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EFFECTS OF TWELVE WEEKS
HEALTH RELATED PHYSICAL
FITNESS COMPONENT TRAINING ON
MALE STUDENTS ACADEMIC
ACHEVEMENT IN CASE OF ONJOJO
GENERAL SECONDARY SCHOOL By:
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**BAHIR DAR UNIVERSITY
SPORT ACADEMY**



**EFFECTS OF TWELVE WEEKS HEALTH RELATED PHYSICAL
FITNESS COMPONENT TRAINING ON MALE STUDENTS
ACADAMIC ACHEVEMENT IN CASE OF ONJOJO GENERAL
SECONDARY SCHOOL**

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August, 2019

BAHIR DAR, ETHIOPIA

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FITNESS COMPONENT TRAINING ON MALE STUDENTS ACADAMIC
ACHEVEMENT IN CASE OF ONJOJO GENERAL SECONDARY
SCHOOL**

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***A THESIS SUBMITTED TO, SPORT ACADEMY BAHIRDAR UNIVERSITY IN
PARTIAL FULIFIMENT FOR THE REQUIREMENTS OF THE DEGREE OF MASTER
OF EDUCATION IN TEACHING PHYSICAL EDUCATION***

August, 2019

BAHIR DAR , ETHIOPIA

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DECLARATION OF AUTHORSHIP

I, here by that this thesis for the partial fulfillment of the requirement for the Degree of Masters of Education in teaching physical education on the title of **“EFFECTS OF TWELVE WEEKS HEALTH RELATED PHYSICAL FITNESS COMPONENTS TRAINING ON MALE STUDENTS ACADEMIC ACHIEVEMENT IN CASE OF ONJOJO GENERAL SECONDARYSCHOOL** is my real original work and all sources of materials used in this thesis have been acknowledge. It has not previously formed on the basis for the award of any Degree, Diploma of any University, Other Institution of higher learning or publication except where due acknowledgement is made in acknowledgements

By: Addisu Hankebo

Place: Bahir Dar University

Signature

Date

DEDICATION

I dedicate this thesis manuscript to my families and friends. As well as the researcher extended his dedication to peoples who contribute even a piece of advice throughout the process of conducting this study.

BIOGRAPHICAL SKETCH

The researcher was born at a place called Mirab Badawacho Woreda Danema Town of Hadiya Zone in South Nation Nationality Peoples of Region State in November 14, 1983 EC. He learnt his Elementary School from grade 1-8 in Buligita elementary school and he attends his secondary & Preparatory school in shone secondary & preparatory schools from the year 1999-2002 EC. He joins his first Degree by regular program from 2003 EC -2005E.C completed & Graduated from Dilla University by Sport Science department & assigned to teach physical Education .And also he attending his 2nd degree (master of education) in Teaching physical Education by summer program from 2008-2011 EC in Bahir Dar University.

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LIST OF ABBREVIATIONS

SNNPRS : South nation nationality people Regional State

CG: Control Group

CVE: Cardio Vascular Endurance

EG : Experimental Group

GPA: Grade Point Average

MD: Mean Difference

ME: muscular Endurance

MOE: Ministry of Education

MS: Muscular Strength

POT: Post test

PT : pre test

SD : Standard Deviation

SPSS: Statistical Package for Social Sciences

WHO: World Health Organization

USDHHS: united state department of health and human services.

