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The Outcome Of Selected Physical Fitness Exercise In Maximizing Muscular Strength And Endurance Performance Of Male Basket Ball Players In Shone Preparatory School Of Grade Eleven Students

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Strength and endurance are important components of physical fitness in maximizing basketball abilities. The study was conducted to maximize muscular strength and endurance performance on selected 30 male basketball players of Shone preparatory school Grade 11 students. These selected thirty male students were assigned as one group and their age ranges 18 and 19 years. All subjects participated in physical fitness exercises for 12 weeks i.e., three days per week and 90 minutes duration per day. Pre-test, during training test and post training tests were conducted on the physical fitness variables such as step test, Squat test, sit-ups, Pushups and 12 minutes run/walk. The data collected from subjects were analyzed by paired sample t-test to determine the differences between pre-test and post-test mean value results of the participants of the study. According to the findings of current study, step test 26.6 (beats per minute) mean differences, and squat test 7.86 (squats per minute) mean differences were recorded. The mean differences value of sit-ups and pushups performances of mean differences 8.07 and 8.24 (number per minute) were respectively recorded. In twelve minutes run 271.16 meters increments were observed. The results obtained in the study indicate that, there were significant improvements in squat, sit-ups, pushups, 12 minutes run and in the case of steps test, heart beat was reduced because of improvement in the performance. It is noted that the final findings of this study were significantly improved on all physical fitness variables due to the twelve weeks of physical fitness training program.

Keywords: Physical fitness, School, 12 week, Training

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01. INTRODUCTION

This section is intended to provide the background for this study, statement of the problem, research objectives and research questions. Moreover, it presents other sections such as scope and Significance of the study of this thesis.

1.1. Background of the Study

One of the most popular sports around the world, Basketball is a fast-paced game played by men and women of all ages and ability. The game involves both offence and defense of play. The basic offensive skills are passing, ball handling, shooting, and rebounding. Defensive skills include guarding opponents, blocking and positioning to defend the basket, using quickness to intercept or steal the ball, and rebounding missed shoots. Basketball has evolved many commonly used techniques of shooting, passing and dribbling as well as specialized player positions and offensive and defensive structures (player position) and techniques. After the invented of Basketball in United States, the game rapidly spread nationwide and to Canada and other parts of the world. Basketball has been popular in some part of Africa for many years. The rate of development of basketball popularity and playing techniques within the Africa countries varies with geography. According to the national federation in 1939 E.C. the game was introduced in Ethiopia by the Canadian physical education teachers at Teferi Mekonen School. Then, the Basketball was spread in all schools of Addis Ababa and throughout the country. The International Basketball Federation (FIBA) was established to spread the game in the world under well-organized rules, techniques and tactics of play. The FIBA has been organizing competition and training for the development of the game and the participation of the people in the sport. And also provides youth Basketball training programs in order to create skilled professionals and produce individuals who possess all qualities in their life.

The rapidly increasing popularity of basketball has also need a demand of excellent performance. The basketball practitioners require many attributes to become successful Players. These include cardiovascular fitness, muscle strength, muscular Endurance, flexibility, agility, Coordination, skill and tactical knowledge (Oudat and Ghassab, 2007). To succeed in a team sport, basketball players need

The optimal combination of technical, tactical, physical characteristics and mental motivation (Scholich, 1990).

Basketball is characterized as an intermittent sport, making physiological demands more complex than continuous sports such as running (Drust *et al*., 2000). It requires a number of physiological qualities to be performed at the highest intensity and skill execution with an exceptionally high standard of technical ability, as well as a tactical understanding of the game.

Physical qualities of basketball players include aerobic and anaerobic endurance, strength, agility, and sprinting ability, jumping and kicking power. Like elite sprinters or distance runners, Basketball payers generally have extraordinary capacities in one single physical quality (Hoff and Helgerud 2004).

For young players, the most important attributes are high levels of skill in passing, shooting, dribbling, and heading. The players must be able to execute these skills on a variety of field surfaces and when the ball is delivered either in the air or on the ground. Once these technical skills have been achieved, it is much easier for the player to develop the necessary decision-making ability, field positioning, speed, endurance, and psychological characteristics. It is important to first assess the ability levels of the players and then to challenge them at those levels, which will make the game more enjoyable (Sport science exchange Roundtable, 2000).

Maximum strength is the maximum capability of a muscle or muscle group to generate tension. It is often measured by the one repetition maximum test (1RM), which is operationally defined as the heaviest load that can be moved over a specific range of motion, one time and with correct performance(Marta and Paulo,2003). Strength and conditioning programs have helped many athletes become stronger, faster, and, in some cases, larger. These programs have also succeeded in providing athletes with the ability to enhance their performance. It is a commonly accepted fact that many football skills can be enhanced through proper strength training and conditioning (Jack, 2001).

Excellent endurance performance capacity has long been recognized as important prerequisite for on-field performance of basketball players (Bangsbo *et al*

., 2006; Ekblom, 1986; Reilly, 1997). For instance, a player's aerobic endurance capacity facilitates performance retention, which is limited by endurance, throughout a 90-120 minutes game. In addition, it influences the regeneration capabilities following high-intensity games and training units and the recovery following brief high-intensity exercise spurts during games or training unit (Broich *et al*., 2012). Muscular endurance tests are those in which a number of repetitions are performed with sub maximal loads (Marta and Paulo, 2003).

