EFFECT OF SELECTED PHYSICAL EXERCISES ON ENHANCING MUSCULAR ENDURANCE, STRENGTH AND FLEXIBILITY OF U-17 MALE FOOTBALL TRAINEES OF JIGJIGA CITY; ETHIOPIAN SOMALI REIONAL STATE

MEd. THESIS

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MARCH, 2017

HARAMAYA UNIVERSITY, HARAMAYA

Effect of Selected Physical Exercises on Enhancing Muscular Endurance, Strength and Flexibility of U-17 Male Football Trainees of Jigjiga City; Ethiopian Somali Regional State

A Thesis Submitted to the Department of Sport Science,
Postgraduate Program Directorate
HARAMAYA UNIVERSITY

In partial Fulfillment of the Requirements for the Degree of
MASTER OF EDUCATION IN TEACHING PHYSICAL EDUCATION

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DEDICATION

I dedicate this thesis manuscript to my Mother, Aregash Hailu and my beloved one Helina Almenh for their affection and love for their dedicated partnership in the success of my life.

STATEMENT OF THE AUTHOR

First, I declare that this thesis is my genuine work and that all sources of materials used for this thesis have been duly acknowledged. This thesis has been submitted in partial fulfillment of the requirements for a Master of Education Degree at Haramaya University and is deposited at the University Library to be made available to borrowers under rules of the library. I solemnly declare that this thesis is not submitted to any other institution anywhere for the award of any academic Degree, Diploma or Certificate.

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ACKNOWLEDGEMENTS

I would like to express my gratitude to the Almighty God who provided all things to me, to attain this victory and for giving me the opportunity to follow and complete this Master of Education Program.

My sincere gratitude extends to my Major Advisor Dr. Desta Enyew for his consistent guidance, encouragement, critical remarks, insightful comments and suggestions and for his engagement throughout this work. My heartfelt thanks go to my Co-Advisor Dr. Shimelis Mekonnen for his constructive advice, suggestion, comments, guidance, encouragement and support throughout the development of this thesis.

My deepest gratitude also goes to Alemseged Zewdu, Helina Alemneh, Teshome Demilew, and the rest of friends, who helped, guided, encouraged and supported me in this thesis undertaking.

ACRONYMS AND ABBREVIATIONS

ACSM	American College of Sports Medicine
BMI	Body Mass Index
BPM	Beats per Minute
CSA	Central Agency Statistics
DTT	During Training Test
FFM	Fat-Free Mass.
FIFA	Federation of International Football Association
HRmax	Maximal Heart Rate
MECY	Manitoba Education, Citizenship and Youth
NASPE	National Association for Sport and Physical Education
PHCE	Population and Housing Census of Ethiopia
PoT	Post Test
PRE	Progressive Resistance Exercise
PRT	Progressive Resistance Training
PT	Pre Test
ROM	Range of Motion
SPSS	Statistical Packages for Social Sciences
THR	Target Heart Rate
U-17	Under 17 years
WHO	World Health Organization

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ABSTRACT

The study was conducted to investigate the Effect of Selected Physical Exercises on Enhancing Muscular Endurance, Strength and Flexibility of U-17 football trainees of Jigjiga City; Ethiopian Somali Regional State. In the city there are about 125 total players who participate in Five U-17 male football team (each team/cluster contains 25 trainees). From 125 total players only *Forty trainees were selected as study subjects by using simple random sampling techniques. All Selected subjects were participated in low, moderate and high intensity in selected physical exercise for 12 consecutive weeks that is 3 days per week 60 minute duration per day. Pre, during and post training tests were conducted on the selected physical fitness variables such as muscular endurance, muscular strength, and flexibility. The data collected from the study subject was analyzed using SPSS version 20 software. The data pertaining to those selected physical fitness variables were analyzed by paired sample 't' test to determine the significant difference between initial and final mean for participant. According to analyzed data in push up 8.97 mean difference was recorded. The mean difference value boosted in pull up performance by 6.10 after putting the subjects for 12 weeks on selected physical exercises. In sit and reach test 4.05 increments were observed . The result obtained in this study indicated that there were significant improvement in muscular endurance, muscular strength and flexibility. Based on this finding, it can be concluded that low, moderate and high intensity physical exercise has positive effect on enhancement of muscular endurance, strength and flexibility of U-17 male football trainees.*

***Keywords**: Physical exercise, muscular endurance, muscular strength, flexibility, U-17*

1. INTRODUCTION

This chapter describes the research background, statements of the problem, research questions, scope of the study, significance of the study, and objectives of the study respectively.

1.1. Back ground of the study

Football (soccer) is among the most popular sports in the world. The Federation International de Football Association (FIFA), estimated that at the turn of the 21st century there were approximately 250 million football players and over 1.3 billion people "interested" in football; in 2010 a combined television audience of more than 26 billion watched football's premier tournament, the quadrennial month long World Cup finals(*https://www.britannica.com/sports/football-soccer*). Fitness is the key for the overall performance of the athletes. Fitness is the product of exercise and training. Fitness is an important implication in the general health of the individuals. Regular physical activities and fitness exercises are critically important for health and wellbeing of all people when individuals are participating in vigorous /high intensity exercise or some types of moderate healthy enhancing physical activities (Bulter, R. Davice and B. Lewis, 1998).In the area of many field and court sport competitions one can hardly differentiate from the other in terms of the level of fitness performance difference. So, many people concentrate on the development of the basic physical fitness components to be effective in sports competition. Physical fitness components are basic components such as agility, strength, power, speed, balance, flexibility and endurance which play a significant role in performance of sports and games. Football requires players to perform numerous actions that Require strength, power, speed, agility, balance, flexibility and endurance (Bloomfield *et al.,* 2008;Helgerud*et al.,* 2001) suggesting that the physical conditioning of players is a complex process. Football is a multi-dimensional sport requiring players to jog, run, sprint, accelerate, decelerate, jump, change direction and get up from the ground after falls and knocks (Bangsbo and Michalsik, 2002). Football-specific activities such as tackling, heading, passing, shooting, controlling the ball, maintaining balance and holding body position when under defensive pressure, jointly comprise the physical demands of the sport (Stolen, Chamari, Castagna and Wisloff, 2005). Collectively anthropometric, physiological, technical, and perceptual factors can contribute to successful performance in football (Hoare and Warr, 2000).

It is known that level of physical fitness can determines sport performance of the athletes, however in our country especially in Jigjiga most of the junior or youth football players seems physically unfit particularly in the upper part of their body this can greatly affect the performance of footballers because the nature of football demands different physical qualities from participants. Indeed, A large number of studies have evaluated the physical demands of a football game and the effects of fitness training on football players (Mohr M. *et al.,*2003). Therefore this study is designed to examine the effects of twelve week physical exercise program on enhancing of muscular endurance, strength and flexibility of U-17 male footballers performance.

1.2. Statement of the Problem

Selected types of exercises are important for the development and maintenance of health and performance. In fact, numerous studies have examined the effect of aerobic exercise training on physical and mental health (Heller T. *et al*., 2011).However, There is no enough research that studies the effect of selected physical trainings on muscular strength, endurance and flexibility of some health related fitness particularly in Jigjiga Ethiopian,somali.The investigator lives in Jigjiga since 2013/14 G.C and observe that the coach or trainer of Jigjiga football project team as they don`t have well designed training plan, and they don't bother about intensity, volume, and duration of the exercises, more or less they mainly focused on skills only& leading carelessly (follows traditional ways of coaching), this may affect the trainees of physical fitness.And according to the researcher outlook on the football trainees of Jigjiga most of them are resemble physically unfit especially in the upper body part. due to the above mentioned reasons.

Keeping these in consideration, the investigator was initiated to undergo detail investigation on selected physical exercises which could awake and refresh coaches to overcome their problems and improve the performance of their trainees.

Therefore this study was tried to answer the following research questions:

1. How does selected physical exercise bring effects on muscular strength, endurance and flexibility of U-17 male football trainees?
2. What types of exercise are important for improving muscular endurance, strength and flexibility of U-17 male football players?

3. What changes will come on muscular endurance, strength and flexibility of football players after the exercise program?

1.3. Scope of the study

The Scope of this study was located at eastern Ethiopia which is 637km far from the capital city, Addis Ababa. This study were restrict only on the U-17 male football trainees, of Jigjiga city who was participate in the selected physical exercises of low, moderate, and high intensity. The aims of this study was to assess the effects of selected physical exercise on enhancing muscular endurance, strength and flexibility performance of U-17 male football trainees of Jigjiga city, Somali Regional State.

1.4. Significance of the Study

The aim of this study was to analyze or investigate the effect of selected physical exercises on muscular endurance, strength and flexibility performance enhancement of U-17 male football players of Jigjiga City, Ethiopian Somali Regional State. Therefore, this study can help coaches, athletes and managers to understand formulate and implement effective strategies of coaching and fitness training program.

In addition, this study was signifying the following factors as mentioned bellow:

- The study was helpful to the physical education teachers, coaches, and athletes to know which exercise is important to enhance muscular endurance, strength and flexibility performance
- This study was also helpful to coaches, teachers and trainees to know about the effects of selected physical exercises on the enhancement of muscular endurance, strength and flexibility performance

1.5. Objectives of the Study

1.5.1. General objective

General objective of this study was to investigate the effects of selected physical exercises on enhancing muscular endurance, strength and flexibility of U-17 football trainees.