ABSTRACT

Developing effective physical fitness exercise program for students is a strategy for improving student's Academic achievement. The purpose of this study was to investigate the effect of 12 weeks' health related physical fitness exercise training on student's Academic achievement. The study employed Experimental research design. From grade 10 male 200 total population, 36 sample students were selected with the age of (experimental group=16.4±6.255, control group = 17.611±1.144) and divided randomly into 2 equal groups. Both the experimental group (number = 18) and control group (number = 18) participated in the typical one classes of 40-minute Physical education per week, but only Experimental group were participated in additional 3 sessions per week of 50 minutes per session of fitness training. Pre and post test results of the selected fitness variables were taken from both groups. Cardio respirator fitness was measured using 12 minute run test, variables were tested by, Muscular endurance were tested using push-ups and Muscular strength were measured by using Wall-sit test. The data collected from the study subject was analyzed by using SPSS version 21 software. By using paired t-test the mean differences/changes from pre to post test results of the variables and students average score changes from first to second semester were checked. The results showed health related physical fitness components such as CVE (MD=1860.89), ME (MD=9.33) and MS (MD=25.278), were improved significantly following the 12-week fitness Exercise in EG at ($p < 0.05$). Besides, were significantly reduced, since ($p < 0.05$). Since ($p > 0.05$) However, health related physical fitness components of the Control group have no significant effect on student's Academic achievement in all selected fitness variables. Therefore, the null hypotheses were rejected in case of cardiovascular accepted in case of muscular strength and muscular endurance. Finally, the researcher concluded that most health related physical fitness components have a significant effect on students' academic achievement following the twelve-week health related physical fitness exercises & recommended that regular fitness exercises had positive effects on students' academic ,therefore PE teachers are expected to conduct, implement & encourages fitness exercises for the students.

CHAPTER ONE

INTRODUCTION

1.1. Background of the Study

In the last few decades, a growing body of research has built an argument that physical fitness among youth might affect their cognitive development and academic achievement. With regard to the possibility of the effects of physical fitness on cognition and academic achievement in children, Tomporowski et al. have proposed a hypothetical conceptual model. In the model, they identified psychosocial factors, health factors, and physical fitness as direct precursors to children's mental functioning (e.g., academic achievement), and suggested that socioeconomic status (SES) level and gender may moderate as well. Among them, PF has historically been regarded as a potential mediator of the effects of exercise. Training on cognitive functions/structure to date, some studies found that children with higher aerobic fitness exhibited larger hippocampal volumes as well as superior performance on a relational memory task compared to those with lower fitness. Participating in regular physical activity and maintaining physical fitness is widely established (Department of Health, 2004, United States Department of Health and Human Services, 2008). It has been clearly demonstrated that physical activity decreases risk of developing cardiovascular disease (CVD), stroke, some cancers, obesity, type 2 diabetes mellitus and is also effective in the treatment of several of these diseases. There has also been growing interest in the benefits of physical activity for mental health and a strong evidence base shows that regular activity and improved fitness increases psychological well-being (Biddle, Fox & Boutcher, 2001, Biddle & Mutrie, 2008). Exercise can help people feel better about them and their lives reduce anxiety and improve mood.

Physical exercise increases beneficial effects for any age group by providing the exercise which is specific and appropriate to the level of fitness of the individual. It also creates a sense of well-being, produce greater energy and reduce the risk of developing many diseases. Exercise makes demands on the body systems over normal every day activities and as result the systems adapt anatomically and physiologically (Rosser, 2001).

Physical activity is essential for numerous reasons i.e. Physical fitness, mental health and social interaction. The physical health benefits of participating in regular physical activity maintaining physical fitness are widely established (Department of health, 2004, United States department of health and Human services, 2008). Exercise can help people feel better about their lives reduce anxiety and improve mood. Evidence is also show that physical activity is associated with substantially reduced risk of mental illness and conditions such as depression, cognitive impairment and dementia (Fox & Mutrie, in press; 2008). The benefits of physical activity in the treatment of depression (National Institute of Clinical Excellence, 2004) and improvement in select aspects of cognitive function in older adults are becoming increasingly well-established (Angevaren, Aufdemkampe, Verhaar, Aleman, & Vanhees, 2008). Furthermore, acute bouts of well managed physical exercise may facilitate certain aspects of information. Processing in adults (Tomprowski, 2003). Regular physical activity increases the amount of oxygen delivered to the brain, which increases children's capacity to learn. In addition to these benefits of physical fitness, researchers have found relationships between physical fitness and cognitive functioning. Physical fitness has also been linked to higher levels of self-esteem, which are associated with higher academic performance in the classroom (Field et al, 2001). The most commonly researched use for physical fitness is certainly for the purpose of physical exercise directly impacting the body. Regular physical fitness has been proven to have a positive relationship with the healthy functioning of all of these areas. In addition to the physical benefits of physical fitness, researchers have found relationships between physical fitness and cognitive functioning and academic achievement. Past literature consistently supports participation in movement and exercise, which leads to the reduction of stress, improvement of emotional state, and helps one to function comfortably. Brain Gym exercises and balanced movements have been proven to reduce anxiety (Hillman, 2004). Physical fitness refers to a set of health and skill related attributes a person has in regard to their ability to perform physical activity behaviors. But the researchers' goal was to examine the five components of health related physical fitness including cardio respiratory fitness, body composition, muscular endurance, muscular strength and flexibility (Ortega, Ruiz, Cstillo and Sjostrom, 2008) as predictor of academic achievement. These particular components were selected because they have been identified as important health markers in childhood and adolescence and they related to risk factors associated with chronic and degenerative diseases (American College of Sport Medicine, 2010) Physical fitness has also been

