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THE EFFECT OF EIGHT WEEKS STRENGTH TRAINING ON PASSING AND SHOOTING SKILLS OF HAND BALL IN THE CASE OF WORETA SECONDARY AND PREPARATORY SCHOOL FEMALE STUDENTS BY MULU

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BAHIR DAR UNIVERSITY

SPORTACADEMY

MASTER OF EDUCATION IN TEACHING

PHYSICAL EDUCATION

**THE EFFECT OF EIGHT WEEKS STRENGTH TRAINING ON
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BY MULU ASSEFA

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JANUARY, 2021

BAHIRDAR, ETHIOPIA

**BAHIR DAR UNIVERSITY SPORT ACADEMY GRADUATE
STUDIES**

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**A THESIS SUBMITTED TO THE SCHOOL OF GRADUATE STUDIES OF BAHIR
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BAHIR DAR

APPROVAL PAGE

As member of the examining board of final Msc, Open defense we certify that we have read and evaluated this thesis prepared by Mulu Assefa entitled with “THE EFFECT OF EIGHT WEEKS STRENGTH TRAINING ON SHOOTING AND PASSING SKILLS OF HAND BALL IN THE CASE OF WORETA SECONDARY AND PREPARATORY SCHOOL FEMALE STUDENT” recommended that it is accepted as fulfilling the thesis requirement and for the Degree of Master of education.

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I hereby certify that I have read this thesis prepared under my direction and recommended that it has accepted as fulfilling the Msc thesis requirements.

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Name of advisor	Signature	Date
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DEDICATION

I would like to dedicate this thesis to all my best families and friends who supported the accomplishment of my dream of receiving my master's degree. Enat you taught me what unconditional love and sacrifice. I could have not made it through everything without your love and support.

DECLARATION OF AUTHORSHIP

I, hereby that this thesis for the partial fulfillment of the requirement for the Degree of Master of education on the title of “THE EFFECT OF EIGHT WEEKS STRENGTH TRAINING ON SHOOTING AND PASSING SKILLS OF HAND BALL IN THE CASE OF WORETA SECONDARY AND PREPARATORY SCHOOL FEMALE STUDENTS” is my real original work and all sources of materials used in this thesis have been acknowledged. It has not previously formed on the basis for the award of any Degree, Diploma of any University, Other institution of higher learning or publication except where due acknowledgement is made in acknowledgements.

Mulu Assefa

Signature

Date.....

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Table of Contents

DEDICATION	i
DECLARATION OF AUTHORSHIP	ii
ACKNOWLEDGMENTS	iii
Table of Contents	iv
List of table	vii
List of figures	viii
List of abbreviations	viii
CHAPTER ONE	1
INTRODUCTION	1
1.1 Background of the study	1
1.2 Statement of the problem.....	3
1.3. Objective of the study	4
1.3.1. General objective	4
1.3.2 Specific objective.....	4
1.4. Hypothesis.....	4
1.5. Significance of the Study	4
1.6. Delimitation of the Study.....	5
1.9 Organization of the Study	6
CHAPTER TWO	7
REVIEW OF RELATED LITRATURE	7
2.1. Concept of strength training.....	7
2.2. Strength training on handball.....	8
2.3. Effect of strength training on handball	8
2.4 Strength training and passing.....	9
2.5 Strength training and shooting	10

CHAPTER THREE	11
RESEARCHMETHODS	11
3.1 Study area.....	11
3.2 Research design	12
3.3 Training procedure and protocol.....	13
3.4 Activities to be given for strength training	15
3.5. Population, sample and sampling technique.....	15
3.5.1 Study Population and Sample size.....	15
3.5.2 Sampling techniques.	16
3.6 Study criteria.....	16
3.6.1. Inclusive Criteria.....	16
3.6.2. Exclusive criteria	16
3.7 Source of data	16
3.8 Data collection instruments.....	17
3.9 Study variables.....	17
3.9.1 Independent variables	17
3.9.2 Dependent variables.....	17
3.10 Materials/instruments.....	17
3.11 Testing administration protocol	17
3.11.1 Passing Test	18
3.11.2Shooting test.....	20
3.12 Method of Data Analysis	22
3.13. Reliability of the test.....	22
RESULTS AND DISCUSIONS	23
4.1 Introduction.....	23
4.2 Result of the study	23
4.3 Discussion	26
CHAPTER FIVE	28

SUMMAR, CONCLUSION AND RECOMMENDATION	28
5.1 Summary	28
5.2 Conclusion	29
5.3 Recommendations.....	29
REFERENCE.....	31
Appendix.....	33
Appendix A: - experimental group training plan	33
Appendex b:control group mean.....	41
Appendex c:- expermental group mean	42
Appendix: pictures	43

List of Table	Page
Table 1 . Example of training strategy	14
Table 2. the intervention schedule	14
Table 3. Demographic characteristics of participants	23
Table 4. Descriptive statistics of performance variable	24
Table 5. Paired sample t-test results of performance variables for the two groups of pre and post test	25

List of figures	Page
Figure 1. Map of the study	12
Figure 2. passing test measurement	19
Figure 3. Shooting test measurement Adapted from Handball skill Assessment Tests (HSAT)	
Handball sport rules, (2016)	21

List of abbreviations

CG	control group
EX	experimental group
MD	mean difference
N	number
POTP	posttest shooting
POTP	posttest passing
POTS	posttest shooting
PRTP	pretest passing
SD	standard deviation
SPSS	statistical package for social science

Abstract

Hand ball is a type of team game and requires a complex skill. The purpose of this study is to investigate the effect of eight weeks strength training on passing and shooting skill of handball grade12th female students in woreta secondary and preparatory school. The study employed experimental research design. 60 students are randomly selected from total 397 grade12th female students and divided in two group 30 experimental and 30 control groups. Only experimental group participate on strength training for 8 weeks with three sessions per week for 40 minutes. Subjects were measured passing and shooting skills of hand ball before administration of strength training as pretest and after training as posttest. The data collected from study subject was analyzed using spss version 23 software by paired sample t-test with level of significance 0.05. The result showed that strength training significantly improved passing and shooting kills in control group at ($p < 0.05$). But no significant difference were found in the variable control group ($p > 0.05$) based on these finding it can be conclude that 8 weeks strength training has a positive effect on improvement of passing and shooting skill of hand ball on female students. There for strength training method is suggested to handball learners and player. The researcher recommended that the teachers and coaches should have included strength training for learners and trainers to improve skills of hand ball.

Keywords; strength training, passing, shooting and skill

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

Handball is a type of ball game also known as team handball, European handball or Olympic handball (Barbara Schrodts 2011). Then it is a team sport in which two teams of seven players each (six out court players and a goalkeeper) pass a ball using their hands with the aim of throwing it into the goal of the other team. A standard match consists of two periods of 30 minutes, and the team that scores more goals wins.

Handball is a rapid game of continuous action, requiring fitness and endurance as well as flexibility and balance. Good passing and catching skills enable a team to keep possession of the ball and thus go into the attack in order to score. Teams score goals by getting the ball into their opponent's goal (Yadav, S and Bahana 2011).

Modern handball is played on a court of 40 by 20 meters (131 by 66 ft), with a goal in the middle of each end. The goals are surrounded by a 6-meter (20 ft) zone where only the defending goalkeeper is allowed; goals must be scored by throwing the ball from outside the zone or while "diving" into it. The sport is usually played indoors, but outdoor variants exist in the forms of field handball and Czech handball (which were more common in the past) and beach handball. The game is fast and high-scoring: professional teams now typically score between 20 and 35 goals each, though lower scores were not uncommon until a few decades ago. Body contact is permitted, the defenders trying to stop the attackers from approaching the goal. No protective equipment is mandated, but players may wear soft protective bands, pads and mouth guards. (IHF the rules of the game January 2019).

