THE EFFECT OF 12 WEEKS SELECTED RESISTANCETRAININGSON MUSCULAR ENDURANCE AND STRENGTH PERFORMANCE:THE CASE OF GRADE 11 AND 12TH MALE STUDENTS AT CHANCHO PREPARATORY SCHOOL, GOLOLCHA WOREDA, ARSI ZONE, OROMIA REGIONAL STATE, ETHIOPIA.

MEd THESIS

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The Effect of 12 Weeks Selected Resistance Trainings on Muscular Endurance and Strength Performance. The case of grade11and12male students with group age17-19 years of Chancho Preparatory School, Gololcha Woreda, Arsi Zone, Oromia Regional State, Ethiopia.

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In partial Fulfillment of the Requirement for the degree of
MASTER OF EDUCATION IN TEACHING PHYSICAL EDUCATION.

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SCHOOL OF GRADUATE STUDIES

As thesis research advisors we hereby certify that we have read and evaluated the thesis prepared, by **Sisay Gudeta** entitled:" **The Effect of 12 weeks Selected Resistance Trainings on Muscular Endurance and Strength Performance. The case of grade 11 and 12 male students with group age 17-19 years of Chancho Preparatory School,Gololcha Woreda, Arsi Zone, Oromia Regional State, Ethiopia** ". We recommended that it can be accepted as fulfilling the thesis requirement.

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As members of the Board of Examiners of the Master of Education. Thesis open defense examination, we certify that we have read and evaluated the thesis prepared by**: Sisay Gudeta Hirpo** and examined the candidate. We recommended that the thesis be accepted as fulfilling the thesis requirement for the Degree of: Master of Education in Teaching Physical Education.

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DEDICATION

I dedicate this thesis to my beloved wife, children and all my friends for their help me with love and for their immense contribution in this study.

STATEMENT OF THE AUTHOR

First, I declare and affirm that this thesis is my own work and that all the sources of the material used for the thesis have been duly acknowledged. I have followed all ethical principles of research in the preparation, data collection, data analysis and completion of this thesis. This thesis has been submitted in partial fulfillment of the requirements for Master of Education. Degree at Haramaya University and is deposited at the university library to be made available to borrowers under the rules of the library. I solemnly declare that this thesis is not submitted to any other institution anywhere for the award of any Academic Degree, Diploma or Certificate.

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Name Sisay Gudeta Hirpo Signature_____

Place: Haramaya University, Haramaya

Date of submission _____

BIOGRAPHICAL SKETCH

The Author, Sisay Gudeta Hirpo , was born in June,1969 E.C in Arsi Zone Oromia Regional State. He attended his elementary education at Kogo Fata and junior school at Digalu Bora Luku Junior Secondary School and he continued his secondary education at Chilalo Secondary School (Asela). Then, he joined teachers Training Institute at Nakemte for his teaching profession. In 1996 E.C he joined Bale Robe Teachers Training College and graduated with Diploma in physical education. Then, 2000 E.C he joined Jimma University and graduated in September 2004 E.C. with BEd, in major Physical Education and sport, Minor Biology.

The Author has been teaching Physical Education in Chancho Preparatory School in Golocha District. After three years of service, he joined Haramaya University in July2014 for his Master of Education in Teaching Physical Education.

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ACRONYMS AND ABBERVIATIONS

ACSM	American College of Sport Medicine
AG	Arsi Gololcha
BMI	Body Mass Index
CG	Control group
DTT	During Training Test
EHR	Exercising Heart Rate
Gym	Gymnasium
HIEG	High Intensity Exercise Group
HRmax	Maximum Heart Rate
HRRmax	Maximum Heart Rate Reserve
HU	Haramaya University
IRERC	Institutional Research Review Committee
K.g	Kilo Gram
Kcal	Kilo Calories
LIEG	Low intensity Exercise Group
ME	Muscular Endurance
MIE	Moderate Intensity
MoE	Ministry of Education
NASPE	National Association for Sport & Physical Education
No.Re.	Number of Repetition
PoT	Post Test
PT	Pre-Test
PUP	Push up
SLJ	Standing Long Jump
SPSS	Statistical Package of Social Sciences
TG	Training group (experimental group)
VO2	Volume of Oxygen Uptake

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ABSTRACT

The primary purpose of this study was to evaluate the effects of 12 weeks selected resistance trainings on muscular endurance and strength performance. Forty (40) young male students of beginner trainees from chancho preparatory school were selected as subjects purposively. Their age ranges from 17-19 years. The control group has (20) subjects. The experimental group has twenty (20) subjects were placed in one group and participated in 40 minutes exercises. The selected subjects practiced three days per week for 12 weeks in low, moderate and high intensity exercise training respectively. A paired sample T-test was used to analyze and compare the collected data. After 12 weeks of training the experimental or training group achieved an average of 11.05(49%)mean difference respectively on improving muscular strength and endurance and the group achieved in each treatment with in push up 11.05 MD,(49%), in sit up 17.86 MD,(82.8%), in pull up 10.7, (91.8%), in SLJ 0.86MD, and (25%) achieved respectively. This was the high improvement of the muscular endurance and strength. The control group achieved an average of (7.70%) MD of muscular endurance and an average of (29.95%) this was the minimum improvement of the muscular endurance. The control group gained 9.95MD,(44.8%)in sit up,5.45MD,(29.95%)in push up, 0.7 MD, (7.29%) in pull up and 0.49 MD,(16%) in SLJ respectively. According to the result of these selected resistances exercise training, the improvement of muscular endurance and strength performance in training group have remarkable improvement respectively. Therefore, this finding indicates that the training session given for the trainees should be more of on muscular endurance and strength trainings for the better performance of the male trainees.

Key W0rds: The effect of selected resistance trainings on muscular endurance and strength Performance on male.

1. INTRODUCTION

This chapter deals with back ground of the study, statement of the problem, scope and limitation of the study, significance of the study and objective of the study.

1.1. Background of the Study

Some sports and sport events such as throwing events in track and field are characterized by the demonstration of strength and high power outputs. In addition, many of the strength/power sports involve maximal efforts which must be repeated after relatively short rest periods (Tanaka and Swensen, 1998). Thus, some strength and conditioning professionals believe that the inclusion of aerobic endurance training may offer some benefits to strength/power athletes (Baechle, 1994). Additionally, it is well documented that strength/power athletes may perform endurance exercises in order to maintain an optimal body weight or to reduce body fat levels. In the past two decades; concurrent resistance and endurance training programs have received much attention as a form of training. (Cadore, E,L,et al.2011)

Several studies have shown that concurrent training (resistance and endurance training in the same session or program interferes with the development of muscle strength or power (Chtara, et al., 2008), On the other hand, some studies reported a compatibility of resistance and endurance training and did not show any reduction in strength adaptations after concurrent strength and aerobic endurance training (Izquierdo,*et al*.,2004)and(Glowacki,*et al*.,2004). Furthermore, some studies demonstrate a positive effect of concurrent training on muscle strength and muscular endurance. (Davis, 2008a, b)

Over the last several years exercise has been included in the daily program of most people since knowledge of its beneficial effects are spread worldwide. Through exercise people improve their health, robustness, well-being and generally their quality of life. Robustness is important in order for the body to function effectively. The components that constitute robustness are: bodily constitution, cardiovascular robustness, flexibility and muscular robustness. Muscular robustness is constituted by two components: strength and the muscular endurance. The probability of suffering from injury in the joints is significantly less in an individual who attains muscular robustness (Corbin *et al*., 2000). .

In order to have improvement of muscular endurance a higher volume of training has been shown to be more effective (Iickson,*et al.*, 1994) and (Kraemer,1997). In this case, it was recommended that a break of 1-2 minutes should be taken for every 15 repetitions or more and less than 1 minute for every 10-15 repetition. Participants that trained for increase of muscular endurance appeared to be more effective when they used a set with a lot of repetitions and small periods of rest (30 -90 seconds or even less) (Anderson and Kearney, 1982). In research conducted by Campos, Gerson, Luecke, Wendeln, Toma and their colleagues et al, (2002), 32 untrained men took part and were separated into 4 experimental groups. A group executed 3-5 maximum repetitions of 4 sets in each exercise with a resting time between the sets to be 3 minutes. There was also an intermediary group, who had performed 9-11 maximum repetitions of 3 sets with 2 minutes break, while there was another group who did a high number of maximum repetitions (20-28) of 2 sets with 1 minute break. Three exercises were done (leg press, seats and leg extension) with a frequency of 2 times per week for the first 4 weeks and 3 times per week for the last 4 weeks. The group that executed few maximum repetitions showed better results in the measurement for increasing maximum strength, than the group that executed a high number of maximum repetitions. In contrary in the measurement for muscular endurance the group that executed a high number of maximum repetitions showed better results than the group that executed few maximum repetitions in all exercises. In another research where untrained men participated and were trained 3 times per week for an interval of 12 weeks, no differences occurred in the maximum strength when the trained volume and the intensity were equal. Participants were divided into 3different trained groups where the intensity and the trained volume were equal (Baker,*et al*., 1994). In untrained participants where circular training was used with weights for interval of 10 weeks with a frequency of 3 times per week, significant increase in maximum strength was observed (1 RM)in 9 from10 exercises (15-42%) (Harber,*et al*., 2004).

With this substantial information in mind, this study was attempted to examine the effect of 12 weeks selected resistance exercises trainings on muscular endurance and strength performance (The case of grade 11and 12 male students with group age range of 17-19 years old at Chancho Preparatory school, GololchaWoreda, Arsi Zone, Oromia Regional State).

1.2. Statement of the Problem

Performing effective way of the physical fitness is important to manipulate main trainings such as;-push up, pull up, weight lifting, running, cycling, swimming, which leads to effective way of performing enhancement in developing physical fitness. Therefore, it is possible to conclude that practicing with training principles, understanding of safety rule and knowing level of exercise intensity, frequency and duration of training and performance level of individuals as well as age are important to enhance performance.

Selected types of exercises are important for the development and maintenance of health and physical performance. In fact, there had been many studies analyzing exercise and fitness. However, there were no enough research that studies the effect of selected resistance exercise trainings on muscular endurance and strength performance of some health related fitness. The investigator aggravates to solve the lack of sport science knowledge, training principle, safety rule, coaching style and the athletic performance in the world wide. Because of this the investigator initiated to overcome the effect selected resistance exercise trainings on muscular endurance and strength performance in the world physical fitness.