linked to higher levels of self-esteem and lower levels of anxiety, which are associated with higher academic performance in the classroom. The relationship between physical fitness and academic achievement has received attention because of the increasing number of children who are unhealthy and physically unfit. Also, schools are feeling the pressure to meet academic standards. Unfortunately, students are not receiving ample amount of physical activities at school (Hall, & Kramer, 2009). The idea of the mind and the body working together to achieve success is an essential part of life. Aristotle (as cited in Brügemann&Gerds-Ploeger, 2013) once said, “Life is movement.” Both Plato and Aristotle recognized the relationship between physical activity and the mind. Benefits of exercise do not stop at the muscular level but integrate connections within the brain to stimulate new pathways, which inevitably speed up the learning process.

Health practitioners, policy makers, educators, and community advocates have also pointed to childhood obesity as one of the greatest modern day public health crises. Recently, research has begun to link childhood obesity to non-health outcomes. For example, studies have established that overweight and obese children have academic outcomes that are worse than their more physically fit peers (Castelli, Hillman, Buck, & Erwin, 2007; Datar, Sturm, &Manabosco, 2004).As noted by Brubaker (2011) it provides students with many opportunities to improve their overall lifestyle; first and foremost, it provides students the opportunity to improve their physical fitness development and health. Schools have the potential to improve the health of students by providing instruction in physical education that promotes enjoyable lifelong physical activity.

Unfortunately, many schools have reduced physical education opportunities in order to dedicate more class time to meet these academic standards (Lavall, 1984). Ethiopian Ministry of Education has been developing physical education curriculum in secondary schools with a one-day class schedule in a week-40 minutes long. It is limited class compared with other academic subjects to ensure and develop student’s optimal physical fitness; to achieve their personal goals for various work-related, sport, and leisure activities. Despite, the main aim of Ethiopian education system provision for quality education for all is to strive productivity, social and individual problem solving capacity (Ministry of Education, 1994). Therefore, the main aims of this study were addressing all the relationship b/n physical fitness activities and academic performance or achievement with the references of physical fitness tests and students’ scores of results (GPA).

1.2 Statements of the Problems

A study found that health related physical fitness tests were positively related to academic achievement in an elementary setting (Castelli, Hillman, Buck, & Erwin, 2007). Even though there are numerous positive effects related to being physically active and physical fitness, their effect on cognition and academic achievement is not clear. The relationship between physical fitness and academic achievement has received attention because of the increasing number of children who are overweight and physically unfit. Also, schools are feeling the pressure to meet academic standards (Maeda & Murata, 2004). As the study which was conducted on the effect of health related physical fitness on academic achievement by Fisher (1996) and Din (2005) found health related physical fitness has significant effect on students' academic performance, while Yiannakis and Melnick (2001), Broh (2002), and Jordan (1999) were able to determine was a significant positive effect on student academic achievement.

The above section of this study showing that there are a number of different conclusions drawn from various studies regarding the impact that health related physical fitness activity have been reported to have on academic achievement.