According to grade 12 physical education text book, Hand ball is one of the popular team games in the world. One of the reasons for its popularity is its inexpensive nature. The game also is played by both sexes. The main objective of the game is to score a goal by moving the ball

toward the opponent goal. The dribbling and passing techniques are very similar to those used in basketball. In spite of this, handball retains a unique nature that involves continuous play, body contact and movement. This makes the game attractive and to be included in the curriculum. Handball is basically a running sport and it can be provide a large contribution to develop social interaction, health and improve fitness level. It requires skills common to other sports. In general, handball is sport for all ages, both sexes and is easily learned can be played indoors or outdoors and is in expensive.

The game was codified at the end of the 19th century in Denmark. The modern set of rules was published in 1917 in Germany, and had several revisions since. The first international games were played under these rules for men in 1925 and for women in 1930. Men's handball was first played at the 1936 Summer Olympics in Berlin as outdoors, and the next time at the 1972 Summer Olympics in Munich as indoors, and has been an Olympic sport since. Women's team handball was added at the 1976 Summer Olympics (Sega Alex November 2017)

The International Handball Federation was formed in 1946 and, as of 2016, has 197 member federations.(member federation in ndt) The sport is most popular in the countries of continental Europe, which have won all medals but one in the men's world championships since 1938. In the women's world championships, only two non-European countries have won the title: South Korea and Brazil. The game also enjoys popularity in East Asia, North Africa and parts of South America. Women's team handball was later added in 1976 at the Montreal Games. The United States has never enjoyed much success in the sport, drawn from the fact neither the men nor women's teams qualified for the Sydney Games. But the women's team finished 8th at the Atlanta Games in 1996, while the men took 9th. The African handball confederation has been first continental confederation and with its 51 national federations. The founding congress took place on january15, 1973, in Lagos, Nigeria, (International Handball Federation February 2009).

According to Addis Ababa sport commission website launched on (2014) hand ball has a short history in Ethiopia. Before 1960 E.C hand ball in our country was not well known. After the year, it should a tremendous development throughout the country, especially in military camps and some senior high schools.

Handball sport in Ethiopia started at 1960 E.C in Addis Ababa University by the foreign teachers. Then in 1961 E.C the course was given for different classes of Armed Force members in order to make participant on the tournament which will be organized by the Ethiopian Handball Federation. The Ethiopian Handball Federation was formed in 1962 E.C and finally Ethiopia become member of the international Handball Federation in 1964 E.C (written documents from handball federations).

The history of hand ball in Amhara region, handball sports were firstly introduced in 1977 at the Old Airport in Bahir Dar town and then expand throughout the region. Currently, in Amhara region, there are 85 coaches, eight clubs, 15 playing courts and 440 players (Amhara Regional State Sport Bureau Report 2008). Hand ball was officially known that the performance of the Amhara regional state handball team was better as evidenced in its championship results. The regional team won a number of champions during the Ethiopian handball championship in the year's between 1985 and 1991 E.C.

1.2 Statement of the problem

The researcher will address the effect of 8 weeks strength training on passing and shooting skills of handball on female students at woreda secondary and preparatory school that will be focusing the students playing experience gaps. In the previous 3 years when researcher thought grade 12th in woreda secondary and preparatory school there is lack of strength to perform handball skills. Especially females' performance on shooting and passing were less than males. Females don't have a chance to engaging in handball game at their free time. They don't have experience of handball game and training. Because of this reason researcher focus is only females. Therefore; these study will investigate that strength training have significant effect on shooting and passing skills of handball on female students or not. This study use to fill the gap of passing and shooting skills of female students. Based on this research physical education teachers may design a variety of exercise for the student. It is a good opportunity to get experience for the researcher.

1.3. Objective of the study

1.3.1. General objective

To investigate the effect of 8 weeks strength training on passing and shooting skills of handball, in the case of woreta secondary and preparatory school on female students.

1.3.2 Specific objective

1. Examine the effect of 8 weeks strength training on passing skill of handball on female students.
2. See the effect of 8 weeks strength training on shooting skill of handball on female students.

1.4. Hypothesis

1. Strength training has significant effect on passing skill of handball on female students.
2. Strength training has significant effect on shooting skill of handball on female students.

1.5. Significance of the Study

The main aim of this study is to investigate the effect of 8 weeks strength training on passing and shooting skills of hand ball in grade12th female students in woreta secondary and preparatory school. Generally, this study had the following significances.

- ✓ This research help to bring training approach for woreta secondary and preparatory school female student's capacity through passing and shooting training.
- ✓ This research understands and differentiates the influential training method that develops handball skill for students effectively demonstrate.
- ✓ To provide a proper and fertile ground for teachers to utilize the training method on the development of handball skill (i.e., add knowledge) teaching and learning session.
- ✓ This study help to distinguish female students can participate in competition like as male students with other woreda.

- ✓ This study may serve as a reference for other school to conduct their study on these training methods on students.

1.6. Delimitation of the Study

The research on this study was delimited on:

- Variables- Independent variable (Strength training), and Dependent variable (Passing and Shooting skills)
- Location- The study was conducted in Woreta city administration secondary and preparatory school.
- Focused on only female students of grade 12, who will be enrolled in 2012 E. C academic year.

1.7 Limitations of the Study

- Since the test items were many, the researcher was not able to take all the measurements. Because of absence of apparatus, and professional assistance, the researcher therefore considered it as a limitation of this study.
- The training and tests were limited to specific tests that are easily monitored and administered during schools were closed due to COVID- 19.
- Food habits and the way of life style, which could influence on the results, could not be controlled by the researcher personally though orientation was given about these aspects to the subjects.
- Finally, unable to control metrological variations such as air temperature and atmospheric pressures during testing periods were the limitations encountered in this study.

1.8 Operational Definitions of Terms

- **Effect:** something brought about by a cause or an agent; result
- **Muscle strength:** the ability to produce high peak rates of force development.
- **Passing:** players pass the ball from hand to hand with the aim of scoring goal without touching or going inside the defending line.
- **Shooting accuracy:** Shot or throw is the culmination of offense aimed at scoring a goal.

- **Shooting:** is aiming at throwing the ball in to the opponent team (goal).
- **Skill:** is excellent performance, bringing together various abilities to lesser and various degree and conscious decision and effort.
- **Strength training:** is a type of physical exercise specializing in the use of resistance to induce muscular contraction, which builds the strength, an aerobic endurance, size of skeletal muscles and bone density.
- **Training:** pedagogical process aimed to upgrade or improve the performance of athletes.

1.9 Organization of the Study

This study has consists of five chapters: The first chapter deals with the background of the study, statement of problem, objective of the study, hypothesis, significance of the study, delimitation of the study, limitation of the study, definitions of terms and organization of study. The second chapter deals with review of related literature. The third chapter deals with the research design and methodology. The forth chapter deals with result and discussion of the study and last chapter focuses on summary of the findings, conclusion and recommendations of the study.

CHAPTER TWO

REVIEW OF RELATED LITRATURE

2.1. Concept of strength training

Grade 11th physical education text book (2006) states that about the types of muscular strength it is maximum amount of force that can be applied by a muscle during a single maximal contraction. Strength allows to do more work and to move more smoothly and efficiently. There are three types of strength; these are dynamic, static and Iso- kinetic strength.

