



JIMMA UNIVERSITY

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DEPARTMENT OF SPORT SCIENCE

**EFFECTS OF 12 WEEKS REGULAR PHYSICAL EXERCISE
TRAINING ON MALE STUDENT'S FITNESS
DEVELOPMENT IN SOME SELECTED COMPONENTS OF
FITNESS IN CASE TOBA SECONDARY SCHOOL**

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JIMMA, ETHIOPIA

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DEDICATION

I dedicate this thesis manuscript to my adviser and families. As well as the researcher extended his dedication to peoples who contribute even a piece of advice throughout in my life to reach in this stage.

BIOGRAPHICAL SKETCH

The author was born on August 1982 E.C in south western part of Oromia region specific place .Gumey woreda is Fund Jimma Zone He attended his elementary school at Toba Edgt and secondary school education at Toba high and preparatory school In, respectively. Upon successful completion of his high school studies, he joined Dire dawa University and graduated with Bsc Degree in sport science in 2005 E.C and served as physical education teacher at different schools in Jimma Zone at Gumay Woreda. . The author joined Jimma University to pursue his post graduate study in the field of Sport science.

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ABBREVIATIONS

PARQ: Physical Activity Readiness Questionnaires

ACSM: American College of Sports Medicine

ANOVA: Analysis of variance

COG: Control Group

EXG: Experimental Group

POT: Post test

PT: pre test

MD: Mean Difference

SD: Standard Deviation

SEM: Standard error of the mean

SPSS: Statistical Package for Social Sciences

PE: Physical education

HRPF: Health related physical fitness

SRPF: skill related physical fitness

CVE: Cardio vascular endurance

MS: Muscular strength

BMX: Body mass index

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ABSTRACT

The purpose of the study was to investigate the effects of 12 weeks regular physical exercise training on male student's fitness development in some selected component of fitness in case of Toba secondary school. The study employed Experimental research design. 40 male students with the age of (EXG= 16.80 ± 1.00 and COG= 16.45 ± 1.05 (20 experimental groups and 20 Control group) was randomly selected. Pretest & Posttest measurements were taken from the two groups before & after the intervention of regular physical exercise training, which were performed for 12 weeks. The data collected from the participants were analyzed. Descriptive statistics such as arithmetic mean and standard deviation was applied to process the data. Inferential statistics such as paired t-test (t value and p-value) was used to compare the pre training and post training data. Paired t-test and with level of significant at 0.05 by using SPSS version 23, software. The findings of this study indicate that 12 weeks regular physical exercise training have significant effect on male students fitness development in body composition BMI test, muscular strength chin up test, power vertical jump test, flexibility sit and reach test, and agility illusion test. The result of the study shows that the control group has not a significant change at 0.05 level of confidence in the post and pre results whereas the experimental group has a significance difference at 0.05 level of confidence in the post and pre results. The results clearly indicate that 12 weeks regular physical exercise training have a significant effect on male students fitness development at 0.05 level of confidence in the pre and post test results. Hence it is recommended that physical educators and physical education high school teachers include 12 weeks regular physical exercise training for their schedules program for fitness development

Key Words: *Effects of 12 weeks, Regular Exercise, Fitness Development.*

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

Fundamental movements of man, which they have achieved from their pre-human ancestors, are walking, running, jumping, climbing, throwing, pulling, pushing etc. By permutation and combination of these basic fundamental movements, man has developed various secondary movements essential for day-to-day living and for the use in games and sports. Physical education has long and established tradition in schools, being linked to the development of both body and mind. In other words, it is an important component of the overall school program and integral part of the educational program. However, physical education uses physical activity to produce holistic improvements in persons' physical, mental social & emotional qualities. Physical activity has significant physical health benefits; and it appears to improve health-related quality of life by enhancing psychological well-being and by improving physical functioning in persons compromised by poor health. (USDHHS, 1996) and it is positively associated with health related quality of life (Berger & Motl, 2001).

However, physical education provides students with many opportunities to improve their overall life style; first and foremost, it provides students the opportunity to improve their physical fitness, development and health (Brubaker, 2011). There are many factors which help to develop physical fitness, but regular physical exercise training is the key aspect to achieve optimal physical fitness. It is a multidimensional state of being that usually refers to two aims: performance, which consists of skill-related fitness components, and health that includes five health-related fitness components, each of which contributes to total quality of life (Corbin & et al., 2006). Fitness is the first and foremost thing to enjoy the life fully (Reddy, 2012). Education is the process by which person acquires knowledge, skills and habits or behaviors that help him/ her become useful member of a society. It also helps people develop an appreciation of their cultural heritages and try more satisfying their lives (Richards, 1995:1). Physical education is mainly given through physical activities to develop and maintain all aspects of personality which include physical, mental and social wellbeing (Sahile & Gezegn, 2012). Carbine et al., (2002) also suggested that the relationship between a healthy life and regular exercise is undeniable. Exercisers have an all-cause mortality rate that is less than one-third of that of non-exercisers. Moreover, some forms of regular physical

activity, even if it is very mild form of activity, of low and moderate amounts of physical activity, can also have beneficial health results. Carbine et al., (2002)

Fitness, physical activity behavior and motor skill development are important components of the physical education curriculum and are potentially indicators of child health. Physical fitness in children and adolescents has also been linked to positive health outcomes in adults. Moreover, motor skills can be used for talent identification to predict sporting success in children. Previous research has demonstrated the positive effects of four-weeks after school program addressing motor skills and fitness can have in young children. Therefore, encouraging motor skill and fitness development in young children is likely to have substantial benefits on health outcomes and potentially subsequent sporting success in children (Grice, 2003; Kvaaviket al., 2009; Matvienko and Iradge, 2009 and Lloyd et al., 2010).

Physical fitness is the state of health and wellbeing and more specifically, the ability to perform aspects of sports, occupations and daily activity (president counseling of physical fitness and sports, 2012) Physical). fitness has relationship with enhanced performance in sports and motor skills (Matte, 2015). Generally, Fitness is defined as the ability of a person to live a happy, well-balanced life. Two components of physical fitness have been declared that include health related and skill related physical fitness components. Health related physical fitness component is concerned with the health and wellbeing. Health related physical fitness component involves, cardiovascular endurance, flexibility, muscular strength and endurance and body composition. On the other hand the skill related physical fitness components refer to ability to learn sports and other kinds of physical activities. This ability includes agilities, balance coordination, power, speed and reaction time (Moe, 2010)

Regular physical exercise will produce beneficial effects for any age group providing the exercise is specific and appropriate to the level of fitness of the individual. Progressive exercise correctly performed will increase the level of fitness and improve health. It will also create a sense of well -being, produce greater energy and reduce the risk of developing many diseases. Exercise makes demands on the body systems over and above normal every day activities and as result the systems adapt anatomically and physiologically (Rosser, 2001).

During the last few decades, the role of sport and physical activity in students' health and wellbeing has been the focus of sport scientists. Research has shown that regular and systematic exercise can have a positive effect on developing physical skills and ability, while improving aspects of personality through group activities. Physical activity has also been

shown to lead to academic achievement in students (Kantomaa et al., 2009; Gilinsky, 2010). It has been clearly demonstrated that physical activity decrease risk of developing cardiovascular disease, stroke, some cancers ,obesity, type 2 diabetes mellitus and is also effective in the treatment of several of these diseases(Thomas,Keeley Kenneth and Fox,2009).

The reality in toba secondary school shows low time allotment of physical education than other subjects. Because of these students showed limitations on their physical fitness status when the researcher evaluates in his physical education practical classes particularly in grade 9-10 students. The researcher thought that if the number of periods given in one week was increased with contents of regular exercise, it would have influence on physical fitness qualities otherwise the situation made students to have poor physical fitness. Due to this, the aim of the study was to evaluate the effects of twelve weeks regular physical exercise on selected physical fitness variables on grade 9-10 male students.

1.2. Statement of the problem

Even if it remains unknown to what extent fitness instruction has been included in physical education program, fitness test program has been implemented in most schools as millions of young people have experienced fitness testing (Placek, et al., 2001).Interestingly, both US and the republic of Chain start systematic youth fitness testing in schools in the early 1950s for complete different reasons. The force in the US was unsatisfactory performance of American youth compared to European youth on the Kraus Weber test (Freedson et al, 2000; Seinfeld and Vogel, 1989). By contrast, the national wide impetus to follow the model of the Soviet Union was one of the primary reasons for the PRC to implement the national fitness test in schools (Ili, 1996).

The underlying assumptions for testing youth people's fitness in physical education program in both countries, however, were almost identical. It was widely believed that the identifications deficiency of fitness through testing could help teachers to implement appropriate intervention and motivation for youngsters to practice in more physical activates (Fan, 1996: Pangrazi, 2001). Similarly, fitness program in both countries have undergone revolutionary revisions over the years (Keating, X., D, 2003).

Now a day, regular physical exercise is the best therapy that treats people without giving medication in our country. most people are aware that regular physical exercise can positively affect many aspects of our physical, mental, emotional and social well-being. Especially

those suffer from chronic diseases, depression and constant worry although many studies believe that regular physical exercise can give health benefits by positively affecting body composition, immune system and musculoskeletal development for males but many of us including those who are involved in the regular exercise training program may not know how many of them follow the regular exercise training program with respect to the class members in order to give proper training. Even though, From the last seven years the researcher practical observation students in Toba secondary school were not participate in the regular exercise program to develop the health related physical fitness and skill related physical fitness due to the absence of well trained professionals and lack of awareness about the effect of fitness training and its contribution. Due, to this the students were not good in fitness level like agility and power, like flexibility, muscular strength and body composition. That is why; this study was mainly focused by systematically conducting on the effect twelve weeks of regular physical exercise training on male student's fitness development in some selected components of fitness in case Toba secondary school.

1.3. Objective of the study

1.3.1. General Objective

The general objective of the study was to investigate the effects of 12weeks of regular physical exercise training on male student's fitness development in some selected component of fitness in case of Toba secondary school.

1.3.2. Specific objective

- ❖ Based on the above general objectives the following specific objectives were developed:
- ❖ To examine the effect of 12 weeks regular physical **body composition** exercise on student's fitness development.
- ❖ To examine the effect of 12 weeks regular physical **Muscular strength** exercise on student's fitness development.
- ❖ To examine the effect of 12 weeks regular physical **flexibility** exercise on student's fitness development.
- ❖ To evaluate the effect of 12 weeks regular physical **power** exercise on male student's fitness development.
- ❖ To evaluate the effect of 12 weeks regular physical **agility** exercise on male student's fitness development.

1.4. Hypotheses

HI: There was significance effect on muscular strength of male students as a result of 12weeks regular physical exercise training.

HO: There was no significance effect on muscular strength of male students as a result of 12 weeks regular physical exercise training.

HI: There was significance effect on flexibility of male students as a result of 12weeks regular physical exercise training.

HO: There was no significance effect on flexibility of male students as a result of 12 weeks regular physical exercise training.

HI: There was significance effect on agility of male students as a result of 12weeks regular physical exercise training.

HO: There was no significance effect on agility of male students as a result of 12 weeks regular physical exercise training.

HI: There was significance effect on power of male students as a result of 12 weeks regular physical exercise training.

HO: There was no significance effect on power of male students as a result of 12weeks regular physical exercise training.

HI: There was significance effect on body composition of male students as a result of 12weeks regular physical exercise training.

HO: There was no significance effect on body composition of male students as a result of 12 weeks regular physical exercise training.

1.5. Significance of the Study

The main benefit of any research is the increase in knowledge, the study which carried out by one researcher may be further studied and would be studied by others many times which is the increase in knowledge upon a specific issue. The outcome of the finding could help:

- ❖ To provide a proper and fertile ground for PE teachers to utilize selected fitness tests and evaluate the improvement of their students' physical fitness qualities through 12 weeks regular exercise program.
- ❖ Give information about the relevance of the training with or without awareness of the current level of student's performance through a designed program.

- ❖ Initiate concerned and interested researchers in the area to expand findings and to come up with new ideas and suggestions that can effect of the betterment of the exercise in particular and its effect to the other students in the high school in general.
- ❖ In this regard, the study could play an important role in the provision of data and nominating the strong as well as the weak side of the 12weeks regular physical exercise training.
- ❖ The study will give an opportunity and encouragement to the interested researcher to conduct further studies on the effects of 12 weeks regular physical exercise training on male student's fitness development.
- ❖ The present study provides as a guide line for those who were participating in this study which are involve in 12weeks regular physical exercise program.
- ❖ To help teachers to know further about regular physical exercise training programs and apply effectively in their training.

1.6. Delimitation of the study

The study was to investigate the effects 12weeks of regular physical exercise training on male student's fitness development in some selected components of fitness in case of Toba secondary school which was delimited to:-

The study was conducted at Toba secondary school student grade level 9-10 and the samples were 40 male students. The age will be between 15-18 years of male students. The study was delimited to 12 weeks regular exercises which are aerobics exercise, stretching exercise, strength and power exercise and agility exercises.

The study was delimited by the needs for field based tests with standardized protocols such as vertical jump test, sit and reach test, illusion agility test, chin up test and BMI test. The selected physical fitness components were muscular strength, flexibility, power agility and body composition.

The training program for experimental group was conducts three days per week, 40-60 minute per session and 12weeks regular physical exercise training.

Individuals with cardiac conditions such as hypertension or uncontrolled diabetes or other conditions that would be contraindicated for exercise testing and training were not admitted

to the study. Individuals were having bone and joint problem, diabetes mellitus, bad habits and those taking medications were not included into the study.

1.7. Limitation of the study

The following limitation was faced in the study. These are:

- ❖ The hereditary and environmental factors.
- ❖ Metrological variations such as air temperature, atmospheric pressures, relative humidity etc. during testing periods may not be control and their possibility will influence on the result. Inadequacy of available relevant research materials, sufficient books.
- ❖ The researcher had not include other physical fitness variables since it is wide, to study all physical fitness variables, it would require relevant materials, sufficient economy, laboratory measurement protocol and conducive environment.
- ❖ The researcher was not control the player's Lifestyle (diet, sleep, nutrition, and time management), Mental (psychological preparation, ability to cope under pressure) and socioeconomic status; since, they are living with their own parents' house.

1.8. Operational Definition of terms

- ❖ **Agility** is the ability to rapidly and accurately change the direction of the entire body in space (Payne & Bahn, 1999, p 53).
- ❖ **Body composition:** - It is a health-related component of physical fitness that relates to the relative amounts of muscle, fat, bone and other vital parts of the body.(USDHHS,1996).
- ❖ **Effect:** is something brought about by a cause or an agent; result (Mifflin, 1998)
- ❖ **Exercise** is physical activity that is planned, structured and repetitive for the purpose of conditioning any part of the body (Tall, 2002).
- ❖ **Experimental:** Based on new ideas ,forms or methods that are used to find out what effect they have: (Ritchie and Lewis,2003)
- ❖ **Fitness** is the quality or state of being (Gutin, 1980).
- ❖ **Flexibility** is the ability to move without restriction during a normal range of movement: it is the quality of being bent without stiffness of bones (Roth, 2002).
- ❖ **Muscular strength:-** is the amount of force the muscles can produce. The push up test is most often used to the muscular strength (www.spps.org).

- ❖ **Physical activity** is any bodily movement produced by skeletal muscles that result in energy expenditure (MFH in Newu zeland, 2003)
- ❖ **Physical exercises** any bodily activity that enhances or maintains physical fitness and overall health and wellness (Tall, 2002).
- ❖ **Physical fitness** is a set of attributes that people have or achieve and the ability to carry out daily tasks with vigor and alertness, without undue fatigue (Gutin, 1980).
- ❖ **Post-test:** post-test is an achievement test administered after training (Davis, 2000).
- ❖ **Power :-** power as work divide by time, or the rate of doing work if one can perform the same work better than the other with in the same time interval, then we have got a better power Shorkey(1997, p. 145).
- ❖ **Pre-test:** pre-test is a preliminary test administered to determine performance of students before training (Brian Mac, 2000).
- ❖ **Test:** is involves a series of measurement with different physical fitness performance variables.
- ❖ **Training:** is the conditional exercise program related with objective to train physical exercise?