It is an interesting topic for physical exercise science, coaches, athletes, other specialist in sports exercise and it provides information how to improve our physical fitness participant and to be developing muscular endurance and strength performance in the world athletics events.

This research was attempted to answer the following research questions:-

1. How do selected resistance exercise trainings provide effects on muscular endurance and strength performance of male students?
2. What should be the load and intensity, of selected resistance exercise trainings on muscular endurance and strength performance to upgrade qualities of physical efficiency of male students at Chancho Preparatory School?
3. What is the significant of selected resistance exercise trainings on muscular endurance and strength performance of male students?
4. What should be done on selected resistance exercise trainings on muscular endurance and strength performance?

1.3. Scope of the Study

This study was conducted at Chancho Preparatory School in GololchaWoreda. It is a government school and located in Oromia Regional State, Arsi Zone, Gololcha District. The school is located around 272km, from Addis Ababa. The school was established in 2000 E.C. At Chancho town 3kms, from the center of the town. It occupied 6000 square meters area and shared the compound with Chancho Secondary School. Since the location of the district is low land the climate is too hot throughout the year except a few months of rain. Due to the dryness of the area there is a series water shortage. This high temperature and shortage of water affected students' activities on this experimental research work. The experimental research was complex and considers usually as a private domain. Due to lack of data collection materials, man power and others reasons, it has been very difficult to carryout and use as many subjects as possible. Due to this, the numbers of the subjects were limited in sample size. Hence only volunteer 40 male students have been included as participants.

1.4. Significance of the Study

Currently Athletic performance enhancement is based up on critical study of human physiology, modern way of feeding, scientific way of training and based up on new investigations and principles. This study was highly concerned on the effects of selected types of resistance exercise trainings on enhancing muscular endurance and strength performance of male students at Chancho Preparatory School. Therefore, this study will help coaches, athletes, physical education teachers, other participants and managers to understand formulate and implement effective strategies of coaching and fitness training program.

1.5. Objectives of the Study

1.5.1. General objectives

The overall objective of the study was to examine the effect of 12 weeks selected resistance exercise trainings on muscular endurance and strength performance of male students at Chancho Preparatory School in GololchaWoreda , Arsi Zone, in Oromia Regional State.

1.5.2. Specific objectives

Specifically the objective of this study was intended to:-

- Observe changes induced by selected resistance exercise training program on muscular endurance.
- Evaluate the effect of 12 weeks selected resistance exercise trainings in improving the muscular strength performance on male of among 17-19 years in Chancho preparatory School.
- Investigate the influence of selected resistance trainings on muscular endurance and strengths performance on male students among 17-19 years in Chancho Preparatory school.
- Examine the effect of selected resistance exercise between tests on male muscular endurance and strength performance.

2. REVIEW OF RELATED LITERATURE

This chapter deals with components of physical fitness, muscular endurance, muscular strength, characteristics of exercise intensity, measurement of exercise intensity, target heart rate and aerobic fitness had been included.

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

2.1. Components of Physical Fitness

Physical fitness is a set of attributes that people have or achieve. Being physically fit has been defined as the ability to carry out daily tasks with vigor and alertness, without undue fatigue and with ample energy to enjoy leisure time pursuits and to meet unforeseen emergences. Fitness is defined as a condition in which an individual has enough energy to avoid fatigue and enjoy life. Physical fitness is divided in to five health related (muscular endurance , muscular strength , flexibility ,cardiovascular endurance and body composition) and six skill related (agility ,balance , coordination ,speed , power and reaction time) components. Skill related fitness components are fitness types which enhances ones performance in athletic or sports settings. Health related fitness is the ability to become and stay physically healthy. This problem associated with inactivity (NASPE, 2009).

2.1.1. Muscular endurance

Muscular endurance refers to the ability of the muscle to work over an extended period of time without fatigue. Performing pushups, pull-ups and sit-ups for one minute is commonly used in fitness testing of muscular endurance. In training setting muscular strength and endurance can go in line. According to the research conducted on the effects of strength training on endurance capacity of top-level endurance athletes, strength training can lead to

enhanced long- term (>30 min) and short-term (>15 min) endurance capacity both in well-trained individuals and highly trained top-level endurance athletes, especially when high volume, heavy resistance strength training protocols are applied(Aagaard and Andersen,2010).

The combination of strength and endurance results in muscular endurance - the ability to perform many repetitions against a given resistance for a prolonged period of time (1).It is a crucial element of fitness for athletes such as distance runners, swimmers, cyclists and rowers. It's also important for success in many team sports like soccer, field hockey and Australian Rules football. Traditionally, muscular endurance programs have used moderate loads lifted for 12-25 repetitions. However, this is completely inadequate for many sports such as boxing, distance running, cycling, swimming, throwing and many others.

Any form of training must mirror the specific demands of the sport. In resistance training, this means that the load used should match the resistance that must be overcome while competing. The number of repetitions or the duration of exercise bouts in a session should approach that during the event.

Recall that muscular endurance training makes up only one part of the annual strength program - even for endurance athletes. It should follow a phase of maximal strength training. This makes sense because the greater an athlete's maximal strength, the greater their potential for strength endurance - i.e. the more force they will be able to apply over a prolonged period. Heavy strength training has also been shown to improve exercise economy in endurance athletes (3, 4, 5). For more information on the annual strength program see the programs. Scand *J Med Sci Sports. 2002 Oct; 12(5):288*

2.1.2. Muscular strength

Muscular strength refers to the maximum amount of force a muscle can exert against an opposing force. Fitness testing usually consists of a one-time maximum lift using weights, bench press, leg press, etc. Muscular strength and performance have direct relationship. According to the research, result conducted on the skeletal muscle mass and muscle strength in relation to lower extremity performance of older men and women suggest that low muscle strength, but not low muscle mass, is associated with poor physical function (Paul *e al.*,2000).

Muscular strength is just one component of physical fitness. Along with cardiovascular fitness, muscular endurance, flexibility and body composition, muscular strength can provide

several health benefits. Muscular strength refers to the amount of force a muscle can produce and is usually measured by the maximum amount of force a muscle can produce in a single effort (maximal effort). The amount of muscle strength which can be achieved depends on gender, age, and inherited physical attributes. While strong muscles are essential for any athletic endeavor, strong muscles can benefit everyone in some way. (Matt Winggins last updated Apr, 06, 2015)

2.2. Characteristics of Exercise Intensity

Exercise intensity refers to how hard the body is working during physical activity. The health and fitness goals, as well as the current level of fitness, will determine the ideal exercise intensity. The goal is work hard, but not too hard. Typically, exercise intensity is described as low, moderate, or vigorous. For maximum health benefits, this is to work hard, but not too hard, described as moderate- intensity by the (National Physical Activity Guidelines for Australians). These guidelines recommend that for good health, you should aim for at least 30 minutes of moderate- intensity physical activity on most days. This is the same for women and men (http; // www.betterhealth, 2013). The process of determining and controlling appropriate exercise intensity presents a challenge, which has implications related to both physiological changes and to individual compliance within the an exercise program. (K and EPLM 2001).

Several measurements for exercise intensity for various exercise modalities will be devised and applied. These include proportion of maximal oxygen uptake (%VO2 max**),** proportion of maximal heart rate (%HRmax), proportion of heart rate reserve (%HRR max), and blood lactate indices. The will cover the principles of predicating and controlling exercise intensity by extrapolation from the relationships between oxygen uptakes, heart rate, power output and running sped. Ideally, proportions of the O2 max are used to specify exercise intensity levels. The recommended intensity range is normally between 40% and 85% depending on the health and training status of the individual (ACSM, 1995). (http; // www.betterhealth, 2013).

Low- intensity- The decrease in the minimal intensity to 40% of Vo2 max and 55% of HR max represents a change in the ACSM recommendation and more clearly recognizes that the minimal threshold for improving fitness/ health is quite variable at the lower end of the intensity scale.

Moderate- intensity – activity in this statement referred to activities that use Approximately 150 kilocalories (630 KJ) per day or are equivalent to 55-65% of V02 max. The statement also highlights that many health benefits be accrued by accumulating short bouts of activity throughout the day time.This recommendation should be seen as the minimal recommendation for health benefits as not all disease respond to moderate- intensity activity. Indeed, the Surgeon General of the United States later updated the recommendation to state that: 'Additional health benefits can be gained through greater amounts of physical activity. People who can maintain a regular regimen of activity that is of longer duration of more vigorous intensity are likely to derive greater benefit.(health and style.com/fitness/ moderate-intensity-exercise/ Feb 29,2016)

High-intensity- Martin Gibala et al. (2012) have been researching high-intensity exercise for several years. Their 2009 study on students[10] uses 3 minutes for warming up, then 60 seconds of intense exercise (at 95% of VO2max) followed by 75 seconds of rest, repeated for 8–12 cycles (sometimes referred to as "The Little Method"). Subjects using this method trained 3 times per week obtained gains similar to what would be expected from subjects who did steady state (50–70% VO2max) training five times per week. While still a demanding form of training, this exercise protocol could be used by the general public with nothing more than an average exercise bike.

Gibala's group published a less intense version of their regimen in a 2011 paper in Medicine and Science in Sports and Exercise. This was intended as a gentler option for sedentary people who had done no exercise for over a year. It included 3 minutes of warm-up, 10 repetitions of 60-second bursts at 60% peak power (80- 95% of heart rate reserve) each followed by 60 seconds of recovery, and then a 5-minute cool-down.[11] Martin Gibala et al. (2012)

2.3. Measurement of Exercise Intensity

There are varying ways to measure the exercise intensity to make sure the body is getting the most out of every workout. You may need to experiment to find out which method of measuring exercise intensity suits you best. Three different measurement methods include; - Target heart rate, talk test, and Exertion rating scale (htt;/www.betterhealth,2013).