Dynamic strength also called isotonic strength. Iso-means the same tonic means tone iso-tonic means the same tone. It is defined as the maximal weight that can be lifted at one time. Dynamic strength required shortening or lengthening of a muscle. Weight lifting is the common form of iso -tonic training. Exercises such as sit-ups, pushups, chin-ups are iso-tonic exercises. The major values of performing iso-tonic contraction in exercise are the increase of joint range of motion. In addition, isotonic movements tend to facilitate blood circulation and thereby helping to facilitate muscular endurance. In iso-tonic exercise a body part is moved and the muscle change in length, either shortening or lengthening.

1. Static strength is a muscles ability to exert a force without changing length. Static strength also called isometric strength. Metric means length, iso-metric means the same length. Static strength demands forcefully contracting the muscles in a fixed position. That is, with no change in the length of the muscle or the angle of a joint at which the contraction takes place. The measures of static strength are achieved when you exert maximal force against an immovable object. Wall press, shoulder arm tensor, wall sit etc are examples of static strength exercise.
2. Iso-kinetic strength is strength that allows you to exercise with a constant resistance through the full range of motion. Kinetic means movement Iso-kinetic refers to movement at affixed speed. It requires changes in the length of muscle while the contraction is performed at a constant speed. Iso-kinetic strength exercise is usually done with a special machine that is not available for most people. Iso-kinetic device are designed so that regardless of the amount of force applied against resistance. It can only

be moved at a certain speed. That speed will be the same whether maximum force or only half the maximum force is applied.

So that, the researcher will focus on dynamic or iso-tonic and static or iso-metric strength exercise because no need of expensive apparatus. Iso-kinetic needs special machine, it is not available in the school, the researcher doesn't use iso-kinetic strength exercise.

2.2. Strength training on handball

According to department of kinesiology, SanJose state university research result women have significantly weaker muscle strength than men. The difference on muscle strength between females and males is more on upper body, and less on lower body. Females are relatively stronger on their legs than arms and shoulders. This difference may impact many aspects in sport performance. Therefore coaches or teachers should design different training in plans and use different training methods for women in sport

Strength training adaptations contribute to the increase of the muscular power output, the development of the capacity of energy producing systems of the body and the ability to improve motor power potential in competition (Verkhoshansky, 2006). Therefore handball skills need muscular strength that means strength training will enhance the handball skill on passing and shooting.

2.3. Effect of strength training on handball

Li G.P. (1988) study suggests that maximum strength training of muscle in lower extremities, explosive strength of triceps muscle of calf and the tenacity of the shoulder external rotation should be enhanced in handball athletes.

When properly performed, strength training can provide significant functional benefits and improvement in overall health and well-being, including increased bone, muscle, tendon, injured ligament strength and toughness, improved joint function, reduced potential for injury (Shaw BS 2014) increased bone density, increased metabolism, increased fitness (Shaw BS, Shaw I 2005) (Shaw BS Shaw, 2009). and improved cardiac function. Training commonly uses the technique of progressively increasing the force output of the muscle through incremental weight

increases and uses a variety of exercises and types of equipment to target specific muscle groups. Strength training is primarily anaerobic activity, although some proponents have adapted it to provide the benefits of aerobic exercise through circuit training (Robinsenkaramyer 2019).

Muscular strength is an important factor in handball performance (kvorning 2006). Most researchers agree that higher maximal power and strength may be associated with an advantage on blocking, hitting, pushing and ball throwing in goal keeping ,jumping, running, sprinting (lees and Nolan,1998). A variety of training methods are used to increase strength and power in sport to enhance physical quality. (Santos and janeira, 2008).

2.4 Strength training and passing

Passing; is one of the basic, technical elements. A pass must be accurate, fast and tactically useful accurate, so that a player has no problems when catching the ball.

Decision to which a pass should be directed depends on the player's position in a particular situation. A pass should be directed to that player, whose position may menace the opponent.

Passing and catching on hand ball, the perfect pass is not possible due to many factors eg, opposition players trying to stop the pass, players need to be catch ball from many situation from low pass, chest pass, from bounce the ground and other pass (C.Zerwinsh1997).

Types of passing depending on the particular situation we pass:

- standing
- while running
- with jump (preliminary stride)
- with vertical jump

In regard to performance we divide passing into:

- one hand pass both hand pass + upper + upper + half-upper + half-upper + near hip + lower + lower in particular situations

According to Vargheese, Joji and Shelvam, P.V (2005) research result strength training has significant effect on passing skill of basketball. Passing in basketball has been defined as “The

deliberate attempt to move a live ball between two teammates”, a definition which might equally apply across other sports equally well, albeit with a change to the item being passed where appropriate. Vargheese, Joji and Shelvam, P.V. (2015).As researchers agreed up on passing, dribbling catching skills of basketball are similar with handball, there for the significance of strength training most likely similar.

2.5 Strength training and shooting

Shots are one of the most important elements of handball. They are vital elements that decide the scores. While shooting the muscles of the lower and upper limbs, pelvic region and trunk are extremely engaged. One can assume that shooting is performed similarly to passing, but with a stronger action of the trunk and upper limbs. The shot power is conditioned by the distance and hand action time on a ball. The greater the distance that the hand on the ball covers in the time unit the stronger the shot will be (a ball reaches a higher velocity) performed. The names of shots have been derived from the way the players move on the court and the position of his/her body to the ground. In handball there are the following shots:

1. Leaning Back Shot
2. Vertical Jump Shot
3. Stride /Jump Shot
4. Shot While Falling
5. Situational Shots (in particular situations).

CHAPTER THREE

RESEARCHMETHODS

3.1 Study area

The study was conducted at Woreta City Administration in South Gondar zone of Amhara National Regional State. The Administrative center of South Gondar is Debretabour is also administrative center of fogera woreda. Woreta is town in northern Ethiopia located in the Debub Gondar Zone of Amhara Region east of LakeTana and South of Addis Zemen, this town has latitude and longitude of $11^{\circ} 55'N$ $37^{\circ} 42'E$ with an elevation of 1828 meters above sea level. (Wikipedia)The study was conducted at woreta(preparatory school) City Administration in South Gonder zone of Amhara national regional State.



Figure 1. Map of the study

This chapter presents the research method which will employ in the study since it will be intend to make detail description and analysis on the effect of strength training on passing and shooting skills in handball game on grade 12female students.

3.2 Research design

The research design in the study was employ experimental method, since it determinant helps to examine the effect of strength training on passing and shooting skills on female students.

3.3 Training procedure and protocol

The basic principles of strength training involve a manipulation of the number of repetitions, sets, tempo, exercises and force to cause desired changes in strength, endurance or size by overloading of a group of muscles. The specific combinations of reps, sets, exercises, resistance and force depend on the purpose of the individual performing the exercise: to gain size and strength multiple (4+) sets with fewer reps must be performed using more force. (ShariatA kargarafard M, DanaeeM.etal 2015) stated that a wide spectrum of regimens can be adopted to achieve different results, but the classic formula recommended by the American College of Sports Medicine reads as follows:

- 8 to 12 repetitions of a resistance training exercise for each major muscle group at an intensity of 40% to 80% of a one-repetition max (RM) depending on the training level of the participant.
- Two to three minutes of rest is recommended between exercise sets to allow for proper recovery.

Two to four sets are recommended for each muscle group.

Three important variables of strength training are intensity, volume, and frequency. Intensity refers to the amount of work required to achieve the activity and is proportional to the mass of the weights being lifted. Volume refers to the number of muscles worked, exercises, sets, and reps during a single session. Frequency refers to how many training sessions are performed per week.