1.9 Organization of the study

This study was consisted of five chapters. The first chapter deals with the back ground of the study, statement of the problem, objectives of the study, hypothesis of the study, delimitation of the study, limitation of the study, significance of the study, definitions of terms used in the study. The second chapter deals with the review of related literature, and the third chapter deals with the research design and methodology of the study. The fourth chapter deals with presentation, analysis and discussion of the data, and the last chapter deals with the summary of the findings, conclusion and recommendations of the study.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1. The Concept of Physical Education

Concept of physical fitness is as old as humankind. Throughout the history of mankind physical fitness has been considered an essential element of everyday life. The ancient people were mainly dependent upon their individual strength, vigor and vitality for physical survival. This involved mastery of some basic skill like strength, speed, endurance, agility for running, jumping, climbing and other skills employed in hunting for their livings. Over the past four decades, there has been an increase in the prevalence of overweight and physical fitness deterioration in adult across all genders, ages and racial/ethnic groups (Ichinohe et al. 2004). The negative effects of degraded physical fitness on both the individual and society are serious and multi-dimensional. It can cause many risk factors to health including coronary heart disease, certain forms of cancer, diabetes, hypertension, stroke, gall bladder diseases, osteoarthritis, respiratory problems, and gout and is associated with increases in all-cause mortality (Cataldo, 1999). In adults, relationship among physical activity, health related fitness, and health are fairly well established (Boucherd and Shepherd 1994). Low levels of physical activity and cardio respiratory fitness are both associated with higher risk of all cause and disease specific mortality (Thune et al. 1998). Physical fitness is the ability to perform daily activities willingly and actively. Physical fitness includes not only components of sports but those of health as well. Regular physical activity prevents or limits weight gain, and gain in body mass index (BMI) (Kyle et al. 2000).

2.2. The Contribution of Physical Education to Physical Fitness

Today physical education programs are designed and intended to promote general health and overall fitness. The exact regime of education may vary among programs, but physical education remains critical in achieving an overall healthy society. The main purposes of physical education are the process of becoming peoples physically active for the rest of their lives. Physical education has long and established tradition in schools, being linked to the development of both body and mind. Further it is an important component of the overall school program and integral part of the educational program that contributes, primarily through physical activity experiences, to the total growth and development of all students (Pangrazi&Darstn.d, 2002).

Physical fitness has long been recognized as one of the primary objectives of physical education and sport. Today the development and promotion of health related fitness is a diversity of populations is an important outcome of many programs in our field. Health related fitness encompasses the development of cardio respiratory efficiency, flexibility, muscular strength and endurance and appropriate body composition. Scientific evidence of the health benefits of exercise continues to grow, maintenance of an adequate level of the health related components of physical fitness; cardio respiratory endurance, muscular strength and muscular endurance, body composition and flexibility can help reduce the risk of heart disease, hypertension, on-insulin dependent diabetes, osteoporosis, obesity and certain mental health problems such as depression. (Wuest& Bucher, 1995).

2.3. Physical exercise

Physical exercises any bodily activity that enhances or maintains physical fitness and overall health and wellness. It is performed for various reasons, including increasing growth and development, preventing aging, strengthening muscles and the system, it is good for health .in addition, improving your endurance, strength, balance and flexibility .(exercise & physical activity NIH national institute on aging January 2009).

Physical activity appears in general to have a positive effect on several health outcomes it has long been acknowledged as an important part of a healthy life style, and recent scientific evidence has linked regular physical exercise to a wide range of physical health benefits (Tall, 2002).

2.4.1 Types of physical Exercise

Physical exercises are generally grouped into two types, depending on the overall effect they have on the human body which is aerobic exercise and anaerobic exercise. An active vigorous workout can be aerobics or anaerobic. To simplify, aerobic means „with oxygen“ while anaerobic means „without oxygen. (Corbett, 2009).

Based on the intensity level there are three broad intensities of exercise:

- Light exercise- the exerciser is able to talk while exercising. Going for a walk is an example of light exercise.
- Moderate exercise- the exerciser feels slightly out of breath during the session. Examples could be walking briskly, cycling moderately or walking up a hill.
- Vigorous exercise-the exerciser is panting during the activity. The exerciser feels his/her body is being pushed much nearer its limit, compared to the other two

intensities. This could include running, cycling fast, and heavy weight training (Gulhane,2015).

2.5 Exercise

Is physical activity that is planned, structured and repetitive for the purpose of conditioning any part of the body .Exercise is used to improved health and maintain physical fitness component and is important as means of physical rehabilitation. Exercise is useful preventing coronary heart disease, obesity depression and improving motor skill or physical fitness components. Range of motion exercise is one of aspect of exercise important for increasing or maintains joint function strengthening. Exercise provides appropriate resistance to the muscle to increase endurance and strengthening. A well balanced exercise program can improve general health, builds, and endurance and physical fitness components (USDHHS, ACSM, 1996; 2000).

Physical Activity is defined as bodily movement produced by the contraction of striated muscle that substantially increases energy expenditure. This definition includes exercise, which is planned, structured, and repetitive physical activity aimed at improving maintaining physical fitness, organized sports or striated muscle that substantially increases energy expenditure(USDHHS, ACSM 1996; 2000).This definition includes exercise, which is planned, structured, and repetitive physical activity aimed at improving maintaining physical fitness, organized sports or games (football, basketball), transport (walking, cycling), occupational physical activity(manual labor, household chores) and non-organized, recreational physical activities(Okely, Patterson &Bother, 1998).

Exercise can be divided into aerobic exercise and anaerobic exercise. Aerobic exercise, which uses oxygen to keep large muscle groups moving continuously at intensity that, can be maintained for at least 20 minutes. Aerobic exercise uses several major muscle groups throughout the body, resulting in greater demands on the cardiovascular and respiratory systems to supply oxygen to the working muscles. Aerobic exercise includes walking, systems to supply oxygen to the working muscles. Aerobic exercise includes walking, Jogging, and swimming, and is the form recommended for reducing the risk of heart disease and increasing endurance. Unlike anaerobic exercise, anaerobic exercise involves heavy work by a limited number of muscles, for example during weight lifting. These types of activities are maintained only for short intervals, and the supply of oxygen is insufficient for aerobic metabolism, resulting in a substantial oxygen debt and anaerobic metabolism within those

muscles. Another example is sprinting, in which the exercise is high in intensity but short in duration, resulting in substantial oxygen debt. Weight lifting and other types of anaerobic exercise increase strength and muscle mass, but are of limited benefit to cardiovascular health (Microsoft Encarta Encyclopedia Deluxe, 2003).

2.5.1. The Needs of Exercise

Physical fitness and exercise are essential for good physical and mental health, including weight control. Exercising helps a person develop and keep a strong self-image and a sense of emotional balance. As people get older, exercise becomes more important. This is because after the age of 30, the heart's blood pumping capacity declines at a rate of about 8 percent each decade. Exercise is also very important for children as well. Vigorous physical activity helps in a child's overall development so he or she reaches optimal size and necessary capacities when he or she reaches adulthood. Your body needs a certain amount of calories every day just to function. If you eat more calories than your body needs, it may be stored as excess fat. For instance, if you have an excess of 10kg fat, and each gram has some 9 calories, then you have 90000 calories for your body to use! Exercising helps you achieve or maintain a healthy weight by stoking our metabolism, utilizing and burning the extra calories. And if you exercise, your body works harder and needs more fuel. Even after you stop exercising, your body continues to burn calories at a modestly increased rate for a few hours. The more intensely you workout, the more calories you burn. By burning more calories than you take in, you can reduce body fat, giving you a healthier body composition. Losing body fat can make you look and feel better and can reduce your risk of obesity (Tayler, 1985).

2.5.2. The Benefits of Exercise

Regular Exercise is one of the most important things you can do for your health and performance. The health benefits of doing regular Exercise have been shown in many studies. You are likely to get the most benefits to your health if you are someone who is not very active at all and you become more active. However, there are still benefits to be gained for anyone who increases their physical activity levels, even if they are already doing 30 minutes of moderate intensity activity on most days. Overall, people who do the recommended levels of Exercise can reduce their risk of premature death by 20-30%. Other health benefits include the following (Gulhane,2015).

2.5.3. The Benefits of regular Exercise

The benefits of regular exercise are numerous. regular exercise improves the strength of your bones, ligaments and tendons, allows your body to use fats and sugars more efficiently, burns lots of calories and plays an important role in reducing the onset and symptoms of aging and illness They include systemic changes such as reduced cholesterol and blood pressure, improved muscular endurance, reduced body fat, increased metabolism it strengthen the heart and lungs, making them more efficient and durable, improving quality of life. Exercise not only extends your life, but also gives you more energy to live it to the fullest. Regular exercise reduces your risk of heart disease, vascular disease, diabetes, reduces stress and combats depression as it increases self-esteem and physical and wellness (Kathleen, 2006). Regular exercise has positive effects on low back pain and encourages strength, flexibility, and muscular endurance. This outcome has also shown to promote levels of activity, leaving the subject feeling better both physically and mentally. (Privett, 2012)

The benefits of exercise are very well known to all. Scientists and researchers all over the word do not cease to repeat it at every opportunity. One study after other shows the beneficial effects of exercise to our mind and body it helps to (Thomas *et al.*, 2008).

- ❖ **Better cardiac function:** The heart gets more blood per beat. That means that the heart rate is reduced in times of relaxation and during the exercise.
- ❖ **Weight loss:** During exercise the body burns fat and as a result the total body fat is reduced.
- ❖ **Improving mental health:** Regular exercise releases the endorphins, the natural painkillers of the body, which among other things reduces stress, anxiety and depression.
- ❖ **Reducing diseases:** The extra weight is an aggravating factor in the emergence of: heart disease, high blood pressure, stroke, diabetes and certain types of cancer.
- ❖ **Increases body resistance:** Maybe during or immediately after exercise you feel tired, but in the long-term exercise increase the strength and the sense of well-being keeping fatigue away.
- ❖ **Improves muscle health:** Exercise encourages the development of microscopic blood vessels that provide sufficient quantities of oxygen in the muscles and keep

away from the muscles metabolic wastes such as lactic acid. This process can reduce the discomfort felt by those suffering from chronic muscle pain and back pain.

- ❖ Increases the maximum consumption of oxygen by the body
- ❖ Improves cardiovascular and cardiovascular function
- ❖ Increasing the supply of blood to muscles and the ability to make better use of oxygen
- ❖ Lowers heart rate and blood pressure
- ❖ Reduces stress, improves mood with more energy, reduces risk of depression or anxiety
- ❖ Greater resistance to fatigue
- ❖ Helps us to sleep better (Alex Chris,2008
- ❖ webmaster@www.manageyourlifefor.com)

Basically aerobic activities are those in which a sufficient amount of oxygen is available to meet the body's demands. During the performance of elevated level for an extended period .this activity typically involve vigorous and repetitive whole body or large muscle and movements that sustained for an extended period. Popular aerobic activities including running, walking rowing, swimming cycling aerobic dancing, jogging, tread mill and somewhat continuous in nature the intensity of work load can be easily regulated by controlling the pace. (Shemelis M, 2011).

2.6. The Concept of Physical Fitness

Physical fitness to the human body is what fine-tuning is to an engine. It enables us to perform up to our potential. Fitness can be described as a condition that helps us for better look, pleasant feel our best. It is the ability to perform daily tasks vigorously and alertly with energy left over for enjoying leisure time activity and meeting emergency demands. (Desta Enyew, 2012).

Physical fitness is characterized by the ability to perform occupational and recreational activities without becoming unduly fatigued and to have the capacity to handle unforeseen emergencies And also it is associated with a person's ability to work effectively, enjoy leisure time, be healthy, resist hypo kinetic diseases or conditions, and meet emergency situations"(Corbin et al., 2006).

There are many factors which help to develop physical fitness, but regular physical activity is the key aspect to achieve optimal physical fitness.

2.7. Components of Physical Fitness

Fitness is defined as a condition in which an individual has enough energy to avoid fatigue and enjoy life. Physical fitness is divided into five health and six skill related components. Skill related fitness components are fitness types which enhance one's performance in athletic or sports settings. Health related fitness is the ability to become and stay physically healthy. The portion of physical fitness directed toward the prevention of or rehabilitation from disease. The development of a high level of functional capacity for necessary and discretionary tasks of life and the maintenance or enhancement of physiological functions in biological systems that are not involved in performance but are influenced by habitual activity. Maintaining an appropriate level of health related fitness allows a person to meet, emerge, reduce the risk of disease and injury, work efficiently, participate and enjoy physical activity (sports, recreation, leisure), look one's physical best (Polwman, 2011). Generally, fitness is defined as the ability of a person to live a happy, well-balanced life. It embraces the physical, intellectual, social and spiritual aspects of a person's life. Fitness has health-related components and skill related components which include; cardiovascular endurance, muscular strength, muscular endurance, flexibility and composition (Olaitan, 2005). Skill-related components include agility, balance, coordination, speed, power and reaction time (Wilmore, and Costill, 2002).

2.7.1. Health Related Physical Fitness

Health-Related Physical Fitness is the portion of physical fitness directed toward the prevention of or rehabilitation from disease, the development of a high level of functional capacity for the necessary and discretionary tasks of life, and the maintenance or enhancement of physiological functions in biological systems that are not involved in performance but are influenced by habitual activity. Maintaining an appropriate level of health related fitness allows a person to meet, emerge, reduce the risk of disease and injury, work efficiently, participate and enjoy physical activity (sports, recreation, leisure); and look one's physical best. (Polwman, 2011), and also health related physical fitness are directly related to improvement of health. (Virginia Department of Education, 2006).

2.7.1.1. Cardiovascular Endurance

Cardiovascular endurance, sometimes called cardio respiratory fitness, aerobic fitness, or aerobic capacity, is one of a health-related component of physical fitness that relates to ability of the circulatory and respiratory systems to supply oxygen during sustained physical activity (USDHHS, 1996). Cardiorespiratory endurance is considered a critically important

component of health related fitness because the functioning of the heart and lungs is so essential to overall wellness.

CVE is one of the most important measures of overall health. A person's level of cardiovascular endurance helps predict probability of disease, quality of life, and ability to react to acute physical and mental stress. For healthy individuals, higher cardiovascular endurance also indicates an elevated level of physical fitness. (Corbett, 2009)

A person simply cannot live very long or very well without a healthy heart. Low levels of cardio respiratory fitness are linked with heart disease. Cardio respiratory endurance is developed by activities that involve continuous rhythmic movements of large-muscle groups like those in the legs-for example, walking, jogging, cycling and aerobic dance. (Insel&Roth, 2002).A VO2 max test in the laboratory setting is considered to be the best measure of cardiovascular fitness. Commonly administered field tests include the One mile run/walk, the 12-minute run, the PACER run for children and various bicycle, step, and treadmill tests.

2.7.1.2. Flexibility

It is the ability to move the joints through their full range of motion and stretching exercises can improve to normal (Insel&Roth, 2002). Flexibility is specific to each joint of the body, thus there is no general measurement of flexibility as there is for cardiovascular fitness. Flexibility is the degree to which body segments can move or be moved around a Joint. (Brown,1986).Flexibility is typically measured in the lab using measurement devices such as a goniometry, flex meter and in the field with test exercises such as the sit and reach, and the zipper test.

2.7.1.3. Muscular Endurance

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

It is a health-related component of physical fitness that relates to the muscle's ability to continue to perform without fatigue (USDHHS, 1996).and it is the ability to sustain a given level of muscle tension and to perform repeated movement with sub maximal loads for

extended period of time i.e. to hold a muscle contraction for a long period of time, or to contract a muscle over and over again. Muscular endurance is important for good posture and for injury prevention and copes with the physical demands of ever day life and enhances performance in sports and work. Like muscular strength, muscular endurance developed by stressing the muscles with a greater load (weight) than they are used to (Insel&Roth,2002).For true assessment of muscular endurance it would be necessary to test each major muscle group of the body. Lab and field tests of muscular endurance are similar and are based on the number of repetitions that can be performed by the specific muscle group being tested (example: repetitions of push-ups or abdominal curls). Muscular endurance can be measured isometric ally (static contractions) or isotonic ally (dynamic contractions). (willardson, 2008)

2.7.1. 4. Muscular Strength

Muscular Strength is a health-related component of physical fitness that relates to the ability of the muscle to exert force (USDHHS, 1996).and refers to the force or tension that can be generated by a muscle or muscle group during one maximal effort (Physiology of Exercise: Responses and Adaptations, 2nd edition).