2.4. Target Heart Rate (THR)

The human body has an in-built system to measure your exercise intensity- your heart. Your heart rate will increase in proportion to the intensity of your exercise. You can track and guide your exercise intensity by calculating your Target Heart Rate (THR) range (www.betterhealth, 2013). For low to high – intensity physical activity, a person's Target Heart Rate should be 50 to 85% of his or her maximum heart rate . This maximum rate is based on a person's age. An estimate of a person's maximum heart rate can be calculated as 220 beats per minute (bpm) minus your age. Because it is an estimate, use it with caution- Take your pulse again when you have been exercising for about 5-10 minutes. Continue taking your pulse at regular intervals. A heart rate monitor is an easy way to keep track of your heart rate whiles you where exercising or you can take your pulse. There's a simple way to know your target heart rate helps you hit the bull's eye." We don't want people to over exercise" (ChristopherTravers ,MS April 9,2015)

2.5. Aerobic Fitness

Aerobic fitness is a measure of the combined efficiency of the lungs, heart, bloodstream and exercising muscles in getting the oxygen to muscles and putting them to work. A large aerobic capacity increases the body's efficiency to perform daily activities (Stephens et al., 2003).
Aerobic endurance is the highest proportion of VO2max at which an individual can sustain > 20 minutes activity. It closely allied to the lactate thresholds 'point at which muscular fatigue begins to be hastened. Elite endurance athletes can sustain activity typically at greater than 80% of their aerobic power, whereas sedentary or diseased individuals may only be able to sustain activity at 40-50% of aerobic power. This means the inactive or diseased person not only has a reduced capacity but also cannot utilize as much of whatever capacity they possess compared with the more active or fitter individual. Aerobic power, typically described as VO2max.It is the maximum amount of oxygen the body can take in and utilize during physical activity. These are influenced by three factors: the lungs, ability to oxygenate the blood, the cardiovascular systems ability to deliver the oxygenated blood to the exercising muscles and the muscles ability to extract and utilize the oxygen to produce energy for sustained contractions (Buckley and Hughes, 2008).

3. MATERIALS AND METHODS

This chapter deals with description of study area, sample size and sampling techniques, instruments, methods and procedure of data collection and ethical consideration.

3.1. **Description of the Study Area**

The research was conducted in Oromia regional State in East Arsi Zone, at GololchaWoreda, the case of Chancho Preparatory School. It is a government school. Chancho is 300km far from Addis Ababa to the East. And198 km far from Asella. Gololcha is one of the Woredas in the Oromia region. Part of the Arsi Zone,Gololcha is bordered in the South by Amigna, in the West by Chole, in the North West by Aseko, and in the North and East by the West Hararghe zone. This year (2009 E.C) the school has 368 (235 males and 133 females) students, 18 teachers and 10 administration workers. The school was established in 2000E.C. At Chancho town 3kms, from the center of the town . It occupied 6000 square meters area and shared the compound with chancho secondary school. Since the location of the district is low land the climate is too hot throughout the year except a few months of rain. Due to the dryness of the area there is a series water shortage. This high temperature and shortage of water affected students' activities on this experimental research work. The administrative center of this Woreda is Chancho town. This town has a latitude and longitude of 08°15℃N 40° 08E / 8.250° N 40.133°E with an elevation of 1451 meters above sea level. The primary source of income is mixed agriculture and the major types of crop cultivation in the area is maize, sorghum, *teff*, coffee and mild stimulant cash oriented plant (*chat*). The society mainly uses maize and porridge diet as well as *injera* of *teff*. (Oromia Education Bureau, EMIS Team June, 2007 E.C)

A map of the study site is indicated on page 61.

3.2. Source of Data

Both primary and secondary data were gathered to meet the objective of the study. The primary data were collected from sample subject of purposively selected participants from Chancho preparatory School male students with age range of 17-19 years the data obtained during pre test, during training test and post test in Chancho preparatory School. Secondary data were also collected from the different researches, publications, books, journals and websites to supplement primary data.

3.3. **Research Design**

Experimental design was used for this study. Forty (40) male students with their age range of 17- 19 years were purposely selected from Chancho preparatory School. Besides this, the research focused on field study or experimental study of twelve - weeks selected resistance exercise trainings on muscular endurance and strength performance including low and high intensity performing exercise. The selected groups were contained 20 subjects in training group and the rest 20 subjects were control groups in training program for 12 weeks and 3 days per week for 30 to 40 minutes. The experimental design applied in this study was formal design: which means pre test, during training test, and posttest was given. In addition to this, pre test was administered for the selected subjects on a selected physical fitness (muscular endurance, and strength) to measure their fitness before starting the training. This research was conducted for three months: beginning on October 01, 2016 and ended on January 30, 2017. The lay out for this study shown as follows.

The study design lay out time schedule for training program.

-Total duration	12 weeks
-Frequency	3 days / week
-Duration / Session	30-40 minutes
-Intensity	low, moderate and high intensity exercise.
-Exercise days	Tuesday, Wednesday and Friday
-Time of training	after noon

Because why the time of training was conducted after noon, the location of the study area is low land and the climate is too hot throughout the year except a few months of rain. Due to the

dryness of the area there is a series water shortage. This high temperature and shortage of water affected students' activities on this experimental research work. And the school is 3kms from the center of the town so the students learn at morning and it is uncomfortable time to perform this experimental research work at morning time.

3.4. **Sample Size and Sampling Techniques.**

The School has 368 students. Among 368 students, 235 are males' students and 40 subjects were selected purposively for the given criteria of the study. The participants' medical history questionnaire by a physician . The questionnaires were prepared with the aim of identifying whether they were free from heart disease, stroke and kidney problems. In addition, injury statuses were used as one selected criteria.

3.5. **Sampling Techniques**

The purposive technique was used to select forty (40) subjects of male students. The subjects of this study were students of grade 11 and 12 at Chancho Preparatory School. It is a government school and located in Oromia Regional State, Arsi Zone, Gololcha District. The School has 368 total students (235 males and 133 females) students. So from 235 males of students purposively were selected forty (40) subjects of males students.

3.6. **Data Collection Instruments**

The following materials were used throughout the study:- weight lifting or dampell, barbell or pull-up, mat and stopwatch, etc. In addition were pre test, during training test and post test were used. Pre test was given before starting training, during training test was given after six weeks and post test was given at the end of 12 weeks.

3.7. **Methods and Procedure of Data Collection**

Primary source of data permission for the study was granted by Haramaya University Institutional Research Ethics Review Committee. Primary data was gathered from the subject by three phases with six weeks gap as pretest (PT), during training test (DTT), and posttest (PoT), This data was collected from the subjects in the area where comfortable place and

fitness test instruments were accessible through structured program. To get data from the subjects, tests were given at the beginning of the training, at the middle of the training and at the end of third months and final data were collected at the end of the experiment.

Data was collected at the same time of the day and by the same data collector to control biological and between subject variations (Reily and Brooks, 1982) with the following physical fitness tests and procedure.

3.7.1. **Muscular strength test**

- Standing Long Jump

Standing Long Jump was conducted to measure subjects' strength. In this test, the subject took crouch position by swinging his arm back ward with static position and jumped horizontally as far as possible with two feet. Three trials were given and the longest distance was recorded as a score in meter (Manuel, 2009).

- Pull up

The subjects were asked to hold a barbell on their shoulder with the help of their hands. After that the participants slightly bent their knees until they reached to semi squat position. They stayed for2 -3 seconds in that position. Finally, returned to their standing position and dropped the barbell. This test was used to check the strength of, quadriceps, and hamstring and gluteus muscle of the subjects. The unit was kilogram. (htt:/www.mensfitness.com,2013).

3.7.2. Muscular endurance test

- Push up

The push up test was used on comfortable floor or surface and flat gym mat and stopwatch materials. One number of trial tests had been used. The test procedure has been followed , the hands had been placed slightly wider than shoulder width apart and with fingers pointing forward. The subjects was started from start position (elbows extended) the subject must kept the back straight at all times and lower body to the floor until the chest touches the mat on the floor. Subjects then have been returned to the up position. This was one repetition. Resting has been done only in the up position. The Scoring system was that the total numbers of correct push up in one minute was recorded as they scored (HENRY HALSE Last Updated: Feb 09, 2017)

- Sit up

The sit up test used comfortable and level floor, gym mat and stopwatch materials. One number of trial tests had been used. The test procedure has been followed: the subjects were started by laying on back, knees bent, heels flat on the floor, with the fingers placed and held behind the head. Pulling on the head with the hands had been avoided. The buttock has remained on the floor with no thrusting of the hip. The feet had been hold down firmly by a partner. The subjects had performed as many correct sit up as possible in one minute. In the up position, the individual had touched elbows to knees and then returned until the shoulder blades touched the floor. Any resting had been done in the up position. Breathing had been as normal as possible. Neck had been remained in the natural position. Pull on the head or the neck had been avoided. The Scoring systems were that the total numbers of correct sit ups in one minute was recorded as they scored rep/min (Davis *et al.,* 2000).

3.7.3. Exercise training protocol

The selected 40 subjects were randomly divided in to two groups on purposive basis. One group has 20 subjects for training group and the second group has 20 subjects for control group. All groups were engage in pre test, during training test and post test for 12 weeks. Training group began low intensity exercise program for one month, again the training group continued moderate intensity exercise program for second month and continued high intensity exercise program respectively. The training group began performing low intensity exercise which posses less than (<) 55HRmax, easy repetition, 40minute duration and the training volume had 1x8min repetition and 4min rest. The frequency of training is three days per week and it include 8min of warm up and 5 min stretching , 20 min of main activity, 3min of cool down and stretching. The weekly program had been Tuesday, Wednesday and Friday at 11;00-11;40Pm after noon were used as training program. The same training program was carried out with three different intensity exercises and the group was doing the same activity and takes the same tests three times through the study. But control group did not doing activities.

The research designed training program in agreement with this research experimental project. From the beginning to the end of this study the trainees were given a clear orientation not participate in any physical activities other than this one.

3.7.4. Data quality control

Data have been collected by the researcher and one assistance (degree holder). To avoid errors and training has been given for the assistance data collector on how to use data collecting instruments and measurements during data collection. Only standardized materials were used to keep the quality of the data. Additionally, all the tests were recorded with video and photograph. Finally, the data had been coded and fed to software twice, with different persons to avoid error in data feeding.

3.7.5. Methods of data analysis

The data analysis was done by SPSS statistical software package version 20. After collecting the data on muscular endurance and strength from all subjects and it had been analyzed with paired sample T- test. Moreover the level of significance was sit at 0.05%.

3.7.6. Ethical consideration (Issues)

This study was conducted in the line with ethical issues. The privacy of the participant was protected. Generally, this research has been conducted as per rules, policies and research ethics of Haramaya University sport science academy. The protocol was approved according to research committee or the Haramaya University guidelines. The medical history questionnaire signed by physicians was provided to participant earlier with a written letter and then appointed. All subjects were aware about the way of participant selection criteria and given explanation on the physical activity readiness questionnaire that prepared for the subjects.