1.5.2. Specific objectives

The specific objectives were:

- To evaluate how selected physical exercise does brought effects on muscular endurance, strength and flexibility of U-17 male football trainees of Jigjiga city.
- To examine which types of exercises are important for enhancing muscular endurance, strength and flexibility performance of U-17 male football trainees at Jigjiga city.
- To measure the change brought by selected physical exercises to muscular endurance, muscular strength and flexibility of trainees.

2. REVIEW OF RELATED LITERATURE

This section dealt about football, components of physical fitness (muscular endurance, muscular strength and flexibility), principles of fitness development, the recommended quantity and quality of exercise for developing and maintaining fitness, types of exercises, and exercise for children and adolescence

2.1. Football

Football is a multi-dimensional sport requiring constant changes in activity. The sport demands continuous changes in movement speed that can vary from being stationary, through walking, as well as low and high intensity running bouts (Reilly, 1996,Withers, Maricie, Wasilewski and Kelly 1982).). The challenging energy demands of football emerge from requirements to perform a number of high intensity activities, such as jumping, tackling, accelerating, decelerating and getting off the ground (Bangsbo& Michalsik, 2002). Other game skills such as kicking and dribbling also need to be considered when determining total physical requirements for football (Reilly, 1997). For instance, the oxygen demand for dribbling the ball is greater than the demands imposed by running normally, while the energy demands of running backwards are lower than running with the ball (Kemi *et al*., 2003).

Football is a team game. Team games are sports where body size, shape, body composition and level of fitness, all play an important part in providing distinct advantages for specific playing positions particularly at the highest levels of performance where there is a high degree of player specialization (Ekblom B, 1986).Football is a sport that has attracted more attentions by the people around the world (Moeini,1995). In recent years, several professional football schools have been established for the education of young players around the world, especially in European countries (Stroyer *et al.,* 2004) that indicates the growing football among youth in the world. And now, can be seen countries with a professional attitude to the football where they have focused on the basic age categories and have developed strong teams in these age categories.

The FIFA World Cup, played every four years, is widely considered the world's biggest sporting event, with a following that outranks the summer Olympic Games. Football's growth in

popularity over the past 20 years has seen a similar increase in the amount of research conducted in all fields of sports science (Reilly and Gilbourne 2003).

Professional football is a difficult sport in which various activities such as fast sprints, shooting, hitting and tackles are done in football (Kargarfard and Keshavarz, 2005). Physical and physiological characteristics of football players are required to such a high level of anaerobic power, aerobic capacity, speed, muscular strength, agility and flexibility (Chaleh, 2007; Arnason *et al*., 2004; Bangsbo *et al*., 1991).

2.2. Components of Physical Fitness

Physical fitness is a set of attributes that people have or achieve. Being physically fit has been defined as the ability to carry out daily tasks with vigor and alertness, without undue fatigue and with ample energy to enjoy leisure time pursuits and to meet unforeseen emergences. (Gutin, 1980).

Fitness is defined as a condition in which an individual has enough energy to avoid fatigue and enjoy life. Physical fitness is divided into five health related (muscular strength, muscular endurance, flexibility, cardiovascular endurance and body composition) and six skill related (agility, balance, coordination, speed, and power and reaction time) components. Skill related fitness components are fitness types which enhances one's performance in athletic or sports settings. Health-related fitness is the ability to become and stay physically healthy. This component focus on factors that promote optimum health and prevent the onset of disease and problems associated with inactivity (NASPE, 2009).

Muscular strength, muscular endurance and flexibility are some of the health-related physical fitness components (ACSM, 2003). The level of muscular strength, muscular endurance and flexibility affects an individual ability to perform daily functions and various physical activities throughout the entire life of an individual. They also assist in preventing chronic diseases, injuries as well as osteoporosis. Footballers need to be endured, highly strong and flexible and speedy by its nature and they need to maintain their muscular endurance, muscular strength, and flexible to be elite sports men and prevent themselves from chronic diseases as well as maintain their health.

2.2.1. Muscular Endurance

Muscular Endurance is the ability to perform repeated contractions against a sub-maximal resistance (Anderson et al., 1995). The ability of the muscle to exert a sub-maximal force against resistance repeatedly or to sustain muscular contraction continuously over time is characterized by activities of long duration but low intensity (Robbins et al., 1997).Corbin et al. (2003) define muscular endurance as the maximum number of repetitions or muscle contractions one can perform against a given resistance. Performing pushups and sit-ups or curl up for one minute is commonly used in fitness testing of muscular endurance.

2.2.2. Muscular strength

Strength is seen as an equally important aspect of health-related fitness and refers to the maximum tension or force muscles develop in a single contraction against a given resistance. Wuest and Lombardo (1994) also state that muscle strength is the ability of a muscle or muscle group to exert force in a single effort against resistance. It is also made clear, that there is some crossover effect between muscular strength and muscular endurance. Development of muscular strength also produces some increase in muscular endurance. However, muscular endurance does not enhance strength. Muscle strength is best developed with exercises done against resistance; also referred to as progressive resistance training (PRT) or progressive resistance exercise (PRE). This name is given because the frequency, intensity, and length of time of muscle overload are progressively increased as muscle strength increases. Muscular strength and performance have direct relationship. According to the research, result conducted on the skeletal muscle mass and muscle strength in relation to lower extremity performance of older men and women suggest that low muscle strength, but not low muscle mass, is associated with poor physical function (Paul *et al*., 2000).

2.2.3. Flexibility

Wuest and Lombardo (1994) have defined flexibility as the ability of the various joints of the body to move through their full range of motion. Insel et al. (2001) refer to flexibility as the ability to move the joints through their full range of motion. It is of importance in a variety of

athletic performances but also in the capacity to carry out the activities of daily living, which is very important from a public health perspective.

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

2.3. Principles of Fitness Development

The keys to selecting the right kinds of exercises for developing and maintaining each of the basic components of fitness are found in the principles of specificity, overload, reversibility, progression, diminishing returns, and individual differences. (MECY, 2004.)

Specificity: The type of training in which individuals engage should be directed specifically at improving their abilities in life. Therefore, choose the right kind of activities to improve each physical fitness component, and the right combination of physical fitness components to help in activities of daily living. Strength training results in increases in strength for the muscles being exercised but does little to improve cardio respiratory endurance. Also, train specifically for the specific activity of interest. For example, optimal running performance is best achieved when the muscles involved in running are trained for the movements required. It does not necessarily follow that a good swimmer is a good runner. Specificity also requires that one consider the speed of motion, the number of limbs moving, the direction in which they are moving, and the range over which the movement occurs.

Overload: If a person works often (frequency) enough, hard (intensity) enough, and long (duration) enough to load the body above its resting level, physical fitness will improve. If this is done regularly over a period of time, the body will gradually adapt to the increase in demands. The term overload does not refer to the idea that one needs to overexert or exert at high intensities to obtain gains in fitness; it simply means that one needs to load the body more than it is usually accustomed to.

Reversibility: Physical fitness or the effects of a physical activity program or an exercise program cannot be stored. If a person stops training for a period of time (three to five days, in some cases) a process of detraining will begin. The gains in fitness that were made begin to reverse themselves. If no exercise is done for a long enough period, fitness levels can revert to the original starting point. At least three balanced workouts a week (three hours minimum) are necessary to maintain a good level of fitness.

Progression: Increasing the frequency, intensity, and/or duration of an activity over periods of time is necessary for continued improvement in physical fitness. Improvements in physical fitness are realized fairly rapidly at the onset of an exercise or training program. The rate of improvement will gradually slow down and level off (adaptation) if an overload is present (meaning that the load is increasing and that there is progress). At high levels of physical fitness it may even be necessary to change the type(s) of exercise(s) being performed.

Diminishing returns: The fitter a person becomes, the more difficult it is to continue to become fitter at the same rate. Individuals who begin jogging can, over a relatively short time, improve the speed and duration of their runs. However, experienced distance runners may have to spend an entire training season to decrease their run time by just a few seconds.

Individual differences: Every person has a unique physical and psychological makeup that requires a unique training program. Factors that may play a role are current fitness level, gender, age, heredity, susceptibility to injury, rest and recovery needs, and diet. Two people working out with the same program could experience completely different results. Some activities can be used to fulfill more than one of a person's basic exercise requirements. For example, in addition to increasing cardio respiratory endurance, running builds muscular endurance in the legs, and swimming develops the arm, shoulder, and chest muscles. If the proper physical activities are selected, it is possible to fit parts of a muscular endurance workout into a cardio respiratory endurance workout and save time.