These variables are important because they are all mutually conflicting, as the muscle only has so much strength and endurance, and takes time to recover due to micro trauma. Increasing one by any significant amount necessitates the decrease of the other two, e.g. increasing weight means a reduction of reps, and will require more recovery time and therefore fewer workouts per week. Trying to push too much intensity, volume and frequency will result in overtraining, and eventually lead to injury and other health issues such as chronic soreness and general lethargy, illness or even acute trauma such as avulsion fractures. A high-medium-low formula can be used to avoid overtraining, with intensity, volume, or frequency being high, one of the others being

medium, and the other being low. One example of this training strategy can be found in the following table.

Table 1 . Example of training strategy

Type	High	Med	Low
Intensity (% of 1RM)	80–100%	40–70%	0–40%
Volume (per muscle)	3+ exercises	2 exercises	1 exercises
Sets	4+ sets	2–3 sets	1 set
Reps	20+ reps	8–15 reps	1–6 reps
Session frequency	4+ p/w	2–3 p/w	1 p/w

A common training strategy is to set the volume and frequency the same each week

Table 2. the intervention schedule

Treatment	Strength exercise
Frequency	3 days per week
Total duration	8 week
Duration/session	40 minute
Intensity	Light and moderate
Exercise days	Monday, Wednesday and Friday
Date of exercise	Opposite shift (morning=12:30-1:10AM, Afternoon= 11:00-11-40PM)

The study was conducted in 2012 E.C from the beginning of September to the end of august. And it was conducted for 10 weeks, pretest for 1 week, intervention (training) for 8 weeks and posttest for 1 week.

In the training session that the researcher has select exercise from listed below, according to the trainers' situation. The studied students were divided in to two groups; experimental and control group. Experimental group was subjected strength oriented training and control group doesn't

have. The training load increased progressively throughout the experiment, changing the intensity as well as the number of sets and repetition in accordance with standard training procedures. The training program had based on recommendations of intensity, volume, repetition and set.

The training program should be progressive, So that strength trainers utilize training after pre-test up to the beginning of posttest for 8 weeks.

3.4 Activities to be given for strength training

Strength exercise is any activity that makes your muscles work harder than usual. This increase your muscles' strength, size, power and endurance. Muscle strength activities include;

- Push-ups, sit-ups and squats
- Wall press
- Shoulder arm tensor
- Knee to nose touch
- Side leg lift(adapted from grade 11th physical education text book)

3.5. Population, sample and sampling technique

3.5.1 Study Population and Sample size

In Woreta city administration there is one preparatory school, these schools have 397Volunteerparticipants' female students. The researcher was select randomly 60 female students (grade 12th) from 397 total populations by using random sampling technique. That school is Woreta preparatory school; totally this school has 397 grade 12th female students. Researcher has taken Sample size of this study as 60 samples from 397total populations of female students.

3.5.2 Sampling techniques.

Purposive sampling technique were used to select the school namely Woreta secondary and preparatory school; because the researcher has lived and teach in that school and handball skill problem more face in that school students. Then randomization sampling technique is use to select sample group (N=60). All the subjects are taking part in their regular activities as per school time table.

3.6 Study criteria

3.6.1. Inclusive Criteria

- Absence of physical, visual and hearing impairment and also, there is no previous history of surgeon.
- Free from hypo kinetic disease
- Volunteer and female participants.
- Now in this year (2012 E.C) they must have to be learning in woreta.

3.6.2. Exclusive criteria

- ❖ Students with hypo kinetic disease problem.
- ❖ Students who have physical, visual and hearing impairment.
- ❖ De conditioned student, individual with joint problem
- ❖ Students have no interest they were excluding from the study

3.7 Source of data

The source of data in this research is Pre-test and post-tests result from control group (30) and experimental group (30) of wereata preparatory school grade 12th female students (60).The researcher used primary data sources to get adequate amount of information regarding to effect of strength training on handball shooting and passing skill from female students.

3.8 Data collection instruments

The stated problem need to measure selected variables to evaluate the effect of strength training on passing and shooting skills in hand ball so, the researcher used to collect data through accuracy. Before the experimental group starting strength training the pretest was taken from both control and experimental group's .Posttest also taken from both groups after 8 weeks strength training of experimental group.

3.9 Study variables

These studies have two variables; Independent variable and dependent variables.

3.9.1 Independent variables

The independent variable of this study is strength training.

3.9.2 Dependent variables

The dependent variables of this study are passing and shooting skill of hand ball

3.10 Materials/instruments

For the success of the study the following materials are use through the process of the study. The facilities and materials are such as cones, whistle, meter, stop watch, hand ball court, pen, score sheet, ball and sport field are use during training as well as test.

The training program should be progressive, So that strength trainers utilize training after pre-test up to the beginning of posttest for 8 weeks.

3.11 Testing administration protocol

The assesement of passing and shooti ng parametres was carried out twice; once before the beginning of the strength training (pre test)and once after strength training(post test).The expermental group(30) have strength training,but the control group (30) may not have.The investgater followed standard procuders for testing the selected variables and regestering the scor in recored sheet under the the direct superviosion of subjects.in order to evaluate the effect of strength training on selected variables,all pre test measurments were done with in the 1st week

prior to the commencement of the 8 weeks exercise training program, while post testing was performed with in 1st week following the completion of the program. The participants were performed enough warming up and stretching exercise to all tests at the beginning, and performing cooling down exercise after test. The testing session consisted of warming up test and cooling down with rest. All tests were explained and demonstrated. Before testing, subjects given practice attempts to become familiar with the test. The last three trials were recorded and the researcher used the min of three trials as source of data.

The training program should be progressive, So that strength trainers utilize training after pre-test up to the beginning of posttest for 8 weeks.

3.11.1 Passing Test

The objective of passing test is to know the effect of strength training on passing skill of female student in handball.

Required resources; ball, meter, hand ball court, assistance person, wall and marker.

How to conduct the test? Students do warming up exercise (5-10 minutes), test the skill, and do cooling down exercise.

Passing was measured by accuracy of the passing. As we know, to play the handball game the pass should be accurate. In this research the researcher used passing accuracy test adopted from (Hsat 2016).

Purpose: To measure the performance of a student can pass a handball with one hand.

Time: 30 seconds for each 3 trials. Before scoring test result they attempting trials or chance

Test; The student must stand inside the three-meter box and throw the ball against the wall with one hand in an overhand motion, and they stand in front of the marked wall. The ball must hit the wall while traveling through the air. The wall is divided the point is given according to ball placed (hit) area, that is the central (1st) space 7 point, the 1st line 6 point, the 2nd space 5 point, the 2nd line 4 point, the 3rd space 3 point, the 3rd line 2 point, the 4th space 1 point and the last line

and outer part 0. The last line or boundary is 1 meter by 1 meter, the next 75 by 75 centimeter and the inner line is 50 by 50 centimeter.