The entire participant has been clear information about the purpose of the study and the procedure to be explained to the subjects. The participants were not at risk of any harm, and had an opportunity to leave the study at any time when they feel they need to do so. The result of the questionnaires was kept confidential. Any type of information was not disclosed to anyone except the researcher and the assistance in the experiment.

The physician identified the subjects who were not participating in any sport activity and who can participate in a light sport activity.

4. RESULTS AND DISCUSSIONS

4.1. Overview

This chapter deals with the analysis of data collected from the subjects based on the findings under this study. The purpose of this study was to evaluate the effects of 12 weeks selected resistance trainings on muscular endurance and strength performance .The case of grade 11 and 12 male students with the age range of 17-19 years at chancho preparatory school. Forty subjects selected from chancho preparatory school. They were randomly assigned in to two groups of experimental group (training group) and control group with 20 subjects for each group.

In this study, field tests were given three times (Pretest, during training test and Post test). Under this, two dependent variables (muscular endurance and strength) had been evaluated by push up, sit up, pull up, and standing long jump test and the results of those variables are discussed as follows.

4.2. The Effect of Resistance Trainings on Muscular Endurance and Strength.

Table 1. Mean Values of Pushup, Sit up, pull up in rep. per/ min and standing long jump in meter. For training and control groups independent T-tests.

TG (n=20) CG (n=20)

Variables	Group	Mean	MD	Std. Deviation
Push up	Training	28.3333±1.09097	6.90	8.45059
	Control	21.4333 ±0.80688		6.25006
Sit up	Training	31.9333 ± 1.35918	3.95	10.52820
	Control	27.9833 ±1.10762		8.57962
Pull up	Training	17.9667 ± 0.82509	7.82	6.39111
	Control	10.1500 ± 0.51411		3.98227
Standing	Training	3.9825 ± 0.06751	0.627	.52290
long jump	Control	3.3658 ± 0.06461		0.50045

From the above table, mean± SE (standard error of mean) are values of push up, sit up, pull up and standing long jump for experimental and control groups. That indicates, PT= per training test which was taken before training, DTT= during training test which was measured at the 6th week of training, POT= post training test measured at the end of 12 weeks of training, MD= mean difference (POT-PTT), sup= sit up, PUP =push up, pull up and SLJ= standing long jump.

There were significant difference between PT, DTT and POT mean value of both groups.

When we compare groups with their mean values, experimental group was recorded 28.3. mean and control group was also recorded 21.43.This was the lowest mean value .the experimental group increased from 22.55 to 33.60.This was the medium recorded mean value with11.05.This group (31.5%) showed improvement from PT- DTT and (125%) PT-POTin push up parameter. The Scoring system was that the total numbers of correct push up in one minute was recorded as they scored.(HENRY HALSE Last Updated: Feb 09, 2017)

When we compare experimental and control group which was the highest recorded change of the push up treatments with the mean difference of 6.90. This show that experimental group significantly increases in push up performances on muscular endurance and muscular strength of trainees between group. In another way, this group achieved (21.8%) improvement from PT- DTT and (32.8%) improvement from PT-POT in push up parameter.

Treatment with control group shows (18.9%) improvement from PT-DTT and (23.9%) improvement from PT-POT in push up parameters. There were significant difference between experimental and control groups mean value of both groups.

When we compare groups with their mean values, experimental group was recorded 31.93. Mean and control group was also recorded 29.98. This was the lowest mean value. The experimental group was recorded change of the treatments with the mean difference of 3.95 in sit up between groups. This shows that training groups significantly increases in sit up performances of trainees between groups.

There were significant difference between experimental and control group mean value of both groups. When we compare groups with their mean values, experimental group was recorded 17.97 mean and control group was also recorded 10.15. This was the lowest mean value. The experimental group was recorded change of the treatments with the mean difference of 7.82 in

pull up between groups. This shows that training groups significantly increases in pull up performances of trainees between groups.

There were minimum difference between experimental and control group mean value of both groups. When we compare groups with their mean values, experimental group was recorded 3.98 m mean and control group was also recorded 3.37 m mean values. Those results are related with mean values. The experimental group was recorded change of the treatments with the mean difference of 0.267 m in standing long jump parameter.

Generally, the average of the push up and sit up tests of experimental group achieved 10.85 mean differences in muscular endurance. The control group gained an average 6.55 mean differences in muscular endurance.

When we compare the mean difference of experimental group with control group the experimental group increased their muscular endurance by 10.85 and the mean difference of control group increased their muscular endurance by 0.53.Their for, training or experimental group treatment scored or achieved better than control group in muscular endurance parameter.

In addition when we compare the average of pull up and standing long jump tests of experimental group achieved 8.45 mean differences in muscular strength. The control group gained an average 3.21 mean differences in muscular strength. The experimental group increased their muscular strength by 5.24 and the mean difference of control group increased their muscular strength by 0.31.Their for, experimental group treatment scored or achieved better than control group in muscular strength parameter.

In general, the finding of this study was in agreement with the finding of (Hoeger WK et al., 2013) who conducted a study on the whole body vibration improves body mass, flexibility and strength in previously sedentary adults and found a significant improvement in the abdominal and upper body muscular endurance.

4.3. The Mean Difference of Resistance Trainings on Muscular endurance and Strength for Training group.

Table 2. Mean difference of Push up, Sit up, and pull up Performance in rep/per min and standing long jump in meter for training group. TG (n=20)

	PT	DTT	POT	MD
Push up	22.55 ± 1.69	28.85 ± 1.65	33.6 ±1.51	11.05
Sit up	21.55 ± 1.36	34.85 ± 1.83	39.4 ± 1.72	17.85
Pull up	11.65 ± 0.89	19.9 ± 1.05	22.35 ± 1.07	10.7
SLJ	3.44 ± 0.91	4.21 ± .074	4.30 ± .071	0.86

From the above table, mean ± SE (standard error mean) is the value of experimental group between each test. That indicates, PT= pre training test which was taken before training, DTT= during training test which was measured at the 6th week of training, POT= post training test measured at the end of 12 weeks of training, MD= mean difference, SLJ= standing long jump.

There were significance difference between PT, DTT and POT mean value of experimental group. When we compare each test with their mean values; training group treatment was increased from 22.55 to 33.60 in push up. This was the highest recorded mean value with 11.05 mean differences .This group shown (49%) improvement from PT-DTT and (49%) improvement from PT-POT in push up parameter. The scoring system was that the total numbers of correct push up in one minute was recorded as they scored.(HENRY HALSE Last Updated: Feb 09, 2017)

When we compare sit up test for this group with their mean values; training group treatment was increased from 21.55 to 39.40 in sit up. This was also the highest recorded mean value with 17.85 mean differences. This group shows (47.8%) improvement from PT-DTT and (82.8%) improvement from PT-POT in sit up parameter. The scoring system was that the total numbers of correct sit ups in one minute was recorded as they scored repetition per minute (Davis *et al*., 2000).

Treatment with pull up test for experimental group with their mean values; the group was increased from 11.65 to 22.35 in pull up. This was the highest recorded mean value with 10.7 mean differences. This group shows (7.1%) improvement from PT-DTT and (91.8%) improvement from PT-POT in pull up parameter. This test was used to check the strength of gastronomies, quadriceps, and hamstring and gluteus muscle of the subjects. The unit was kilogram (htt:/ www.mensfitness.com,2013).

The last treatment with standing long jump for experimental group with their mean values; the group was increased from 3.44 to 4.30 in standing long jump. This was the medium recorded mean value with 0.86 mean differences. They also show (22.38%) improvement from PT-DTT and (25%) improvement from PT-POT in standing long jump. Three trials were given and the longest distance was recorded as a score in meter (Manuel, 2000).

When we compare treatments with their tests from PT-POT between each test sit up test was recorded from 21.55 to 39.40 per minute mean value was recorded. This was the first recorded change of treatments with 17.85 mean differences.

The treatment with push up tests from PT-POT was recorded change from 22.55 to 39.40 in repetition per minute of mean value. This was the second recorded change of the treatments with 11.05 mean differences.

The treatment with pull up tests from PT-POT was recorded from 11.65 to 22.35 in repetition per minute of mean value. This was the t 3rd recorded change of the treatments between tests with 10.7 mean differences. But when we compare those treatments between their tests from PTT-POT by present pull up was recorded the highest present improvement from PT-POT (91.8%) improvement in repetition per minute.

Treatment with standing long jump tests from PT-POT was recorded 3.44 to 4.30 in meter of mean value. This was lowest recorded change of the treatments with 0.86 mean differences.

4.4. The Mean Difference of Resistance Trainings on Muscular endurance and Strength for Control group.

Table 3**.** Mean Values of Push up, sit up, and pull up Performance in rep/ per min and standing long jump in meter for control group. CG (n=20)

	PT	DTT	POT	MD
Push up	18.20 ± 1.14	22.45 ± 1.44	23.65 ± 1.36	5.45
Sit up	21.75 ± 1.90	30.70 ± 1.67	31.50 ± 1.39	9.75
Pull up	9.60 ± 0.88	10.55 ± 1.03	10.30 ± 0.78	0.7
SLJ	3.04 ± 0.12	3.53 ± .092	3.53 ± .088	0.49

From the above table, mean ± SE (standard error mean) is the value of control group between each test. That indicates, PT= pre training test which was taken before training, DTT= during training test which was measured at the 6^{th} week of training, POT= post training test measured at the end of 12 weeks of training, MD= mean difference, SLJ= standing long jump.

There were differences between PT, DTT and POT mean value of control group. When we compare each test with their mean values; control group treatment was increased from 18.20 to 23.65 in push up. This was the lowest recorded mean value with 5.45 mean differences. This group shows (23.35%) improvement from PT-DTT and (29.95%) improvement from PT-POT in push up parameter.

When we compare sit up test for this group between tests with their mean values; control group treatment was increased from 21.75 to 31.50 in sit up. This was also the lowest recorded mean value with 9.95 mean differences. This group shows (41.15%) improvement from PT-DTT and (44.8%) improvement from PT-POT in sit up parameter.

Treatment with pull up test for control group between tests with their mean values; the group was increased from 9.60 to 10.30 in pull up. This was the lowest recorded mean value with 0.7 mean differences. This group shows (9.89%) improvement from PT-DTT and (7.29%) improvement from PT-POT in pull up parameter.

The last treatment with standing long jump for control group with their mean values; the group was increased from 3.04 to 3.53 in standing long jump. This was the lowest recorded mean value with 0.49 mean differences. They also show (16%) improvement from PT-DTT and (16%) improvement from PT-POT in standing long jump.