2.4. The Recommended Quantity and Quality of Exercise for Developing and Maintaining Fitness

Based on the existing evidence concerning exercise prescription for healthy adults and the need for guidelines, the American College of Sports Medicine (ACSM) makes the following recommendations for the quantity and quality of training for developing and

maintaining muscular strength and endurance,and flexibility in the healthy adult:

Muscular strength , endurance and flexibility

1. Resistance training: Resistance training should be an integral part of an adult fitness program and of a sufficient intensity to enhance strength,muscular endurance, and maintain fat-free mass(FFM). Resistance training should be progressive in nature, individualized, and provide a stimulus to all the major muscle groups. One set of 8–10 exercises that conditions the major muscle groups 2–3 days per week is recommended.
2. Multiple-set Aerobic dance refers to a variety of activities such as high and low-impact aerobics and jazz dancing. The term "groupexercise" has been coined to encompass the broad spectrum of these activities, such as, step aerobics, slide board exercise,strength aerobics, and spinning, which are usually performed to music. Regimens may provide greater benefits if time allows. Most persons should complete 8–12repetitions of each exercise; however, for older and more frail persons (approximately 50–60 yr of age and above), 10–15 repetitions may be moreappropriate.
3. Flexibility training: Flexibility exercises should be incorporated into the overall fitness program sufficient to develop and maintain range of motion (ROM). These exercises should stretch the major muscle groups and be performed aminimum of 2–3 days per
week. Stretching should include appropriate static and/or dynamictechniques (ACSM,1990).

2.5. Types of Exercise

Exercises are generally grouped into three types depending on the overall effect they have on the human body:

- Aerobic exercises, such as cycling, walking, running, hiking, and playing tennis, focus on increasing cardiovascular endurance. Wilmore J and Knuttgen H (2003)
- Anaerobic exercises, such as weight training, increase short-term muscle strength. Stavrinos T., et al.(2005)
- Flexibility exercises, such as stretching, improve the range of motion of muscles and joints. Spinks W., et al.(2006)

2.5.1. Aerobic Exercise

Aerobic (or cardiovascular exercise, a term attributed to this kind of exercise because of its various benefits in cardiovascular health) refers to exercise that involves or improves oxygen consumption by the body. (http://education.yahoo.com/reference/dictionary /entry/aerobic.) Aerobic means "with oxygen", and refers to the use of oxygen in the body's metabolic or energy generating process. (http://en.wikipedia.org/wiki/Aerobic_or ganism.) Many types of exercise are aerobic, and by definition are performed at moderate levels of intensity for extended periods of time. This intensity can vary from 50-80% of maximum heart rate. Running a long distance at a moderate pace is an aerobic exercise, but sprinting is not. Playing tennis, with near continuous motion, is generally considered aerobic activity, while doubles tennis, with their brief bursts of activity punctuated by more frequent breaks, may not be predominantly aerobic. Among the recognized benefits of doing regular aerobic exercise are:

- **Stronger heart**: the heart muscle is strengthened and enlarged, to improve its pumping efficiency and reduce the resting heart rate.
- **Increase of the total number of red blood cells** in the body, to facilitate transport of oxygen throughout the body
- **Improved breathing**: the muscles involved in respiration are strengthened, to facilitate the flow of air in and out of the lungs.
- **Improved muscle health**: Aerobic exercise stimulates the growth of tiny blood vessels (capillaries) in muscles. This helps our bodies more efficiently deliver oxygen to muscles, can improve overall circulation and reduce blood pressure and remove irritating metabolic waste products such as lactic acid from the muscles.
- **Weight loss**: Combined with a healthy diet and appropriate strength training, aerobic exercise may help lose weight.
- **Disease reduction**: Extra weight is a contributing factor to conditions such as heart disease, high blood pressure, stroke, diabetes and some forms of cancer. As weight loss occurs, the risk of developing these diseases decreases. In addition, weight bearing aerobic exercise, such as walking, can reduce the risk of osteoporosis and its complications. Low impact aerobic exercises, such as swimming, cycling and pool

exercises, can help keep fit in those who have arthritis, without putting excessive stress on joints.

- **Improved immune system**: People who exercise regularly are less susceptible to minor viral illnesses such as colds and flu. It is possible that aerobic exercise helps activate your immune system and prepares it to fight off infection.
- **Improved mental health**: Regular aerobic exercise releases endorphins, our bodies' natural painkillers. Endorphins also reduce stress, depression and anxiety.
- **Increased stamina**: Exercise may make us feel tired in the short term, i.e., during and right after the activity, but over the long term it will increase stamina and reduce fatigue. (http://en.wikipedia.org/wiki/Aerobic_organism.)

2.5.2. Anaerobic Exercise

Anaerobic exercise is the type of exercise that enhances power and builds muscle mass. Muscles trained under anaerobic conditions develop differently, leading to greater performance in short duration, high intensity activities, which last up to about 2 minutes. (http://www.asmi.org/sportsmed/Performance/anaerobic.html.) The most common form of anaerobic exercise is strength exercise. Strength exercise is the use of resistance to muscular contraction to build the strength, anaerobic endurance and size of skeletal muscles. There are many different methods of strength training, the most common of which are weight and resistance exercise. These two types of exercise use gravity (through weight stacks, plates or dumbells) or machines to oppose muscle contraction, and the terms can be used interchangeably. When properly performed, strength training can provide significant functional benefits and improvement in overall health and well-being including increased bone, muscle, tendon and ligament strength, toughness and endurance, improved joint function, reduced potential for injury resulting from weak muscles, improved cardiac function.

2.6. Exercise for Children and Adolescence

Exercises for children and young people should match their age, skill level and maturity. It should also include variety of fun activities. Most activities should be moderate to vigorous aerobic (Cardio-respiratory Endurance). At least three times a week, include activities that

promote muscle strengthening and endurance, flexibility and bone strengthening (WHO, 2010). Children need at least 30 to 60 minutes (and up to several hours) of moderate to vigorous physical activity every day. Younger children can achieve the 60 minute target through the accumulation of bouts of activity of varying duration throughout the day. This can include short intermittent bouts of physical activity, as well as longer bouts such as when taking part in exercise program (ACHEPER, 1994).

It is important to stress that, at this age, variety of activity is important. For example, activities involving moderate to vigorous intensity activity will provide cardio-respiratory benefit. On the other hand, all movement that involves carrying body weight such as walking will help children and young people to maintain energy balance (WHO, 2010). For bone health, it is especially important for children to engage in bouts of weight-bearing activities that produce high physical stresses on the bones and joints such as running, jumping, skipping, ball games or gymnastics. Active play involving carrying, climbing, and rough and tumble will help develop and maintain muscular fitness and flexibility. Such a range of different modes and intensities of activity will provide a full range of health benefits across all body systems (Tony and Susana, 2006).

While much of the above still holds for older children, adolescents will begin to adopt adult- like activity patterns and are likely to achieve the recommended activity levels through a different profile of activities. These might include participation in organized exercise programs and games, a delivery round, exercise classes, and recreational activities such as dancing (Steptoe and Buter, 1996). The activity patterns will promote a full range of health benefits. In order to make lifetime activity an attractive prospect to young people, it is critical that exercise programs help children and young people to experience enjoyment in a range of activities, to feel confident about their physical skills and their bodies, and to appreciate the importance and benefits of activity for health (Tony and Susana, 2006).

2.6.1. Cardio-respiratory endurance

Goals cardio-respiratory endurance includes preventing obesity and reducing risk factors. For younger children, the focus should be on keeping them active rather than improving VO2 max. Activities that require moving the whole body such as walking, jogging, running, playing football and basketball, swimming, and biking are best to maximize total energy expenditure.

When we observe children at play, their play tends to be anaerobic: periods of highly intense activity followed by periods of low intensity rest. The child's exercise program should follow this model (Katz, 2008).

2.6.2. Muscular endurance and strength

The American Academy of Pediatrics recommends that strength training programs for children should be conducted by trained adults. These programs should consist of high repetitions and low resistance to emphasize muscle balance, flexibility and proper technique. Muscles that tend to be weak in children include the triceps, hamstrings, abdominals, rhomboids/trapezius, hip abductors, and the tibialis anterior (ACHEPER, 2009). Children should avoid weight lifting, power lifting and body building until they reach full maturity. Too strenuous strength training can damage epiphyseal plates. Rope jumping, jumping jacks, hopping, star jump, squat jump, squats, bear walk, push up crawl, sit up squat thrusts etc. are some important exercises to developed strength of children (Katz, 2008).

2.6.3 Flexibility

Flexibility exercises should be held to the point of tension for 15 seconds or longer, and be performed 3 to 7 days per week (Tony and Susana, 2006). Even though children will often gravitate naturally toward ballistic stretching, the focus should be on slow, controlled static stretching. Same good examples of flexibility/stretching exercises for kids are shoulder stretch ,triceps stretch ,sit and reach ,quadriceps stretch ,hamstring stretch ,calves stretch etc. (EETC Inc., 2002).

Generally all children and young people should be active, at a moderate to vigorous level activity, for at least 60 minutes every day. Moderate to vigorous activity includes everything from sport, physical education (PE) and formal exercise to active play and other physically demanding activities such as dancing, swimming or skateboarding. It also includes everyday activities such as walking and jogging (WHO, 2010).

3. MATERIALS AND METHODS

This section of the study explains the description of the study area in which that it shows where the study was conducted and where the study area was located and the general feature of the study area and also the experimental materials are explained. The study design which shows the number of participants, the experiment period, the parameters were studied and the exercises and tests were used is explained. This source of study population, the sample and sampling techniques, the inclusion and exclusion criteria of the study participants are described. In addition the source of data, the method and procedures in which the researcher used to collect data, the analysis of performance tests, the data analysis and the data quality control was mentioned in addition the protocol and ethical considerations are also included.