The basic issue that drives this study is to know the effect of participating in health related physical fitness exercise on student's academic achievement. The main target of this study was to test the effect of twelve weeks' health related physical fitness exercise on student's academic performance. In addition to this the researcher were initiated to conduct this study to know the varies roles of physical education activities in relation to academic performance of the students. That is why because physical education can have so many advantages or benefits for the individuals if he/she/ can actively participated in different forms of physical exercises on regular basis

The main issues that initiated the researchers who conduct this study were (the question that motivated were what are the major roles physical Education activities in relations to academic achievements. This is because schools are given more emphasis to teach academic subjects that are assessed on standardized tests than on other nonacademic subjects like physical education. Academic goal forced the educational leaders and teachers to shift their focus solely on students' academic achievement. A more focused mindset on academic performance has hindered the

quality and quantity of physical education classes. In addition to this since there were no major previous studies that were conducted at this Woreda or study area that the effect of health related physical fitness exercises on student's academic achievement, there was a knowledge gap in the Onjojo Woreda communities. In the same ways, the reality in Onjojo General Secondary school shows low time allotment of physical education than other subjects.

Understanding & knowing relationship between physical fitness exercises and academic success is very important points to know & achieve the whole objectives of education. The discussion of many literatures revealed that there is no clear consensus regarding the effect that health related physical fitness exercise participation has on academic performance. Furthermore, previous research has identified other problems that have been traced back to health related physical fitness. Each study took a different methodological approach and differed with respect to the subjects studied. Therefore, this study were attempted to check or assess outcome of physical fitness exercises training on students' academic performance by using experimental research design with the variables of health related fitness components pre & posttest results and academic performance of first & second semester score results of the students/GPA/. In this area many research were conducted .For example in specific brain growth and development, a study conducted by Chaddock Heyman et al., (2015), found that differences in aerobic fitness levels in children play a role in cortical gray matter structure, which is important for academic success. Children who have a higher level of aerobic fitness are shown to have cognitive and brain plasticity, which can correlate with success in academic areas, especially mathematics. Also higher levels of aerobic fitness have been associated with larger brain volumes in two regions of the brain that are critical for memory and learning the hippocampus and dorsal striatum. Conyers and Wilson (2015) agree, by stating that the hippocampus is essential for creating new memories and for learning. And more specifically the study conducted by Tessema Ewnetie (20018), Effects of physical exercises on health related fitness components & students' academic achievements by using 34 sample females' students & with five fitness variables. But the gaps of this study were using of the sample 36 male students with three fitness variables & average score results of the students or GPA

The study were used the subject of the study Grade ten male students with the sample of 36 students and randomized in both experimental & control groups.

At school level the communities like parents and teachers are giving more attention to academic areas than physical fitness activity. The rational is that physical fitness exercises can have many positive effects on both body & mind of the individuals. There are several proven indicators that have

shown physical activity benefits the human brain, its basic functions, and abilities. One of the most critical brain functions that can predict academic success is memory.

So, (2012) found that physical activity may increase memory functions and in turn create academic success for students who engage in moderate to vigorous physical activity multiple times a week.

Therefore, the researcher is want to conduct this study that is why to investigate the relationship between health related physical fitness and academic achievement of Onjojo general secondary school grade ten male students or the effect of fitness training on students' academic performance by using Experimental research design with the fitness variables of cardiovascular endurance, muscular strength, macular endurance & the students results scores or GPA. The tests that are used to collect the data were 12minute run test, wall sit &push up tests &the data were analyzed by using computer system software of SPSS (statistical packages of social science).

1.3. Objectives of the Study

1.3.1 General Objective of the Study

The general objective of this study was; to investigate the effect of 12weeks heath related fitness component training on student's academic achievement in case of Onjojo General Secondary school grade ten male students.

1.3.2 Specific objectives of the study

In addition to the general objective above, this research addressed the following specific objectives:

1. To test the effect of twelve weeks' fitness exercise on student's academic achievements.
2. To identify the effect of 12weeks cardio respiratory fitness exercise on student's academic achievement.
3. To examine the effect of 12weeks' Muscular endurance fitness exercise on student's academic achievement.
4. To evaluate the effect of 12weeks' Muscular strength fitness exercise on student's academic achievement.