When we compare treatments with their tests from PT-POT between each test sit up test was recorded from 21.75 to 31.50repetition per minute mean value was recorded. This was the first recorded with minimum change of treatments with 9.95 mean differences.

The treatment with push up tests from PT-POT was recorded change from 18.20 to 23.65 in repetition per minute of mean value. This was the second recorded with minimum change of the treatments with 5.45 mean differences.

When we compare treatments with their tests from PT-POT standing long jump was recorded 3.04 to 3.53 in meter mean value. This was the 3rd recorded and lowest change of the treatments between tests with 0.49 means differences.

Generally, the average of push up and sit up tests of training group achieved 14.45 of mean difference of muscular endurance. And the group gained an average of 8.93 mean of muscular strength. In other words control group achieved an average of push up and sit up 7.6 mean difference of muscular endurance. The control group gained an average of 0.595 mean difference of muscular strength.

When we compare the mean difference of training group increased their muscular endurance by 14.45 and the mean difference this group increased in their strength by 11.56. So, the experimental group with their treatment scored better than in muscular endurance and strength than control group.

A study conducted by (Schuenke MD *et. al*. 2002)who examined the Muscle build, fat lose and get fit through high intensity exercises group is in agreement with this study.

There for, the result on this study shows that the training group can have a positive effect on the performance enhancement of the muscular endurance and strength.

4.5. The Significance Level of Each Test Results.

Table 4.The mean difference value and significance level of each test results of training and control group. TG (n=20) CG (n=20)

Parameters	**Para(I)**	**Para(J)**	**MD (J-I)**		**Sig**	
			Training	Control	Training	Control
Push up	POT	PT	33.60	23.65	.006	.181
		DTT	6.3	4.25	.000	.000
			4.75	1.2	.181	.000
Sit up	POT	PT	39.40	31.50	.000	.276
		DTT	13.3	8.95	.000	.000
			4.55	0.8	.276	.000
Pull up	POT	PT	22.35	0.7	.003	.705
		DTT	8.25	1.55	.000	.000
			2.45	-0.25	.705	.003
SLJ	POT	PT	4.304	0.49	.000	.890
		DTT	0.77	0.49	.000	.000
			0.094	0	.890	.000

MD= mean difference, training group, control group, SLJ= Standing Long Jump, PT= pre training test which was taken before training, DTT= during training test which was measured at the 6th week of training, POT= post training test measured at the end of 12 weeks of training, Para.(I) first parameter, and Para. (J) Second parameter.

Table 4 shows the overall results of each treatment in each test. It includes the mean difference from one test to another and the significance of post tests in reference to the pre tests and during test. Improvement of performance was recorded in training group in each test. The better significant improvements were observed in training group in sit up, push up and pull up treatments. However, dependent variables group revealed a remarkable change. This was due to the fitness- training program that group were engaged in. However, a more significant

change in the training group in sit up and pull up was an evident for the positive effect of selected resistance exercise on muscular endurance and strength performing exercise program.

When we compare the recorded results of each subjects with normative data in each treatments' from pre test to post test by individual average shown in the following statement.

In push up there were three (3) subjects recorded above average among forty (40) subjects. They also had shown (7.5%) improvement in push up for muscular endurance. Then 30 subjects recorded an average and they had shown (75%) improvement in muscular endurance. And 7 subjects were recorded below average from 40 subjects and they had shown (17.5%) improvement.

When we compare the recorded results of each subjects with normative data in sit up test by each average had shown, below. There were 17 subjects recorded (42.5%) excellent in sit up test while compared with normative data. There were also 12 subjects recorded (30%) above average improvement in muscular endurance,10 subjects also recorded (25%) average improvement in muscular endurance and 1 subject was recorded (2.5%) below average result.

When we compare the recorded results of each subjects with normative data in pull up test by each average had shown, below. There were 22 subjects recorded excellent when they compared with normative data and they had shown (55%) improvement in muscular strength test. There were also 13 subjects recorded above average and they had shown (32.5%) improvement in muscular strength. And 2 subjects were recorded an average and they shown (5%) improvement in muscular strength. Finally 3 subjects were recorded below average and they had shown (7.5%) improvement in muscular strength.

When we compare the recorded results of each subjects with normative data in standing long jump test by each average had shown, below. The whole subjects were recorded excellent and they had shown (100%) improvement in muscular strength.

5. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1. Summary

The purpose of this study was to evaluate the effects of selected resistance trainings on muscular endurance and strength performance of male students. To achieve the aim of the study 40 male students, who did not participate in any other special training, were selected as a subject from chancho preparatory school. Beside this, all the subjects in this study live in a similar life style and their age ranges between 17-19 years.

The subjects were randomly divided in to two groups in which all groups consisted of twenty (20) subjects. The first group acted as training group exercise performing and the second group acted as control group. The experiment lasted for 12 weeks. The dependent variables selected for the study were muscular endurance and strength. The experimental measurements used for this study were push up, sit up, pull up and standing long jump. Before training program, pre physical fitness test for each variable was given to them. Then after six weeks of training program of physical fitness tests and at the end of training program pos-test were given to each dependent variable. Finally, the data were analyzed with paired T- test. The analysis was used to figure out the effect of all trainings and to find out significant difference if any, between the groups on selected variables. In all cases, the 0.05% level confidence was fixed to the test's significance, which was considered as an appropriate.

The overall results of each treatment in each test. It includes the mean difference from one test to another and the significance of post tests in reference to the pre tests and during test. Improvement of performance was recorded in training group in each test. The better significant improvements were observed in training group in sit up, push up and pull up treatments. However, dependent variables group revealed a remarkable change. This was due to the fitness- training program that group were engaged in. However, a more significant change in the training group in sit up and pull up was an evident for the positive effect of selected resistance exercise on muscular endurance and strength performing exercise program.

When we compare the recorded results of each subjects with normative data in each treatments' from pre test to post test by individual average shown in the following statement.

In push up there were three (3) subjects recorded above average among forty (40) subjects. They also had shown (7.5%) improvement in push up for muscular endurance. Then 30 subjects recorded an average and they had shown (75%) improvement in muscular endurance. And 7 subjects were recorded below average from 40 subjects and they had shown (17.5%) improvement.

When we compare the recorded results of each subjects with normative data in sit up test by each average had shown, below. There were 17 subjects recorded (42.5%) excellent in sit up test while compared with normative data. There were also 12 subjects recorded (30%) above average improvement in muscular endurance,10 subjects also recorded (25%) average improvement in muscular endurance and 1 subject was recorded (2.5%) below average result.

When we compare the recorded results of each subjects with normative data in pull up test by each average had shown, below. There were 22 subjects recorded excellent when they compared with normative data and they had shown (55%) improvement in muscular strength test. There were also 13 subjects recorded above average and they had shown (32.5%) improvement in muscular strength. And 2 subjects were recorded an average and they shown (5%) improvement in muscular strength. Finally 3 subjects were recorded below average and they had shown (7.5%) improvement in muscular strength.

When we compare the recorded results of each subjects with normative data in standing long jump test by each average had shown, below. The whole subjects were recorded excellent and they had shown (100%) improvement in muscular strength.

Generally, this study proved that training group performing exercise was significantly better improvement on muscular strength and endurance performance of exercise group. On the other hand, when we compare training group with control group the control group gained lowest improvement on muscular strength and endurance as compare to training group.

5.2. Conclusions

Based on the major findings of the study, the following points are stated as a conclusion.

- A research conducted on male students, who engaged in training group and control group exercise program, indicates that the exercise trainings given to the subjects have a significant benefit on enhancing muscular strength, endurance and other fitness.
- Training group exercises are better improving on muscular strength and endurance in sit up and push up exercise training.
- Pull up exercise training has improved the muscular endurance of male students.
- Training group has a positive effect on muscular strength as well as increment of skills than control groups.
- Finally, when we compare the recorded results of each subject's average with normative data in each treatment had shown some improvement in muscular endurance and strength.
- Additionally in standing long jump when we compare the overall performance with normative data the whole subjects were recorded excellent and had shown (100%) improvement in muscular strength.

5.3. Recommendations

Based on the findings of the study the following research was proved those twelve (12) weeks of selected resistance trainings on muscular endurance and strength performance exercise programs significantly are a selected physical fitness variable of the participants. Based on these results, discussions and findings of the research, the following recommendations are given.

- Considering the importance of 12 weeks selected types of resistance training exercises sport teachers, coaches and individuals while practicing, they should include the different types of exercise in their training programs.
- Sport science teachers, coaches and athletes should be awarded the benefits of muscular endurance and strength performance and the level of exercises to improve athlete performance, health status and general fitness.
- Sport teachers coaches and individual regular exercise participants should emphasis to improve the upper body strength, abdominal strength and the lower limb strength to enhance performance.
- Sport teachers, coaches and trainees should have enough awareness concerning safety rule and training principles to make the body ready for an intensified exercise, to minimize physical injuries and to improve physical fitness.
- Coaches, sport teachers and other professionals should give attention for their training session more in moderate intensity exercise muscular endurance and strength exercise session for better performance.
- This study is very important for those who want to be a sport science educator in this field of study and for those who want to participate in regular physical exercise program.

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7. APPENDICES

Appendix I Information sheet and Informed Consent form for Chancho Preparatory School male students.

Research Title:-The Effects of 12-weeks Selected Resistance Exercise Training on Muscular Endurance and Strength Performance on male students at Chancho Preparatory School.

This research study was been carried out and governed by the regulations for research on human beings.

1. Purpose of the study: the purpose of this study is to investigate or examine the effects of 12 weeks selected resistance exercise trainings on muscular endurance and strength performance on male students. The findings of this research will be very much contribution on sport men as well as the community. More over the aim of this study is to write a thesis for the partial fulfillment of master program in physical education.

2. Procedure and Duration:

The experiment of the study period was taken 3 months. This study was involved 40 subjects from Chancho Preparatory School male students, your son was participate in low, moderate and high intensity training 3 days per week for 12 weeks. Participation in the study was not exceed forty (40) minutes per session. Subjects also participate in physical performance test in three, phases, at the beginning, at the middle and final test at the end of 12 week training..

3. Risks and Benefits

If physical activity will performed during abnormal physiological condition it would result in pain, eventually it would result death. There for, the students are not performing any physical activity, if they feel one of the following signs. Abnormal heart rate, too fast or too slow breathing rate , coughing etc. Incase if they face injury or pain, the researcher will be give first aid to them. If it is severe, the researcher will cover every cost for them to recover.