It is the amount of force a muscle can produce with a single maximum effort. Strong, powerful muscles are important for the smooth and easy performance of everyday activities, such as carrying, lifting, boxes, and climbing stairs, as well as for emergency situations. They help keep the skeleton in proper alignment, preventing back and leg pain and providing the support necessary for good posture and it can be developed by training with weights or by using the weight of the body for resistance during callisthenic exercises such as push-ups and sit-ups (Insel&Roth, 2002).

For true assessment it would be necessary to test each major muscle group of the body. Lab and field tests are similar and involve the assessment of one repetition maximum (the maximum amount of resistance you can overcome one time). 1RM tests are typically conducted on resistance machines. Strength can also be assessed using dynamometers. Strength can be measured isometric ally (static contractions) or isotonic ally (dynamic contractions).

2.7.1.5. Body Composition

It is a health-related component of physical fitness that relates to the relative amounts of muscle, fat, bone and other vital parts of the body. (USDHHS,1996). There are standards to determine the levels of body fat that individuals should possess. It is essential to maintain a minimal amount of body fat (percent body fat) for good health, but an excess level as well as a very low body fat level can cause serious health risk. The proper way to determine recommended weight is by finding out what percent of total body weight is fat and what amount is lean tissue. Body composition can be accessed through several techniques. The most common of these are: hydrostatic weighing or under water weighing, skinfold thickness, girth measurements and bioelectrical impedance. Because these procedures yield estimates of body fat, each technique may yield slightly different values. Therefore, when assessing body composition, the same technique should be used for pre and posttest comparisons (Hoeger&Hoeger, 1999).

BMI is calculated as body weight in kilograms divided by height in meters squared (kg/m^2) or is an indicator of weight-for-height. It is considered as one of the most commonly anthropometric measures to assess total body adiposity, because of its simplicity as a measure and its global acceptance (Cornier &et al., 2011). BMI is probably a reasonable indicator of fatness in the general population. (Health related fitness measures for youth, 2012).

The components of physical fitness are specific and different, are also interrelated. Fit individuals have adequate levels of each of components of physical fitness (i.e. the health-related components, skill-related components, metabolic fitness components and bone integrity), but unfit individuals can possess one component of physical fitness and do not possess the other components. For example, individuals who have good cardiovascular fitness do not necessarily have good strength, as well as individuals who possess good balance do not necessarily have good agility (Corbin &et al., 2006).

2.7.2. Skill-related Physical Fitness Components

2.7.2.1. Agility

Is the ability to quickly change body position and make directional changes in body movement? Agility is the —ability to rapidly and accurately change the direction of the entire body in space (Payne &Bahn, 1999, p 53) .Agility is the ability to move quickly with frequent direction position, enhance your performance in a in variety of activities (Barro&

Gee, 2004). This is the combination of speed and coordination. It allows you to efficiently change direction and body position at speed. Agility most commonly measured via the Illinois agility runs (Wesson, 2002).

2.7.2.2. Balance

Is the maintenance of equilibrium while stationary or while moving? The harmonious development of physical, mental and spiritual aspects of person; Balance is the ability to maintain equilibrium in other words, something is balanced when it seems as something natural and simple to perform, or is balance when its center of gravity is over its area of support (Payne & Bahn, 1999).

2.7.2.3. Coordination

Is the ability to use the sense and body parts in order to perform motor tasks smoothly and accurately? But according to John, (1996:97) Coordination involves putting the relevant motor programs in the right order and effectively using the neuron muscular system to produce smoothly an efficient movement. Hence, coordination is the ability to integrate sensor and motor systems to produce efficient movement.

2.7.2.4. Power

Is the ability to transfer energy swiftly into force. And also it is an explosive strength, is the ability to effectively integrate strength and speed to produce maximum muscular force at a maximum speed. It is the rate at which energy is expended or work is done. Then Shorkey (1997, p. 145) defined power as work divided by time, or the rate of doing work if one can perform the same work better than the other within the same time interval, then we have got a better power. It combines strength (force) and velocity or speed (Distance/time). Power is measured by throwing heavy object or vertical jumping (Hetzler, 2015). According to Bosco and Gustafson (2003), power is a function of force and time (power = work / time) is defined as the rate of performing work (work = Force x Distance). Since work is a production of force x distance; Power is the combination of strength with explosiveness (speed), maximum muscular force released at speed. Power is a fundamental factor in jumping, throwing and striking (Flaherty, 2013)

2.7.2.5. Speed

Is the ability to perform a movement quickly? It is the time that takes us to respond to a stimulus. Johnnet.al, (1996, p. 96) also state that speed is basically how fast you can move partial your body or the whole of your body, and is measured in meters per second. Therefore, speed is the rate of movement and often refers to the ability to move rapidly and it is an important factor in all explosive sports and activities that require sudden changes in space. The simplest measures of speed is a 30 m, mark a non-slip surface and sprint as hard as the competent can perform from a flying start over the course and record the time taken(Wesson, 2002).

2.7.2.6. Reaction Time

Is the ability to perform movements and actions of the body or body-part at a particular moment to produce to best effect? This is the time between a stimulus being perceive and the first movement made in response to it. It also depends on how long you take to process the information and this can be improved with practice. So reaction time measures how swiftly the competent interpret and the react to expected and unexpected events happening around his or her (Hetzler, 2015).The most accurate measures of reaction time involve a simple test is a stick drop test (Wesson, 2004).

2.8. The need of physical fitness assessment

Historically, physical fitness assessments for children and adolescents have been a mainstay of the physical education curriculum. If used correctly, fitness assessments can enhance instruction of fitness concepts, provide diagnosis of fitness needs for individual exercise prescription, facilitate fitness goal-setting and self-monitoring skills, and promote fitness knowledge and self-testing skills (Whitehead et al., 1990). However, there are many factors other than physical activity that can influence a child's performance on physical fitness tests (e.g., maturation, heredity, predisposition / trainability and body composition). An over emphasis on fitness testing in the curriculum can send the wrong message to children about physical activity. For example, some children may get discouraged in physical education if they score poorly on fitness tests despite being physically active. Alternately, children may incorrectly believe that they don't need to be active if their fitness levels are in the healthy fitness zone. Studies have demonstrated that negative feedback from fitness testing can lead to reduction in a child's level of intrinsic motivation toward physical activity (Whitehead & Corbin, 1991). These concerns have caused many experts to question the continued emphasis

on physical fitness testing in the curriculum (Kemper & van Mechelen, 1996). Recently, there has been a conceptual shift in the physical education field toward the promotion of physical activity. While fitness is still a desirable outcome, more emphasis is being placed on promoting the behavior of physical activity.

For example, in the current National Association for Sport and Physical Education (NASPE) definition of a physically educated person, three of the five components refer specifically to physical activity (NASPE, 1995). In addition to having good skills and reasonable levels of fitness, a physically educated person participates in regular activity, knows the benefits of participation and values the contribution activity can make to a healthy lifestyle. Incorporating physical activity assessments into the curriculum allows for better instruction on physical activity concepts and avoids some of the problems associated with fitness testing. An additional benefit is that by emphasizing a behavior, all children can be successful. Many people assume that physical activity and physical fitness are directly related, but they actually represent very different things. Physical activity is a behavior, while physical fitness is a characteristic. While physical activity will contribute to physical fitness, the relationship is not as strong as one would expect. There are a variety of other factors that influence levels of physical fitness and many are beyond a person's control. The relationship between physical inactivity and obesity is also not as high as would be expected (especially among children). Even if a relationship is present, it is not clear that it is a causal factor. Physical inactivity can lead to obesity, but it is equally plausible that obesity leads to inactivity. The current consensus is that physical activity and physical fitness is reciprocally related (bi-directional arrow) and that they exert independent effects on health. This implies that a person needs to be physically active even if they have reasonable levels of fitness. Individuals with low levels of fitness can also obtain health benefits by remaining physically active. Because some of the factors influencing fitness are beyond a person's control (e.g. genetics and rate of maturation), emphasis should be placed on being physically active. The model presented above is useful in understanding the relationships between physical activity, physical fitness and health (Corbin, 2001) the complex relationships among physical activity, physical fitness, health wellness and etc. Source: Adapted from Bouchard et al., 1990. Trends in activity choice throughout adolescence Declines in physical activity in adolescence are predominantly in vigorous activities and non-organized sports (Bradley, McMurray, Harrell, & Deng, 2000; Caspersen et al, 2000; Van Mechelen et al., 2000). The decline in non-organized sports is evident by the reduced numbers of adolescents found playing playground

games or sports and games in local parks. As participation in non-organized sports decreases, participation in organized sports becomes even more important to overall activity level. As behavioral patterns with regard to organized sport are established early (Engstom, 1991), it is important that involvement in organized sports begin in pre-adolescence. This is particularly important for girls as girls 'team sports, which are common in middle school, tend to drop off in high school (Bradley et al., 2000). In a study into the activity choices of 656 girls and boys tracked from ages 9-15 years in the United States, girls reported more social and sedentary activities with age. Girls aged 12–15 years reported mostly sedentary activities, with talking becoming the girls 'primary leisure activity at 12 years of age (Bradley et al., 2000). In boys, there was a sharp increase in sedentary behavior at ages 12-15 years. *Aga pdf*

2.9. Factors Influencing Fitness

Gender

Before puberty, boys and girls differ a little in aerobic fitness, but from then on girls fall behind. Young women average 15 to 25% less than young men in aerobic fitness, depending on their level of activity. But highly trained young female endurance athletes are but 10% below male endurance athletes of the same age in vo₂max and performance times (Sharkey, 1990).

Training

Training improves the function and capacity of the respiratory and cardiovascular systems and boosts blood volume, but the most important changes takes place in the muscle fibers that are used in the training. Aerobic training improves muscles ability to produce energy aerobically and shifts metabolism from carbohydrate to fat, which may produce the single most important health effect of exercise. Burning fat reduces fat storage, blood fat levels, and cardiovascular risk. It also improves insulin sensitivity and reduces the risk of some cancers. Of course, training enhances the ability to perform, but the improvement is limited to the activity used in training (Sharkey, 1990).

Heredity

We inherit many factors that contribute to aerobic fitness, including the maximal capacity of the respiratory and cardiovascular systems, a larger heart, more red blood cells and hemoglobin and a high percentage of slow oxidative and fast oxidative-glycolytic muscle fibers. Mitochondria, the energy producing units of muscle and other cells, are inherited from

the maternal side. Recent evidence indicates that the capacity of muscle to respond to training may also be inherited. Other inherited factors such as physique and body composition will also influence fitness and the potential to perform at a high level (Sharkey, 1990).

2.10. Effect of Aerobic Exercise on Health Related Physical Fitness

There are many studies done on the effect of aerobic exercise training on health related physical fitness to name a few Vivek (2013) studied on the effect of aerobic exercise on physical fitness and body composition of school boys. It is concluded that Aerobic training contributes significantly for the promotion of abdominal strength, Speed, cardio-vascular endurance, body composition. Another study by Licy (2006) also studied on the effects of aerobic exercise intervention with goals of improving health-related physical fitness among selected adults. The results of analysis of variance with repeated measures of health-related physical fitness showed that the subjects in the exercise group had significantly more improvements in abdominal muscle strength and endurance than the subjects in the control group. This study indicated that 12-week aerobic exercise program was effective in improving the abdominal muscle strength and endurance among selected adults.

Further Toy, (2008) also studied on the effect of aerobic dance training on Vo2 Max and Body Composition in early middle aged men. After twelve weeks of aerobic dance training, a significant reduction was noted in body weight, BMI and percentage body fat, and a significant in Vo2 max. This study highlights that systematic aerobic dance training helps to increase the physical and cardio respiratory fitness among middle aged adults. Promoth, (2010) also studied on the effect of step aerobics training on selected physical and physiological variables of physical education students. The subjects performed step aerobics apart from their regular physical education workout, five days in a week for a period of sixty minutes. The control groups did not participate any training program except their regular workout. The data were computed statistically by using ANCOVA to see progressive effects. The result shows step aerobics had significant effects on selected physical and physiological variables improved significantly among the experimental group i.e., flexibility, explosive power, BMI, and Vo2 max and no significant changes were seen in control group.

Mahendran (2009) studied the effect of 12 weeks aerobic exercises on selected health related physical fitness and physiological variables among adolescents. Selected health related variables were, muscular strength measured using hand grip dynamometer, muscular endurance measured using bent knee sit ups, cardio-respiratory endurance measured using 12-minutes run/walk, flexibility measured with sit and reach box. Body mass index measured

using height and body weight. The results of pre- test and post- test were compared by using Analysis of Covariance. All variables were significantly improved among experimental group. Promoth,K.G,(2010) also studied on the effect of walking on body composition and cardiovascular function of middle aged men. Substantial improvement occurred in maximum oxygen consumption sub-maximal heart rate and resting diastolic blood pressure and reductions of body weight and percent of fat. Demir (2013) investigated the effects of eight-week step-aerobic exercise programs on flexibility, body weight, and body fat percentage and body circumference measurements of sedentary women. As a result of the step-aerobic exercises, they found that flexibility and all parameters related with the body composition of the individuals were changed positively. Health Related Physical Fitness is the portion of physical fitness directed toward the prevention of or rehabilitation from disease, the development of a high level of functional capacity for the necessary and discretionary tasks of life, and the maintenance or enhancement of physiological functions in biological systems that are not involved in performance but are influenced by habitual activity. (Polwman, 2011 cited in Mathewos, 2013)

Shahana et al., (2010) investigated on the effect of a 12-week aerobic exercise program on health-related physical fitness components in middle-aged adults. The experimental group 30 subjects underwent aerobic exercise training thrice a week for 12 weeks. The control group 30 subjects did not attend any training program. The post-tests were conducted on both groups. They conclude that improved cardio respiratory endurance, flexibility, muscular strength endurance and decreased skin fold thickness (body fat %) among the experimental group after 12 weeks. In the case of control group no significant changes were seen in any of the selected variables. Saygin & Ozturk, (2011) also investigated on the effects of 12 week aerobic exercise program on health related fitness components and blood lipids in obese girls. Participants joined sessions for 60 min per day, 3 days per week for 12-week. They concluded that regular aerobic exercise may affect health related fitness components.

Further, Chao-Chien, & Yi-Chun, (2012) examined the effect of jumping rope training on the health-related physical fitness in students with intellectual impairment. Their findings on jumping rope training demonstrated significant effects on cardiovascular endurance, flexibility, and muscular strength and endurance. No significant influence on the BMI of students with intellectual impairment. Bagavinar & Kamalakkannan, (2013) also examined the effect of aerobic training, aquatic training and combined training on selected physical fitness, variables among obese college men. The mean gains and losses made from pre and posttest were statistically significant showing that aerobic training, aquatic training and

combined training produced significant improvement in flexibility, muscular endurance, cardio respiratory endurance, percent body fat, body mass index. Control group produced insignificant at $p < 0.05$

2.11. Physical Fitness Test Test for Flexibility

Flexibility of the joints, both in the upper and lower body, is an important component of health-related fitness. People benefit from increased flexibility on a daily basis, both in routine tasks and those associated with more rigorous physical activity (American College of Sports Medicine, 1995). Flexibility was measured by the sit-and-reach test (Clark et al., 1989). The sit and reach test is used to determine the joint range of motion and flexibility of the muscles around the hip joint (the test simultaneously examines the flexibility of the lower back and hamstrings). The reliability of the test has been documented previously (Johnson and Nelson, 1979 cited in Durandt, 2009).

After a warm-up, the participants sat on the floor with their legs straight out in front of them, heels touching the side of a box. Their fingertips were positioned on the 0 cm edge of the box that was marked in centimeters towards the opposite edge. They were then asked to bend forward with arms outstretched towards their toes. The farthest test score of the three trials were administered and the mean value was taken in the analysis. The sit-and-reach test was conducted to measure flexibility of the hamstrings and lower back. The sit and reach measured the distance of the performed stretch to the nearest cm Equipment needed box and a ruler. Before the test, the shoes were removed and the subjects were instructed to slowly reach forward with their knees fully extended as far as possible with palms facing downward. This test represents flexibility in the lower back and upper thighs. The score is recorded to the nearest centimeter as the distance before (negative) or beyond (positive) the toes.(Willis,*et.al* 2012).