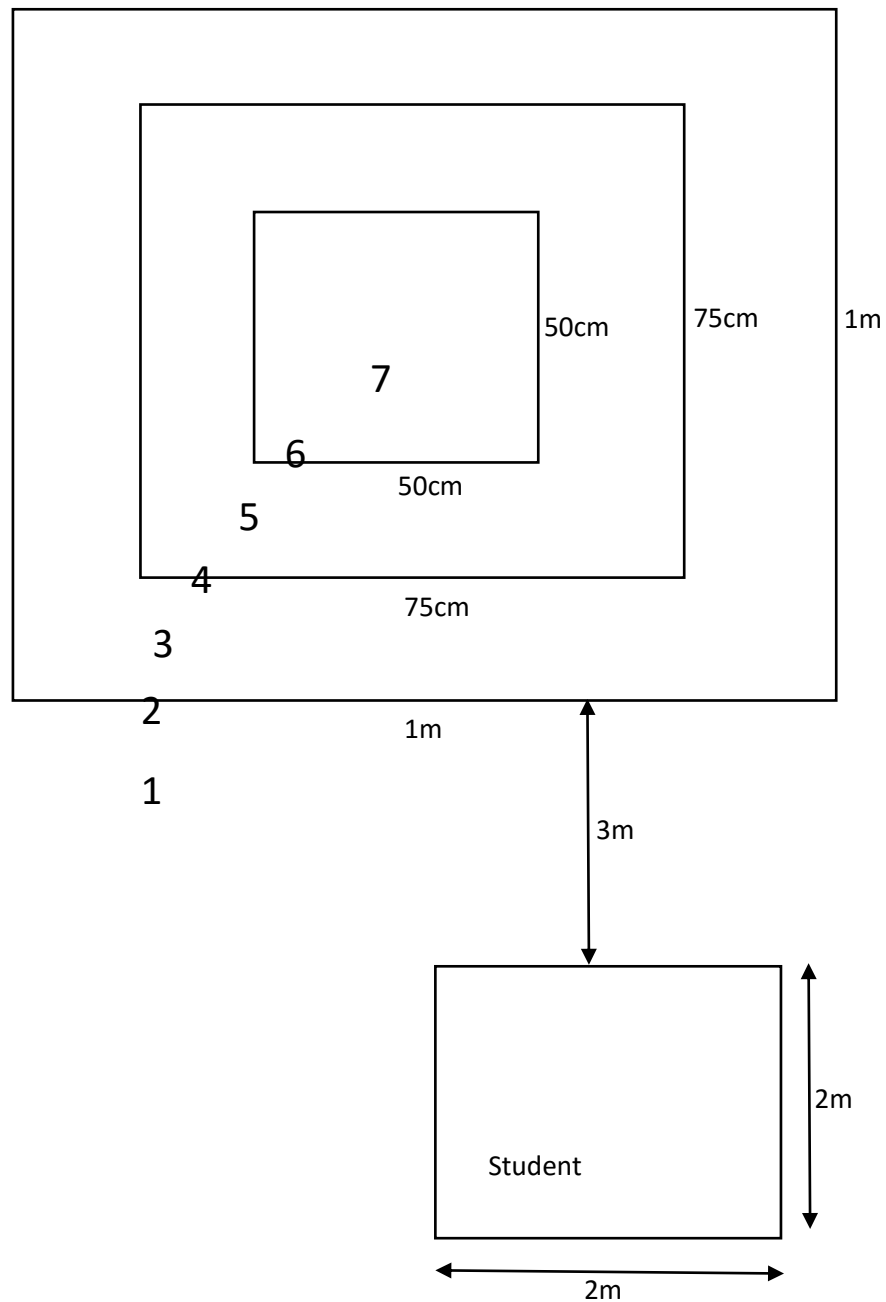


Figure 2. Passing test measurement

Adapted from Handball skill Assessment Tests (HSAT) Handball sport rules, (2016)

3.11.2 Shooting test

The objective of shooting test is to know the effect of strength training on shooting skills of female student

Required source; ball, meter, assistant person, wall and marker wall, chalk etc

How to conduct the test? Students do warming up exercise (5-10 minutes), test the skill, and do cooling down exercise at the end of the test.

Shooting was evaluated by shooting accuracy of the score according to hand ball assessment test (Hasst 2016).

Purpose: the purpose of this test is to measure the jump shot ability of the students.

Time: a student shot the ball within 30 seconds and three trials that could be record and before that they can attempt.

The wall was used to mark the target. The wall marked on 2 meter height and 3 meter width. It divided as follows. 40 centimeter at 4 corners is the 1st one, the right and left sides on straight to 40 centimeter is the second, upper and lower parallel to 40 centimeter is the third, the rest central space is the fourth, outside the boundary of the 2 meter by 3 meter line is the fifth and outside the wall is the sixth.

The point of scoring accuracy is based on the target that was marked on the wall place that mentioned; when students shot the ball the following points were awarded according to ball place. That is from 2 by 3 meter marked wall 40 centimeter on 4 corners have 5 point, right and left or straight to 40 cm of corner have 4 point, upper and lower or parallel to 40 cm have 3 points, the rest central space have 2 point and outer part of the boundary line in the wall have 1 point. The student stands in front of the marked wall by 6 meter distance.

3.12 Method of Data Analysis

The researcher is analyzed experiment effect through quantitative analysis method by using Spss (23.0 version) statically package for social science at significant 0.05 level of confidence. To examine whether there is significant difference In female volunteer students on pretest and post test result. To evaluate the pre-post training effect of each training modality, paired sample t-test was employed.

3.13. Reliability of the test

The reliability of a test was assured by using necessary equipment's and measurements and by over viewing and applying references. To ensure the reliability and uniformity of the testing technique the investigator had a number of practice sessions in the testing procedures with the guidance of reference with the value above 0.85 alphas. In addition the investigator discusses with her advisor and experts to select the measurements of skill test. According to Handball skill Assessment Tests (HSAT) Handball sport rules, (2016)

CHAPTER FOUR

RESULTS AND DISCUSIONS

4.1 Introduction

This chapter deals with the analysis of pre and post test data collected from experimental (n=30) and control (n=30) groups under the study. The purpose of the study is to investigate the effect of 8weeks strength training on shooting and passing skills of hand ball. Accuracy was used to measure shooting and passing performance. Pretest and posttest were taken from both experimental and control group before and after strength exercise training intervention and the scores were recorded. The collected data were analyzed using paired t-test to analyze pretest and post test result of experimental and control groups.

4.2 Result of the study

Table 3. Demographic characteristics of participants

Group	Number	Sex	Age Mean=S.D
Experimental group	30	Female	17.4
Control group	30	Female	17.45

As shown from the above table, descriptive characteristics of 60 study participants from woreta secondary school female students age for experimental and control group were 17.4 and 17.45 respectively.

Table 4. Descriptive statistics of performance variable

Paired Samples Statistics		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	preTpassco	3.2767	30	.91200	.16651
	postTpassco	3.4100	30	1.05369	.19238
Pair 2	preTpassEX	3.1223	30	1.27472	.23273
	postTpassEX	4.6220	30	1.16037	.21185
Pair 3	PreTshootCO	2.3900	30	.49260	.08994
	PostTshootCO	2.2917	30	.44393	.08105
Pair 4	PreTshootEX	1.9497	30	.91064	.16626
	PostTshootEX	3.0553	30	.92508	.16890

The above table shows the pre and post test results of shooting score for both experimental and control groups. As shown in the tables the pretest score of EG were found to be 1.9497 ± 0.91064 and the CG pretest found to be 2.3900 ± 0.49260 . But after 8 weeks strength training given to EG, the mean score of shooting score for EG has a great change from pre to post test. But the mean value of CG stays very close from pre to post test. As the table reveals, shooting score of EG found 3.0553 ± 0.92508 whereas CG found 2.2917 ± 0.44393 after strength training. This implies that, there was mean difference between the post and pretests, yet it is impossible to tell here if the differences are statistically significant. Hence a paired sample t-test comparing the pretest and post test scores of the variables and which was computed to examine whether this number show statistical difference between shooting score and accuracy of the participant. The paired t-test result was presented in the table as follows.