Further, well-established anaerobic endurance capacity is important for explosive and maximum execution of such high-intensity game situations (Ekblom, 1986; Reilly, 1997; Reilly *et al*., 2008). Because of the importance of players' aerobic and anaerobic endurance capacity,

Maximizing this capacity is the central element of conditioning training in basketball players. Performance control and the design of player-specific training regimen aimed at performance optimization rely on diagnostic methods for the assessment of individual player's potentials and capacities.

The effectiveness of many physical performances is related to various basic traits found in boys and girls including their maturation, body size, physique type. Many of these traits are related to heredity; others, such as body weight have hereditary implications, also be affected by environmental influences, including the nature and amounts of exercises, nutritional practices and health habits (Mazumdar, 2012).

The fitness formula for a well-conditioned football player is a simple one. There are no shortcuts, no magic pills. A long-term commitment is necessary to reach and maintain a player full physical potential. The two primary objectives of the strength program are to prevent injury and enhance the abilities to play the game. Those abilities include strength, speed, power and the ability to sustain these qualities for an entire game. Also the strength program of a basketball player must be intense, brief, and generate the type of muscular gains that are most functional in playing the game (Hoff and Helgerud, 2002).

Hence, the present study was employed with a view to improve with regard to the relationship of Selected physical fitness variables to maximize the ability of basketball players of Shone Preparatory School. Shone town is the investigator's working area where he served and has more than seven years work experiences in teaching physical education and sport in Shone Preparatory School. Within this long period of time he was observed a lot of problem in muscular strength and endurance performance of basketball players at East Badewacho Woreda of Hadiya Zone, SNNPR.

For this reason the investigator selected Shone Preparatory School to conduct a research in maximizing strength and endurance abilities of this school of grade 11 male students.

1.2. Statement of the Problem

There have been many studies analyzing training program, muscle strength, muscle endurance and cardiovascular endurance performance. Endurance allowed players to play harder than everyone else, which allowed them to be better defensive players and have enough strength to hit shots up to the end of the game (Scholich, 1990). Beside this a few researches have been done on the improvement of physical fitness variable of basketball players.

To develop basketball fitness it is clear that participating in training and conducting research is mandatory. Investigator's has more than seven years work experiences in teaching physical education. Within this time he observed a lot of problems in muscular strength and endurance performance of Shone students. Research was not conducted at this area in muscular strength and Endurance performance of basketball players. Hence, the investigator of this study planned to conduct a research on this area. The study was expected to investigate the outcome of selected physical fitness exercises in maximizing muscular Strength and Endurance performance of Shone Preparatory School selected male basketball players.

Therefore, the following basic research questions were answered in this study

01. What are the selected physical fitness exercises to maximizing muscular strength and endurance performance of Shone preparatory school selected male basketball players?
02. What are the effects of physical fitness exercises in muscular strength and

01. endurance performance of basketball players' after 12 weeks of exercises?
02. What is the change observed in muscular strength and endurance parameters of the selected male basketball players?

1.3. Significance of the Study

The main purpose of this study was to examine the effects of physical fitness exercises of muscular strength and endurance in maximizing performance of selected male basketball players of Shone preparatory school at East Badewacho Woreda of Hadiya Zone. This study was reduced muscular strength and endurance performance problems that occur at Shone preparatory School of selected basketball players'. But it does not mean that the outcome of this research is only restricted to Shone Preparatory School. It could also helps to know which training would help for basketball l players to improve playing capacity and physical fitness particularly in strength and endurance performance. After finding of the problems, the investigator would suggest solutions and recommendations in regard with maximizing strength and endurance abilities of grade 11 male students.

1.4. Objectives of the Study

1.4.1 General Objective

The general objective of this study was to examine the effects of physical fitness exercises in maximizing muscular strength and Endurance abilities of selected male basketball players.

1.4.2. Specific Objectives

01. To examine the effect of selected physical fitness exercises in maximizing muscular strength performance of Shone preparatory school students.
02. To assess the effects of selected physical fitness exercises in maximizing muscular endurance abilities on selected Shone preparatory school of male basketball players.
03. To investigate the significance changes in muscular strength and endurance performance of Shone Preparatory School of selected male students.

04. LITERATURE REVIEW

This section deals about physical fitness and components, effect of physical fitness exercise on cardiovascular endurance, effect of physical Fitness exercise on muscular endurance, speed and quickness training, strength training for basketball players and endurance training were briefly discussed.

2.1. Physical Fitness Components

As stated by Caspersen *et al*., 1985, physical fitness is the ability to function effectively in physical work, training, and other activities and still have enough lefts over to handle the emergency that might arise. As Caspersen physical fitness is also a set of attribute that people had 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 emergencies (Caspersen *et al*., 1985). (According to the American Medical Association, the general capacity of physical fitness to adapt and respond favorability for physical effort.) Individuals are physically fit when they meet ordinary and unusual demands of daily life safely and effectively without being overly fatigued, and have energy left for leisure and recreational activities.