3.1. Description of the Study Area

The study was conducted at Jigjiga City in Ethiopia Somali Regional State; Jigjiga is a city in eastern Ethiopia and the capital of the Somali Region of the country. Jigjiga Zone is located in the East of Harar and west of the border with Somalia; this city has an elevation of 1,609 meters above sea level. The city is located on the main road between Harar and the Somali city of Hargeisa. It has enjoyed postal service since 1923, and had telephone service by 1956. Based on figures from the Central Statistical Agency in 2005, Jijiga has an estimated total population of 98,076 of whom 50,355 are men and 47,721 are women (CSA, 2005). The 1997 census reported this town had a total population of 65,795 of whom 33,266 were men and 32,529 women. The dominant ethnic group living in the town was Somali (99.0%), the next 3 largest groups were the Amhara (0.25%), the Oromo (0.44%), and the Gurage (0.30%); all other ethnic groups made up 0.08% of the population (PHCE, 1994). This city is the largest settlement in Jijiga woreda. In Jijiga, the climate is warm and temperature. In winter, there is much less rainfall in Jijiga than summer. The climate of Jijiga is a subtropical highland climate , with the influence of mountain climate, the seasonal difference is minor. This is attributed to the fact that Jijiga is located on a plain surrounded by mountains and to its distance to the sea and its effects. (Climate Data Ethiopia, 2013). The researcher used Gymnasium and sport field in the town for study area/site. (See map of the study site on , page 56)

3.2. Source of Data

The researcher used primary data. The primary data were obtained from experimental variables according to the designed parameters, using pre, during and post test measurements in the field throughout the training program (12 weeks) on the selected health related fitness parameters of study subjects/participants.

3.3. Study Design

In this research, simple random sampling techniques were used to select study subjects. One hundred twenty five players were obtained from male U-17 football project (Five project teams) at Jigjiga city and forty trainees were selected by using simple random sampling techniques. All subjects were involved in training program for 12 weeks and 3days per week, duration for 60 minutes. The experimental design used in this study was informal design; which means pre, during, and post test without control group norms were used for comparison. In addition to this, those tests were administered for the selected subjects on a selected physical fitness (muscular strength, endurance and flexibility) at pre, during and post training.

3.4. Experimental Materials

The researcher used the football ground of Jigjiga secondary school, gymnasium in the city. The materials that the researcher used for the study were the stop watch, whistle, gym mat, and jumping ropes, box, bars, measuring tape and football for the training session as well as for the evaluation tests.

3.5. Population The of Study

Study population of this research was all male U-17 football trainees of Jigjiga city. In the city there are about 125 total players who participate in Five U-17 male football team (each team/cluster contains 25 trainees). Among the existing trainees, only 40 were selected by using simple random sampling that is; 8 subjects were selected from five cluster or football project team).

3.6. Sample Size and Sampling Techniques

Simple random sampling or Chance sampling techniques were used to specify study subjects that is, a group of subjects/40 subjects were taken from 125 football trainees of Jigjiga city. First, each of trainees were listed on a slip of paper and mixed in a container and draw as a lottery, the lotteries paper were taken out until a maximum of 40 subjects reached.

The health status of the trainees were checked using physical readiness questionnaire which was prepared based on the reviewed available literatures on similar studies, journals and other sources, to identify and reject subjects with health problems.

3.6.1. Inclusion and Exclusion Criteria

Male Subjects who fulfilled the health history questionnaire and who were volunteer to be the part of this study and those with ideal body weight (BMI:-18.5-25) were part of the study, while females, due to the aims/purpose of the researcher they were not participated in this study. In addition, the subjects who had recent physical injury and medical problems were also excluded from the study.

3.7. Methods and Procedures of Data Collection

Quantitative data were collected through the appropriate muscular endurance, strength and flexibility fitness test measures such as push up test, pull up test, sit and reach test before and after putting the subjects in the 12 weeks of exercising program. The data was gathered from the subject by three phases with six weeks gap as pretest (PT), during training test (DTT) and posttest (PoT). These data was collected from the subjects in the area where comfortable place and fitness test instrument was accessible through structured program. To get data from the subjects tests were taken at the beginning of the training, at the mid of the training and at the end of the three months and final data were collected at the end of the experiment.

3.8. Test Analysis

3.8.1. Push up Test for Muscular Endurance

The Push up test was conducted using comfortable floor, flat gym mat and measure materials. One number of trial tests was used. The push-up fitness test (also called the press up test) measures upper body endurance. A standard push up begins with the hands and toes touching the floor, the body and legs in a straight line, feet slightly apart, the arms at shoulder width apart, extended and at a right angles to the body. Keeping the back and knees straight, the subject lowers the body to a predetermined point, to touch some other object, or until there was a 90-degree angle at the elbows, then returns back to the starting position with the arms extended. This action is repeated, and test continued until exhaustion, or until they can do no more in rhythm or have reached the target number of push ups. Scoring: Recorded the number of correctl y completed pushups. *(www.topendsports.com/testing/tests/pull-up/push-up.htm)*

3.8.2. Pull up Test for Muscular Strength

The pull up test needs, Horizontal overhead bar, at an adequate height so that the participants can hang from with arms fully extended and feet not touching the floor. The pull up test (also called the chin-up test) is widely used as a measure of upper body strength. The procedures as used in the President's Challenge Fitness Awards and Fitness Gram, the subjects Grasp the overhead bar using either an overhand grip (palms facing away from body) or underhand grip (palms facing toward body), with the arms fully extended. The subject then raises the body until the chin clears the top of the bar, then lowers again to a position with the arms fully extended. The pull-ups should be done in a smooth motion. Jerky motion, swinging the body, and kicking or bending the legs is not permitted. As many full pull-ups as possible are performed. Finally the total number of correctly completed pull-ups is recorded.

(www.topendsports.com/testing/tests/pull-up/push-up.htm)

3.8.3 Sit and Reach Test for Flexibility

The subject perform warming up activities and some stretching activities for five minutes before starting test and then sit on the floor with legs stretched out straight ahead. Shoes were removed.

The soles of the feet was place flat against the sit and the reach box. Both knees were locked and press flat on the floor –the tester may assist by holding them down. With palms facing downwards, and the hands on top of each other or side by side, the subject reaches forward along the measuring line as far as possible. Three times trial were permitted to the subject and the best one from three trials was taken as his score. The subject reaches out and holds the position for at one –two seconds while the distance was recorded (Wells K.F. and E.F.Dillon, 1952).

3.9. Methods of Data Analysis

The Researcher analyzed and interpreted data by comparing pre, during and post test results by paired t-test on computerized statistical packages software system (SPSS) version 20.The level of significant were 0.05%.

3.10. Data Quality Control

In order to decrease common errors care was taken on the procedure of push up test, pull up test and sit and reach test were recorded. Standard procedure was taken for obtaining the measurements to gather the data from the subjects. In addition practical tests and measurements were recorded with photograph for farther check on test and measurement procedures.

3.11. Protocol and Ethical Considerations

The study was dealt with the ethical issues and code of conduct related to the investigation. It can make guarantees and confidentiality of the information that were given to the study, and risk of harm due to participation. Therefore, the study was conduct all actions based on the university rules, code of conduct and policies concerning to research ethics.

4. RESULTS AND DISCUSSIONS

4.1. overview

This chapter deals with the analysis of data collected from the sample under study. The purpose of this study was to investigate the effect of selected physical exercises on enhancing muscular endurance, strength and flexibility of U-17 football trainees of Jigjiga City; Ethiopian Somali Regional State,. Forty subjects were selected from Jigjiga city of U-17 male football trainees. The participants were engaged in designed exercise program for twelve weeks for 60 minutes, the subjects were engaged in exercise 3 days in a week. In this study, field tests were taken three times at Pre, during and Post exercise. Under this, three variables such as muscular strength, endurance and flexibility had been evaluated by push up, sit up and sit and reach test as well as the results of those variables are discussed as follows:-

4.2. Demographic Characteristics of the Study Participants

A total of 40 U-17 male football trainees were selected for the study subjects. From the total number of the study subjects; no one was lost. 100% of the study subjects; follow up the training program properly from initial till end.

4.3. Effect of selected physical Exercises on Muscular Endurance

Table 1: Pre, During, Post Test Mean values of push up

Test	N	PT	DTT	PoT	Sig.	T-value
Push up	40	18.47±7.70	21.90±8.40	27.45±8.77	.00*	-25.00

Values are mean ± standard deviation, PT= pre Training test which was taken before training, DTT= During Training test which was taken at the sixth week of training, PoT= Post Training test measured after putting the study group for 12 weeks training program

The data (table 1) showed that there was significant difference in-between the pre, during and post test score. The improvement in performance was due to the selected exercises in which they were engaged in designed training program. The mean score value for push up test before physical exercise was 18.47,the subjects were scoring good fitness (according to norm) during

training test was 21.90, which means they scored good fitness (according to norm) and after training mean score value was 27.45, again the subject were scored good fitness (according to norm in the appendix G, table 6). When we compare the mean value score of before training test with the mean score values of after 12 weeks selected physical exercise training program, the mean difference value increased by 8.97. This result indicated the effective change was observed on participants' Muscular endurance.