The above table shows the pre and post test results of passing score for both experimental and control groups. As shown in the tables the pretest score of EG were found to be 3.1223 ± 1.275 and the CG pretest found to be 3.2767 ± 0.91200 . But after 8 week strength training given to EG, the mean score of passing score for EG has a great change from pre to post test. But the mean value of CG stays very close from pre to post test. As the table reveals, passing score of EG found 4.6220 ± 1.1604 whereas CG found 3.4100 ± 1.0537 after strength training. This implies that, there was mean difference between the post and pretests, yet it is impossible to tell here if the differences are statistically significant. Hence a paired sample t-test comparing the pretest and post test scores of the variables and which was computed to examine whether this number

show statistical difference between passing score and accuracy of the handball players. The paired t-test result was presented in the table as follows.

Table 5. Paired sample t-test results of performance variables for the two groups of pre and post test

Paired Samples Test		Paired Differences					T	Df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	preTpassco–postTpassco	-.13333	.63717	.11633	-.37126	.10459	-1.146	29	.261
Pair 2	preTpassEX–postTpassEX	-1.49967	1.04883	.19149	-1.89131	-1.10803	-7.832	29	.000
Pair 3	PreTshootCO–PostTshootCO	.09833	.39224	.07161	-.04813	.24480	1.373	29	.180
Pair 4	PreTshootEX–PostTshootEX	-1.10567	.80210	.14644	-1.40518	-.80616	-7.550	29	.000

Key: - EG=Experimental group, CG= Control group, PT= pre t test, POT= posttest, MD= mean difference, df= degree of freedom

The above table shows the test of significance differences of the two groups (EG and CG) of pre and post test results. According to the data presented in the table, the pre and post test result of shooting scores from 6m showed a statistically significant difference in EG. The result suggests that EG significantly improved shooting performance when measured in shooting scores from 6m (MD=-1.10567, SD=0.80210, p=0.000) when exposed to 8 weeks strength training than CG (MD=0.09833, SD=0.39224, p=0.180). Hence, (P <0.05) Post-training shooting scores from 6m was significantly improved than pre-test scores for the EG. But no significant improvement was observed in CG (p>0.05). The above table also displays the test of significance differences of the two groups (EG and CG) of pre and post test results of shooting accuracy from 6m.

According to the data presented in the table, the pre and post test result of shooting accuracy from 6m for the EG showed a statistically significant difference (MD=-1.10567, SD=0.80210, p=0.000). Hence, (P<0.05) post test score was significantly increased than pretest score for the

EG. But, no significant difference was observed in 6m shooting accuracy score of CG between pre- and post-testing freedom29 (MD=0.09833, SD=0.39224, $p=0.180$). The results indicate that the applied training protocol caused a significant improvement in total and relative shooting accuracy

The above table shows the test of significance differences of the two groups (EG and CG) of pre and post test results. According to the data presented in the table, the pre and post test result of passing scores from 3m showed a statistically significant difference in EG. The result suggests that EG significantly improved passing performance when measured in passing scores from 3m (MD=-1.49967, SD=1.04883, $p=0.000$) when exposed to 8 weeks strength training than CG (MD=-0.13333, SD=0.63717, $p=0.261$). Hence, ($P < 0.05$) Post-training passing scores from 3m was significantly improved than pre-test scores for the EG. But no significant improvement was observed in CG ($p > 0.05$). The above table also displays the test of significance differences of the two groups (EG and CG) of pre and post test results of passing accuracy from 3m.

According to the data presented in the table, the pre and post test result of passing accuracy from 3m for the EG showed a statistically significant difference (MD=-1.49967, SD=1.04883, $p=0.000$). Hence, ($P < 0.05$) post test score was significantly increased than pretest score for the EG. But, no significant difference was observed in 3m passing accuracy score of CG between pre- and post-testing freedom 29 (MD=0.13333, SD=0.63717, $p=0.261$). The result indicate that the applied training protocol caused a significant improvement in total and relative passing accuracy

4.3 Discussion

The purpose of this study was to investigate the effect of eight weeks strength training on shooting and passing skills of woreda secondary and preparatory school grade 12th female students. The subjects participated throughout the testing period and cooperated for the success of collection of necessary data. The experimental group participated in 8week strength training program while the control group did not participate in this selected strength training program. Prior to the study, procedures and guidelines had presented orally and Subjects were agreed to participate. In this study strength training showed improvements on shooting and passing performance. The finding of this study in each variable are discussed as follows.

The findings of the study revealed that there were significance differences before the training and after 8weeks of strength training on students shooting and passing performance when assessed in shooting score from 6m and 3m distance respectively. The result suggests that EG significantly improved shooting accuracy Hence, ($P < 0.05$) Post-test shooting and passing performance was significantly improved in shooting score from 6m and passing from 3m distance than pre-test values for the EG. But in CG no significant difference were found not significant at 0.05 level of confidence shooting and passing accuracy performance of EG increased after 8weeks of strength training. But the pre and post test score of CG stay very close. The increment of the rate of this score in EG was one indicator of the improvement of the player's shooting and passing performance. The reason behind this change was strength training that they were engaged in. This research indicates that strength training has significant effect on passing and shooting skills.

This research result was supported by the findings of Sherif Ali and Ahmed Mohamed, (2010) conducted on effects of strength training program on improving the shooting skill of junior handball players. The result on pre and posttests of shooting performance showed significant change in EG ($p < 0.05$). But in control group there were no significant differences between pretest and posttest results. Sherif Ali and Ahmed Mohamed research result was also similar with Emel Cetin and Yeliz Ozdol (2012) whose finding on the effects of 8 weeks strength training on the jumping throw performance in young handball players showed significant improvement in shooting performance.

These research result also supported by the finding of Yilkal Chalie(2019), conducted effects of strength training on shooting performance and some selected physical fitness variables among Addisalem male hand ball players. BediluAsferaw(2019) whose finding on the effect twelve weeks strength training on handball skills (passing)with specific reference to Dangila town handball project result was also similar with these research finding and Yilkal Cahalie finding.

CHAPTER FIVE

SUMMAR, CONCLUSION AND RECOMMENDATION

5.1 Summary

The purpose of this study was to investigate the effect of 8 weeks strength training on shooting and passing skills of woreda secondary and preparatory school grade 12th female student. For this purpose, the researcher reviewed a number of literatures in order to decide the focus of the study and methodologies. In order to attain the general objective of the study, experimental research method was employed to investigate the target populations in the study 60 female students of grade 12th woreda secondary and preparatory school in 2012ec was taken, by using purposive sampling technique. In order to attain the general objective the study the following **specific objectives** were formulated.

- Examine the effect of 8 weeks strength training on passing skill of handball on female students.
- See the effect of 8 weeks strength training on shooting skill of handball on female students.

According to the specific objective of the study the following **hypothesis** were formulated.

- Strength training had significant effect on passing skill of handball on female students.
- Strength training had significant effect on shooting skill of handball on female students.

Subjects for the study were 60 female students who are participating in woreda secondary and preparatory school. Subjects were divided in to two groups, experimental and control group. The experimental group performed strength training for 8 weeks. However the control group did not perform the selected strength training. All subjects participate in physical education class, and had taken pre and post testing. Experimental method employed to collect a data used to analyze the change mean scores to experimental and control for pre to post values. The data was gathered from the experimental and control group results as the form of pre-test and posttest method had been organized using appropriate and relevant statically method of data analysis. Paired t- test

which assists to come up with finding had used. Finally, as study revealed that strength training has been a significant effect on hand ball passing and shooting skills.

5.2 Conclusion

Based on the major finding of this study, experimental group of female students participating for 8 weeks 3 days per week for 40 minutes in strength training had significance effect.

The experimental group participants have showed improvement on hand ball skill performance level from pretest to post test.