2.2. Components of Fitness

2.2.1. Cardio Respiratory Endurance

Cardio Respiratory endurance is the ability of the circulatory and respiratory systems to supply oxygen and nutrients needed for muscular activity and transports waste products from the cells during sustained physical activity (USDHHS, 1996). Cardiovascular fitness is also referred to as cardiovascular endurance, aerobic fitness and cardio respiratory fitness. A high level of cardio respiratory fitness permits continuous physical activity without a decline in performance and allows for rapid recovery following fatiguing physical activity. A VO2 max test in the laboratory setting is considered to be the best measure of cardiovascular fitness. Commonly administered field tests include the one mile run/walk, the 12-minute run, and various bicycle, step, and treadmill tests.

2.2.2. Muscular Strength

Muscular Strength is the ability of the muscle to exert force (USDHHS, 1996). For true assessment it would be necessary to test each major muscle group of the body. According to (Foss and Keteyian, 1998), "strength is the force or tension of a muscle or, more correctly, a muscle group can exert

Against a resistance in one maximal effort". Strength is greatest amount of force a muscle or muscle group can exert in a single effort. Muscular strength is the maximum force or tension level that can be produced by a muscle group" (Heyward, 1991). Strength and power share importance with endurance in soccer play. Maximal strength is one basic quality that influences power performance. An increase in maximal strength is usually connected with an improvement in relative strength and, therefore with improvement of power abilities. A significant relationship has been observed between 1RM and acceleration and movement velocity (Hoff and Helgerud, 2004).

2.2.3. Muscular Endurance

Muscular endurance is the ability of muscle group to continue to perform without fatigue (USDHHS, 1996). For true assessment of muscular endurance it would be necessary to test each major muscle group of the body. Laboratory and field tests of muscular endurance are similar and are based on the number of repetitions that can be performed by the specific muscle group being tested (example: repetitions of push-ups or abdominal curls). Muscular endurance can be measured isometrically (static contractions) or isotonically (dynamic contractions). Muscular endurance is the ability of a muscle or muscle group to perform repeated movements with a sub-maximal loads (force) for extended periods of times (Gutin, 1980).

2.2.4. Body Fat and Lean Body Mass

Regular football training influences body composition. Loss of body fat in middle-aged men was in the range of 1–3 kg following 3 months of training, corresponding to a reduction in fat

Percentage of 1–3%. Specifically, fat mass was lowered by 1.8 kg in young and middle-aged

Men playing street football for 45 min, two to three times a week for 12 weeks(Bangsbo, et al.,

2015). A narrative review examining cardiovascular health, body composition, muscle strength

And functional capacity.

2.2.5. Speed

Speed is the ability to move the body or to another with faster response in time. It has been

Shown that to improve speed each parts of the body quickly. Basketball is a game that requires

Skill and speed. Speed is the ability to perform a movement within a short period of time.

Speed training is an important football related skill and a component of physical fitness which

Enables a player to move from one point athlete needs to work on acceleration, starting ability,

Stride rate, speed endurance, and stride length (Neiman, 1995).

2.2.6. Power

Power is the ability to move the body parts quickly while applying the maximum force of the muscles. Power is a combination of both speed and muscular strength. For example, to have a good finishing, at middle distance running, an athlete is expected to combine speed and muscular strength. According to pacific Lutheran university (http://scorecardresearch.com), power is a function of the amount of work performed per unit of time. The shot put, a tennis serve, a basketball ring on the goal, a sprint start, a basketball dunk, and a baseball pitch all exhibit power. Thus, power can be tested by vertical jump height test.

2.2.7. Agility

Agility is the ability to change the direction of body or its parts rapidly. It is dependent on

Strength, reaction time, speeds of movement and muscular coordination. Quick start and stops

And quick changes in direction are fundamental to good performance in basketball (Nabhendra,

2010). Agility in basketball, players have to make rapid changes in direction in response to a moving ball. Basketball is a game full of direction and speed changes with and without the ball,

And agility training helps players become more alert and improves coordination. A basketball

Player who is agile is able to change direction quickly without losing balance. It include factors such as speed strength, balance and coordination and is beneficial because it helps a player's ability to get and hold onto the ball (Sheppard and Young, 2006)

2.3. Effect of Physical Fitness Exercise on Cardiovascular Endurance

A person's level of cardiovascular

Endurance helps to prevent disease, quality of life, and ability to react to acute physical and mental stress. For healthy individuals, higher cardiovascular endurance also indicates an elevated level of physical fitness (Eric, 2009). Aerobic exercises use large muscle groups to increase heart rate. This causes faster breathing which maximizes the oxygen and nutrients in the blood cells. During maximum aerobic exercise, the trained individual has increased maximum oxygen consumption and is better able to process oxygen and fuel can provide more energy to working muscles. Aerobic capacity is the most widely accepted single indicator of one's cardio respiratory fitness level and it is one of the best types of activity for training and maintaining allow percentage of body fat (Probart *et al*., 1991).