2.11. Children and young people and Regular physical activity

Kennedy, (2006) stated that Regular physical activity provides young people with substantial physical, mental, and social health benefits. Regular practice of physical activity helps children and young people to build and maintain healthy bones, muscles and joints, helps control body Weight, helps reduce body fat and develop efficient function of the heart and lungs. It facilitates developing the skills of movement and helps prevent and control the feelings of anxiety and depression, engagement in play and sports gives young people

opportunities for natural self-expression, self-confidence, and relief of tension, achievement, social interaction and integration as well as for learning the spirit of solidarity and fair play. Physical fitness is not only one of the most important keys to a healthy body; it is the basis of dynamic and creative intellectual activity.

According to UN (2003), physical activity is critical for the holistic development of young people. Physical activity can also boost the immune system and strengthen the psychological wellbeing of people with HIV and AIDS related illness. It has proven benefits to a child's ability to learn, and increases concentration, attendance and overall achievement (May and Phelan, 2005).

According to WHO, (2003a), it is estimated that less than one-third of young people are sufficiently active to benefit their present and future health and well-being. This decline is largely due to increasingly common sedentary ways of life. For example fewer children walk or cycle to school and excessive time is devoted to watching television, playing computer games and other sedentary activities often at the expense of time and opportunities for physical activity and sports.

Shephard, (2001) reported that habitual physical activity begins to decline as early as 6 years of age. Other critical periods when physical activity is likely to diminish include adolescence, the transition from school to university and from university to the labor force. Furthermore, the largest decreases in physical activity over the past decade have been shown by the youngest cohort, those currently aged 16 to 21 years. In all age groups, sport participation has been displaced by media watching, home maintenance, eating and resting.

Cooper, (2005) explained that the centers for Disease Control and prevention reports that the percentage of children ages 6 to 11 who are overweight has increased nearly 300 percent over the past 25 years. The numbers are almost identical for teenagers. In (Cooper, 2005), Klish and Baylor said "children today have a shorter life expectancy than their parents for the first time in 100 years." Similarly Narayan said, "One in every three U.S. children born after 2000 will become diabetic unless many more people start eating less and exercising more."

According to Mandigo, (2005), in 2000, 57% of Canadian children and youth aged 5 to 17 years were not sufficiently active to meet international guidelines for optimal growth and development. For adolescents, this number increased from 64% in 2000 to 82% in 2002. Girls in particular appear to be most at risk, in 2000; only 30% of girls and 40% of boys were

considered active enough. It has also been found that children who are more physically active showed higher academic performance. Importantly, when patterns of physical activity and healthy life styles are acquired during childhood and adolescence they are more likely to be maintained throughout the life span. Consequently, improving physical activity levels in young people is imperative for the future health of all populations (WHO, 2003a).

2.12. Seniors people and physical activity

According to YMCA, (2004) there is strong, systematic evidence of a direct link between regular physical activity and improved health for people of all ages. A 10% increase in adult activity would prevent around 6,000 pre-mature deaths not to mention bringing economic benefits worth at least £ 2 billion a year.

According to UN, (2007) and Shephard, (2001) older people constitute increasingly higher proportions of the total world population. In 2007 people aged 60 and over represented 11% of the world's population and this is projected to rise to 21% by 2050. Most of these older persons will be living in developing countries.

Joseph et al., (2005) explained that the prevalence of physical inactivity is high and initial health status is poor in this segment of the population. No matter what part of the country you live in or whether it is urban, sub urban or rural, all communities need to provide physical activity opportunities for older adults.

According to Robert Wood Johnson Foundation, (2001) and Dillion, (2006) Scientific evidence increasingly indicates that physical activity can extend years of active independent life, reduce disability, and improve the quality of life for older persons as well. Physical activity is important for healthy aging, improving and maintaining quality of life and independence as people age (WHO, 2003b). More recently, scientists have begun to demonstrate that exercise also may improve cognitive functioning in older adults (Carbin et al., 2002) and (The Journal on Active Aging, 2004).

According to WHO, (2003b) for adults and aging individuals physical activity has shown to improve balance, strength, coordination, flexibility, endurance, mental health, motor control and cognitive function. Improved flexibility, balance, and muscle tone can help prevent falls-a major cause of disability among older people. Walking or organized exercise sessions, appropriately suited to an individual's fitness level can provide the opportunity for social interaction, for reducing feelings of loneliness and social exclusion. Physical activity

improves self-confidence and self-sufficiency, the benefits of physical activity can be enjoyed even if regular practice starts late in life. While being active from an early age can help prevent many diseases, regular movement and activity throughout life can also help relieve the disability and pain associated with common diseases among older people are cardiovascular diseases, arthritis, osteoporosis and hypertension.

Department of Health and Human Service of USA, (2004) suggested that Researchers have found that exercise and physical activity also can improve the health of people who are 90 or older, who are frail, or who have the diseases that seem to accompany aging. Staying physically active and exercising regularly can help prevent or delay some diseases and disabilities as people grow older. In some cases, it can improve health for older people who already have diseases and disabilities, if it's done on a long term, regular basis.

2.13. Physical Activity in the School

Most elementary schools around the world have physical activity built into the school week through physical education classes. The amount of time varies between schools, districts, States, and countries, but most have a set schedule of minutes per week a student is guaranteed to be physically active. Elementary schools also generally have time built into their schedules for Recess each day. These are two opportunities that for the most part are scheduled, but can be lost or taken out of schedules for various reasons including testing, instrumental classes, and Interventions, so it is important for educators to develop more strategies to incorporate physical activity into the school day. Brain breaks are a popular strategy and are designed for students to perform in a small Space near desks or in the classroom in their own chairs (Caldwell & Ratliffe, 2014). Examples Of appropriate breaks would be performing fitness skills such as jumping jacks, jogging in place, Or pushups; using exercise videos from DVD's or the internet; or playing games in class that involve physical activity. Videos, short clips, and movement sessions should be quick and to the Point and are intended to give the student an opportunity to refocus and reboot their energy. A Few goals of brain break videos are to increase students' heart rate, assist teachers with providing Physical activity within the day, and release some of the students' energy after sitting during a Lesson. Movement breaks are essential to refocusing attention on academics and can be taken advantage of multiple times a day (Koch, 2013). Integration of physical activity and academic subjects is bridging or merging the content from multiple academic areas to allow students to see the connections and relationship of Knowledge (Koch, 2013). Within the classroom setting, there are several ways to integrate Physical activity, including stories,

historical characters, creating shapes, and using locomotor Movements to perform tasks. Koch gives several suggestions, including Math Bo, which is using math equations and functions and “combat” style skills in the air to complete the equations.

Integrating the compass and directions within the classroom and using fitness skills for direction on the map can also allow students in social studies to move more. Within science classes, Teachers can use physical experiments and allow students to move throughout the room, as well as acting out content material, like physically acting out the states of water. It is important for Classroom teachers to understand basic locomotor movement skills and terminology, and for this to occur, the physical education teacher and classroom teachers would need to collaborate.

Another integration strategy that has proven to be very useful is the use of yoga skills and Techniques. Yoga practice improves individuals’ physical fitness levels, focus and relaxation, as Well as several aspects of cognition and executive functions (Telles, Singh, Kumar, & Balkrishna, 2013). It is suggested that yoga should be practiced several times a week and for multiple weeks in a row in order to gain the physical and cognitive benefits. Suggested yoga Skills include breathing techniques, loosening exercises, and physical postures. Specific yoga Skills can be performed within classroom settings, at recess, or within appropriate places at the School, and consist of different postures such as the butterfly pose, cobra posture, and raised leg Posture, and tree posture. According to Telles et al., the strategy of incorporating yoga into the School day for elementary students is one that teachers are capable of doing without technical training, can be varied each day to keep enthusiasm and interest, and has shown significant Benefits towards cognitive achievement and focus. Afterschool clubs are a great approach to incorporating physical activity into a school day without taking time from the normal daily schedule. Käll, Nilsson, and Linden (2014) found that enjoyable, non-competitive activities resulted in many benefits for the school, students, and Teachers, including fellowship, reduced boredom, and joy. The activities held after or before School should be positive, motivational, and enjoyable for all to participate in and held at least 10 two times a week. The programs can cater to all types of students and can include the use of Equipment, teams, individual games, or no equipment at all. A more specific afterschool strategy is a running club to offer students assistance with improving their running and walking abilities, as well as developing a sense of community. Some of the options include basic running clubs, like Girls on the Run, H.E.R.O. Boys’ Running Club, and Running and Writing clubs. Vanzandt (2011) found that after integrating a writing and

running programs, there were significant benefits to the students who participated. Many of these groups meet twice a week for about sixty to ninety minutes and work on running technique and endurance, building up to a culminating race such as a 5K. Within the program, Van Zandt also found that many students made more growth after implementing running buddies, which increase accountability, goal setting, and motivation. The program coincides with a writing Program to help promote journal writing skills. The use of a running program after school has proven to be successful for many elementary schools in gaining student achievement in Academics, social situations, and physical fitness.

2.13. Lack of exercise and poor conditioning

And physical health risks will increase. The physical problems associated with a reduction in exercise and the benefits of exercise are widely known. What is not known adequately are the psychological or cognitive benefits exercise has on a person (Boone 1983; Jerome, 1996). More than a quarter of today's children ages 6-11, are considered obese. Among kids age 12-17, 25% of girls and 18% of boys are Obese. Studies have shown a dramatic increase in the number of obese children in the last few decades in this country. The number of overweight children 6-17 years of age has doubled in the past thirty years (University of Michigan study, October 2003). Lack of exercise among young people has been found to contribute to obesity and health problems (Field, Miguel & Sanders, 2001). Despite the increased incidence of childhood obesity and type II diabetes mellitus, physical education time is being reduced to address academic issues related to 'No Child Left Behind' legislation (Medical-News, October 2004). Physical education programs are being Eliminated in many districts nationwide because of budget restrictions or the perceived need for increase time for academic core subjects In order to raise test scores (J. Blaydes, 2000). Many schools cannot afford and provide a salaried physical education specialist (M. Hurst, 2004). Budget cuts in the 1990's caused massive teacher layoffs and an academic focus on school reform triggered the decline of Physical education in Oregon schools (Blankenship, 2000). According to the surgeon General, "nearly half of Americans youth age 12 to twenty-one years are not active on a regular basis. Only Nineteen percent of all high school students are physically active for more than twenty minutes or more five days a week, in physical education classes" (A. Warren, 2000).

2.15. Why fitness test?

Schools and colleges have the potential to improve the health of young people by providing instruction in physical education that promotes enjoyable lifelong physical activity of the learners. Diseases and health problem resulting from an inactive lifestyle have their origins early in life. This is when an active life style should be established. Fitness begins at birth and should continue throughout a person's life. Fitness improves general health and it is essential for full and vigorous living. The physically fit child feels more alert and eager to do things. A weak child is a weak brick in the wall of the nation. The wealth of a nation depends entirely upon the health of every citizen of the country (Carbin, C.B.; Lindsy, R. and Welk, G. 2000).

According to American College of Sports Medicine, (1998) performance in any sporting event is the result of a multitude of factors, which include the amount of training performed, the body's adaptation to the training, motivation level, nutritional status and weather conditions to name a few. As you can see, physiological parameters only account for a portion of any performance, and so the role of any exercise physiologist is also similarly limited. Through fitness testing, the factors involving physiological processes, over which there is some control, can be measured and ultimately improved upon.

The complex nature of physical fitness can be best understood in terms of its components such as cardiovascular endurance, strength, flexibility, speed and muscular endurance. In addition to these components of physical fitness there are many other factor which contribute to physical fitness including heredity, living standard, nutrition, hygienic conditions, environmental and climate factors etc. (Sallis JF, McKenzie TL, 1992).

Competition is the ultimate test of performance capability and is therefore, the best indication of training success. However, when trying to maximize performance, it is important to determine the trainees' ability in individual aspects of performance. Fitness testing attempts to measure individual components of performance, with the ultimate aim of studying and maximizing the trainees' ability in each component (Chandel AS, 1993).

2.16. Selective Variable of physical fitness

2.16.1. Flexibility

It is interesting to know that there is no ideal standard for flexibility. There is little scientific evidence to show that a person who can reach 2 inches past his or her toes on a sit-and-reach

test is less fit than the person who is able to reach 6 inches past his or her toe. Too much flexibility as well as too little flexibility could be detrimental (Corbin et al., 2003). To develop flexibility, it is recommended that muscles are stretched past normal length until resistance is felt. For duration, the stretch should be held from 5 to 10 seconds initially, building to 30 to 45 seconds (Wuest et al., 1994).

Several sit-and-reach tests (SRs) are commonly used in health-related and physical fitness test batteries to evaluate the hamstring and lower back flexibility (Jackson, A.W. & Langford, N.J., 1989; Hoeger et al, 1990; Hui and Yuen, 2000). Such field measures are only moderate indicators of hamstring extensibility. However, the SRs are frequently used to evaluate the hamstring muscle extensibility because the procedures are simple, easy to administer, require minimal skills training and are particularly useful in large scale extensibility evaluation in the field setting (Hui and Yuen, 2000)

For its effective application, the participants sat on the floor, with their shoes off, their legs straight, and feet against the flex meter foot stop. Before the test the researcher asked the participant: do you have a back injury or is there any other reason you should not try to touch your toes? If the participant's answer was positive, the flexibility test was started. When participant reached forward and touched the stretch foot for 3 seconds, the best measurement of the three was recorded in centimeters (Morteza Jourkesh, et al, 2011).

According to Australian College of Sport & Fitness, (ACSF, 2013) measuring the distance from their toes to their fingertips, and record. If their fingers are passed their toes, the results are positive, if the fingers are behind the toes, the results are negatively determining the ability the participants measuring in centimeters by means of the chart indicated below.

Table 1: Standardized Rating Scale of Flexibility

Rating	Sex	
	Female	Male
Very Poor	< -15	< -20
Poor	-15 to -8	-20 to -9
Fair	-7 to 0	-8 to -1
Average	+1 to +10	0 to +5
Good	+11 to +20	+6 to +16
Excellent	+21 to +30	+17 to +27
Super	> +30	> +27

Source: Australian college of Sport & fitness 2013

2.16.2. Agility Test

Agility will be assessed using 10 meter agility shuttle test. Mark two lines 10 meters apart using marking tape or cones. The two blocks was placed on the line opposite the line they was going to start at. On the signal "ready", the participant places their front foot behind the starting line. On the signal, "go" the participant sprints to the opposite line, picks up a block of wood, runs back and places it on or beyond the starting line. Then turning without a rest, they run back to retrieve the second block and carry it back across the finish line. Two trials are recorded (Morteza Jourkesh, .et al, 2011).