In control group participants there is no improvement on hand ball skill performance from pretest to post test. The following conclusions were drowning based on the finding of the study.

- 1 Eight weeks strength training had a significant effect on improvement of shooting skills of female student
- 2 Eight weeks strength training had a significant effect on improvement of passing skills of female students.
- 2 There were significance differences between the pretest result and post test result of experimental group participants.
- 3 There were no significance differences between the pretest and post test result of control group.

5.3 Recommendations

Based on the result, discussions and findings of the study the following idea would be recommended.

- Strength training is important in hand ball skill of passing and shooting performance of females. There for, it would advisable to implement strength training program for hand ball learners and trainers.
- Strength training is recommended as mode of training to improve females performance on hand ball passing and shooting skill

- Further studies should be conducted in the same area on various age categories, sex and some variables.
- In our country there is little number of researchers on the effect of strength training on female students of hand ball skills. Therefore teachers and coaches would better to conduct research on these surroundings.

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Appendix

Appendix A: - experimental group training plan

Eight weeks' strength training program for experimental group

Day	Week -1	Set	Rep	Intensity	Time	Recovery time
Day 1	<u>Warming up exercise</u> jogging and synchronized movement of hand leg, and arm, stretching exercise	1	1	Light	5'	5 second
	<u>Main part</u> Push up, sit up and squat	2	8	Moderate	30'	1 minute between each set
	<u>Cooling down</u> Students perform light movement and static stretching exercise	1	1	Low	5'	5-8 second
Day 2	<u>Warming up exercise</u> jogging and synchronized movement of hand leg, and arm, stretching exercise	1	1	Light	5'	5 second
	<u>Main part</u> Push up, sit up, squat and wall press	2	8	Moderate	30'	1 minute between each set
	<u>Cooling down</u> Students perform light movement and static stretching exercise	1	1	Low	5'	5-8 second
Day 3	<u>Warming up exercise</u> jogging and synchronized movement of hand leg, and arm, stretching exercise	1	1	Light	5'	5 second
	<u>Main part</u> Push up, sit up, squat, wall press and shoulder arm tensor	2	8	Moderate	30'	1 minutes between each set
	<u>Cooling down</u> Students perform light movement and static stretching exercise	1	1	Low	5'	5-8 second

Eight weeks' strength training program for experimental group

Day	Week -2	Set	Rep	Intensity	Time	Recovery time
Day 1	<u>Warming up exercise</u> jogging and synchronized movement of hand leg, and arm, stretching exercise	1	1	Light	5'	5 second
	<u>Main part</u> Push up, sit up, squat wall press, shoulder arm tensor, knee to nose touch and side leg lift	2	8	Moderate	30'	1 minute between each set
	<u>Cooling down</u> Students perform light movement and static stretching exercise	1	1	Low	5'	5-8 second
Day 2	<u>Warming up exercise</u> jogging and synchronized movement of hand leg, and arm, stretching exercise	1	1	Light	5'	5 second
	<u>Main part</u> Push up, sit up, squat wall press, shoulder arm tensor, knee to nose touch and side leg lift	2	8	Moderate	30'	1 minute between each set
	<u>Cooling down</u> Students perform light movement and static stretching exercise	1	1	Low	5'	5-8 second
Day 3	<u>Warming up exercise</u> jogging and synchronized movement of hand leg, and arm, stretching exercise	1	1	Light	5'	5 second
	<u>Main part</u> Push up, sit up, squat wall press, shoulder arm tensor, knee to nose touch and side leg lift	2	8	Moderate	30'	1 minutes between each set
	<u>Cooling down</u> Students perform light movement and static stretching exercise	1	1	Low	5'	5-8 second

Eight weeks' strength training program for experimental group

Day	Week -3	Set	Rep	Intensity	Time	Recovery time
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Day 1	<u>Warming up exercise</u> jogging and synchronized movement of hand leg, and arm, stretching exercise	1	1	Light	5'	5 second
	<u>Main part</u> Push up, sit up, squat wall press, shoulder arm tensor, knee to nose touch and side leg lift	2	8	Moderate	30'	1 minute between each set
	<u>Cooling down</u> Students perform light movement and static stretching exercise	1	1	Low	5'	5-8 second
Day 2	<u>Warming up exercise</u> jogging and synchronized movement of hand leg, and arm, stretching exercise	1	1	Light	5'	5 second
	<u>Main part</u> Push up, sit up, squat wall press, shoulder arm tensor, knee to nose touch and side leg lift	2	8	Moderate	30'	1 minute between each set
	<u>Cooling down</u> Students perform light movement and static stretching exercise	1	1	Low	5'	5-8 second
Day 3	<u>Warming up exercise</u> jogging and synchronized movement of hand leg, and arm, stretching exercise	1	1	Light	5'	5 second
	<u>Main part</u> Push up, sit up, squat wall press, shoulder arm tensor, knee to nose touch and side leg lift	2	8	Moderate	30'	1 minutes between each set
	<u>Cooling down</u> Students perform light movement and static stretching exercise	1	1	Low	5'	5-8 second

Eight weeks' strength training program for experimental group

Day	Week -4	Set	Rep	Intensity	Time	Recovery time
Day 1	<u>Warming up exercise</u> jogging and synchronized	1	1	Light	5'	5 second

	movement of hand leg, and arm, stretching exercise					
	<u>Main part</u> Push up, sit up, squat wall press, shoulder arm tensor, knee to nose touch and side leg lift	2	8	Moderate	30'	1 minute between each set
	<u>Cooling down</u> Students perform light movement and static stretching exercise	1	1	Low	5'	5-8 second
Day 2	<u>Warming up exercise</u> jogging and synchronized movement of hand leg, and arm, stretching exercise	1	1	Light	5'	5 second
	<u>Main part</u> Push up, sit up, squat wall press, shoulder arm tensor, knee to nose touch and side leg lift	2	8	Moderate	30'	1 minute between each set
	<u>Cooling down</u> Students perform light movement and static stretching exercise	1	1	Low	5'	5-8 second
Day 3	<u>Warming up exercise</u> jogging and synchronized movement of hand leg, and arm, stretching exercise	1	1	Light	5'	5 second
	<u>Main part</u> Push up, sit up, squat wall press, shoulder arm tensor, knee to nose touch and side leg lift	2	8	Moderate	30'	1 minutes between each set
	<u>Cooling down</u> Students perform light movement and static stretching exercise	1	1	Low	5'	5-8 second

Eight weeks' strength training program for experimental group

Day	Week -5	Set	Rep	Intensity	Time	Recovery time
Day 1	<u>Warming up exercise</u> jogging and synchronized movement of hand leg, and arm, stretching exercise	1	1	Light	5'	5 second
	<u>Main part</u>	2	8	Moderate	30'	1 minute

	Push up, sit up, squat wall press, shoulder arm tensor, knee to nose touch and side leg lift					between each set
	<u>Cooling down</u> Students perform light movement and static stretching exercise	1	1	Low	5'	5-8 second
Day 2	<u>Warming up exercise</u> jogging and synchronized movement of hand leg, and arm, stretching exercise	1	1	Light	5'	5 second
	<u>Main part</u> Push up, sit up, squat wall press, shoulder arm tensor, knee to nose touch and side leg lift	2	8	Moderate	30'	1 minute between each set
	<u>Cooling down</u> Students perform light movement and static stretching exercise	1	1	Low	5'	5-8 second
Day 3	<u>Warming up exercise</u> jogging and synchronized movement of hand leg, and arm, stretching exercise	1	1	Light	5'	5 second
	<u>Main part</u> Push up, sit up, squat wall press, shoulder arm tensor, knee to nose touch and side leg lift	2	8	Moderate	30'	1 minutes between each set
	<u>Cooling down</u> Students perform light movement and static stretching exercise	1	1	Low	5'	5-8 second