2.4. Effect of Physical Fitness Exercise on Muscular Endurance

Muscular endurance, which represents multiple muscle contractions or a sustained muscle contraction over a period of time, for example during running, climbing, swimming, jogging, running on tread mill at the gym there will be muscle contraction those muscle contraction can assists the improvements of muscular endurance. During aerobic exercise, minute ventilation increases and an increased load is placed on the respiratory muscles (Harms *et al*, 2000).

2.5. Speed & Quickness Training

Speed development is one among the components of physical fitness. A more appropriate term for an athlete should be, "specific sport speed skill." For a basketball player the term should read, "Position specific basketball speed skills." Too much emphasis is placed upon running in a straight line (40-yard sprint). The speed to play the game of basketball is specific to the demands of each position. basketball speed is the key to a player's success not straight-line track speed.

Some athletes run fast in a straight line but do not possess the abilities to quickly change direction. Thus, athletes' goal is to develop the specific speed and quickness they use to play their position, and a level of conditioning to sustain that speed and quickness during a game. Speed and quickness are abilities that an individual inherit from his/her genetic pool. There are specific physical and neurological assets an athlete must possess to run fast. These are factors a player have No control over. Athletes cannot develop more speed than their genetic potential will allow. For instance, an elementary school student can sprint faster than anyone in his/her school while having no special training or coaching. She/he may not have better shape than the other kids at school. This is because of the genetic potential of that particular student. There is nothing better for a basketball player to improve position specific speed and quickness than practicing fast and playing fast (Brown *et al*., 2000).

2.6. Strength Training for basketball Players

The benefit of strength and strength training for basketballers is well supported by the researchers. For example, Reilly (1990) showed that the stronger players outlasted the weaker players in terms of a regular place in the team, and had reduced injury risks. The researchers recommend that leg strength in particular is developed, especially in the quadriceps and hamstrings, to help stabilize the knee joint, which is the most frequently injured joint in basketball (Reilly, 1990; Apor, 1998). Similarly, some researchers agreed that knee-extension torque has been associated with success in the game and that strong hamstring muscles in relation to quadriceps are crucial to knee injury prevention (Adams, *et al*., 1992).

The training rules for basket ballers must therefore reflect this need for good acceleration and maximum speed. Apor (1998) suggests, in making fitness recommendations for footballers; that players need to develop the musculature of a sprinter. He mentioned the benefit of maximum leg-strength training with heavy resistances for developing acceleration and speed. Strength and conditioning programs for football require the development of, among other qualities, speed and speed endurance (Kraemer *et al*., 2004). It is known that in a relative short period, varying from 5 to 12 weeks, basketball players are able to improve their running speed, by high-quality and high-quantity practice, including besides basketball-specific training, strength and speed training (Sporis *et al*., 2008; Kotzamanidis *et al*., 2005; Ronnestad *et al* ., 2008). Performance improvements as a result of training programs are influenced by the pre-training level of the individual players (Bouchard and Rankinen, 2001).

2.7. Endurance Training

According to Ekblom (1994), basketball specific endurance tests have also been developed incorporating forwards, backwards and sideways running along with turning and jumping. Research has demonstrated a relationship between players VO2 max and both distance covered and sprints attempted during a game. Mean values for elite players have ranged between 55 and 67mL/kg/min (Tumilty, 1993; Davis *et al*., 1992). The investigator interested to slender the gap of elite basketball player endurance training with beginners players (Tumilty, 1993). Although players can perform conditioning work based around running drills, for example in a variations of shuttle runs, the best way to develop the required endurance appears to be to include a ball and relate the drill to game performance. Reilly (2005) discusses the benefits of 3 v 3 small sided games for young basketball players, though key variables such as time, pitch size and motivational climate are important to success.

03. MATERIALS AND METHODS

In this Section the experimental site, experimental materials, experimental design, source of data, target of study population, sampling size and sampling techniques, inclusion and exclusion criteria, method and procedures of data collection, performance test analysis, methods of data analysis, data quality control and protocol and ethical consideration were briefly discussed.

3.1. Study Area

East Badewacho Woreda is found in Hadiya Zone, SNNPR. It is located between 7o 9` to the south, and 8o15` to North latitude and 37o5` to 40o00`to east longitude. The Woreda is bounded by Alaba special Woreda of SNNPR to the North- East and Siraro -Woreda of Oromia Region to the East, Kadida Gamela Woreda of KembataTembaro Zone and Mirab Badewacho Woreda which was the former part of Badewacho Woreda to the West and Wolaita Zone to the South. Woreda's capital, Shone town is situated at about 345kms away from Addis Ababa on the asphalt road running from Shashemene to Arbaminch. The special feature in terms of location of East Badewacho is none boundedness with other Woreda's of Hadiya Zone except West Badewacho Woreda from that of 10 Woreda's of Hadiya Zone and Hosanna town reform administration, since it is separated by the presence of KembataTembaro Zone between East Badewacho Woreda and other Woreda's of Hadiya zone.

3.2. Study Materials

The investigator used Shone Preparatory School basketball ground for field tests as well as to conduct the training program of the experimental group/subjects. The following materials were used through the process of the study. These materials are stopwatch, basketball, measuring tape, whistle, mats, Stadiometer, marking cones, Rope, pen and score recording sheet.