The finding of this study was similar to somehow with Thingnam Nandalal Singh, Laishram Santosh Singh (2014) who meta analyzed on Muscular Endurance between Inter-College Level Male Football and Handball Players: A Comparative Study, The purpose of the present study was to compare the dynamic muscular endurance between inter college level male football and handball players. The study would provide data, which will show how far football and handball players are alike or different in muscular endurance. The mean values of push up for football players were 25.36; the mean difference of this study was 7.1.

Miller (1994) has postulated that muscular endurance is important in our daily activities such as walking, working, and playing which involves muscular contraction and relaxation, and that people who possess good muscular endurance are said to have a greater working capacity.

Table 2: Comparison Subjects Result with Norm of Push upTest for Muscular Endurance

Rating / Push up Test	High performance	Good fitness	Marginal fitness	Low fitness	N (100%)
PT	2(5%)	18(45%)	10(25%)	10(25%)	40(100%)
DTT	2(5%)	22(55%)	11(27.5%)	5(12.5.5%)	40(100%)
PoT	8(20%)	28(70%)	3(7.5%)	1(2.5%)	40(100%)

N= 40 subjects PT= Pre Training test which was taken before training, DTT= During Training test which was taken at the sixth week of training, PoT= Post Training test measured after putting the study group for 12 weeks training program

On the above table 2 indicate that there were an improvement of subjects push up performance in relate to the norm in the (Appendix G, on table 6). At the Pre training of test they scored 2(5%) of them above high performance, 18(45%) of them good fitness, 10(25%) of them marginal fitness, 10(25%) of them low fitness, and during training of the subjects were scoring high performance (2\5%), good fitness (22\55%), marginal fitness (11\27.5%), low fitness (5\12.5%),

where as at post of training test the subjects scored 8(30%) of them high performance, 28(70%) of them good fitness, 3(7.5%) of them marginal fitness, 1(2.5%) of them low/poor fitness. The results show that there was an increment of participant push up performance and improved muscular endurance throughout the 12 weeks of selected physical exercise program.

It has been shown by Corbin et al. (2003) that athletes and people interested in jobs requiring high-level performance such as curl-ups are, likely to benefit from good muscular endurance fitness. According to Baumgartner and Jackson (1991), research people who train for strength gain as much endurance as those who train for endurance and vice versa.

4.4 Effect of selected physical Exercises on Muscular Strength

Table 3:Pre, During, Post Test Mean values of pull up

Test	N	PT	DTT	PoT	Sig.	T-value
Pull up	40	8.15±3.51	10.97±3.892	14.25±4.30	.00*	-24.64

Values are mean ± standard deviation, PT= pre Training test which was taken before training, DTT= During Training test which was taken at the sixth week of training, PoT= Post Training test measured after putting the study group for 12 weeks training program

As the data (table 3) shows there were a significant improvement on the muscular strength of the trainees as a result of selected physical exercises of 12 weeks of continuous training programs.

The pre, during and post training tests mean value of pull up for muscular strength were 8.15 repetition,10.97 repetition and 14.25 repetition. These results indicate that there were progressive increases in muscular strength of the athletes. This shows that the selected physical exercises have significant importance on the enhancement of strength performance of the trainees. The performance of the trainees before the training in average were 8.15 repetitions, that means the athletes were the average, (according to the norm) their strength performance during the training test(after six weeks of training) was 10.97 repetitions in average which indicates there were increments in their muscular strength performance and they scored above average score(according to the norm) and their post training test was 14.25 repetitions in average it also shows that there is improvements in their strength performance again and now the final result shown the athletes scored excellent scores according to table 4(appendix G, on table 7) standard

for pull up test. The above table indicates the results of the athletes progressively improved due to the selected physical training which were provided for 12 weeks.

The researcher selected different types of physical training which he provided for the athletes in 12 weeks of training programs. In 12 weeks of training the athletes performed each selected physical exercises 3 times in the same interval and conditions with only changed intensity from low to high intensity.

The study indicates that a selected physical exercise is a key to bring the change in the muscular strength of upper body of the football trainees. This result was consistent with the finding of Arlene et al., (2006) who reported that both male and female improved their upper body muscular strength and endurance performance after 12 week exercise training.

Table 4: Comparison Subjects Result with Norm of Pull up Test for Muscular Strength

Rating	Excellent	Above average	Average	Below average	Poor	N (100%)
Pull up test						
PT	3(7.5%)	13(32.5%)	16(40%)	8(20%)	0(0%)	40(100%)
DTT	10(25%)	15(37.5%)	13(32.5%)	2(5%)	0(0%)	40(100%)
PoT	20(50%)	18(45%)	2(5%)	0(0%)	0(0%)	40(100%)

N= 40 subjects PT= Pre Training test which was taken before training, DTT= During Training test which was taken at the sixth week of training, PoT= Post Training test measured after putting the study group for 12 weeks training program

From the presented data on the above table 4 there were significant change observed on the subjects of muscular strength and enhancement of pull up performance due to well designed physical exercise training program for twelve weeks, three times per week for 60 minutes duration of exercise. The results obtained from the subjects at pre training test, 3(7.5%), 13(32.5), 16(40%), 8(20%), and 0(0%) of them scored Excellent, above average, Average, Below Average and poor respectively. At During training of test, 10(25%), 15(37.5%), 13(32.5%), 2(5%), and 0(0%) of them were scoring excellent, above average, average, below average and poor. At Post training of test 20(50%), 18(45%), 2(5%), 0(0%), and 0(0%) of them scored excellent, above average, average, below average and poor accordingly. This result shows

that significant change were achieved on the study participant at pre, during, and post training test according to the norm (Appendix G, on table 7).

4.5. Effect of selected physical Exercises on flexibility

Table 5: Pre, During and Post training test Mean values sit and reach test (cm)

Test	N	PT	DTT	PoT	Sig.	T-value
SR	40	8.25±3.753	10.175±3.734	12.30±3.71	.00*	-18.86

Values are mean ± standard deviation, SR= sit and reach test PT= pre Training test which was taken before training, DTT= During Training test which was taken at the sixth week of training, PoT= Post Training test measured after putting the study group for 12 weeks training program

The above table showed that there was significance differences before the exercise and after 12 weeks of physical exercise on the subjects sit and reach performance. The mean values of sit and reach were 8.25 in before selected physical exercise, that means they scored average (according to the norm), which was improved to 10.175 in during test here is also the trainees were the average (according to the norm) and improved by 12.30 after 12 week physical exercise test (they scored above average according to the norm in the appendix G on table 8); these means the sit and reach performance improved by 4.05 after 12 weeks of physical exercise. The main reason for these improvements was due to selected physical exercises in which the subjects (they) took at the field. All these activities involved vigorous movement of the joints of the body. This result was supported by previous findings of Miller (1994), that active people are more flexible than inactive individuals.

The inability to stretch far forward indicates tightness in the low back and hamstrings due to inactivity (Lidell, 1997). This finding agreed with the finding of Odiango et al., (2010) on effect of physical exercise program on health -related fitness components (cardio respiratory endurance, low back flexibility and body composition) of physically challenged pupils also reported similar results reported in this study.

However, the improvement of the rate of this data was one indicator of the enhancement of the participant's range of motion in the joints (flexibility). The reason behind this change was physical exercise training that they were participating in well designed training program.

Table 6: Comparison of Subjects Results with Norm of Sit and ReachTest for Flexibility

Rating	Excellent	Above average	Average	Below average	Poor	N (100%)
SRT						
PT	1(2.5%)	12(30%)	13(32.5%)	7(17.5%)	7(17.5%)	40(100%)
DTT	6(15%)	14(35%)	11(27.5%)	9(22.5%)	0(0%)	40(100%)
PoT	15(37.5%)	11(27.5%)	12(30%)	2(5%)	0(0%)	40(100%)

N= 40 Subjects SRT= Sit and Reach Test PT= Pre Training test which was taken before training, DTT= During Training test which was taken at the sixth week of training, PoT= Post Training test measured after putting the study group for 12 weeks training program

From the presented statistics on the above table 6, there was a significant difference observed in between before, during and after 12 weeks of physical exercise training program on the study participant of flexibility and sit and reach performance. As the results were taking from the subjects at pre training test was 1(2.5%), 12(30%), 13(32.5%), 7(17.5%), 7(17.5%) of them scored excellent, above average, average, below average, and poor respectively. At during test training test was 6(15%), 14(35%), 11(27.5%), 9(22.5%), and 0(0%) of the subjects (study participants) were scoring excellent, above average, average, below average and poor accordingly. At post of training test was 15(37.5%), 11(27.5%), 12(30%), 2(5%) and 0(0%) of the subjects were scoring excellent, above average, average, below average and poor respectively. When we compare the result that was presented on the above table, with the norm of sit and reach for flexibility (Appendix G, on table 8), there was significant difference in between pre and post training of test.