According to Getchell, (1979) the Illinois Agility test is a commonly used test of agility in sports. It measures the ability to change position and direction. The length of the course is 10 meters and the width (distance between the start and finish points) is 5 meters. Four cones are used to mark the start, finish and the two turning points. Another four cones are placed down the center an equal distance apart. Each cone in the center is spaced 3.3 meters apart. Subjects should lie on their front (head to the start line) and hands by their shoulders. On the “go” command the stopwatch is started, and the athlete gets up as quickly as possible and runs around the course in the direction indicated, without knocking the cones over, to the finish line, at which the timing is stopped

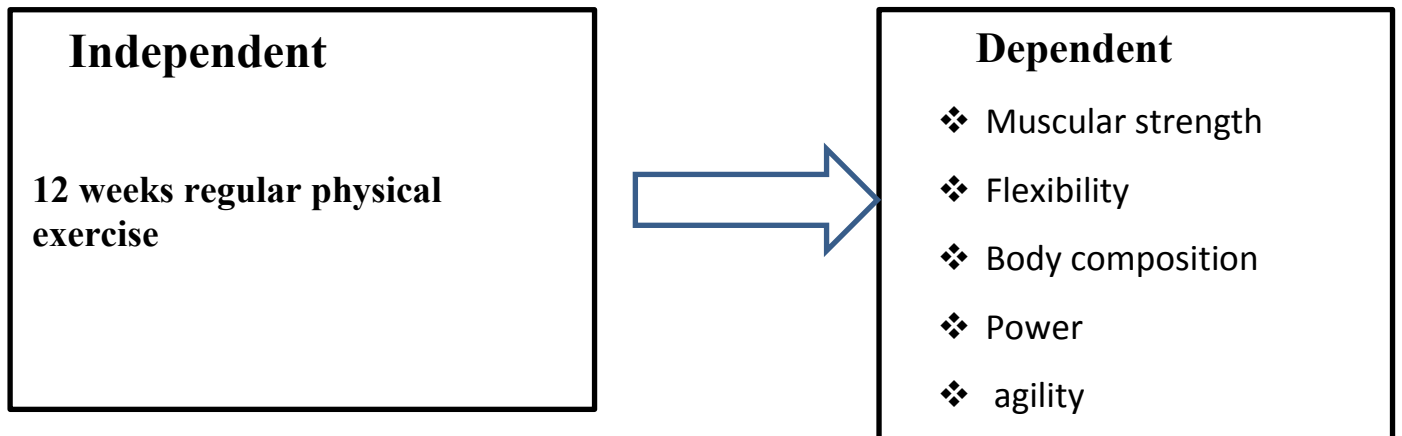
Table 2: Standardized Rating

Scale of Agility					
Sex	Rating				
	Exc.	Good	Average	Fair	Poor
Male	<15.2	16.1-15.2	18.1-16.2	18.3-18.2	>18.3
Female	<17.0	17.9-17.0	21.7-18.0	23.0-21.8	>23.0

Sources, Morteza Jourkesh, .et al, 2011.

2.17. Conceptual frame work

The conceptual framework of the study is based on the interactions of the independent variables (Twelve weeks regular physical exercise) and the dependent variable (body Composition, muscular strength, flexibility, power and agility).



Source: Adapted from Olaitan (2005) and Wilmore, and Costill (2002)

CHAPTER THREE

RESEARCH METHODOLOGY

3.1. Description of the Study Area

This study was conducted in one selected secondary school from Gumay woreda which was found in Jimma zone located at south West part of Ethiopia in oromia regional state ,which is around 405km far from addis ababa and also 74km far from Jimma to Gumay woreda.

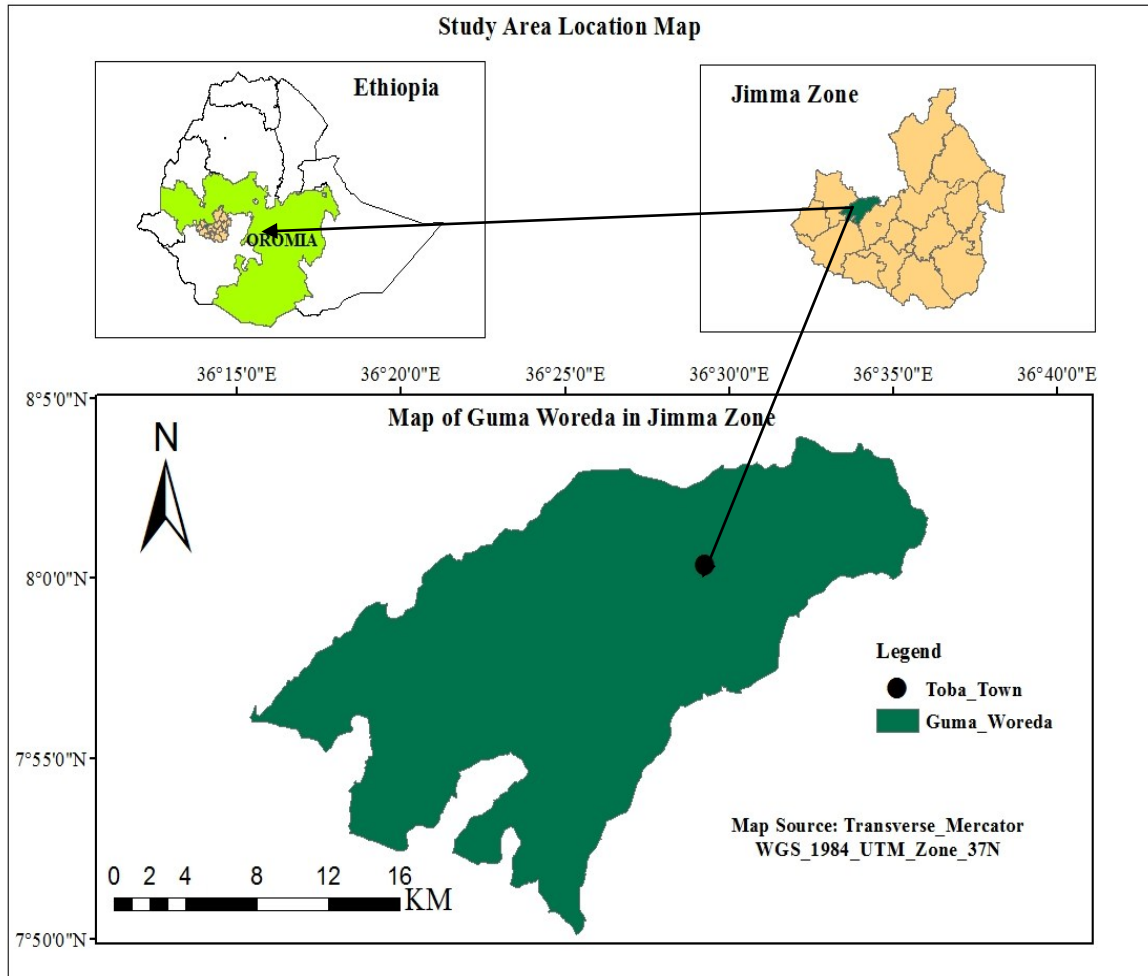


Figure 1: Map of study area (GumayWoreda)

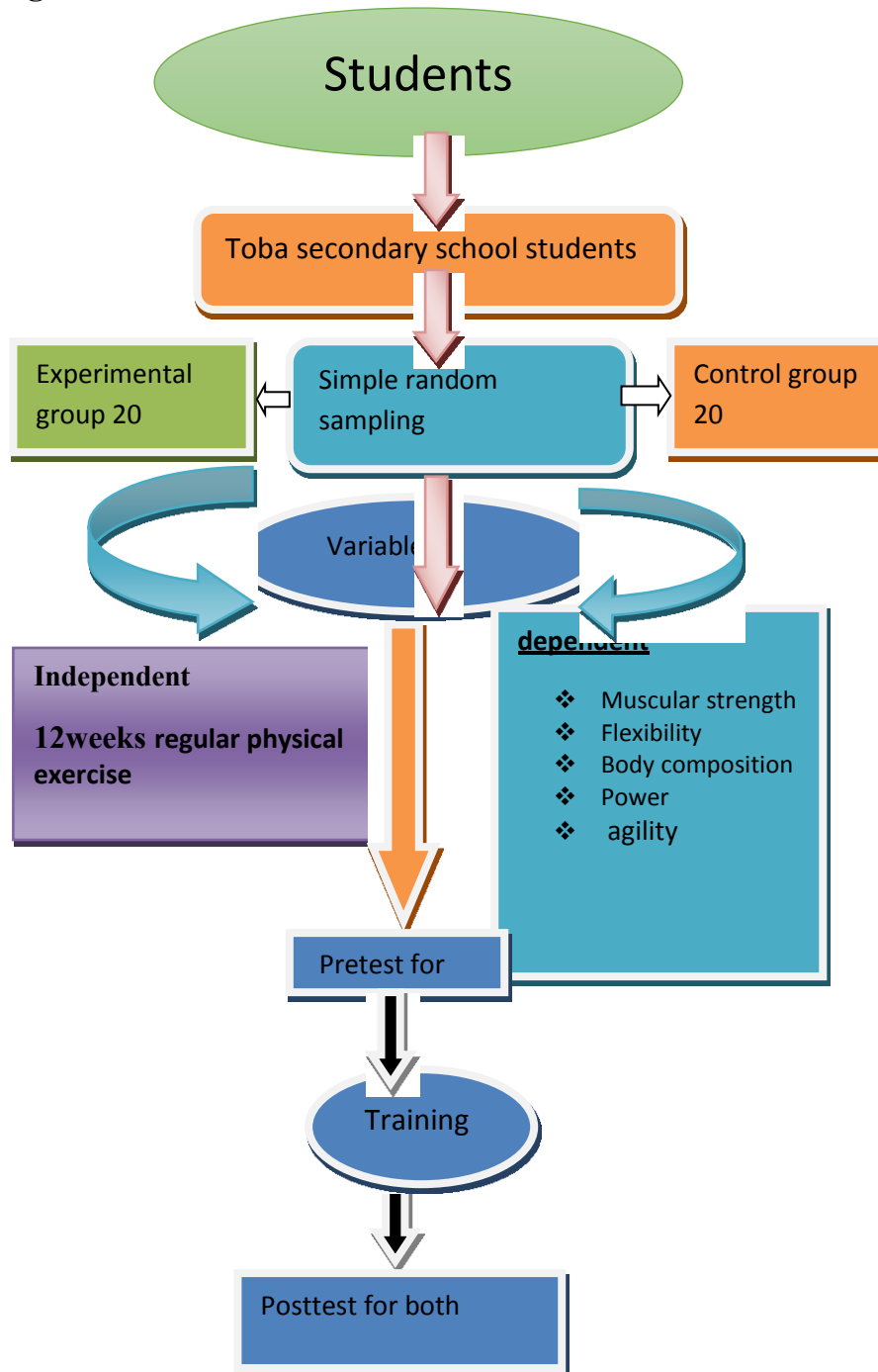
3.2 Research Design

In this study, true experimental research design was employed to investigate the effects of 12weeks regular physical exercise training on male student's fitness development in some selected component of fitness in case of Toba secondary school. Depending on the nature and appropriateness of the pre and post test data, the researcher were use quantitative approach employed with experimental design, since it helps to measure, assess, evaluate and analyze the effects 12 weeks of regular physical exercise training on the fitness development aspects that means independent variable on the dependent variables. The experimental Group was received specially designed twelve weeks regular physical exercise training while the controlling Group was not treated by the 12 weeks regular physical exercise training. The study was conducted focus on the experimental study with in the 12 weeks regular physical exercise training on male students fitness developments. The design of the experiment was planned in three phases .these are : Phase one : Pretest; Phase two : Training or Treatment and Phase three : Posttest.

Table 3: The Study design lay out

Treatment	Physical fitness variables
Frequency	3 days/week
Total duration	12 weeks or three month
Duration/Session	40-60 minutes
Intensity	low, Moderate, high
Exercise days	Tuesday, Wednesday, Friday
Time of exercise training	Morning

Diagram 1: DIAGRAM OF EXPERIMENTAL DESIGN



3.3. Population, Sample and Sampling Techniques

As Patton (1990) argues, there are no particular rules for the selection of sample and participants. The sample size depends on what researcher want to know, purpose of the inquiry, what is at a stake, what was useful and what can be done with available time and resources. The selection of sampling techniques for the study was based on the representatives and resourcefulness of the sample from Toba high school there were two grade levels (9-10) both were selected purposively because of that the researcher was teach at

both grade level. The total numbers of population in grade 9 and 10th male students were 473. Since the researcher was conducted experimental to properly administer the test and manage the samples during twelve weeks regular physical exercise training only 40 samples were selected by using simple random sampling techniques. Simple random sampling technique was also used again to assign control and experimental group. From the total (40) samples 20 subjects were randomized to the control group and the rest 20 subjects were randomized to experimental group by using simple random sampling techniques.

3.4 Inclusion and Exclusion Criteria

Investigators must include in their protocols a through description of the study population the first priority is that the subject population have the attributes that was make it possible to accomplish the purpose of the research the .Investigators must specify inclusion and Exclusion criteria for participation in a study Inclusion criteria are characteristics that the prospective subjects must have if they are to be include in the study factors such as age gender type and stages of disease the subject previous treatment history and the presence or absence as in the case of the healthy or control group of other medical psychosocial or emotional conditions healthy or control subjects may be defined as those individuals would are free of certain specified attributes of non-health .An example of inclusion criteria for a study of body Composition, muscular strength, flexibility and power and agility male students between the ages of 15-18 who have been diagnosed with the health statuses of the subject were assessed by physical activity readiness

Individuals with cardiac conditions such as hypertension or uncontrolled diabetes or other conditions were contraindicated for exercise test and training were not admitted to the study, in addition to these individuals having bone and joint problem, diabetes mellitus, and those taking medications were not included into the study.

3.5 Source of Data

The data for this study was collected from primary source of data such as from student's pre and post test results of the selected fitness variables.

3.6 Data Collection Instrument and testing Procedure

In order to collect the data which was necessary for the analysis of the study, the researcher was used some health related physical fitness variables and skill related fitness variable test result. The use of appropriate tests helps to collect data from the some selected health related and skill related physical fitness variables. The detail of each data collection tests and

procedures were discussed as follows: The changes in the following physical fitness variable parameters were recorded especially before and after training in terms of pre-test and post-test.

Table.4. the type of Test used for the selected variables to collect appropriate data

No	Variables	Tests
1	Power	Standing vertical jump
2	Muscular strength	chin up test
3	Agility	Illinois test
4	Flexibility	Sit and reach test
5	Body composition	BMI or body mass index

3.6.1 BMI test procedures and analysis.

Is a relatively easy way to determine the extent of overweight or obesity is to use a person's body weight and height (Adopted from Mackenzie, 2005 101 performance evaluation test).

BMI is a calculation of body weight and height indices for determining degree of obesity. The most common formula for body mass index is body weight in kilograms divided by height in Meters squared. Therefore, during body mass index test the participants had off their shoes and should have light clothes and sands on calibrated beam. The height in meters (m) and Their Weights in kilograms (kg) will be recorded (WHO, 2012). Then BMI was calculated with this formula.

$$\text{BMI} = \text{Weight (kg)} / \text{Height square (m}^2\text{)}.$$

Equipment needed to measure body composition by using the test BMI includes a scale and a tape measure.

Test procedures:

- ❖ proper positioning for measuring height (standard erect posture with the head and eyes in the Frankfurt horizontal plane) was needed;
- ❖ Height and weight typically were measured without shoes and in light indoor clothing.

❖ After measuring height and weight calculating BMI by dividing weight to height squared. Body weight was measured using weight scale measure. Height was measured with a tape meter.

❖ Finally, calculate the BMI by using the formula

$$\text{BMI} = W/h^2$$

3.6.2 Sit and reach Test procedures and analysis

The participants perform warming up exercise activities and some stretching activities for 5 - 10 Minutes before starting test and then sit on the floor with legs stretched out straight ahead and then removes their shoes. The Soles of the feet are placed flat against the sit and reach box. Both knees should be locked and Pressed flat to the floor. The palms facing downwards and the hands on top of each other or Side by side the subject reaches forward along the measuring line as far as possible. Three Times trail were permitted to the subject and the best one from three trials were taken as his Score. The subject reaches out and holds that position for at one-two seconds while the Distance is recorded (Ferrucci et al. 2004) modified sit-and-reach test

The objective of this test was to monitor the development of the student's lower back and hamstring flexibility. The required Resource/materials to undertake this test were Box, Meter Ruler, Tape, and Assistant:

Figure 2. Sit and Reach test procedure



(Source: <http://www.topendsports.com>)

3.6.3. Chin-up test procedure and analysis

Purpose:-To measure the strength of the trainees arm, shoulder and upper back muscles.

Equipment:-Bench, a bar which is suspended in the air and assistant.

Procedure:-The trainees warms up for 10 minutes, the trainees hangs from the bar with the palms of their hands facing them and arms straight (start position). Shorter trainees may be lifted by the spotter or by using a bench to the starting position. The trainees, using the arms, pulls the body up until the chin is above the bar and then lowers the body to the start position, the trainees continues with the pull ups until they are unable to continue or let go of the bar.

Scoring:-The assistant counts and records the number of successfully completed pull ups.