3.3. Study Design

For this study 30 male students with age of 18-19 years were selected from Shone Preparatory School of grade 11. In this study purposive sampling design was applied. The PT, DTT and PoT on selected physical fitness, such as step test, Squat test, sit ups, Pushups and Twelve minutes run/walk (Cooper test) were administered for the selected experimental group. The studies subjects were engaged in designed training program for twelve weeks. The training schedule includes three days per week i.e., Monday, Wednesday, and Friday. Totally 36 days in three months (February, March and April, 2015) was planned for training sessions in which 90 minutes were allotted for each session. In this study a single group for experimental purpose was participated and standard norms were applied. Thus, there was no a control group in this study.

(Training schedules were shown on appendix table 6-8, pages 45-47)

3.4. Source of Data

The primary data were collected from experimental study group through pre, during and post tests on selected physical fitness parameters. The secondary data were collected from different written materials like journals, prior researches works, published books and other documented materials.

3.5. Target of Population

The study populations were Shone Preparatory School of grade 11 male, students between ages of 18 and 19 years in East Badewacho Woreda of Hadiya Zone, SNNPR. The investigator of this study selected only 30 students from the total of 220 grade 11 male students based on selection criteria.

3.6. Sampling Techniques and Sample Size

To this specific study the investigator followed

Purposive sampling technique. In this research instances, the researcher wished to use small number of participants on the basis of participant knowledge, skills and abilities. Its elements and purpose of the study may be members of subjects are easily identified from its larger population (Babbie, 2007). The selection of subjects based on their grade level, age, health status and on their interest to participate in physical fitness exercises program of muscular strength and endurance. The sample size of this study contained 30 selected male students between the ages of 18 and 19 years from 220 grade 11 male students of Shone Preparatory School at EBW, Hadiya zone, SNNPR.

3.7. Inclusion and Exclusion Criteria

Subjects who Grade eleven students and who fulfill a questionnaire for history of health status and whose ages are between 18 and 19 years were included in this study. In addition to this, the subjects who have any recent physical injury and poor medical conditions have not participated in this study.

3.8. Methods and Procedures of Data Collection

After giving training for selected male students of basketball players' quantitative data were collected using the appropriate physical fitness Variables as mentioned below.

01. **Steps test**: to measure muscular strength-endurance of legs in connection with Cardio-respiratory ability
02. **Squat test**: to measure lower body or leg muscular strength-endurance
03. **Sit ups:** to measure muscular endurance of abdominal muscle.
04. **Pushup tests**: for measuring muscular strength-endurance of arms and chest.
05. **12 minutes run/walk:** for measuring cardiovascular endurance.

The data was recorded by the investigator with the help of one assistant data recorder

3.9. Physical Fitness Test procedure

The following fitness tests as the parameter of physical fitness variables were recorded for pre-test, during training test and post-tests of the study.

3.9.1. Steps Test

Before starting this test the investigator collected essential instruments for this test, such as 12 inches or 30.61cm bench, stopwatch, and heart rate monitor (optional). By the help of assistant

Data recorder the investigator took subjects' resting heart rate before performing warm-up exercise. Purpose of this steps test was to measure cardio respiratory fitness.

The Subjects stood in front of a step bench. Assistant data recorder ordered commands to "Go", and then the stop watch started counting. Subjects started steps up and down on the flat form at a rate of steps in one minute. The complete of up and down steps were counted as one step of up and down. The subjects stopped up and down immediately on completion of the test, and the heart beats were counted for 15 seconds. Finally we multiplied these 15 seconds by 4 in order to get the beats per minute (McArdle *et al*., 1972).

3.9.2. Squat Test

Before starting this test the investigator collected essential equipment for this test, such as Stop watch, mats and Score record sheets. This test was used to measure lower body or leg strength also raising heart rate during training sessions. Before test, the subjects performed warming – up exercise properly. Subjects stood upright in front of a mat with their feet shoulder wide apart. Assistant score recorder ordered to 'Go" then stop watch started counting. Subject's squats down lightly pushes down and Jump up, repeats this sequence of movements until they are unable to continue with no rest in one minute. The assistant data recorder counted and recorded the number of successfully completed squats (Fry *et al*., 2014).

3.9.3. Sit-up Test

Before starting this test the investigator collected the equipment for this test such as mat, stop watch, pen and score record sheets. The participants performed enough warming up and stretching exercises. The Subjects lie on back, hands on back of neck with fingers clasped, knees bent less than 90 degrees, feet on floor and heels no more than 12 inches from buttocks. Up torso until elbow is in contact with knees and return to starting position. Subjects were encouraged to perform one or two trial repetitions before test. The complete of one sit ups (up and down) of repetitions were

Counted as one half sit up. The assistant score recorder recorded number of repetitions of sit-ups performed in 60 seconds (YMCA, 2000).

3.9.4. Push-Ups Test

The muscles of the upper body and shoulders are another frequently measured muscle group. Push-up is used to measure the strength and endurance of upper body muscle groups. Less muscular strength and endurance of the upper body and shoulder group may increase the chances that a person may have shoulder pain.

In this test, only the upper body is load. Before starting this push up tests the participants performed warming up and stretching exercises.