4.6. Effect of Selected Physical Exercises on Muscular Endurance, Strength and Flexibility

Table 7:The mean difference value and significance level of each test results of participants

Dependent variable	Parameter(A)	Parameter(B)	MD(A-B)	Sig.
Push up	Post test (27.45)	Pre test (18.47)	8.97	0.00
		During training test (21.90)	5.55	0.00
Pull up	Post test (14.25)	Pre test (8.15)	6.10	0.00
		During training test (10.97)	3.28	0.00
Sit and reach	Post test (12.30)	Pre test (8.25)	4.05	0.00
		During training test (10.17)	2.13	0.00

Values are mean ± standard deviation, SR= sit and reach test PT= pre Training test which was taken before training, DTT= During Training test which was taken at the sixth week of training, PoT= Post Training test measured after putting the study group for 12 weeks training program

Table 7 shows the mean difference in between before training test to during training test results and from before training to after training test results and significance of after training test results in reference to before training test results for participants. Statistically significant changes were seen in push up, pull up, and sit and reach performance of the study participants. Meanwhile, the finding of this study showed that 12 weeks of selected physical exercise had significant effects on muscular endurance, muscular strength and flexibility of U-17 football trainees. This was because, the researcher selected different types of physical exercise which he provided for the athletes in 12 weeks of training programs. In 12 weeks of training the athletes performed each selected physical exercises 3 times in the same interval and conditions with only changed intensity from low-moderate-high intensity after the first 4 weeks of training, intensity changed from low to moderate and after another 4 weeks of training intensity changed from moderate to high. These selected physical exercise trainings were flexibility exercises, strength training, such

as push up, pull up, dumbbell, trunk lift, parellal dips, triceps dips on stair/chair and circuit training, up step (step exercises) and rope Jumping . This is supported by (ACSM, 1998) the combination of frequency, intensity, and duration of chronic exercise has been found to be effective for producing a training effect. The interaction of these factors provides the overload stimulus. In general, the lower the stimulus the lower the training effect, and the greater the stimulus the greater the effect. As a result of specificity of training and the need for maintaining muscular strength and endurance, and flexibility of the major muscle groups, a well-rounded training program including aerobic and resistance training, and flexibility exercises is recommended.

A study on health outcomes and Physical activity in children (HOPC) at McMaster University found that children who are more physically active have higher fitness levels. Fitness increases when children spend more time in moderate to vigorous physical activity (activity that makes the heart beat faster).

The study indicates that a selected physical exercise is crucial to enhance participants' muscular endurance, strength and flexibility performance. This investigation was supported by many studies. (ACSM, 1990) Resistance training should be an integral part of an adult fitness program and of a sufficient intensity to enhance strength,muscular endurance, and Flexibility exercises should be incorporated into the overall fitness program sufficient to develop and maintain range of motion.

5. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1. Summary

The purpose of this study was to investigate the effect of selected types of physical exercises on enhancing muscular endurance, strength and flexibility of U-17 male football trainees of Jigjiga City; Ethiopian Somali Regional State. To achieve the aim of the study 40 male trainees were selected as a subject from 5 U-17 male football project teams of Jigjiga. Among the existing teams (Five cluster) 8 trainees were included from each cluster for these study subjects, to specify the study subjects' simple random sampling techniques were used. And the study subjects engaged in to well design physical exercise training program for 12 weeks, three times per week with 60 minute duration in low, moderate and high intensity of exercise. Each session was divided again in to warming up, main part and cooling down phase. The researcher selected different types of physical exercise which he provided for the athletes in 12 weeks of training programs. In 12 weeks of training the athletes performed each selected physical exercises 3 times in the same interval and conditions with only changed intensity from low-moderate-high intensity after the first 4 weeks of training intensity changed from low to moderate and after another 4 weeks of training intensity changed from moderate to high. These selected physical exercise trainings were flexibility exercises, strength training, such as push up, pull up, dumbbell, trunk lift, parellal dips, triceps dips on stair/chair and circuit training, up step (step exercises) and rope Jumping .

However the investigator was assessing the study participant before training, at the six weeks of training and after 12 weeks of training to investigate the effect of selected physical exercises on enhancing muscular endurance, strength and flexibility of U-17 football trainees of Jigjiga. The data collected from the study was analyzed using SPSS version 20 software. And discussed the result which was obtained at Pre, during and post training test as well as comparing the subjects result with the norm of each test.

The paired sample t-test was used for this study. Based on the analysis made, at the end of the program it was observed that significantly among the participants due to the program significant

change were observed in improvement of muscular endurance, muscular strength and flexibility of the trainees.

The major finding of this study showed that 12 weeks of selected physical exercise had significant effects on muscular endurance, muscular strength and flexibility of U-17 football trainees.

5.2. Conclusions

The findings of the study showed that 12 weeks of low, moderate and high intensity physical exercise program can have a significant effect on muscular endurance, strength and flexibility of U-17 football trainees.

Based on the major finding of the study the following pointes are stated as a conclusion.

- Physical exercise had significant effect on enhancement of Muscle strength, endurance and flexibility and changed significantly. This was because well designed physical exercise program had positive effect in enhancing these fitness components.
- A research conducted on U-17 football trainees, who engaged in low, moderate and high intensity exercise program, indicates that the exercise given to the subjects had a positive effect on enhancing muscular endurance, strength and flexibility performance. As well as most of the individual who participates in physical exercises has got an improved fitness.
- Strength training, such as push up, pull up, dumbbell, trunk lift, parellal dips, triceps dips on stair/chair and circuit training, up step (step exercises) rope Jumping and flexibility exercises are important for enhancing muscular endurance, strength and flexibility performance of U-17 male football trainees of Jigjiga.
- The study indicates that a selected physical exercise is a key to bring the change in the muscular strength, and muscular endurance of upper body of the football trainees.
- The study indicates that, there were enhancements of the participant’s range of motion in the joints (flexibility). The reason behind this change was physical exercise training that they were participating in well designed training program.

5.3 Recommendations

Based on the findings, discussions and results of the research, the following recommendations are made:

- Physical education teachers, coaches and athletes should be aware the load or the intensity level of physical exercises to improve footballers' performance.
- coaches or trainers should have enough awareness concerning safety rule and training principles to make ready the body for an intensified exercises, to minimize injury and to enhance performances.
- To be beneficial from regular physical exercise at all level the exercise program needs to be longer.
- Individuals need to participate in regular physical activities to promote muscular strength/endurance and flexibility.
- Enforce coaches of youth trainees should include the different exercise intensity level in their training programs.
- To make the study more valid, the study may be repeated on large samples.
- Promotion of regular physical exercise in general and selected physical exercise in particular is necessary in enhancing muscular endurance, strength and flexibility of football trainees.
- Similar study may also be conducted for different levels of players (School level, University level, National level and International level).

6. REFERENCES

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7. APPENDICES

Appendix A

Health History and Physical Readiness Questionnaire

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

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

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

If yes indicate the type of injury that you had_____

2. Do you have suffered with heart condition? A. Yes B. No

3. Identify any medical problems that you had

A. Cardiovascular C. respiratory E. None

B. neuromuscular D .metabolic

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

A. Yes B. No

5. Are you taking any prescription medicines recently?

A. Yes B. No

If yes, name them below: _

Name of drug	Dosage
_____	_____
_____	_____
_____	_____

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

A. Yes B. No

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

A. Yes B. No

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

A. Yes B. No

9. Do you currently smoke?

A. Yes B. No

10. Do you currently exercise regularly (at least 2 times per week) and/or work in a job that is physically demanding.

A. Yes B. No

13. Do you know any reason why you should not participate in a program of physical activity?
A. Yes B. No

If yes explain your reason here

Appendix B

Participation Information Sheet

Consent to Participate Voluntarily In this Research Study

HARAMAYA UNIVERSITY

Researcher's name: - **Teklu Eshetu Abdi**(**Bsc in Sport Science**)

Supervisor's name: **Dr. Desta Enyew**

Dr. Shemelis Mekonen

Thesis title: - Effect of selected physical exercises on enhancing muscular endurance, strength and flexibility of U-17 male football trainees of Jigjiga city, Ethiopian Somali Regional State.

You are being asked to participate in this research study as described below. All this like research study carried out are governed by the regulations for research on human beings. These regulations require that the researcher should obtain a signed agreement (consent) from you to participate in this research project.

The researcher will explain to you in detail the purpose of the project, the procedures to be used, the potential benefits and the possible risks of participation in this study. You can ask the researcher any questions that you may have about the study, and expect to receive satisfactory answers regarding the same. A basic explanation of the project is summarized below.

After discussion, if you agree to participate in the study, please sign this form in the presence of the researcher. You may discontinue at any time from the study if you choose to do so.

1. **Purpose:**

The purpose of this study to investigate the effects of selected types of physical exercise on enhancing muscular endurance, strength and flexibility of U-17 male football trainees' .The findings of this study can be very much contribution to sport men as well as the community.

More over the aim of this study is to write a thesis for the partial fulfillment of master program in teaching physical education for principal investigator.

2. **Risks and the Safeguards**:

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

3. **Confidentiality:**

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

4. **Contact address: institutional research ethics review committee (IRERC)_____**
   TekluEshetu----------+251912302039

I certify that I have read and fully understand the above project. I willingly consent to participate.

Signature of Subject_____

Name: _____

Address: _____

Date: Date: _____

I certify that I have explained fully to the above subject the nature, the purpose, the potential benefits and the possible risks involved in this research study.

