lunges,	3	8	30 second for each	High	3day/week	1 hour
			Skater jump,	3	8				
			Vertical Jumps,	5	7				
			High knees,	5	7				
			Sid-to-Sid Hops,	4	6				
	7th week	11:00-12:00	Skater jump,	3	5	30 second for each	low	3day/week	1 hour
			Vertical Jumps,	3	5				
			Single leg Sid-to-Sid Hops	2	6				
			bounding speed	2	6				
	8th week	11:00-12:00	High knees,	3	6	30 second for each	High	3day/week	1 hour
			Forward- backward hops,	3	7				
			Skipping,	4	8				
			Triple jump	4	8				
			Squat jump	5	7				
	9th week	11:00-12:00	jumping lunges,	4	6	30 second for each	Moderate	3day/week	1 hour
			tuck jumps,	2	6				
			Lateral jumps,	3	5				
			Sid-to-Sid Hops,	2	5				
May	10th week	11:00-12:00	Squat jump,	3	7	30 second for each	high	3day/week	1 hour
			jumping lunges,	4	8				
			Skater jump,	3	7				
			tuck jumps,	4	8				
	11th week	11:00-12:00	Forward- backward hops,	3	6	30 second for each	Moderate	3day/week	1 hour
			Single leg Sid-to-Sid Hops	3	5				

			Skipping,	**3**	**6**				
			Box drills,	**3**	**5**				
			Triple jump	**3**	**5**				
	12th week	**11:00-12:00**	**Lateral jumps,**	**3**	**5**	**30 second for each**	**Moderate**	**3day/week**	**1 hour**
			Vertical Jumps,	**2**	**6**				
			High knees,	**3**	**7**				
			Sid-to-Sid Hops,	**2**	**8**				

Training plan

Month 0ne Parts	Types of Activity performed	Time	Intensity	Repetition	Rest	Remark
Warming ups	✓ Walking, ✓ jogging, ✓ slow running, ✓ dynamic stretching… etc.	10M For each training program	low	Depending on the intensity of exercises and individualization	-	
Main part	Squat jump, jumping lunges, Skater jump, tuck jumps, Lateral jumps, Vertical Jumps, High knees, Sid-to-Sid Hops, Forward- backward hops, Single leg Sid-to-Sid Hops Skipping, Box drills, Triple jump Tuck jumps, Lateral jumps, Box drills, Bounding speed	40M For each training program	Low, Moderate and High based on the training protocol l		30 second between each exercise	
Cooling down	✓ Slow running, ✓ jogging, ✓ walking ✓ static stretching exercise with meditation. And ✓ Rehydrate,	10M For each training program	low			

\

1st day plyometric *Session training plan*e: -

Name of coach/Researcher: -Mubarek Naser **No of players**: -15 **Duration: -** 60M **Title: -** plyometrics exercise **Location of training**: -Worabe main stadium **Age category**: - U-17 Name of club: Kemal and Sadat football academy	**Date:** -------/---------/---------- **Equipment:** -cone, ball, stop watch, measuring tap **Objectives: -** To give plyometrics exercises for excremental groups in order to measure its effect on player's physical development and skill performance

Phase	Time	Main contents	Coach (Researcher) activity	Time	Athlete's activity (Excremental group)	Time	Set	Repetition	Recovery	Intensity	Frequency
Warming up	10M	✓ Walking, ✓ jogging, ✓ slow running, ✓ dynamic stretching … etc.	♦Giving instruction for participants	1M	♦practicing proper warming up activities and ♦Dynamic stretching	9 M				low	One's a day
			♦Control player's activity	Full time							
Main part (work out)	40 M	1. Squat jump, 2. Jumping lunges, 3. Skater jump, 4. Tuck jumps,	♦Introduce the skill	1M	♦Performing the proper activities what the researcher show them	9 M for each activates	2 2 3 3	4 4 5 5	30 second between each exercise	low	
			♦Demonstrate fundamental skills	3M							

			♦Observe the players activity	Full time							
Cool down	10M	Walking, jogging, Slow running, static stretching exercise with meditation. And Rehydrate,	♦Check players condition ♦Provide feed back	Full time'	♦Conducting proper cooling down ♦Static stretching	10M			One's a day	low	

- ***Like this one the same Session training plan*e *were done for 12 consecutive weeks and 3 days per week (source: my own work)***