The benefits of the participant from this study ,it is hoped that ,in the future the students and the society will beneficial from this study by understanding the effects of selected resistance exercise trainings on muscular endurance and strength performance ,qualities on physical performance and adjusting Life style in doing their daily routine.

Appendix II. **Health History Questionnaires for Subjects to be fill by physician.**

This questionnaire was designed to obtain information on the health status of the subjects participating for the research study. Physician was been examining the Chancho Preparatory School male students and decide their participation for the study by answering the following questionnaire and finally approved by parents/caregiver. The information was be kipped strictly confidential. To be made the questionnaire briefer and clear for parents it can be prepared.

INSTRUCTION: please examine the athletes or students and indicate your correct response to each question by encircling it on the choice letter given. Finally, approve as the athletes students is ready to participate on low, moderate, and high intensity exercise training program which engaged for three months.

1. Does this person have a recent physical injury such as bone, muscle, and joint which will be aggravated by physical exercise?

A. yes B .No

If yes, indicate the type of injury that person had_____

2. Does this young have suffered with heart condition?

A. yes B. No

3. Does ever felt pain his chest when he does practice physical exercise?

A. yes B. No

4. Is this individual taking any prescription medicines recently?

A. yes B. NO

If yes, name them below:-

Name of drug Dosage

_____ _____

5. Does this individual have kidney problem?

A. yes B. NO

6. Is there any history of coronary Heart Disease in his family?

A. yes B. No

7. Does this individual is fit three month of low, moderate and high intensity exercise?

A. yes B. No

I hereby state that I have examined the medical condition of this person and answer honestly the above questions. Finally, the following is my decision on the individual's health condition.

Fit for the study exercise Unfit for the study exercise

Physician name_____ signature_____

date_____

Agreement by participant's parent/guardian:

Parent/ guardian name: _____ signature: _____ date: _____

Data collector's name_____ signature_____ date: _____

Appendix III .Physical Fitness Tests of data Record sheet

Code of participant_____ Height_____

Age_____ Weight_____

No	Types of Test	Major Factor to be Measured	Fitness level often several weeks of training			
			Unit	Pre Test	During training test	Post Test
1	Muscular Endurance Test	Push up	Rep. per Minute			
		Sit up	Rep. per Minute			
2	Muscular strength Test	Pull up	Rep. per minute			
		Standing Long Jump	Meter			

Appendix IV. **Paired sample T- test result of each independent variable**.

1. Paired T- tests result of pushup

	Sum of squares	D f	Mean square	F	Sig.
Between Groups with Groups	1396.517 6549.850	2 117	698.258 55.982	12.473	.000
Total	7946.367	119			

2. Paired T- test result of sit up

	Sum of squares	D f	Mean square	F	Sig.
Between Groups with Groups	4284.817 7065.975	2 117	2142.408 60.393	35.474	.000
Total	11350.792	119			

3. Paired T- test result of pull up

	Sum of squares	D f	Mean square	F	Sig.
Between Groups with Groups	731.467 4447.125	2 117	365.733 38.010	9.622	.000
Total	5178.592	119			

4.Paired T- test result of standing long jump

	Sum of squares	D f	Mean square	F	Sig.
Between Groups with Groups	11.392 30.925	2 117	5.696 .264	21.551	.000
Total	42.317	119			

5. Independent sample tests for each variables and groups..

Variables		Equality of variables		T- test for equality of means						
		F	Sig.	T-value	df	Sig.(2-tailed	MD	Std. error difference	The difference	
									lower	upper
Push up	Equal variances assumed	8.147	.005	5.085	118	.000	6.90	1.35693	4.21291	9.58709
	Equal variances not assumed			5.085	108.7	.000	6.90	1.35693	4.21052	9.58948
Sit up	Equal variances assume	1.934	.167	2.253	118	.026	3.95	1.75334	.47790	7.42210
	Equal variances not assumed			2.253	113.4	.026	3.95	1.75334	.47644	7.42356
Pull up	Equal variances assumed	15.483	.000	8.041	118	.000	7.82	.97215	5.89154	9.74179
	Equal variances not assumed			8.041	98.8	.000	7.82	.97215	5.88766	9.74567
S L J	Equal variances assumed	.048	.826	6.600	118	.000	.62	.09344	.43163	.80171
	Equal variances not assumed			6.600	117.8	.000	.62	.09344	.43163	.80171

6.Paired sample T- test result of dependent variables of multiple comparisons

TG (n=20)

variables	Test	Mean d/f for training group (I-J)	Sig.	95% Confidence Interval	
				Lower bound	Upper bound
Push up	PT →DTT PT →POT DTT →POT	-5.27 ± 1.67 -8.25 ± 1.67 -2.97 ± 1.67	.006 .000 .181	-9.2467 -12.2217 -6.9467	-1.3033 -4.2783 .9967
Sit up	PT →DTT PT →POT DTT →POT	-11.12 ±1.74 -13.8 ± 1.74 -2.67± 1.74	.000 .000 .276	-15.2502 -17.9252 -6.8002	-6.9998 -9.6748 1.4502
Pull up	PT →DTT PT →POT DTT →POT	-4.60 ± 1.38 -5.70 ± 1.38 -1.10 ± 1.38	.003 .000 .705	-7.8726 -8.9726 -4.3726	-1.3274 -2.4274 2.1726
Standing long jump	PT →DTT PT →POT DTT →POT	-.625 ± .115 -.678 ± .115 -.053 ± .115	.000 .000 .890	-8984 -9514 -3259	-.3526 -.4056 .2199

7. paired sample T- test result of dependent variables of multiple comparisons

CG (n=20)

variables	Test	Mean d/f for control group (I-J)	Sig.	95% Confidence Interval	
				Lower bound	Upper bound
Push up	PT →DTT PT →POT DTT →POT	5.27 ± 1.67 8.25 ± 1.67 2.97 ± 1.67	.006 .000 .181	1.3033 4.2783 -9967	9.2467 12.2217 6.9467
Sit up	PT →DTT PT →POT DTT →POT	11.12 ±1.74 13.8 ± 1.74 2.67± 1.74	.000 .000 .276	6.9998 9.6748 -1.4502	15.2502 17.9252 6.8002
Pull up	PT →DTT PT →POT DTT →POT	4.60 ± 1.38 5.70 ± 1.38 1.10 ± 1.38	.003 .000 .705	1.3274 2.4274 -2.1726	7.8726 8.9726 4.3726
Standing long jump	PT →DTT PT →POT DTT →POT	.625 ± .115 .678 ± .115 .053 ± .115	.000 .000 .890	.3526 .4056 -.2199	.8984 .9514 .3259

8. Independent T-tests of groups (training and control group) TG (n=20) CG (n=20)

Group		N	Mean	Std. Deviation	Std. error mean
Push up	Training	60	28.3333	8.45059	1.09097
	Control	60	21.4333	6.25006	.80688
Sit up	Training	60	31.9333	10.52820	1.35918
	Control	60	27.9833	8.57962	1.10762
Pull up	Training	60	17.9667	6.39111	.82509
	Control	60	10.1500	3.98227	.51411
SLJ	Training	60	3.9825	.52290	.06751
	Control	60	3.3658	.50045	.06461

Appendix V. Description of Training Plan

Fitness Training Plans for Sports

Sports fitness training plans are the strategies for achieving peak performance. More than simply building strength or endurance, effective programs are created based on sport-specific demands, sound principles, and coaching wisdom earned from years of experience. Plus, using test results to individualize the program for each athlete is key to success. And the way to controlled training process and meaningful planning of training was long, starting with the first of attempts and errors, leading to scientific based planning which has started to develop during the 19th Century.

A training plan is the document which outlines details about the formal training a trainee will do with you. It is your responsibility to complete and lodge a training plan. It is involved the following intensity exercise. Low intensity, moderate, high intensity exercise, load and principles of trainings were discussed below. Department of state development page last update: 23/03/2017

1. Low intensity exercise:-measuring heart rate is the method most often used to evaluate intensity in everyday life or to set the level of exercise in physical training, low, moderate and high levels of exercise intensity, as measured by heart rate, are defined as follows: Low is about 40-54% MHR. The decrease in the minimal intensity to 40% of Vo2 max and 55% of HR max represents a change in the ACSM recommendation and more clearly recognizes that the minimal threshold for improving fitness/ health is quite variable at the lower end of the intensity scale. For low- intensity sub maximal exercise, fatigue may result from substrate depletion, dehydration, hyperthermia, or loss of motivation associated with central fatigue. In this exercise intensity 40 minutes were given, 3 days per week exercise, minimum repetition and 30sec. active rest b/n exercise. (Running competition. com. Nov 27, 2013)

2.**Moderate intensity exercise**:- the amount of energy used by the body per minute of activity, the table below in weekly training program lists examples of activities classified as moderate intensity based up on the amount of energy used by the body while, doing the activity. Activities in this statement referred to activities that use approximately are equivalent to 55-65% of V02 max. In this exercise intensity 3 days per week, duration of time 35 minutes

for activity, medium repetition, 30 sec. active rest b/n exercise and the load is somewhat hard.(Health and style . com/fitness/ moderate- intensity- exercise/ Feb 229,2016)

3**. High intensity exercise**:- High intensity aerobic interval exercise is superior to moderate exercise for increasing Vo2 .Subjects using this method trained 3 times per week obtained gains similar to what would be expected from subjects who did steady state (50–70% Vo2max) training five times per week. While still a demanding form of training, this exercise protocol could be used by the general public with nothing more than an average exercise bike.

Gibala's group published a less intense version of their regimen in a 2011 paper in Medicine and Science in Sports and Exercise. This was intended as a gentler option for sedentary people who had done no exercise for over a year. It included 3 minutes of warm-up, 10 repetitions of 60-second bursts at 60% peak power (80- 95% of heart rate reserve) each followed by 60 seconds of recovery, and then a 5-minute cool-down.[11] (Gibala's 2011).

4. **Load**

Sport training consists of activities and movements which generally lead to high fatigue. Fatigue is the direct product of load caused by physical activity or exercise. Fatigue is essential for starting the adaptation processes in the organism which ultimately lead to increase in performance capacity. And it is hard activity .Training load and recovery (www.indraneelghosh.com/sports/sport science/12).