Date: _____ Signature of Investigator: _____

Appendix C

Table 1: Anthropometric Measurements of Participants

subjects` code	Height	Weight	BMI=KG/H^2
S1	1.7	58	20.0
S2	1.7	60	20.7
S3	1.7	57	19.7
S4	1.7	54	18.6
S5	1.7	56	19.3
S6	1.65	54	19.8
S7	1.65	58	21.3
S8	1.63	57	21.5
S9	1.63	59	22.2
S10	1.63	54	20.3
S11	1.65	55	20.2
S12	1.63	53	20
S13	1.63	52	19.6
S14	1.65	56	20.5
S15	1.65	57	20.9
S16	1.63	51	19.2
S17	1.63	56	21.1
S18	1.67	58	21.2
S19	1.67	56	20.5
S20	1.67	55	20.1
S21	1.67	54	19.7
S22	1.68	59	20.9
S23	1.68	58	20.5
S24	1.68	57	20.2
S25	1.68	55	19.5
S26	1.69	60	21.1
S27	1.69	58	20.3
S28	1.69	59	20.7
S29	1.69	56	19.6
S30	1.69	57	20
S31	1.58	57	22.8
S32	1.58	56	22.4
S33	1.58	55	22.1
S34	1.58	54	21.6
S35	1.6	58	22.6
S36	1.6	57	22.2
S37	1.6	56	21.8
S38	1.6	55	21.4
S39	1.72	60	20.3
S40	1.72	59	20

Appendix D

Subjects` Fitness Assortment Record Sheet

Table 2: Pre, during and post training of Push up test (Raw Data)

Subjects`Code	Pre Test	During Test	Post Test	Remarks
S1	18	22	27	
S2	20	25	29	
S3	24	29	35	
S4	6	6	9	
S5	10	15	19	
S6	25	28	35	
S7	14	17	23	
S8	28	32	39	
S9	12	15	19	
S10	15	18	25	
S11	14	17	22	
S12	15	18	23	
S13	28	33	38	
S14	14	17	21	
S15	13	16	19	
S16	27	30	38	
S17	8	10	15	
S18	28	32	37	
S19	25	30	35	
S20	31	34	39	
S21	36	40	47	
S22	14	17	25	

S23	9	11	15	
S24	20	25	30	
S25	14	17	20	
S26	38	43	47	
S27	20	23	28	
S28	12	15	21	
S29	10	12	25	
S30	17	21	25	
S31	22	27	35	
S32	17	20	25	
S33	8	10	15	
S34	20	24	27	
S35	26	30	36	
S36	20	23	28	
S37	14	17	25	
S38	18	22	32	
S39	11	14	20	
S40	18	21	25	

pre test:-a test which was taken before training, During test: a test which was taken at the sixth week of training, Post test:-a test which had taken after putting the study group for 12 weeks training program

Table 3. Pre, during and post training of Pull up test (Raw Data)

Subjects` Code	Pre Test	During Test	Post Test	Remarks
S1	12	15	21	
S2	9	14	18	
S3	6	8	11	
S4	10	13	17	
S5	13	15	20	
S6	12	14	19	
S7	9	12	16	
S8	3	5	8	
S9	8	10	12	
S10	5	8	10	
S11	4	6	10	
S12	12	15	19	
S13	11	14	17	
S14	6	11	16	
S15	7	10	14	
S16	4	6	10	
S17	6	8	10	
S18	6	8	10	
S19	16	20	23	
S20	6	8	10	
S21	5	8	11	
S22	16	20	23	
S23	16	18	21	
S24	7	10	13	
S25	13	17	20	
S26	6	10	15	
S27	7	10	12	

S28	6	8	12	
S29	10	13	15	
S30	7	12	16	
S31	10	13	17	
S32	6	8	10	
S33	4	6	9	
S34	3	5	7	
S35	8	11	13	
S36	7	10	13	
S37	6	8	11	
S38	10	12	16	
S39	9	13	15	
S40	5	7	10	

pre test:-a test which was taken before training, During test: a test which was taken at the sixth week of training, Post test:-a test which had taken after putting the study group for 12 weeks training program

Table 4. Pre, During and Post Training of Sit and Reach Test (Raw Data)

Subjects` Code	Pre Test	During Test	Post Test	Remarks
S1	11	13	15	
S2	13	15	17	
S3	3	5	8	
S4	5	7	9	
S5	8	9	11	
S6	12	13	15	
S7	4	6	7	
S8	9	12	14	
S9	3	4	6	
S10	5	8	12	
S11	13	15	17	
S12	14	15	16	
S13	11	13	15	
S14	3	5	7	
S15	8	10	12	
S16	12	14	16	
S17	5	8	13	
S18	9	11	13	
S19	3	5	8	
S20	13	15	18	
S21	6	8	9	
S22	8	11	13	
S23	7	8	9	
S24	9	13	16	
S25	3	5	9	
S26	3	4	7	
S27	8	9	11	

S28	8	10	12	
S29	13	14	16	
S30	6	8	9	
S31	9	12	15	
S32	3	5	6	
S33	10	12	14	
S34	7	8	9	
S35	10	13	15	
S36	11	13	14	
S37	14	16	18	
S38	4	6	8	
S39	15	16	18	
S40	12	13	15	

pre test:-a test which was taken before training, During test: a test which was taken at the sixth week of training, Post test:-a test which had taken after putting the study group for 12 weeks training program

Appendix-E

Description of The Training Plan

In sport, training needs well designed and prepared plan. The purpose of a Training Plan is to identify the work to be carried out to achieve agreed objectives and to be effective in the training program objectives. Sports fitness training plans are the strategies for achieving peak performance. In sports training plan goals or objectives should be specified, participants' fitness level should be assessed before, during and after training, exercises should be selected and specific to the selected fitness component needed to develop, it should follow the training principles and also it should be well adjusted to the participants fitness level and to the weather condition. International guidelines on physical activity in childhood and youth suggest that all young people should take part in sports or other physical activities, be physically active on all or most days, and engage in activity that is of at least moderate intensity, and lasting about an hour. (Gutin,. 2004). Resistance, aerobic and flexibilty training should be conditions the major muscle groups 2–3 days per week is recommended (ACSM,1990).

A well-designed personal physical activity plan will outline how often (frequency), how long (time), and how hard (intensity) a person exercises, and what kinds of exercises (type) are selected. The exercise frequency, intensity, time, and type (FITT principle) are key components of any fitness plan or routine. An individual's goals, present fitness level, age, health, skills, interest, and availability of time are among the factors to consider in developing a personal physical activity plan. In particular, every plan should have a schedule that progresses over time. Progression can take the form of changes in any of the FITT components, but not all at once. For example, an athlete training for high-level competition would follow a different program than would a person whose goals are to develop good health from a sedentary start. Regardless of the specific goals, both programs would be based upon the elements of the FITT principle. Initially, a personal physical activity plan does not need to include all the health-related fitness components. The choice of which components to focus on initially should be based upon the likelihood of adopting the new behavior and a consideration of whether the goals are SMART (specific, measurable, attainable, realistic, and time framed). (MECY. 2004.)

Training frequency

Frequency refers to the number of training sessions per a specific period of time such as week and month or year. Following any form of fitness training, the body goes through a process of rebuild and repair to replenish its energy reserves cons63umed by the exercise.
This involves how often you engage in your exercise program. One day a week is not enough to develop physical fitness. The American College of Sport medicine (ACSM) recommends three to five days of exercise per week.

Characteristics of Exercise Intensity

Exercise intensity refers to how hard your body is working during physical activity. Your health and fitness goals, as well as your current level of fitness, will determine your ideal exercise intensity. The goal is work hard, but not too hard. Typically, exercise intensity is described as low, moderate, or vigorous. For maximum health benefits, the goal is to work hard, but not too hard, described as moderate-intensity by the (National Physical Activity Guidelines for Australians). These guidelines recommend that for good health, you should aim for at least 30 minutes of moderate-intensity physical activity on most days. This is the same for women and men (http://www.betterhealth, 2013). The process of determining and controlling appropriate exercise intensity presents a challenge, which has implications related to both physiological changes and to individual compliance within an exercise program. Kemi O., et al. (2003)
Several measurements for gauging exercise intensity for various exercise modalities have been devised and applied. These include proportion of maximal oxygen uptake (%VO2 max), proportion of maximal heart rate (%HRmax), proportion of maximal heart rate reserve (%HRRmax), and blood lactate indices. The following will cover the main principles of predicting and controlling exercise intensity by extrapolation from the relationships between oxygen uptakes, heart rate, and power output and running speed. Ideally, proportions of the O2 max are used to specify exercise intensity levels. The recommended intensity range is normally between 40% and 85% depending on the health and training status of the individual (ACSM, 1995).

The ranges of exercise intensity

- Low (light) is about 40-54%MaxHR
- Moderate is 55-69%
- High (vigorous) is ≥ 70%

For moderate-intensity physical activity, a person's THR should be 50 to 70 per cent of their maximum heart rate. The maximum rate is based on a person's age. An estimate of a person's maximum heart rate can be calculated as 220 beats per minute (bpm) minus your age. Because it is an estimate, use it with caution. Keep your heart rate at the lower end of your recommended range if you are just starting regular exercise. Gradually increase the intensity of your workouts as your fitness improves. Also, your heart rate should stay in the lower ranges during warm-up and cool down periods. Using a heart rate monitor is an easy way to keep track of your heart rate while you're exercising, or you can take your pulse.
Source: www.cardiosmart.org(American College of Cardiology) and betterhealth.vic.gov/exercise-intensity

Measuring exercise intensity

There are various ways to measure exercise intensity to make sure the body is getting the most out of every workout. One coach may need to experiment to find out which method of measuring exercise suits best. There are three different measuring methods include:

- Target Heart Rate Method
- Talk Test Method And
- Exercise Rating Scale

Measuring heart rate by taking pulse

Taking your pulse at regular intervals lets you know whether you are exercising within your target heart rate range. Some tips include.