1.4. Hypotheses

To determine statistical probability within a quantitative study, null and alternative hypotheses were used. The study was attempted to test the following hypotheses:

1. There is will be no significant difference in average scores results of students as a result of 12weeks fitness variables exercise.
2. There will be significant difference in average score results of students as a result of twelve weeks' health related physical fitness variables exercise.
3. There will be no significant differences in average score results of students as a result of cardiorespiratory exercises.
4. There will be significant differences in average score results of students as a result of cardiorespiratory exercises.
- 5 There will be no significant differences in average score results of students as a result of muscular strength & endurance exercises.
- 6 There will be significant differences in average score results of students as a result of muscular strength & endurance exercises

1.5. Significance of the Study

The purpose of this study was to investigate the effects of health related physical fitness exercise on student's academic achievement on Onjojo general school grade 10th male students. There are numerous factors that influence student academic achievement. The outcome of this study finding might be helps to:

1. Provides good ground for secondary school HPE teachers to utilize programmed physical fitness training/exercise for students.
2. Helps students to improve physical fitness and that provides information to understand the effect of health related physical fitness training/exercise on academic achievement.
3. Create awareness to students, parents and communities regarding the importance of Health related physical fitness exercise on student's academic achievement.
4. Helps to teach the benefits of participating in regular physical exercises.
5. Helps to know the important roles or outcomes of physical education activities.
6. Provides the information's about the relationship b/n fitness exercises & academic performance
7. Lastly, serve as a key for other researcher who might want to study further, were some significances of this study.

1.6 Delimitation of the study

In research, delimitations address how the study is narrowed in scope (Creswell, 1998). This study was designed to investigate the effects of endurance exercises on student's academic achievement. The study was delimited in south nation nationality people regional state (SNNPRS) in hadiya zone mirab badawacho woreda in onjojo secondary school grade ten students. The geographical location of the study area were lies 120km South west from Hawassa (the regional capital) ,300km from Addis Ababa (Capital of Ethiopia)&bordered in South wolayita ,on the North Kembata Tembaro zone &in East Misraq badawacho woreda. The populations of the study were selected from grade ten & the selected subjects were only male students selected by using simple random sampling technique &randomized in two groups. And also the followings are additional information's about the main delimitation areas of the study. They are:

- The subject of the study was grade ten students.
- Healthy Only students were participated in this study.
- The Selected fitness components were only the health related physical fitness Variables. They are cardiovascular endurance, Muscular strength &Endurance.
- Only field tests that are easily administered were used and the first and second semester average score results were taken to measure the student's academic achievement.
- The training time was limited to 12 weeks, 3 days per week and 50-minutes per session.
- The study was conducted in the academic of year of 2019GC

1.7 Limitation of the Study

The main limitations of this study were throughout the process of conducting this study, the researcher are faced or challenged by the following problems .They are:

- The selected subjects those who undertaken have no previous experience about exercise training in a regular basis
- Lack of laboratory test materials.
- Lack of sport materials availability in the school.
- Lack of specific test to measure the relationship b/n physical fitness and academic achievement.
- The external variables might not be controlled properly this and other factors might affect the results of this study.

1.8. Operational Definition of Key Terms

- **Academic achievement:** - means students overall average results across all subjects offered out of 100.
- **Training:** - is along & complex scientific process to produce skilled & talented athletes.
- **Spss:** - is the computer system software that is used to perform the statically data to analyze the results of the study.
- **General Secondary School:** - is the school that comprises /deliver/ teaching learning process in a one compounds for both grade level of 9-10 students.
- **Effect:** - something brought about by a cause or an agent; result.
- **Physical fitness:** - refers to a set of attributes people have or achieve, and are related to their ability to perform day to day activity (Singh A. et al., 1999).
- **Physical exercise:** - means any planned/program of bodily activity that is performed to enhances and maintain physical fitness and overall healthy (Hanna K.M., 2006).

1.9. Organization of the Study

This study consists of five chapters; the first chapter deals with the back ground of the study, statement of the problem, objectives of the study, hypothesis, significance of the study, delimitation of the study, limitation of the study, and 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. The fourth chapter deals with result and discussion of the study and the last chapter focuses on summary of the findings, conclusion and recommendations of the study.