- The subjects started push-up (military position)
- Participant hands were shoulder wide apart
- Arms extended straight out under the shoulders
- Back and legs in a straight line, and toes curled under.
- Starting in the up position,
  - Hands were slightly ahead of the shoulders in the proper position for the downward motion.
  - Lower until the chest is about 2 inches from the floor with the elbows bent at 90o and raise up again.
- The completion of one complete push up (down and up) was counted as one pushup.
- The total numbers of pushups the subjects did in one minutes were recorded as their scores.

3.9.5. Twelve (12) Minutes Run/ Walk Test (Cooper test)

The subjects of quasi experimental group started running on athletics track. The subjects did their best to run many laps around running track for 12minutes. When 12 minutes over the subjects stopped running and they stood on their spot. Then, the amount of distance covered by subjects within twelve minutes and the exercise heart rate (EHR) of each subject were measured in meter and beat per minute. In addition, after getting plenty of resting time, resting heart rate (RHR) of the subjects was measured in best minute.

3.10. Methods of Data Analysis

The data was collected through physical fitness Assessment tests and analyzed by using computerized statistical package software of version twenty (SPSS V20). The paired sample t-test was used to compare the data among pre test, during training test and post tests. Level of significance was < 0.05%.

3.11. Data Quality Control

To ensure quality of the data of muscular strength and endurance the standardized physical fitness test was used with appropriate tools. To reduce the mistakes which could be occurred during data collection and to collect the appropriate data the assistant fitness test recorder was trained among physical education teachers of Shone preparatory school. Additionally, all tests were recorded with photograph and video recorder for further checkup on test procedures.

3.12. Protocol and Ethical Consideration

The study was designed in such way that ethical issues were properly addressed. Privacy of the participants and confidentiality were strictly observed and maintained throughout the study. The study was conducted under Addis Ababa University rules and code of conduct in governing research activities and ethical issues. The written consent/ agreement form was given and informed to the concerned bodies.

04. RESULTS AND DISCUSSION

This chapter deals with the analysis of data collected from the samples under this study. The purpose of the study was to evaluate the effects of physical fitness exercises in maximizing muscular strength and endurance performance of selected basketball players in Shone preparatory school of grade 11 male students. To achieve the purpose of the study 30 male students from Shone preparatory school were selected as subjects and their age was 18-19 years. They were assigned in one group and the selected exercises were given for 12 weeks. The variables which were selected for this study were **Step test, squat test, sit ups, pushups** and **12 minutes run**. Pre-test, during training test and post training tests were conducted for all 30 study subjects and the test results were recorded. The collected data were analyzed by paired sample t-test using Statistical Package for Social Sciences (SPSS) version twenty (V-20) software. The results for each variable are presented in tables and graphs as depicted below.

4.1. Mean and SD Values of Step Test Performance (min)

Table 1. Mean and Standard deviation of step test (Pre-test, during-test and Post-Tests)

Experimental group

Variable	N	PT	DTT	PoT
ST	30	148.46±4.38	136.1±8.01	121.86±8.05

Values are in the form of mean + SD = standard deviation, PT, = pre training test, DTT= during training test, PoT= post training test, ST = step test.

160 **148.46±4.38**

140	136.1±8.01	121.86±8.05
	120	
100		
80		Pre Test
60		During test
40		Post test
20		
0		
PT	DTT	PoT

Experimental group

359img01.png

Figure 1. Mean comparison among pre, during and post step test results of the study subjects

The above table 1 and figure 1 showed that there was significant change in pre-post test results. The improvement was seen on step test mean differences values due to the twelve weeks physical fitness training, in which the subjects were engaged in. The mean value for step test before training was 148.46 + 4.38 beats per minute, during training test results was 136.1 + 8.01 beats per minutes and post training results mean value of step test was 121.86 + 8.05 beats per minutes after twelve weeks training program. The mean differences value was decreased by **26.6 beats** per minutes. This finding showed that there was a significant improvement on cardiovascular fitness performance of the study subjects after 12 weeks training.

The step test result was compared with an international step test norms among similar age groups that range from 18 and 19 years (www.topendsport.com). The international step test norms is 148- 121 for this age groups w hile the step test mean value result of this study was 121.86. Hence, the study result has fallen in above **average standard** (norms found on Appendix, page 39).

4.2. Mean and Standard d deviation Values of Squat Test (number/min) Performance

Table 2. Mean and Standard deviation of Squat Test (Pre, during and Posttest)

Experimental group

Variable	N	PT	DTT	PoT
Sq.	30	34.4±5.57	39.83±5.91	42.26±5.67

Values are in the form of mean + SD = standard deviation, PT, = pre training test, DTT= during training test, PoT= post training test, SqT = squat test.

- **4±5.57**

15		During test
10		Post test
5		
	0	
PT	DTT	PoT

359img02.png

Figure 2. Mean comparison among Pre, during and post squat test results of the study subjects

As depicted above in table 2 and figure 2 the squat test mean value and standard deviation of pre training test results was 34.4±5.57, during training test results was 39.83±5.91 and post training test result was 42.26±5.67. When we compare performance of pre -training test result with post training test result of the squat mean difference was **7.86** squat per minutes. The finding of this result showed an improvement in the squat performance of the participants after three months exercise of this study. It also showed the 3 months physical

Fitness training program had positive effects on the performance of participants' muscular strength and muscular endurance performance.