Table 5: The Normative dates of chin up tests (Beashel, P. and Taylor, J. 1996)

Gender	Classification	Age 15-18
Men	Excellent	>13
	Above average	9-13
	Average	6-8
	Below average	3-5
	Poor	<3

3.6.4. Standing Vertical Jump and Testing Procedure and analysis:

The student stands side on a wall and reaches up with the hand closer to the wall keeping the feet flat on the ground, the points of the fingertips is marked or recorded. This is called the standing reach height. The athlete then stand away from the wall, and leaps vertical as high as possible using both arms and legs to assist in projecting the body upward.

Equipment: - Measuring tape (meter), chalk for marking well, and outdoor jumping pit

Scoring: The jump high is usually recorded as distance score

Figure 3. Vertical Jump Test



Sources Getchell, 1979

Illinois (Agility) Test procedure and analysis

Purpose: To measure the agility of the subject

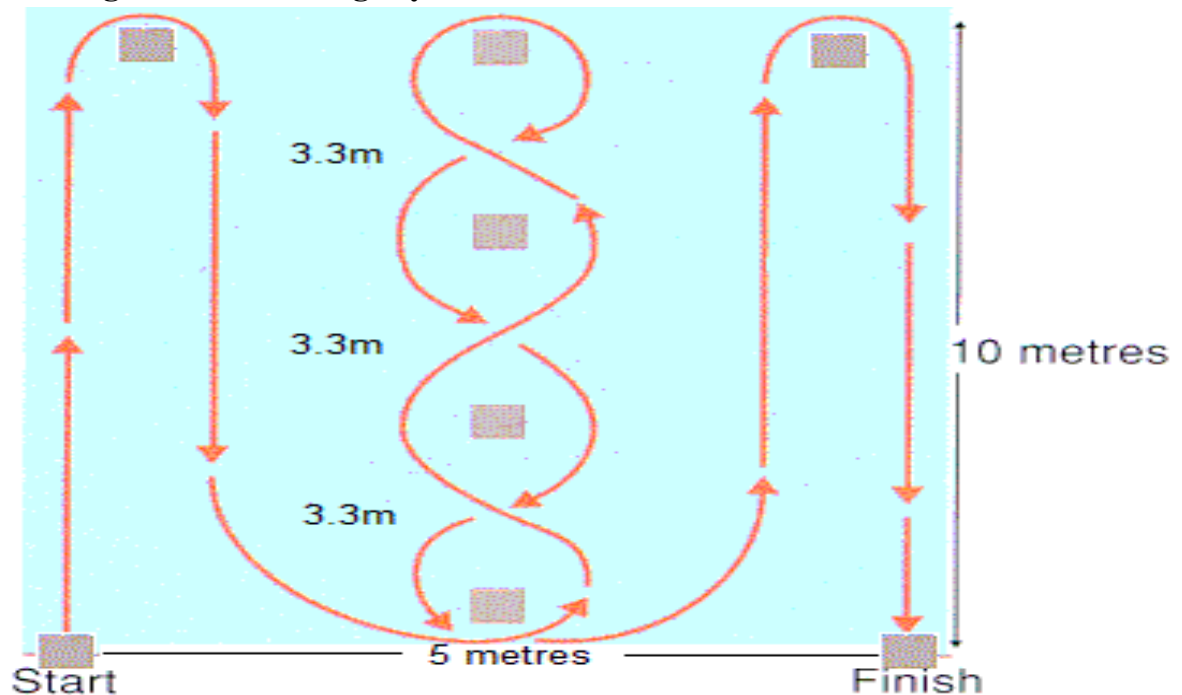
The objective of Illinois agility run test is to monitor the development of the athletes agility required resources to

undertake this test are: flat -non sleep surface, 8 cones, stop watch, Assistant. The athlete warm up for 10 minutes, the assistance set up the course as detailed in the diagram. The athlete lines face down on the floor at the "start" cone. The assistant gives the command "Go" and start the stopwatch. The athlete jumps to his feet and negotiates the Course around the cones following the around the straight and zigzag line route shown in the Diagram to the finish. The assistant stop watch and records the time when the athlete passes the "finish" cone. The way the agility test conducted was bellow picture

Instruction: The subjects run as fast as possible without rest until the distance covers.

Scoring: The stop watch will start at the starting point when the player and stop at the finishing of the agility test and the total second will record.

Figure 4: Illinois Agility Test



Source: Davis et al. 2000

3.7 Method of Data Analysis

The data were collected through fitness tests like chin-up muscular strength test, Illinois agility test, vertical jump power test, BMI body composition test and sit and reach flexibility test. The collected data were analyzed and interpreted in to a meaningful idea using computer in order to analyze the selected physical fitness variable, changes observed among groups. Data were analyzed using computerized statistical package software SPSS version 23. Descriptive statistics such as arithmetic mean and standard deviation was applied to process the data. Inferential statistics such as paired t-test (t value and p-value) was used to compare the pre training and post training data. Moreover, the t-value and p-value was used to make sure whether the regular physical exercises have a significant effect on the selected physical fitness variables. Level of significance will be set at 0.05.

3.9. Selection of variables

3.9.1. Independent variables (causes)

12weeks regular physical exercises training

- ❖ The length of time or duration of exercise.
- ❖ The Intensity and frequency of exercise.

3.9.2. Dependent variables (effect)

FITNESS DEVELOPMENT

- ❖ Body composition
- ❖ Muscular strength
- ❖ Flexibility
- ❖ Agility
- ❖ Power

3.10. Validity and Reliability

Reliability refers to the consistency or dependability of a measurement technique (Andrich, 1981; Leary, 2004). If the measurement of this field test is reliable, then there is less chance that the obtained score is due to random factors and measurement error so that the accuracy of the data can be increased. Multiple recording and agreement among records is one of the methods used to determine the reliability of a certain test which refers to the stability of test scores recorded by different observers. In addition Test-retest over time that involves repeating the same test on at least one other occasion was used to ensure reliability. These methods were used in this field test to make sure that the scores of the students in the field tests are reliable. Moreover, the data from the actual field test was not biased as the researcher himself and two others were recording the results of the students consciously with reference to the test standards provided.

3.11. Ethical consideration

Before beginning the research, the researcher obtained permission from the school and all the participants had clear information about the purpose of the study, the procedures to be used, the potential benefits and the possible risks of participation in this study was explained and written consent was given to the participants and their parents. In every discipline it is unethical to collect information without the knowledge of participants, their informed consent (Bogdan and Biklen, 1998) and (Kumar, 1999). Informed consent requires that respondents are made adequately aware of the type of information collected from them, why the information is being sought, what purpose it will serve to, how they are expected to participate in the study, and how it will directly or indirectly affect them.

CHAPTER FOUR

RESULTS AND DISCUSSION

This chapter deals with the analysis of pre and post test data collected from randomly selected experimental group trainers (n=20) and control/non treatment/ (n=20) groups under the study. The purpose of this study was to investigate the effect 12 weeks of regular physical exercise training on male student's fitness development in some selected components of fitness in case of Toba secondary school . The treatment was given for 12 weeks. The data were obtained from body composition, muscular strength, flexibility, power and agility. Pre-test and post-tests were taken from all experimental and control groups before and after 12 weeks of regular exercise training and the scores were recorded. The collected data were analyzed using: the arithmetic mean, standard deviation and paired sample t test.

4.1 Characteristics of study participants

Table 6: Descriptive statistics of the study participants

Group	N	Age		Height (in meter)		Weight(in Kg's)	
		Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation
Experimental group	20	16.8000	1.00525	1.6320	.04188	58.6665	4.42305
Control group	20	16.4500	1.05006	1.5920	.05736	52.8080	11.57132

The above table reveals that the general characteristics of the study participants regarding to age, height and weight. The mean of the experimental group's age, height and weight were 16.80 years, 1.6320m and 58.66kg, and their standard deviation were 1.00, 0.0418 and 4.423 respectively, this shows that they were homogenous group in terms of age, height, and weight. The table also shows that the mean of the control groups age, height and weight were 16.45 years, 1.592m and 52.808kg, and the standard deviation were 1.050, 0.057 and 11.571 respectively. This showed that the selected samples of the two groups (Experiment group and Control group) were homogenous.

4.2 Results of the Study

Table 7: Paired sample statistics of the BMI (kg/m²) pre and post test results of both Experiment group and Control group

Test	Experiment group					Control group				
	Mean		Std. Deviation		Sig. Value	Mean		Std. Deviation		Sig. value
	Pretest	Post test	Pretest	Post test		Pretest	Post test	Pretest	Post test	
BMI	22.0200	21.6315	1.3565	1.456	0.000	21.0085	21.838	4.7948	1.90963	0.306

The above table indicates that the mean and standard deviation of the BMI of both the experimental and Control Group. The mean values of the experimental group pre and post-test result were 22.02 kg/m² and 21.63 kg/m², while their standard deviation were 1.356 kg/m² and 1.456 kg/m² respectively. On the other hand, the mean values of the Control Group pre and post-test were 21.008 kg/m² and 21.838 kg/m², while their standard deviations were 4.794 kg/m² and 1.909 kg/m² respectively. This shows that the experimental group was reduced from pre to post test, but in case of the Control Group no increment were seen from pre to post test results of values.

Table 8: Paired sample statistics of the Chin Up test pre and post test results of both Experiment group and Control group

Test	Experiment group					Control group				
	Mean		Std. Deviation		Sig. value	Mean		Std. Deviation		Sig. value
	Pretest	Post test	Pretest	Post test		Pretest	Post test	Pretest	Post test	
Chin Up test	8.000	8.8500	1.91943	2.158	0.018	7.7000	7.3000	1.7501	1.719	0.052

The above table indicates that the mean and standard deviation of the Chin Up test of both the experimental and Control Group. The mean values of the experimental group pre and post-test result were 8.0 and 8.85, while their standard deviation was 1.919 and 2.158 respectively. On the other hand, the mean values of the Control Group pre and post-test were 7.00 and 7.30, while their standard deviations were 1.75 and 1.71 respectively. This shows that the experimental group was increased from pre to post test, but in case of the Control Group no increment were seen from pre to post test results of values.

Table 9: Paired sample statistics of the Sit and Reach test pre and post test results of both Experiment group and Control group

Test	Experiment group					Control group				
	Mean		Std. Deviation		Sig. Value	Mean		Std. Deviation		Sig. value
	Pretest	Post test	Pretest	Post test		Pretest	Post test	Pretest	Post test	
Sit and Reach test	7.8000	10.050	1.2814	1.605	0.000	7.000	7.125	1.5559	1.5549	0.650

The above table indicates that the mean and standard deviation of the Sit and Reach test of both the experimental and Control Group. The mean values of the experimental group pre and post-test result were 7.80 cm and 10.05cm, while their standard deviation was 1.28cm and 1.605cm respectively. On the other hand, the mean values of the Control Group pre and post-test were 7.00cm and 7.12cm, while their standard deviations were 1.55cm and 1.55cm respectively. This shows that the experimental group was increased from pre to post test, but in case of the Control Group no increment were seen from pre to post test results of values.

Table 10: Paired sample statistics of the Vertical Jump test pre and post test results of both Experiment group and Control group

Test	Experiment group					Control group				
	Mean		Std. Deviation		Sig. value	Mean		Std. Deviation		Sig. value
	Pretest	Post test	Pretest	Post test		Pretest	Post test	Pretest	Post test	
Vertical Jump	53.550	57.20	3.349	4.371	0.000	53.20	53.30	3.2053	3.40433	0.308

The above table indicates that the mean and standard deviation of the Vertical Jump test of both the experimental and Control Group. The mean values of the experimental group pre and post-test result were 53.55cm and 57.20cm, while their standard deviation was 3.349 cm and 4.371cm increment. On the other hand, the mean values of the Control Group pre and post-test were 53.20cm and 53.30cm, while their standard deviations were 3.205cm and 3.404cm respectively. This shows that the experimental group was increased from pre to post test, but in case of the Control Group no small increment were seen from pre to post test results of values.

Table 11: Paired sample statistics of the Illusion agility test pre and post test results of both Experiment group and Control group

Test	Experiment group					Control group				
	Mean		Std. Deviation		Sig. value	Mean		Std. Deviation		Sig. value
	Pretest	Post test	Pretest	Post test		Pretest	Post test	Pretest	Post test	
Illusion agility test	18.2700	16.795	1.04282	.7536	0.000	18.475	18.52	.60252	.62795	0.306

The above table indicates that the mean and standard deviation of the Illusion agility test of both the experimental and Control Group. The mean values of the experimental group pre and post-test result were 18.27sec and 16.79sec, while their standard deviation was 1.043sec and 0.754sec respectively. On the other hand, the mean values of the Control Group pre and post-test were 18.47sec and 18.52sec, while their standard deviations were 0.603sec and 0.627sec respectively. This shows that the experimental group was decreased from pre to post test, but in case of the Control Group small increment were seen from pre to post test results of values.

Table 12: Paired sample t-Test results of fitness variables.

<i>TEST</i>	<i>Group</i>	<i>N</i>	<i>Difference</i>	<i>difference</i>		<i>DF</i>	<i>“t”</i>	<i>Sig. value</i>
				Mean	St. deviation			
body composition test	EXG	20	Post–pre test	-0.3885	-0.4121	19	-4.216	0.000
	COG	20	Post – pre test	0.8295	3.524	19	1.053	0.306
Muscular strength test	EXG	20	Post – pre test	0.850	1.461	19	2.602	0.018
	COG	20	Post – pre test	-0.40	0.821	19	-2.179	0.052
Flexibility test	EXG	20	Post – pre test	2.25	1.208	19	8.326	0.000
	COG	20	Post – pre test	0.125	1.213	19	0.461	0.650
Power test	EXG	20	Post – pre test	3.65	1.981	19	8.24	0.000
	COG	20	Post – pre test	2.355	10.066	19	1.046	0.308
Agility test	EXG	20	Post – pre test	-1.475	0.661	19	-9.982	0.000
	COG	20	Post – pre test	0.829	3.524	19	1.053	0.306

In the above table 8 indicated that there was no significant of control group at the five selected fitness variables in the pre and post test results where as in experimental group that means the pre and posttests was significance difference results.

In the paired sample t-Test analysis, all the selected variables of physical fitness test were found to have positive mean gain from pre-test to post-test.

The mean score of the experimental group **BMI test** values before 12weeks regular physical exercise training was (22.02 kg/m²) with the mean score of BMI test after twelve weeks regular physical exercise training (21.63 kg/m²). The result suggests that the pretest EXG mean score and the post EXG mean score there was a statistically significant change in BMI (MD = -0.3885, SD= -0.4121, p= 0.000), hence p < 0.05. Therefore, the hypothesis which say there was a no significance effect on body composition of male students as a result of 12weeks regular physical exercise training on the BMI tests were rejected at 0.05 level of confidence.

The mean score of the experimental group **chin up test** values before 12 weeks regular physical exercise training was (8.0reps) with the mean score of chin up test after twelve weeks regular physical exercise training intervention (8.85 reps), The result suggests that

posttest –pretest mean score of EXG shows a statistically significant change in chine up test (MD = 0.850, SD= 1.461, p= 0.018), hence $p < 0.05$. Therefore, the hypothesis which say there was no significance effect on muscular strength of male students as a result of 12weeks regular physical exercise training of chine up tests were rejected at 0.05 level of confidence

The mean score of the experimental group **sit and reach test** values before 12 weeks regular physical exercise training was (7.80 cm) with the mean score of sit and reach test after twelve weeks regular physical exercise training intervention (10.05 cm), The result suggests that post –pre mean score of EXG shows a statistically significant change in sit and reach test (MD = 2.25, SD= 1.208, p=0.000), hence $p < 0.05$. Therefore, the hypothesis which say there was a no significance effect on flexibility of male students as a result of 12 weeks regular physical exercise training of sit and reach tests were rejected at 0.05 level of confidence.

The mean score of the experimental group **vertical Jump test** values before 12weeks regular physical exercise training is (53.55 cm) with the mean score of vertical Jump test after 12 weeks regular physical fitness exercise intervention (57.20 cm), changes were observed. The result suggests that post –pre mean score of EXG shows a statistically significant change in vertical jump test (MD = 3.65, SD= 1.981, p=0.000), hence $p < 0.05$. Therefore, the hypothesis which say there was no significance effect on power of male students as a result of 12weeks regular physical exercise training of vertical jump tests were rejected at 0.05 level of confidence.