- Take your pulse before you warm up
- Take your pulse again when you've been exercising for about 5-10 minutes
- Continue taking your pulse at regular intervals

The radial pulse is located on your inner wrist. To measure it, you should:

- Put the first three fingers of one hand against the inner wrist of the other hand just below the thumb
- Lightly press your fingers into the hollow next to the tendon on the thumb-side your artery lies just beneath the skin
- Using a watch with a second hand, count your pulse for 15 seconds. Multiply this figure by four to get your beats per minute. (For example, 31 pulse beats over 15 seconds equals a pulse rate of 124 beats per minute.) You can also take your pulse by pressing your fingers lightly against one of your carotid arteries, located on either side of the windpipe.

Factors known to influence heart rate

It's not just exercise that affects your heart rate. Your beats per minute could be raised by a number of internal and external factors including:

=Hot weather, Caffeine intake, Time of day, Hormone fluctuations, Stress or anxiety,
Cigarette smoking and Medications
Source: www.cardiosmart.org(American College of Cardiology) and betterhealth.vic.gov.

Based on the above mentioned reasons and others the researcher was used the training program lasts for about 12 weeks and Participants were exercising three times with 60 minutes of each training days in a week for 12 consecutive weeks. One day was skipped (rest day) in between exercise session days with last consecutive rest days. In addition, the researcher used the above mentioned mechanism (measuring heart rate by taking pulse rate) to measure the exercise intensity of the exercise session. However, the result may be fluctuated due to the above mentioned influenced factors. The main objective of this general training schedule/plan was to investigate the effect of selected physical exercises on enhancing muscular endurance, strength and flexibility of U-17 male football trainees of Jigjiga Somali Regional State, Ethiopia.

By keeping all mentioned in the above, the training schedule is presented on the coming pages.

First Month Training Schedule (December, 2016)

Days	Types of Exercises	Duration (minute)	Frequency	R-Time	Intensity
Monday	General and specific warming up exercises walking, jogging, running and stationed general and specific stretching exercises.	10m	-	5m	Low intensity (40-54%)
	Static stretching exercises	10m	3 x10		
	Rope jumping	5m	-		
	Triceps on stairs/chair	25m	4x8		
	Cooling down and stretching exercise	5m	-		
Wednesday	General and specific warming up exercises walking, jogging, running and stationed general and specific stretching exercises.	10 m	-	5m	Low intensity (40-54%)
	Ballistic stretching exercise	10m	-		
	Pull up activity	10m	2x10		
	Circuit training	20 m	2x5		
	Cooling down and stretching exercises	5m	-		
Friday	General and specific warming up exercises walking, jogging, running and stationed general and specific stretching exercises.	10 m	-	5m	Low intensity (40-54%)
	trunk lift	10 m	2x5		
	Static stretching exercises	15	-		
	Push up	15m	3x10		
	Cooling down and stretching exercises	5m			

The above training schedule was applied every week of the month of December 2016.

Second month training schedule (January, 2017)

Day	Types of Exercises	Duration (minute)	Frequency	R-time	Intensity
Monday	General and specific warming up exercises walking, jogging, running and stationed general and specific stretching exercises.	10m	-	5	Moderate 55-69%
	Push up, and weight lifting 15kg, 20kg, 25kg and 30kg and different types of upper body strengthening exercise.	20m	4x10		
	Rope jumping	5m	-		
	Ballistic stretching exercises	10m	-		
	Cooling down and stretching exercises	5m	-		
Wednesday	General and specific warming up exercises walking, jogging, running and stationed general and specific stretching exercises.	10 m	-	5m	Moderate intensity (55-69%)
	trunk lift	10 m	2x10		
	Flexibility exercise	10 m	3x10		
	Pull ups and parellal dips	20 m	2x12		
	Cooling down and stretching exercises	5 m	-		
Friday	General and specific warming up exercises walking, jogging, running and stationed general and specific stretching exercises.	10 m	-	5m	Moderate intensity (55-69%)
	Dumbbell	20 m	3x10		
	Modified Push ups	10 m	3x10		
	Crunch or sit ups	10m	3x10		
	Cooling down and stretching exercises	5 m	-		

The above training schedule was applied every week of the month of January 2017.

Third month training schedule (February, 2017)

Days	Types of Exercises	Duration (minute)	Frequency	R-Time	Intensity
Monday	General and specific warming up exercises walking, jogging, running and stationed general and specific stretching exercises.	10 m	-	5m	High intensity (>70%)
	Star jump, squat jump, jumping jacks	10 m	3x5		
	Push ups	20 m	3x10		
	Flexibility exercise	10m	-		
	Cooling down and stretching exercises	5 m			
Wednesday	General and specific warming up exercises walking, jogging, running and stationed general and specific stretching exercises.	10 m	-	5m	High intensity (>70%)
	Weight training	10 m	3x10		
	Step exercise & push up	10m	4x10		
	Floor exercises	20 m			
	Cooling down and stretching exercises	5 m	-		
Friday	General and specific warming up exercises walking, jogging, running and stationed general and specific stretching exercises.	10 m	-	5m	High intensity (>70%)
	Pull ups	15 m	3x15		
	Static stretching exercise	10 m	3x10		
	Step up	15 m	4x10		
	Cooling down and stretching exercises	5 m	-		

The above training schedule was applied every week of the month of February 2017.

NB: The number of repetitions, sets and intensity of the exercise were changed within each month.

Appendix F

Table 5. Paired Sample T-test Results of Each Parameter

Test	Test	Mean	MD	SD	SIG,	Lower bound	upper bound	T-value
Push up	PT-DTT	18.47-21.90	-3.42	1.08	0.00*	-3.77	-3.07	-19.99
	PT-PoT	18.47-27.45	-8.97	2.27	0.00*	-9.70	-8.24	-25.00
Pull up	PT-DTT	8.15-10.97	-2.82	0.93	0.00*	-3.12	-2.52	-19.19
	PT-PoT	8.15-14.25	-6.10	1.56	0.00*	-6.60	-5.59	-24.64
Sit and reach	PT-DTT	8.25-10.17	-1.92	0.729	0.00*	-2.15	-1.69	-16.68
	PT-PoT	8.25-12.30	-4.05	1.35	0.00*	-4.48	-3.61	-18.86

PT= pre Training test which was taken before training, DTT= During Training test which was taken at the sixth week of training, PoT= Post Training test measured after putting the study group for 12 weeks training program MD= Mean difference SD= Standard deviation

Appendix-G

Norms of Muscular Endurance, Strength & flexibility test

Table 6: The Push Ups Test for Ages 15-16

Gender	High performance	Good fitness	Marginal fitness	Low fitness
Male	36^{+}	18-35	14-17	<13

Source:-Corbin & Lindsey (2005) p. 31

Table 7: Pull Up Test Norms for Ages 16-19

Gender	Excellent	Above Average	Average	Below Average	Poor
Male	>13	9-13	6-8	3-5	<3

Source: -Davis et al. 2000.

Table 8: Normative Data for The Sit & Reach test

The following table is for 16 to 19 year olds (Davis. 2000, p. 126)

Gender	Excellent	Above Average	Average	Below Average	Poor
Male	>14	11-14	7-10.9	4-6.9	<4

Davis B. 2000.

Table 9: Normative Data for BMI

Category	BMI (Kg/m^2)	
	From	To
Underweight	16	18.5
Normal weight	18.5	25
Overweight	25	30
Obese	30	35

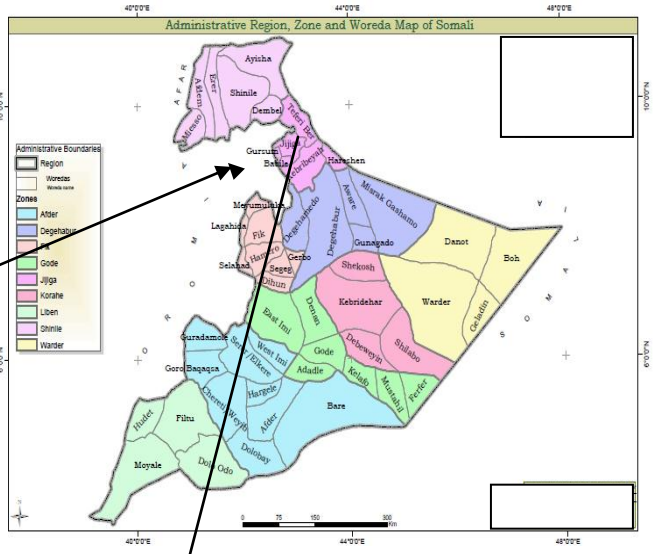
WHO. 2006.

Figure in the Appendix

Figure 1: Map of the study site

Ethiopia

Somali region



Jigjiga city location map

source: https://www.google.com/search?q=jigjiga+map&tbm