In this study, comparison was made between the international squat norms and squat test result of this finding. Based on international squat test norms the age group range from 18 to 25 years is from 39- 43 squats per minute(Boot Camp,2013) while this study result depicted 42.26 squats, per minutes for the same age group. Thus, the result found in this study is **above the average** standard. (Norms found on appendix, page 39).

4.3. Mean Values of Sit Ups (number/minute) Performance

Table 3. Mean value and standard deviation of sit ups data of the participants (pre, during, posttest)

Experimental group

Variable	N	PT	DTT	PoT
SU	30	32.03±5.97	36.9±5.48	40.10±4.64

Values are in the form of mean + SD, SD = Standard deviation, PT, = pre training test, DTT= during training test, PoT= post training test, SU =Sit ups.

15			During test
			Pre Test
10			
	5		
0			
	PT	DTT	PoT

Experimental group

359img03.png

Figure 3. Mean value Comparison among Pre, during and post Sit-ups test results of the study subjects

The above table 3 and figure 3 showed that there was a significant difference in before the exercises and post training after 12 weeks of individuals' sit-ups performance. The mean values of pre test results of sit up was 32.03±5.97 mean values and SD, during training test result of sit up Was 36.9+5.48 and post training test result of sit up was 40.10+4.64. To **f**inding this study results the researcher was compared the mean value of pre training test results with the post training test results. There was the significant increment was observed in the sit ups with in **8.07** mean differences after twelve weeks fitness exercises.

The study has comparative examined the sit-ups for age group ranged from 18 to 25 years. The sit-ups (number per minute) at international standard norms range from 42 to 40 sit-ups (Golding, *et al.,* 1986*)* where as the finding for this study was 40.10 sit-ups per minute. Therefore, this study result is above the average standard (Norms found on appendix, page 39).

4.4. Mean Values of Pushu ps Performance number/minutes

Table 4. Mean value and standard deviation of Pushups data of the participants (pre, during, post test)

Experimental group

Variable	N	PT	DTT	PoT
PU	30	25.26±2.92	28.72±3.94	33.5±5.10

Values are in the form of mean + SD, SD = Standard deviation, PT, = pre training test, DTT= during training test, PoT= post training test, PU = pushups.

359img04.png

Figure 4. Mean comparison among Pre, during and post Pushups test results of the study subjects

The above table 4 and figure 4 revealed the mean values of pushups test results. The mean values of pushups of pre training test results was 25.26 + 2.92, during training result of pushups mean value was 28.76 + 3.94(Standard deviation) and post training test results after twelve weeks exercises was 33.5. When we compare the mean value of pushups performances of pre training test results with post test results of the participants after twelve weeks of exercises were improved by **8.24** + 5.10 mean differences and standard deviation.

The result of pushups for the study subjects was compared with that of an international standard test norm for age group ranges from 15 to 19 years. The international standard test norms ranged from 29 to 38 pushups, numb er per minutes (Golding, *et al*., 1986) while this study has demonstrated the finding to 33.5 pushups (number per minutes) for the same age groups. Therefore, the result of this study in **good standard** (Norms found on appendix, Page 40).

4.5. Mean Standard deviation of Twelve Minutes run Performance (m)

Table 5. Mean value + SD of Twelve minutes Run (meter) of the participants' (pre, during and post-tests)

Quasi Experimental group

Variable	N	PT	DTT	PoT
TMR	30	2572.3±171.3	2723.9±150.32	2843.46±68.7

Values are in the form of mean + SD, SD = are standard deviation, PT, = pre training test, DTT= during training test, PoT= post training test, min = minute and TMR = twelve minutes run.

3000	2572.3±1711.3	2723.5±150.3	2843.46±68.7
2500			
2000			
1500			
1000	Post Test		
500		During test	
	0	Pre Test	

Experimental group

359img05.png

Figure 5. Mean comparison am ong Pre, during and post test results of Twelve Minutes Run

As depicted on the above table 5 and Figure 5 that there was a significant improvement observed in twelve minutes run (in meter) pre-post training tests mean values score of 12 weeks exercise. The mean value of pre training tests results of twelve minutes run was 2572.3 + 171.3, during Training test mean value result was 2723.9 + 150.32 and post training test mean value result of twelve minutes run were 2843.46 + 68.7. From these results the researcher were observed the significant improvements in their performance of the subjects due to physical fitness exercises. When we compare 12 minutes run of pre and post test result of the participants after 12 weeks of exercises program. It showed a significant increment on the performance of the subjects within **271.16** meters mean differences. This result showed there was significant improvement in the performance of the participants' cardiovascular abilities.

The standard norms for 12 minutes run test for male athletes whose age ranges from 17 to 19 was compared with the study result. Standard norms for this test ranges from 2700 – 3000 meters (Cooper, 1968) while the study result was found to be 2843.46 meters in 12 minutes run. Hence, the result of this finding is above average standard (Norms found on appendix, page 40).