The mean score of the experimental group **illusion test** values before 12 weeks regular physical exercise training was (18.27 sec) with the mean score of illusion test after 12weeks regular physical exercise training intervention (16.79 sec), changes were observed. The result suggests that post –pre mean score of EXG shows a statistically significant change in illusion test (MD = -1.475, SD= 0.661, p=0.000), hence $p < 0.05$. Therefore, the hypothesis which say there was a no significance effect on agility of male students as a result of 12 weeks regular physical exercise training on illusion tests were rejected at 0.05 level of confidence.

4.3. DISCUSSIONS

The main purpose of this study was to investigate the effects 12weeks of regular physical exercise training on male student’s fitness development in some selected components of fitness in case of Toba secondary school .The analysis data with the appropriate statistical tools on the research problem have brought out significance findings as training outcomes

through the selected training methods on the selected physical fitness variables. The results on the variables of the study are presented as follow;

In case of Body Mass Index: When we compare the mean score of the experimental group BMI values before 12weeks regular physical exercise training was (22.02 kg/m²) with the mean score of BMI test after 12 weeks regular physical exercise training (21.63 kg/m²). The result suggests that the pretest EXG mean score and the post EXG mean score there was a statistically significant change in BMI (MD = -0.3885, SD= -0.4121, p= 0.000), hence $p < 0.05$. Therefore, the hypothesis which say there was no significance effect on body composition of male students as a result of the 12 weeks regular physical exercise training on the BMI tests were rejected at 0.05 level of confidence.

The t value and p-value also supports the mean result suggests that the 12 weeks regular physical exercise training had significant effect on the body composition of fitness development. In the case of this research, the mean value of the pretest experimental group was more than posttest experimental result that means in BMI concept the less mean result indicates a positive effect.

Therefore, the hypothesis which say there was a significance effect on body composition of male students as a result 12 weeks of regular physical exercise training on the BMI tests were accepted at 0.05 level of confidence, ($0.000 < 0.05$ level of confidence).

In case chin-up test: - When we compare the mean score of the experimental group chin up test values before 12weeks regular physical exercise training was (8.0reps) with the mean score of chin up test after 12 weeks regular physical exercise training intervention (8.85 reps), The result suggests that posttest –pretest mean score of EXG shows a statistically significant change in chine up test (MD = 0.850, SD= 1.461, p= 0.018), hence $p < 0.05$. Therefore, the hypothesis which say there was a no significance effect on muscular strength of male students as a result of 12 weeks regular physical exercise training of chine up tests were rejected at 0.05 level of confidence.

The t value and p-value also supports the mean result suggested that the 12 weeks regular physical exercise training have significant effect on muscular strength fitness development. In the case of this research, the mean value of the experimental group of the chin up test pre EXG score was less than the post EXG score. It indicated that there was a significant effect 12 weeks of regular physical exercise training on muscular strength chin up test.

Hoeger (2002) has condemned the idea that strength is a basic component of fitness and wellness which necessary for the normal physical activities and enjoyment for happier life. Strength refers to the maximum tension or force muscles develop in a single contraction against a given resistance. It is crucial for optimal performance in daily activities such as sitting, walking, running, lifting, carrying objects and doing household work or even enjoying recreational activities.

Sit and reach test: - When we compare the mean score of the experimental group sit and reach test values before 12weeks regular physical exercise training was (7.80 cm) with the mean score of sit and reach test after 12 weeks regular physical exercise training intervention (10.05 cm), The result suggests that post –pre mean score of EXG shows a statistically significant change in sit and reach test (MD = 2.25, SD= 1.208, p=0.000), hence $p < 0.05$. Therefore, the hypothesis which say there was a no significance effect on flexibility of male students as a result of 12 weeks regular physical exercise training of sit and reach tests were rejected at 0.05 level of confidence.

The t value and p-value also supports the mean result suggested that the 12 weeks regular physical exercise training have significant effect on flexibility fitness development. In the case of this research, the mean value of the experimental group of the sit and reach test pre EXG score was less than the post EXG score. It indicated that there was a significant effect 12weeks of regular physical exercise training on flexibility sit and reach test.

Therefore, the hypothesis which say there was a significance effect on flexibility of male students as a result 12 weeks of regular physical exercise training on the sit and reach tests were accepted at 0.05 level of confidence, ($0.000 < 0.05$ level of confidence).

The result with regard to flexibility is also in line with the result of Volga Hovsepian et al. (2013) as they observed that aerobic exercise training has significantly improved flexibility Maja Petric et al.(2014) also favor this result as he found that regular practice of yoga has a significant effect on body flexibility in young ages.

In case of the vertical Jump test When we compare the mean score of the experimental group vertical Jump test values before 12 weeks regular physical exercise training is (53.55 cm) with the mean score of vertical Jump test after 12weeks regular physical fitness exercise intervention (57.20 cm), changes were observed. The result suggests that post –pre mean score of EXG shows a statistically significant change in vertical jump test (MD = 3.65, SD=

1.981, $p=0.000$), hence $p < 0.05$. Therefore, the hypothesis which say there was a no significance effect on power of male students as a result of 12weeks regular physical exercise training of vertical jump tests were rejected at 0.05 level of confidence.

The t value and p-value also supports the mean result suggested that the 12weeks regular physical exercise training had significant effect on power fitness development. In the case of this research, the mean value of the experimental group of the vertical jump test pre EXG score was less than the post EXG score. It indicated that there was a significant effect 12weeks of regular physical exercise training on power vertical jump test.

Therefore, the hypothesis which say there was significance effect on power of male students as a result of 12weeks regular physical exercise training on the vertical jump tests were accepted at 0.05 level of confidence, ($0.000 < 0.05$ level of confidence).

The result goes along with the findings of Kumaraiyana than and Surendar (2013) found out the effect of circuit training and yogic practice on power production. Leg explosive power showed significant difference among the groups. And also with the finding of Chatraet al., (2008) examined the influence of the sequence order of high intensity endurance training and circuit training on changes in muscular strength and anaerobic power. Circuit training alone induced strength and power improvements that were significantly greater than when resistance and endurance training were combined, irrespectively of the intra session sequencing.

Blackmon (2015) stated that depending on the time available for each session and the way training sessions are conducted, all components of fitness can be developed using a three-day-per-week schedule. Equally, Brand, Gustafson, et. al, (2009) showed that a 8 week training intensity program is crucial foundation for moderate intensity training principle system to develop power. There could be some more explanations as to why the increase is not much higher, one could be exercise progress should be adjusted according to the exerciser's own assessment (Dick, 1997 and Corbin et al., 2002) where as in this study all students were trained as a group which seeks further investigation.

In case of the illusion agility test When we compare the mean score of the experimental group illusion test values before 12 weeks regular physical exercise training was (18.27 sec) with the mean score of illusion test after 12weeks regular physical exercise training intervention (16.79 sec), changes were observed. The result suggests that post –pre mean

score of EXG shows a statistically significant change in illusion test (MD = -1.475, SD= 0.661, $p=0.000$), hence $p < 0.05$. Therefore, the hypothesis which say there was a no significance effect on the illusion of male students as a result of 12 weeks regular physical exercise training of illusion tests were rejected at 0.05 level of confidence.

The t value and p-value also supports the mean result suggested that the 12 weeks regular physical exercise training had significant effect on agility fitness development. In the case of this research, the mean value of the experimental group of the illusion test pre EXG score was more than the post EXG score that means less score of illusion indicates positive effect. It indicated that there was a significant effect of 12weeks regular physical exercise training on agility illusion test.

Therefore, the hypothesis which say there was significance effect on agility of male students as a result 12weeks of regular physical exercise training on illusion tests were accepted at 0.05 level of confidence.($0.000 < 0.05$ level of confidence).

The result of this study was in line with the finding of Reilly and Williams *et al.* (2000). They conducted their study on effect of exercise program on health related and skill related physical fitness components of young male soccer projects and found improved agility among the experimental group of young male soccer project after 12 weeks of training program.

In general, according to the objectives of the study, the hypotheses formulated have been presenting in the chapter-1 of this thesis. The testing of each hypothesis and its respective discussion has been presented as follows:

The null hypothesis number two, four, six, eight and ten

It was hypothesized that there was no significance effect of 12 weeks regular physical exercise training on male student's fitness developments on (body composition, power, flexibility, agility and muscular strength).

The results obtained from this study, the formulated above hypotheses was totally rejected at 0.05 level of confidence.

The alternative hypothesis number one, three, five, seven, and nine

It was hypothesized that there was significance effect of 12weeks regular physical exercise training on male student's fitness developments on (body composition, power, flexibility, agility and muscular strength).

The results obtained from this study, the formulated above hypotheses was totally accepted at 0.05 level of confidence.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter deals with the presentation of summary of findings, conclusions and recommendations of the research

5.1 Summary

The main objective of this study was to investigate the effect 12weeks of regular physical exercise training on male student's fitness development in some selected components of fitness in case of Toba secondary school. In order to achieve the objective of the study, the following hypothesis was tested and answered. These are:

- ☞ **HI:** There was significance effect on muscular strength of male students as a result of 12 weeks regular physical exercise training.
- ☞ **HO:** There was no significance effect on muscular strength of male students as a result of 12 weeks regular physical exercise training.
- ☞ **HI:** There was significance effect on flexibility of male students as a result of 12 weeks regular physical exercise training.
- ☞ **HO:** There was no significance effect on flexibility of male students as a result of 12weeks regular physical exercise training.
- ☞ **HI:** There was significance effect on agility of male students as a result of 12 weeks regular physical exercise training.
- ☞ **HO:** There was no significance effect on agility of male students as a result of 12 weeks regular physical exercise training.
- ☞ **HI:** There was significance effect on power of male students as a result of 12weeks regular physical exercise training.
- ☞ **HO:** There was no significance effect on power of male students as a result of 12weeks regular physical exercise training.
- ☞ **HI:** There was significance effect on body composition of male students as a result of 12weeks regular physical exercise training.
- ☞ **HO:** There was no significance effect on body composition of male students as a result of 12weeks regular physical exercise training.

In order to investigate the effect 12 weeks of regular physical exercise training on male student's fitness development, experimental research method was employed. The relevant

data to the study were gathered through actual performance field test with the reference to physical fitness testing norms through the measures of vertical jump power test, Illinois's agility test, body composition BMI test, muscular strength chine up test and flexibility sit and reach test. In general, 40 participants were selected and the age was in between 15-18 years they were only male, grouped into two by simple random sampling techniques as 20 were experimental group 12 weeks regular physical exercise training for 12 weeks and the 20 control group students were attended one PE class per a week with the EXGs. The data were analyzed using the arithmetic mean, standard deviation and paired sample test based on the actual performance field test results. Based on the data gathered, the following major findings were obtained from the study.

5.2. Conclusions

Based on the findings of this study, the following conclusions were drawn:

- ❖ The findings of this study indicate that 12 weeks regular physical exercise has its own significant effect on male student's fitness developments particularly body composition, muscle strength, flexibility, power and agility on a 12 weeks regular physical exercise training of experimental groups showed a significant difference ($p < 0.05$) on the above components compared with control group.
- ❖ The result of the study shows that the control group had no significant effect on male student's fitness developments particularly body composition, muscle strength, flexibility, power and agility result of fitness development test at 0.05 level of confidence.
- ❖ Finally, that the experimental group of students had significant in the 12 weeks regular physical exercise training pre and post result of fitness development test at 0.05 level of confidence.

5.3 Recommendation

Based on major finding and conclusion of the study, it is important to set the following point as recommendations;

The results clearly indicate that 12 weeks regular physical exercise training have a significant effect on fitness development of students.

- ❖ It is good if physical educators and physical education high school teachers include 12 weeks regular physical exercise training as their schedules program for fitness development.
- ❖ It is better if students at any grade level should have knowledge about the effect 12weeks of regular exercise training for fitness developments of students.
- ❖ It is advised to the time of this study was not only three consecutive months, but the program may be extended for a better fitness development.

It is highly expected from professional of physical education, sports and related fields guide and evaluate the importance and benefited from regular physical exercise training program on fitness development

It is also recommended that the result of this study shows that 12weeks regular physical fitness exercise improves health related physical fitness components and this fitness improvement had a positive effect on students' academic achievement; therefore the school principal, families, and Woreda education office would work cooperatively to fulfill the required equipment's for fitness exercise at school

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Appendix A.

Physical activity readiness questionnaire (par-q)

Adopted from Informed use of the PAR-Q: Reprinted from ACSM's Health/Fitness Facility Standards and Guidelines, 1997 by American College of Sports Medicine.

<http://www.memphis.edu/hss/pdf/par-q.pdf>

Regular physical activity is fun and healthy, and increasingly more people are starting to become more active every day. Being more active is very safe form of people. However, some people should check with their doctor before they start becoming much more physically active. Common sense is your best guide when you answer these questions. Please read the questions carefully and answer each one honestly:

YES or NO

- ❖ Do you lose your balance because of dizziness or do you ever lose consciousness?
- ❖ Do you have a bone or joint problem that could be made worse by a change in your physical activity?
- ❖ Is your doctor currently prescribing drugs (for example, water pills) for your blood Pressure or heart condition?
- ❖ Do you know of any other reason why you should not do physical activity?
- ❖ Has your doctor ever said that you have a heart condition and that you should only do physical activity recommended by a doctor?
- ❖ Do you feel pain in your chest when you do physical activity?
- ❖ In the past month, have you had chest pain when you were not doing physical activity?

I certify that the above statements are true and correct. I understand that a Doctor's note may be requested. I fantails requested, I should not proceed with this program until the note is received.

Name: _____ date _____ Signature _____

Appedex B. Participant information sheet and informed consent form

My name is **Tamirat Tesema**. I am working as a data collector for the study being conducted in this school and the purpose of partial fulfillment of Master's degree of Jimma University, the department of sport science in sport academy. I kindly request you to lend me your attention to explain you about the study and being selected as the study participant.

❖ The study title

“ effects 12weeks of regular physical exercise training on male student's fitness development in selected components of fitness in the case of Toba secondary school” .

Purpose of the study

The findings of this study would have a paramount importance for teachers and students how time of the day can affect physical fitness. It also provides a basis for the development of specific training program and time for the effect of regular exercise training in the school. Moreover, the aim of the study is to fulfill Master's Degree in sport science for the investigator and desire to ***“T effects 12 weeks of regular physical exercise training on student's fitness development in selected components of fitness in the case of Toba secondary school” .***

Procedure and durations

There are five variables to be tested before and after training programs are given to you. Participation in this study will not exceed 60 minute per session three days per week for exercise training. The experiment of the study will take twelve weeks. So I kindly request you to spare me this time for twelve weeks regular physical exercise training.

❖ Risks and benefits

The risks of this research study will be little. While administrating the tests and during training session, you may experience localized muscle fatigue in some parts of your body. You may also feel some muscle soreness and fatigue during and after the session of the exercise tests and training but it is not expected unusual risk as a direct result of the study. If any an expected physical injury occurs, appropriate first aid will be provided, but no financial compensations will be given. There will be no costs for participating in the research on part of you. Soap and packed water will be given to you during and after the training session. In addition, when you are

participating in this exercise program you will improve your fitness development. I hope that this will give you a clear picture of twelve weeks regular physical exercise training on students fitness development.

❖ **Rights**

Participation for this study is fully voluntary. You have the right to declare to participate or not in this study. If you decide to participate, you have the right to withdraw from the study at any time and will not label you for any loss of benefits, which you otherwise are entitled. You do not have to answer any question that you do not want to answer.

❖ **Confidentiality**

If you consent to participate in this evaluation, your personal information will be kept confidential. Participant's individual scores will not be disclosed outside of the testing personnel without each participant's writing permission. However, the only researcher may review the study data without writing consent.

❖ **Agreement**

I have read all the information provided on this form and consent to participate in this study.

- **Name**_____
- **signature**_____
- **date**_____

If you do not consent to participate, you do not need to sign this form. Simply return it to the researcher.