According to the American College of Sports Medicine (2002), progressive overloading is the continuous increase of workload on the body, "tolerance in continuously increasing charges of" which is vital for progress in a program. In fact the body continues to adapt as long as it is given stimuli of a higher workload than of what it is used to.

There are many ways to increase the work load: (1) Increasing the endurance, (2) Increasing the repetitions in a given resistance, (3) Changing the speed of repetitions depending on the objectives, (4) Reduction of breaks in order to improve the endurance in the strength, (5) Increasing the training volume, (6) Giving variety of skills (ACSM, 2002). Training involves continuous changes (adaptations) that vary from the level of training, the experience and the genetic characteristics of each individual. Untrained individuals showed adaptations to most programs, something that renders it difficult to appreciate the value of each different program.

The level of improvement in trained individuals was much slower comparing to those untrained (ACSM, 2002).

5. Principles of sports training

Principles of sports training represent recommendations, instructions or standards for coaching aiming at ensuring as much training effect as possible.

5.1. Principle of the unity of versatile and specialized training

For optimum development of an athlete, an optimum proportion of versatile and specialized training is necessary which changes in individual stages of sports training. The volume of specialized training increases gradually. Premature specialization is a mistake, i.e. high increase in specialized training in a very young age, which results in quick increase in sports performance.

5.2. Principle of continuous training process

The basic precondition of increasing and maintaining acquired sports performance is systematic training activity. It is necessary to keep optimum frequency of training units which follow the principle of super compensation. The requirement therefore is to continuously alternate load and rest while respecting individual specifics of athletes.

5.3 .Principle of gradual load increasing

Load volume must respect the current training fitness of the athlete. In a long-term perspective, load must increase gradually. On a regular basis, it is not possible to increase load without any limit. During individual stages, training periods and cycles, load increases, stabilizes and subsequently decreases. In a long-term perspective, load volume is of a wave-shape character with a long-term tendency to increase load.

5.4. **Principle of warm up**:-This involves 3-5 min of warming body temperature to facilitate & ready the body parts. Warm up (no more 15 -20 minutes) .It is use to prevent physical injuries. Duration of warm up is depending up on weather condition or climatic condition. A warm up is the act of preparing for an athletic event or workout by exercising or practicing for a short time beforehand. Warming up helps reduce your risk of injury and the aches and pains that come with exercise. The physiological reason to warm up is to assist your circulatory

system in pumping oxygen-rich blood to your working muscles. The idea is to increase circulation throughout the body, in a gradual manner. A proper warm up safely prepares the body for the increased demands of exercise. By (Gerald Lafon, Article created on:2/27/2008).

5.6 .Principles of Cooling down:-cooling down should consist of the following.

- 5 to 10 minutes jigging/walking-decrease body temperature and remove waste products from the working muscles.
- 5 to 10 minutes static stretching exercise.

Static stretchers are more appropriate to the cool down as they help muscles to relax. Realign muscle fibers and re- establish their normal range of movement. These stretches should be held for approximately 10 seconds. KISTLER ,B,M.et,al (2010)

Appendix VI. Weekly Training schedule

First month (November, 2016) training schedule

Day	Physical quality enhancement	**Types of exercise**	Time(minute	Repetition	Rest	Duration	Intensity exercise	Load
Tuesday	Preparation exercise for lower body strengthening exercise & endurance.	**Warm up exercise** Walking , jogging, rope jumping ,movement of hands & leg, arm & different types of aerobic exercise. -Different types of stretching exercise. **Main activity** Sit up, squat & bench stepping, frog squat, push up, etc. (lower body strengthening exercise). **Cooling down** Lower body strengthening exercise & with breathing meditation.	8 5 20 3	1×8min 1×5min 2×10min (for each exercise) 1×3min	30 second active rest b/n exercise	40’	Low intensity (<55 HR max)	**Easy**
Wednesday	Preparation exercise for abdominal strength & endurance	**Warm up exercise** -Walking**,** jogging, rope jumping, movement of hands& Leg, arm & different types of aerobic exercise. **Main activity** -curl up, sit up, push up, pull up, back sit up, side sit up, & different types of stretching exercise. (Abdominal muscle strengthening exercise). **Cooling down** -slow movement, jogging, simple stretching exercise 7 with breathing meditation.	8 5 20 3	1×8min 1×5min 2×10min (for each exercise) 1×3min	30 second active rest b/n exercise (4min)	40’	Low intensity (<55 HR max)	**Easy**
Friday	Preparation Exercise for upper body strength and endurance	**Warm up exercise** -Walking, jogging, rope jumping, running, stretching, movement of hands, & different types of aerobic exercise. -Different types of stretching exercise. **Main activity** -push up**,** pull up, weight lifting, 15kg, 20kg, 25kg, & 30kg and different types of upper body strengthening exercise . (Upper body strengthening exercise). **Cooling down** -Slow movement of running, low stretching exercise and breathing meditation.	8 5 20 3	1×8min 1×5min 2×10min (for each exercise) 1×3min	30 second active rest b/n exercise (4min)	40’	Low intensity (<55 HR max)	**Easy**

Second month (December, 2016) training schedule

Day	Physical quality enhancement	**Types of exercise**	Time(minute	Repetition	Rest	Duration	Intensity exercise	Load
Tuesday	Preparation exercise for lower body strengthening exercise & endurance.	**Warm up exercise** Walking , jogging, rope jumping ,movement of hands & leg, arm & different types of aerobic exercise. -Different types of stretching exercise. **Main activity** - Squat & bench stepping, frog squat, sit up, etc. (lower body strengthening exercise). **Cooling down** Lower body strengthening exercise, simple jogging & with breathing meditation.	7 3 18 3	1×7min 1×3min 2×9min (for each exercise) 1×3min	30 second active rest b/n exercise(4min)	35’	Moderate intensity (55 -65HR max)	Somewhat hard
Wednesday	Preparation exercise for abdominal strength & endurance	**Warm up exercise** -Walking**,** jogging, rope jumping, movement of hands & Leg, arm & different types of aerobic exercise. -Different types of stretching exercise **Main activity** -Sit up, push up, pull up, back sit up, side sit up, & different types of stretching exercise. (Abdominal muscle strengthening exercise). **Cooling down** - Simple stretching exercise, jogging & with breathing meditation.	7 3 18 3	1×7min 1×3min 2×9min (for each exercise) 1×3min	30 second active rest b/n exercise (4min)	35’	Moderate intensity (55 -65HR max)	Somewhat hard
Friday	Preparation Exercise for upper body strength and endurance	**Warm up exercise** -Walking, jogging, rope jumping, stretching, movement of hands, leg, arm & different types of aerobic exercise. -Different types of stretching exercise. **Main activity** -push up**,** pull up, weight lifting, 15kg, 20kg, 25kg, & 30kg and different types of upper body strengthening exercise . (Upper body strengthening exercise). **Cooling down** -Simple stretching exercise, jogging and breathing meditation.	7 3 18 3	1×7min 1×3min 2×9min (for each exercise) 1×3min	30 second active rest b/n exercise (4min)	35’	Moderate intensity (55 -65HR max)	Somewhat hard

Third month (January, 2017) training schedule

Day	Physical quality enhancement	**Types of exercise**	Time(minute	Repetition	Rest	Duration	Intensity exercise	Load
Tuesday	Preparation exercise for lower body strengthening exercise & endurance.	**Warm up exercise** Walking , jogging, rope jumping ,movement of hands & leg, arm & different types of aerobic exercise. -Different types of stretching exercise. **Main activity** - Squat & bench stepping, frog squat, push up, sit up, back sit up etc. (lower body strengthening exercise). **Cooling down** Lower body strengthening exercise, simple jogging simple movement of hands and with breathing meditation.	5 2 16 3	1×5min 1×2min 2×8min (for each exercise) 1×3min	30 second active rest b/n exercise(4min)	30’	High intensity (65 -85 HR max)	Hard
Wednesday	Preparation exercise for abdominal muscle strength & endurance	**Warm up exercise** -Walking**,** jogging, rope jumping, movement of hands & Leg, arm & different types of aerobic exercise. -Different types of stretching exercise **Main activity** -Circling hip, Sit up, push up, pull up, back sit up, side sit up, & different types of stretching exercise. (Abdominal muscle strengthening exercise). **Cooling down** - Simple stretching exercise, simple jogging, low movement of hands & with breathing meditation.	5 2 16 3	1×5min 1×2min 2×8min (for each exercise) 1×3min	30 second active rest b/n exercise (4min)	30’	High intensity (65 -85 HR max)	Hard
Friday	Preparation Exercise for upper body strength and endurance	**Warm up exercise** -Walking, jogging, rope jumping, stretching, movement of hands, leg, arm & different types of aerobic exercise. -Different types of stretching exercise. **Main activity** -push up**,** pull up, weight lifting, 15kg, 20kg, 25kg, & 30kg and different types of upper body strengthening exercise . (Upper body strengthening exercise). **Cooling down** -Simple stretching exercise, low movement of hands and breathing meditation.	5 2 16 3	1×5min 1×2min 2×8min (for each exercise) 1×3min	30 second active rest b/n exercise (4min)	30’	High intensity (65 -85 HR max)	Hard

Appendix VII. Norms of Physical Test.

The Push up test for men

The following table, adapted from Golding et al, (1986). The Y's way to physical fitness (3rd ed,)

Age	Excellent	Good	Above Average	Average	Below Average	poor	Very poor
17-19	>56	47-56	35-46	19-34	11-18	4 -10	< 4

Source: Y'S Way to physical Fitness: The complete Guide to Fitness Testing and instruction (3rd Edition) by Lawrence Golding and Clayton Myers.

The following are norms for 17 to 19 years olds for Sit up test (Davis 2000)

Age	Sit ups	Excellent	Above Average	Average	Below Average	Poor
17-19	Men	>30	26 - 30	20 - 25	17 - 19	< 17

Norms of Pull up scores for men

The following Normative Data for ages 16 to 19 is adapted from (Top End sports, 2011) Brain Mac, 2011.