4.6. The Mean Difference Value and Significance Level of Each Physical

Fitness Parameters

Table 6. The Mean Differences Value and Significance Level of Each Test Results of the Parameters

Variables	Para	Para	MD	Sig
	(I)	(II)	(I-II)	
Step test	PoT	PT	26.6	0.000
		DTT	12.36	0.000
Squat test	PoT	PT	7.86	0.000
		DTT	5.43	0.000
Sit up	PoT	PT	8.07	0.000
		DTT	4.86	0.000
Push up	PoT	PT	8.24	0.000
		DTT	3.5	0.000
TMR	PoT	PT	271.16	0.000
		DTT	151.63	0.000

Para = parameter I and II, PT = pre training test, DTT= during training test, PoT= post training test, MD= mean differences, Sig= significances, TMR = Twelve minutes run.

As depicted on the above table 6, the table showed results of step test, squat test, sit up, pushups and twelve minutes run. The mean difference value of step test from pre-test and post test result was **26.6** beats per minute as compared

Pre test to during test 12.36 beats per minute. These indicate the mean differences value varies from one test to another. Similarly, squat performance was increased with **7.86** and a significant improvement was recorded after three months of fitness exercises. However sit up performance was increased with **8.07** due to twelve weeks of physical fitness exercises for football players' performances. According to push up tests there was a significant increment observed on mean differences between pre and post test after three months of fitness exercises within **8.24** mean differences. When we compare pre-post test results of the 12 minutes run after the exercise program of twelve weeks, there was an increased mean difference within **271.16** meter distances.

The findings of this study results showed there were significant improvements on three months physical fitness exercises parameters in football players. As supported by Hopkins *et al.,* (1999) significant improvements in all functional physical fitness on their participants including cardio vascular endurance, body agility, balance flexibility and body fat was reported.

The results of these findings were compared with that of international standard norms. According to standard norms the test result of Step test, Squat test, Sit-ups and 12 minutes run were in the above average standard and pushups test result in Good standard level with the norms (see standard norms on appendix, pages 40-41).

05. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1. Summary

- Basketball performance means the ability of the players of muscular strength and endurance. There had been basketball players' performance problems which could be from muscular strength and Endurance performance of basketball players at East Badewacho Woreda of Hadiya Zone, SNNPR, and Ethiopia.
- The aim of this study was to examine the outcome of selected physical fitness exercises in maximizing muscular strength and Endurance abilities of selected male basketball players. The change observed in muscular strength and endurance parameters of the selected male football players after 12 weeks of training program.
- To achieve the purpose of this study, 30 male students with age of 18 and 19 year were selected from Shone preparatory school of grade 11 students. In this study purposive sampling design was applied; Pretest, during training test and Posttest on selected physical fitness parameters from their muscular strength and endurance exercises. The parameters used to measure muscular strength and endurances were step test, Squat test, Sit ups, Pushups and Twelve minutes run/walk were administered for the selected experimental group.
- The exercise schedule was designed for twelve weeks. At which three days exercise session per week with 90 minutes durations and low to moderate intensity was applied. Each 90 minute sessions were divided in to three phases: warming up, main parts and cooling down. The data were collected and analyses were done using SPSS version twenty (V-20) software.
- The paired sample t-test was used to compare the mean value of pretest and posttests of this study. Based on the result analysis made, at the end of the study significant improvements were observed in cardiovascular endurance, muscular strength and muscular endurance performance of the study subjects. In step test result a heart beats was reduced, because it shows improvement on the performance of the study subjects.

5.2. CONCLUSIONS

Based on the major finding of this study the following points were stated as the Conclusions.

The finding of this study showed that, there were improvements on cardio-respiratory endurance of the subjects in 12 minutes run with 271.16 meters mean differences and step test results with 26.6 beats per minute mean differences.

- The result of the study showed improvement in squat test performance with 7.86 squats per minute of the subjects who took part in three months exercise program of this study. It showed that, the 3 month physical fitness training program had effects on the muscular strength and endurance performance of the participants.
- The results of the study showed increments in sit-ups and pushups test results with 8.07 sit ups (number per minute) mean differences

- and 8.24 pushups (number per minute) mean differences.
- These results showed, that the 3 months physical fitness training program had effects on the performance of subjects' muscular strength and endurance performance and in step test results a heart beats was reduced, because it shows improvement on the performance of the study subjects.

5.3. RECOMMENDATIONS

By considering the major findings and discussion of the study, the following recommendations were made.

- As the outcome of selected physical fitness exercise on muscular strength and endurance performances of basketball players' coaches, sport science teachers and others sport commission officers should consider exercise as a part of main work for all basketball players.
- To improve the strength and endurance proficiencies of basketball players, the responsible bodies should provide financial, material and motivational supports.
- A responsible body like East Badewacho Woreda Education Office has to collaborate with the Woreda Sport Commission Office basketball project to maximizing basketball performance of Shone preparatory school as well as other youths.
- Future researches may follow the methodology more sophisticated while using more subjects of current study in order to maximize basketball performance by using longer training period.

Further researchers may conduct studies on more different types of Physical fitness Components that could improve basketball players' performance.

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