Signature of investigator_____ **date**_____

❖ **Contacts address** If there is any question any time about the study please contact **Tamirat Tesema, at (0917205770) email tamirattesema2019@gmail.com**

APPENDIX-C:

12 weeks physical Exercise Training Plan.

phase	week 1-4	week 5-8	week 9-12
Warming-up	Walking, Jogging Exercise & Synchronized movement of hands and leg , arm, and dynamic stretching exercise	Walking, Jogging Exercise & Synchronized movement of hands and leg , arm, and dynamic stretching exercise -from general to specific	Walking, Jogging Exercise & Synchronized movement of hands and leg , arm, and dynamic stretching exercise -from general to specific
Main part	<ul style="list-style-type: none"> ❖ aerobics exercise -skipping rope -jogging exercise -Jumping jacks -running ❖ stretching exercise -Dynamic and static stretching -hamstring stretch -roll down stretch -downward dog stretch -Samson stretch -hip stretch -side stretch -shoulder and arm stretch ❖ power and strength exercise -sit up -squat jump -push up -lunges jump ❖ agility exercise -zigzag running -W-drills -Z- drills 	<ul style="list-style-type: none"> ❖ aerobics exercise -skipping rope -jogging exercise -Jumping jacks -running ❖ stretching exercise -Dynamic and static stretching -hamstring stretch -roll down stretch -downward dog stretch -Samson stretch -hip stretch -side stretch -shoulder and arm stretch ❖ power and strength exercise -sit up -squat jump -push up -lunges jump ❖ agility exercise -zigzag running -W-drills -Z- drills <p><i>Note that</i></p> <ul style="list-style-type: none"> ☞ Intensity of each exercise activity was added by 10% than from month one 	<ul style="list-style-type: none"> ❖ aerobics exercise -skipping rope -jogging exercise -Jumping jacks -running ❖ stretching exercise --Dynamic and static stretching -hamstring stretch -roll down stretch -downward dog stretch -Samson stretch -hip stretch -side stretch -shoulder and arm stretch ❖ power and strength exercise -sit up -squat jump -push up -lunges jump ❖ agility exercise -zigzag running -W-drills -Z- drills <p><i>Note that</i></p> <ul style="list-style-type: none"> ☞ Intensity of each exercise activity was added by 10% than from month two
Cooling down	Rehydrate, light body movement with breathing meditation, and, static stretching exercise	Rehydrate, light body movement with breathing meditation, and, static stretching exercise	Rehydrate, light body movement with breathing meditation, and, static stretching exercise

Appendix-D








Weekly practical lesson plan

Parts	Monday	Wednesday	Friday
Warming -up	Walking, Jogging Exercise & Synchronized movement of hands and leg , arm, and dynamic stretching exercise	Walking, Jogging Exercise & Synchronized movement of hands and leg , arm, and dynamic stretching exercise	Walking, Jogging Exercise & Synchronized movement of hands and leg , arm, and dynamic stretching exercise
Main part	<ul style="list-style-type: none"> ➤ jogging exercise ➤ running on the spot ➤ hamstring stretch ➤ roll down stretch ➤ sit up ➤ squat jump ➤ Z- drills 	<ul style="list-style-type: none"> 🚦 Jumping jacks 🚦 downward dog stretch 🚦 Samson stretch 🚦 hip stretch 🚦 push up 🚦 lunges jump 🚦 zigzag running 	<ul style="list-style-type: none"> ✓ skipping rope ✓ side stretch ✓ shoulder and arm stretch ✓ roll down stretch ✓ W-drills ✓ squat jump
Cooling down	Rehydrate, light body movement with breathing meditation, and, static stretching exercise at the end of the session	Rehydrate, light body movement with breathing meditation, and, static stretching exercise at the end of the session	Rehydrate, light body movement with breathing meditation, and, static stretching exercise at the end of the session

Appendix –E

Daily Practical Lesson Plan

Date	Time	Parts	Set & rep	intensity	Recovery time
Monday	10'	Warming-up Walking, Jogging Exercise & Synchronized movement of hands and leg , arm, and dynamic stretching exercise		moderate	
	40'	Main part/Work-out <ul style="list-style-type: none"> ➤ jogging exercise ➤ running on the spot ➤ hamstring stretch ➤ roll down stretch ➤ sit up ➤ squat jump ➤ Z- drills 	<ul style="list-style-type: none"> - 1 x 12' - 1 x 10' - 2 x 20 sec - 2 x 15 sec - 3 x 6 - 3 x 6 - 2 x 5 	High	1 minute b/n sets and 20 sec b/n different exercise
	10'	Cool-down - trainees perform Rehydrate, light body movement with breathing meditation, and, static stretching exercise at the end of the session		Low	

Date	Time	Parts	Set & rep	intensity	Recovery time
Wednesday	10'	Warming-up Walking, Jogging Exercise & Synchronized movement of hands and leg , arm, and dynamic stretching exercise		moderate	
	40'	Main part/Work-out  Skipping rope  downward dog stretch  Samson stretch  hip stretch  push up  lunges jump  zigzag running	-1 x 10' - 2 x 15 sec - 3 x 10 ' - 2 x 20 sec - 3 x 6 - 2 x 4	High	1 minute b/n sets and 20 sec b/n different exercise
	10'	Cool-down - trainees perform Rehydrate, light body movement with breathing meditation, and, static stretching exercise at the end of the session		Low	

Date	Time	Parts	Set & rep	intensity	Recovery time
Friday	10'	Warming-up Walking, Jogging Exercise & Synchronized movement of hands and leg , arm, and dynamic stretching exercise		moderate	
	40'	Main part/Work-out ✓ Jogging exercise ✓ side stretch ✓ shoulder and arm stretch ✓ roll down stretch ✓ W-drills ✓ squat jump	-1 x 12' - 2 x 15 sec - 3 x 30 sec - 2 x 15 sec - 2 x 5 - 3 x 6	High	1 minute b/n sets and 20 sec b/n different exercise
	10'	Cool-down - trainees perform Rehydrate, light body movement with breathing meditation, and, static stretching exercise at the end of the session		Low	

Appendix F

Profile of participants

A. Experimental Group

No	Name of students	id code	Age	Height in cm	Weight in k.g	Grade level
1	Hafiz Ahmed Aba Gero	A	18	1.67	60.42	9 TH C
2	Dusur Yakub Suleman	B	17	1.69	65.75	10 TH C
3	Sabir Kemal Isa	C	16	1.65	59.45	9 TH A
4	Amir Nasir Mohammed	D	18	1.64	58.33	10 TH D
5	Fayisel Temam Aba Mecha	E	17	1.57	50.31	9 TH B
6	Mamado Adisu Abera	F	18	1.69	63.38	10 TH C
7	Fanu'el Geday Barihe	G	15	1.63	51.34	9 TH D
8	Temasgen Andarge Mola	H	16	1.61	57.43	10 TH B
9	Amade Jemal Isa	I	17	1.66	57.31	9 TH E
10	Adinan Abdela She Teha	J	16	1.60	61.37	10 TH A
11	Kalid Girma Adal	K	18	1.70	65.22	10 TH E
12	Abubakir Abdo Jemal	L	16	1.68	56.04	10 TH A
13	Hamza Ahmid seid	M	17	1.65	63.18	9 TH F
14	Anuwar Mohammed Temam	N	18	1.67	58.98	9 TH G
15	Mohammed Mustefa Husman	O	16	1.59	59.42	10 TH B
16	Amadin Kemal Habib	P	17	1.63	60.21	10 TH D
17	Zinadin Isma'el Aba Biya	Q	18	1.59	53.39	9 TH E
18	Meknun Abdureman Ibrahim	R	16	1.62	59.82	9 TH H
19	Hamza Jara Aba Temam	S	15	1.58	60.71	9 TH D
20	Izadin Ahimed kedir	T	17	1.55	51.27	10 TH C

B. Controlling Group

No	Name of students	ID code	Age	Height in cm	Weight in Kg	Grade level
1	Fami Abde Jemal	A	17	1.69	50.15	10 TH E
2	Amadin Birahanu bayin	B	16	1.55	52.24	9 TH I
3	Anuwar Mohammed bediru	C	15	1.66	56.08	9 TH H
4	Gashaw Goju mola	D	17	1.63	58.24	10 ^{THD}
5	Eliyas Mohammed Aba Jebal		15	1.55	55.82	10 TH B
6	Riyad kefalo mamo	F	16	1.54	53.94	9 TH G
7	Mohammed Muktar Aba Temam	G	17	1.70	54.43	10 TH C
8	Musab Tahir Aba Mecha	H	15	1.57	52.46	9 TH F
9	Abdiket Zakir Nura	I	18	169	55.96	10 TH A
10	Mubarik Jemal Adem	J	17	1.57	60.02	10 TH C
11	Ahmedin Sali Nabso	K	16	1.65	58.14	9 TH D
12	Nezif Lelisa Jobir	L	17	1.56	53.65	10 TH B
13	Umer siraj Biya	M	15	1.52	53.03	9 TH F
14	Jamil Ali Irahim	N	18	1.56	52.92	10 TH A
15	Lata Chala Biru	O	17	1.60	54.65	9 TH A
16	Akimal Nura Shafi	P	16	1.54	52.46	10 TH C
17	Salihu Abdulwohab Jafer	Q	17	1.60	58.61	10 TH D
18	Abdurezak Ahmed Aba Bor	R	15	1.55	58.74	9 TH C
19	Imran Nasir Imam	S	18	1.54	58.68	9 TH B
20	Kalid Kelil Mohammed	T	17	1.57	49.92	9 TH E

D. Scores sheet of the control group students data.

C. Scores sheet of the experimental group students data.															
S.No	Name	Age	height in (M)	pre weight in (Kg)	post weight in (Kg)	<i>body composition</i> kg/ m ²		<i>muscular strength in</i> sec		<i>flexibility</i> in cm		<i>Power in</i> CM		<i>Agility In</i> sec	
						Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test
1	A	18	1.67	60.42	59.21	21.66	21.23	9	11	10	12	60	62	20.4	17.4
2	B	17	1.69	65.75	64.29	23.02	22.51	8	10	8	11	55	61	18.4	16.2
3	C	16	1.65	59.45	56.14	21.84	20.62	7	9	9	11	53	58	17.2	16.1
4	D	18	1.64	58.33	56.24	21.69	20.91	7	6	7	8	54	58	19.9	17.8
5	E	17	1.57	50.31	50.32	20.41	20.41	10	11	6	8	50	54	18.8	16.7
6	F	18	1.69	63.38	62.34	22.19	21.83	8	7	10	13	54	58	16.9	16.1
7	G	15	1.63	51.34	50.12	19.32	18.86	10	12	7	11	59	57	19.4	17.6
8	H	16	1.61	57.43	54.36	22.16	20.97	8	8	8	9	55	59	17.7	16.7
9	I	17	1.66	57.31	56.05	20.80	20.34	7	6	7	11	52	57	18.2	17.6
10	J	16	1.60	61.37	58.69	23.97	22.93	7	10	8	10	56	61	16.6	15.7
11	K	18	1.67	65.22	65.23	23.39	23.39	10	8	7	11	50	55	17.2	16.4
12	L	16	1.68	56.04	54.01	19.86	19.14	9	12	8	9	45	51	19.2	18.4
13	M	17	1.65	63.18	63.08	23.21	23.17	6	8	10	12	46	50	18.6	16.7
14	N	18	1.67	58.98	58.78	21.15	21.08	5	6	6	9	51	54	17.9	16.5
15	O	16	1.59	59.42	59.45	23.50	23.52	6	6	8	12	53	57	18.3	17.3
16	P	17	1.63	60.21	60.16	22.66	22.64	12	11	9	10	51	56	16.8	15.7
17	Q	18	1.59	53.39	53.31	21.12	21.09	7	8	6	9	50	55	19.1	17.6
18	R	16	1.62	59.82	58.91	22.79	22.45	5	7	7	7	57	59	18.1	16.9
19	S	15	1.58	60.71	60.67	24.32	24.30	11	12	7	9	61	62	18.9	16.4
20	T	17	1.55	51.27	51.02	21.34	21.24	8	9	8	9	59	60	17.8	16.1

S.No	Name	Age	height in (M)	pre weight in (Kg)	post weight in (Kg)	body composition kg/ m2		muscular strength in sec		flexibility in cm		Power in CM		Agility In sec	
						Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test
1	a	17	1.69	50.15	50.25	17.56	17.59	8	8	8	7	53	52	18.9	18.7
2	b	16	1.55	52.24	52.05	21.74	21.66	9	10	7	9	56	55	19.2	19.1
3	c	15	1.66	56.08	55.98	20.35	20.31	5	6	6	6	55	55	18.8	18.9
4	d	17	1.63	58.24	58.08	21.92	21.86	7	7	7	6	51	52	17.9	18.1
5	e	15	1.55	55.82	56.24	23.23	23.41	9	8	8	9	50	51	18.6	18.9
6	f	16	1.54	53.94	54.82	22.74	23.12	11	11	7	6	57	55	19.4	19.4
7	g	17	1.70	54.43	54.53	18.83	18.87	8	8	6	7	53	54	18.2	18.1
8	h	15	1.57	52.46	52.20	21.28	21.18	7	5	7	7.5	52	53	18.6	18.8
9	i	18	1.69	55.96	56.02	19.59	19.61	4	5	4.6	6	54	55	19.1	19.2
10	J	17	1.57	60.02	60.72	24.35	24.63	5	4	5	5	53	52	18.7	18.4
11	K	16	1.65	58.14	58.90	21.36	21.63	7	6	10	11	48	49	17.8	17.9
12	L	17	1.56	53.65	53.60	22.05	22.02	9	8	9	9	47	46	18.5	18.2
13	M	15	1.52	53.05	53.20	22.96	23.03	7	6	7	6	57	61	18.1	18.1
14	N	18	1.56	52.92	52.96	21.75	21.76	7	7	7	8	49	48	17.2	17.4
15	O	17	1.60	54.65	54.60	21.35	21.33	7	7	9	6	57	56	17.7	17.9
16	P	16	1.54	52.46	52.42	22.12	22.10	10	9	8	8	56	55	19.2	19.6
17	Q	17	1.60	58.61	58.60	22.89	22.89	8	7	4	5	51	51	18.7	18.8
18	R	15	1.55	58.74	58.75	24.45	24.45	10	9	6	7	58	58	17.6	17.5
19	S	18	1.54	59.68	59.45	25.16	25.07	8	8	7	6	55	54	18.4	18.2
20	T	17	1.57	49.92	49.90	20.25	20.24	8	7	8	8	52	54	18.9	19.2

Appendix-G.

Normative data of the selected physical quality test of players

Table.1. the normative data of BMI test, (Vikram et al, 2003 and NHS Direct, 2011).

Classification	Gender	
	Men	Women
Under Weight	17.9-18.9	15-17.9
Ideal Weight (Normal)	19-24.9	18-24.4
Over Ideal Weight	25-27.7	24.5-27.2
Obese (High risk)	>27.8	>27.3

Table.2. the normative data of chin up test, (Beashel, P. and Taylor, J. 1996).

Classification	Age= 16-18	
	Gender	
	Men	Women
Excellent	>13	>6
Above average	9-13	5-6
Average	6-8	3-4
Below average	3-5	1-2
Poor	<3	0

Table 3. Normative data of Sit & Reach test for 15 to 18-year-old

Gender	Excellent	Above average	Average	Below average	Poor
Male	>14	14.0 - 11.0	10.9 - 7.0	6.9 - 4.0	<4
Female	>15	15.0 - 12.0	11.9 - 7.0	6.9 - 4.0	<4

Source: Davis et al. 2000, p. 126

Table 4. Normative Data of Vertical jump test for 15 to 18 years' old

Gender	Excellent	Above average	Average	Below average	Poor
Male	>65cm	56 - 65cm	50 - 55cm	49 - 40cm	<40cm
Female	>60cm	51 - 60cm	41 - 50cm	35 - 40cm	<35cm

Source: Beashel; 1997

Table 5. Normative data of Illinois Agility Run Test for 15 to 18 years' old

Gender	Excellent	Above average	Average	Below average	Poor
Male	<15.2 sec	15.2 - 16.1 sec	16.2 - 18.1 sec	18.2 - 19.3 sec	>19.3 sec
Female	<17.0 sec	17.0 - 17.9 sec	18.0 - 21.7 sec	21.8 - 23.0 sec	>23.0 sec

Source: Davis et al. 2000

Picture of Experimental Group



Source: my own

Picture of BMI Test



Source: my own

Picture of sit and reach test



Source: my own

Picture of Illinois Agility Test



Source: my own