Age	Pull ups	Excellent	Above Average	Average	Below average	poor
16-19	Men	>13	9-13	6-8	3-5	<3

The following table is Standing Long Jump for male athletes (Adapted from: Hede et,al, 2011)

Age	Excellent	Above average	Average	Below average	Poor
>16	>2.44m	2.44-2.29m	2.28-2.16m	2.15-1.98m	<1.98m

Appendix VIII. Anthropometric Measurement test of raw data record sheet

Norms of Body Mass Index (BMI)

BMI (Kg/m2	Classification
< 18.5	Under weight
18.5 – 24.9	Normal (Healthy weight)
25.0 – 29.9	Over weight
30.0 – 39.9	Obesity

Source: Adapted from WHO, 2004

Code No. of participants	Age	Height in meter	Weight in kg	BMI kg/m2
01	19	1.75	65	21.22
02	19	1.65	65	23.88
03	19	1.78	68	21.5
04	19	1.75	63	20.6
05	18	1.60	58	22.65
06	19	1.65	62	22.8
07	18	1.60	59	23
08	18	1.60	60	23.44
09	19	1.65	58	21.3
010	18	1.65	62	22.8
011	19	1.70	63	21.8
012	19	1.60	59	23.05
013	19	1.60	58	22.66
014	18	1.67	62	22.23
015	19	1.63	62	23.34
016	19	1.65	58	21.3
017	19	1.67	60	21.5
018	19	1.63	60	22.6
019	19	1.65	62	22.8
020	19	1.69	65	22.8
021	19	1.70	67	23.2

022	18	1.65	60	22.04
023	18	1.62	59	22.5
024	17	1.60	58	22.66
025	19	1.67	60	21.5
026	19	1.67	61	21.9
027	19	1.62	59	22.5
028	19	1.60	57	22.3
029	19	1.66	63	22.9
030	19	1.70	66	22.84
031	19	1.72	67	22.65
032	17	1.60	58	22.66
033	19	1.65	59	21.7
034	17	1.65	59	21.7
035	18	1.63	63	23.7
036	18	1.60	58	22.66
037	18	1.62	59	22.5
038	18	1.60	59	23.05
039	18	1.63	60	22.6
040	18	1.60	60	23.44

Table:1. Pushups for age 17-19 raw data

No. of subjects	Pre test in rep. per/ min	During Training test In rep. per/ min	Post test in rep. per/ min	Individual Average
1.	24	34	40	33
2.	20	20	22	21
3.	32	30	32	31
4.	22	29	34	28
5.	12	19	20	17
6.	20	25	26	24
7	25	35	34	31
8.	20	23	25	23
9.	15	21	28	21
10.	35	39	42	39
11.	32	40	45	39
12.	25	30	36	30
13.	17	20	26	21
14.	25	30	32	29
15.	17	21	24	21
16.	15	30	36	27
17.	16	17	18	17
18.	15	20	21	19
19.	16	20	22	19
20.	14	15	18	16
21.	20	30	28	26
22.	16	15	17	16
23.	17	21	22	20
24.	15	30	26	24
25.	21	27	30	26
26.	9	14	16	13
27.	13	11	12	12
28.	19	26	27	24
29.	22	22	23	22

30.	21	30	36	29
31.	26	34	36	32
32.	15	20	27	21
33.	27	30	35	31
34.	15	18	22	18
35.	30	25	32	29
36..	23	31	35	30
37.	15	18	24	19
38..	20	37	42	33
39.	40	41	42	41
40.	14	28	32	25
Group Average	20.4	25.6	28.6	25

Table 2.Sit up scores for age 17 -19 raw data

No. of subjects	Pre test in rep. per/ min.	During Training test In rep. per/ min.	Post test in rep. per/min.	Individual Average
1.	20	36	34	30
2.	36	34	36	35
3.	36	36	42	38
4.	22	47	52	40
5.	24	54	56	45
6.	15	31	36	27
7.	20	35	38	31
8.	27	44	48	40
9.	20	25	28	24
10.	28	30	34	31
11.	15	44	50	36
12.	32	28	30	30
13.	16	33	30	26
14.	20	23	25	23
15.	21	30	28	26
16.	17	38	40	32
17.	17	28	31	25

18.	10	25	27	21
19.	30	40	46	39
20.	18	37	35	30
21.	20	26	28	25
22.	13	35	30	26
23.	40	21	26	29
24.	25	45	36	35
25.	35	38	40	38
26.	15	26	29	23
27.	21	17	22	20
28.	17	34	35	29
29.	12	20	22	18
30.	17	42	45	35
31	21	38	42	34
32.	16	34	38	29
33.	24	34	38	32
34.	31	32	38	34
35.	19	25	30	25
36.	29	39	42	37
37.	18	26	32	25
38.	15	29	35	26
39.	20	25	32	26
40.	14	27	32	24
Group Average	21.6	31.9	35.4	29.7

Table 3.Pull up scores for age 17 -19 raw data

No. of subjects	Pre test in rep. per/ min.	During Training test In rep. per/ min.	Post test in rep. per/ min.	Individual Average
1.	5	5	6	5.3
2.	11	10	11	10.7
3.	9	20	22	17
4.	12	16	18	15.3
5.	20	22	26	22.7
6.	14	21	23	19.3
7.	10	17	19	15.3
8.	5	15	17	12.3
9.	10	14	16	13.3
10.	11	21	22	18
11	12	21	25	19.3
12.	10	11	12	11
13.	10	9	10	9.7
14.	10	10	11	10.3
15.	7	14	10	10.3
16.	10	8	9	9
17.	16	26	28	23.3
18.	10	22	24	18.7
19.	20	30	32	27.3
20.	10	15	18	14.3
21.	5	13	16	11.3
22.	15	16	18	16.3
23.	10	19	20	16.3
24.	8	18	20	15.3
25.	13	25	28	22
26.	12	22	25	19.7
27.	11	27	30	22.7
28.	10	11	10	10.3
29.	6	6	6	6

30.	11	10	10	10.3
31.	12	19	16	15.7
32.	10	10	11	10.3
33.	3	3	4	3.3
34.	3	4	5	4
35.	14	20	12	15.3
36.	16	14	16	11
37.	9	15	16	13.3
38.	5	6	7	6
39.	18	12	12	14
40.	12	14	12	12.7
Group Average	10.6	15.3	16.3	14.1

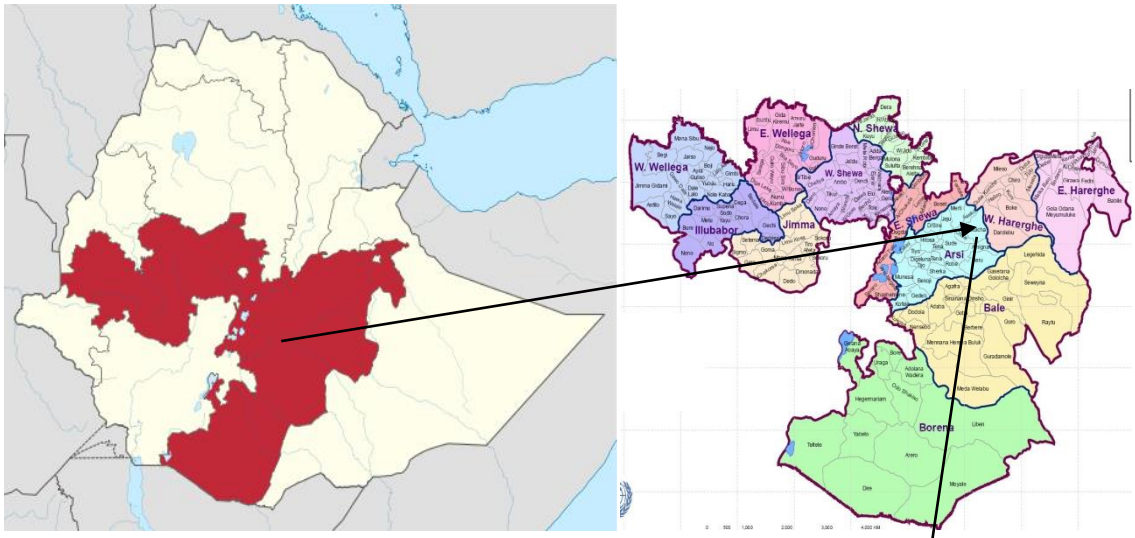
Table 4.Standing Long Jump scores for age 17 -19 raw data

No. of subjects	Pre test in rep. per/ min.	During Training test In rep. per/ min.	Post test in rep. per/ min.	Individual Average
1.	3.42m	4.0m	4.10m	3.84m
2.	3.62m	4.0m	4.0m	3.87m
3.	2.52m	3.0m	3.10m	2.87m
4.	2.82m	3.50m	3.55m	3.3m
5.	2.22m	4.0m	4.0m	3.41m
6.	3.52m	3.7m	3.75m	3.66m
7.	3.22m	3.50	3.50m	3.41m
8.	2.72m	3.0m	3.10m	2.94m
9.	3.22m	4.0m	4.15m	3.8m
10.	3.62m	3.70m	3.90m	3.74m
11.	3.92m	4.10m	4.12m	4.05m
12.	3.62m	4.30m	4.40m	4.11m
13.	3.42m	4.40m	4.50m	4.11m
14.	4.22m	4.50m	4.50m	4.41m
15.	3.62m	3.80m	3.90m	3.8m
16.	3.22m	4.80m	4.85m	4.3m
17.	3.42m	4.50m	4.60m	4.2m

18.	4.22m	4.70m	4.85m	4.6m
19.	2.62m	4.10m	4.15m	3.62m
20.	3.22m	3.80m	3.90m	3.64m
21.	3.32m	4.50m	4.60m	4.14m
22.	3.0m	4.10m	4.25m	3.8m
23.	2.92m	4.40m	4.50m	3.94m
24.	3.82m	4.40m	4.50m	4.24m
25.	3.62m	4.10m	2.20m	3.31m
26.	3.12m	3.60m	3.70m	3.5m
27.	3.22m	4.30m	4.40m	4.0m
28.	2.22m	3.0m	3.0m	2.74m
29.	2.72m	3.0m	3.0m	2.91m
30.	3.82m	3.70m	3.70m	3.74m
31.	3.82m	3.80m	3.70m	3.8m
32.	2.82m	3.20m	3.20m	3.1m
33.	2.82m	3.50m	3.40m	3.24m
34.	3.32m	3.80m	3.85m	3.66m
35.	3.72m	4.0m	4.0m	3.91m
36.	3.42m	4.20m	4.15m	3.92m
37.	2.72m	3.10m	3.15m	3.0m
38.	2.22m	3.0m	3.0m	2.74m
39.	3.12m	3.50m	3.50m	3.4m
40.	3.42m	4.0m	4.0m	3.81m
Group Average	3.3m	3.9m	3.9m	3.7m

List of Figures in the Appendix

Figure 2. Map of the study site.



Location of map

Source: https://www.google.com/search ? q=ARSI+ZONE+