Eight weeks' strength training program for experimental group

Day	Week -6	Set	Rep	Intensity	Time	Recovery time
Day 1	<u>Warming up exercise</u> jogging and synchronized movement of hand leg, and arm, stretching exercise	1	1	Light	5'	5 second
	<u>Main part</u>	2	8	Moderate	30'	1miniute

	Push up, sit up, squat wall press, shoulder arm tensor, knee to nose touch and side leg lift					between each set
	<u>Cooling down</u> Students perform light movement and static stretching exercise	1	1	Low	5'	5-8 second
Day 2	<u>Warming up exercise</u> jogging and synchronized movement of hand leg, and arm, stretching exercise	1	1	Light	5'	5 second
	<u>Main part</u> Push up, sit up, squat wall press, shoulder arm tensor, knee to nose touch and side leg lift	2	8	Moderate	30'	1 minute between each set
	<u>Cooling down</u> Students perform light movement and static stretching exercise	1	1	Low	5'	5-8 second
Day 3	<u>Warming up exercise</u> jogging and synchronized movement of hand leg, and arm, stretching exercise	1	1	Light	5'	5 second
	<u>Main part</u> Push up, sit up, squat wall press, shoulder arm tensor, knee to nose touch and side leg lift	2	8	Moderate	30'	1 minutes between each set
	<u>Cooling down</u> Students perform light movement and static stretching exercise	1	1	Low	5'	5-8 second

Eight weeks' strength training program for experimental group

Day	Week -7	Set	Rep	Intensity	Time	Recovery time
Day 1	<u>Warming up exercise</u> jogging and synchronized movement of hand leg, and arm, stretching exercise	1	1	Light	5'	5 second
	<u>Main part</u> Push up, sit up, squat wall press, shoulder arm tensor,	2	8	Moderate	30'	1 minute between each set

	knee to nose touch and side leg lift					
	<u>Cooling down</u> Students perform light movement and static stretching exercise	1	1	Low	5'	5-8 second
Day 2	<u>Warming up exercise</u> jogging and synchronized movement of hand leg, and arm, stretching exercise	1	1	Light	5'	5 second
	<u>Main part</u> Push up, sit up, squat wall press, shoulder arm tensor, knee to nose touch and side leg lift	2	8	Moderate	30'	1 minute between each set
	<u>Cooling down</u> Students perform light movement and static stretching exercise	1	1	Low	5'	5-8 second
Day 3	<u>Warming up exercise</u> jogging and synchronized movement of hand leg, and arm, stretching exercise	1	1	Light	5'	5 second
	<u>Main part</u> Push up, sit up, squat wall press, shoulder arm tensor, knee to nose touch and side leg lift	2	8	Moderate	30'	1 minutes between each set
	<u>Cooling down</u> Students perform light movement and static stretching exercise	1	1	Low	5'	5-8 second

Eight weeks' strength training program for experimental group

Day	Week -8	Set	Rep	Intensity	Time	Recovery time
Day 1	<u>Warming up exercise</u> jogging and synchronized movement of hand leg, and arm, stretching exercise	1	1	Light	5'	5 second
	<u>Main part</u> Push up, sit up, squat wall press, shoulder arm tensor, knee to nose touch and side leg lift	2	8	Moderate	30'	1 minute between each set

	<u>Cooling down</u> Students perform light movement and static stretching exercise	1	1	Low	5'	5-8 second
Day 2	<u>Warming up exercise</u> jogging and synchronized movement of hand leg, and arm, stretching exercise	1	1	Light	5'	5 second
	<u>Main part</u> Push up, sit up, squat wall press, shoulder arm tensor, knee to nose touch and side leg lift	2	8	Moderate	30'	1 minute between each set
	<u>Cooling down</u> Students perform light movement and static stretching exercise	1	1	Low	5'	5-8 second
Day 3	<u>Warming up exercise</u> jogging and synchronized movement of hand leg, and arm, stretching exercise	1	1	Light	5'	5 second
	<u>Main part</u> Push up, sit up, squat wall press, shoulder arm tensor, knee to nose touch and side leg lift	2	8	Moderate	30'	1 minutes between each set
	<u>Cooling down</u> Students perform light movement and static stretching exercise	1	1	Low	5'	5-8 second

Appendix b:control group mean

cod	sex	prts	pots	prtp	potp	Cont
1	F		2	2.17	4	3.66
2	F		3	1.33	3.66	3.66
3	F	1.33	1.33	3.33	3.33	3.33
4	F	3	2	3.5	3.33	3.33
5	F	2.33	1.67	2.67	2.67	2.67
6	F	2.33	2.33	2.67	2.67	2.67
7	F	2.83	2.33	1.33	1.67	1.67
8	F	2.83	2.33	2	2.17	2.17
9	F	2.33	2.33	3.66	3.66	3.66
10	F	2.67	2.17	2.83	4	4
11	F	2	2.33	4	4.33	4.33
12	F	1.67	1.83	4.33	4.33	4.33
13	F	2	2.67	3.17	4	4
14	F	2.67	2.33	2.67	3	3
15	F	1.33	2.17	3.5	3.66	3.66
16	F	2.5	2	2.67	2.67	2.67
17	F	2.33	1.67	6.33	6.17	6.17
18	F	2	1.67	3	3.17	3.17
19	F	2.67	2	2	2	2
20	F	1.33	1.5	3.66	3.66	3.66
21	F	4.67	5	3.5	5.83	5.83
22	F	1.67	1.67	4.83	5	5
23	F	3	2.67	3.66	3.33	3.33
24	F	3.17	3	3	3	3
25	F	3.5	3.33	3.33	3	3
26	F	1.67	2	3.33	2	2
27	F	2.33	2	3	2.33	2.33
28	F	1.67	1.67	3	4.33	4.33
29	F	2.67	2	2.67	2.67	2.67
30	F	2.33	1.83	3	3	3

Appendix c:- experimental group mean

cod	sex	prts	pots	prtp	potp
1	F	1.17	2.67	2	4.17
2	F	1.67	3	4	4.33
3	F	2	2	2.5	5.17
4	F	1.5	2.67	2.67	5.67
5	F	1.33	2.67	2.33	4.67
6	F	1.33	3.83	4	3.33
7	F	2	3	2.33	2
8	F	2.17	4	3.17	4.5
9	F	1.83	3.17	3.67	4.67
10	F	1.33	3.17	3.5	4.67
11	F	2	2	1	2.67
12	F	2.17	3.33	2	2
13	F	1.67	2.67	2.67	5
14	F	4.33	5	5.67	6
15	F	2	2.33	2.67	4.33
16	F	1.83	2	4	5.33
17	F	1	1	2	4
18	F	1.33	3.66	2.33	5.16
19	F	5	4.67	6	5.67
20	F	1.67	1.67	2.67	3.66
21	F	1.33	3.33	2.67	4.17
22	F	2.67	2.67	2.67	5
23	F	1.33	2.33	2.33	5.83
24	F	1.67	2.83	2.33	4.33
25	F	1.67	3.66	2.83	4.5
26	F	2.5	3.5	4	6.33
27	F	1.5	2.67	2.33	4.5
28	F	1.33	3.66	2	4
29	F	1.5	3.5	5	6
30	F	3.66	5	6.33	7

Appendix: pictures

Experimental group during strength training





Control group during warming up before pre test