CHAPTER-TWO

REVIEW OF RELATED LITERATURE

This chapter discusses about basic concepts of physical education, physical fitness, the relationship b/n physical activities & cognitive function, effects of physical exercises on brain and finally benefits of physical fitness & relation with academic performances.

2.1 An over views of physical Education

Physical Education provides children with learning opportunities through the medium of movement and contributes to their overall development by helping them to lead full, active and healthy lives. “It recognizes the physical, mental, emotional, and social dimensions of human movement, and emphasizes the contribution of physical activity to the promotion of individual and group wellbeing Physical education is a springboard for involvement in sport and physical activities throughout life. It is a source of communication with others and, in addition, can involve an appreciation of the natural environment as well as contributing to moral education and development. The physically educated person is physically literate. They have acquired culturally normative skills enabling engagement in a variety of physical activities, which can help them to maintain their health and well-being throughout their lives; they participate regularly in physical activity because they find it enjoyable; and they understand and value physical activity and its contribution to a healthy lifestyle. The physical education curricula (both primary and post-primary) consist of a number of areas of study called strands, namely athletics, outdoor and adventure activities, aquatics, dance ,gymnastics, games and health related fitness . Each strand has particular characteristics and contributes to the attainment of the overall aim of physical education. Schools are encouraged to adopt a flexible approach in planning for their involvement in physical education, and to offer a range of individual and team based choices to pupils .The Department of Education and Skills (DES) recommends that every post-primary pupil should have 2 hours of physical education per week, and every primary pupil 1 hour per week of physical education.

Average weekly time allocation for physical education across the European Union is 109 minutes (range of 30-240 minutes) with clusters around 60 and 90 minutes in primary schools, and 101 minutes (range 45-240 minutes) with a cluster around 90 minutes in post-primary schools (19, p6).

There is a general belief that physical education in schools is dominated by team games and that too little time is spent in more individual-based physical activities. The result is that too much emphasis is placed on performance and winning, rather than on learning & individual improvement. Ross and colleagues (1985) defined individual

2.2. The Meaning of Physical Education

Bucher (1999:8) states that: - “Historically, physical education programs focused on teaching children and youths in the school setting. The expansion of physical education beyond its traditional realm to non-school settings and people of all ages requires a more inclusive definition to encompass the diversity of programs and the wide range of goals achieved by participants.” Siedentop asserts that “there is probably less agreement today on the basic meaning of physical education than there has been at any time in our professional history”. However, he states that the mostly widely accepted meaning for physical education is based on the developmental model. This model is based on the belief that all school subject, including physical education, should contribute to the development of the whole child. Carefully structured physical activity is recognized as a means through which educational goals can be achieved. To encompass the rapidly changing and ever expanding scope of the field, physical education is defined as an educational process that uses physical activity as a means to help individuals acquire skills, fitness, knowledge, and attitudes that contribute to their optimal development and well-being. In this definition, the term education is broadly defined as the ongoing process of learning that occurs throughout lifespan. This definition recognizes that education, just like physical education, can and does take place in a variety of settings and is not limited to a specific age group. Home schooling continuing education through professional organizations, in-service education, distance learning, adult education, and preschools are just some of the expanded settings for education. Teachers today may be described by various labels such as “instructors”, “leaders”, or “facilitators”. Today’s students are people all ages, spanning the range from the very young attending a preschool to the elderly taking course at a university. Physical education uses physical

activity to enhance the development of the whole person. Physical education includes the acquisition and refinement of motor skills, the development and maintenance of fitness for optimal health and wellbeing, the attainment of knowledge about physical activities and exercise, and the fostering of positive attitudes conducive to lifelong learning and lifespan participation. physical education is concerned with the promotion of active lifestyles for people of all ages and abilities. Physical education program under qualified leadership enriches participants' lives.

To more fully understand physical education, its relationship to play, game, and sport must be examined. Physical education, play, games, and sports are different entities, although they may share some common elements. Play refers to activities engage in freely from amusement. Play is spontaneous, and the act of playing is rewarding in itself. Play emphasizes the joy of participation. Derived from play, games are contests in which the outcome is determined by strategy, skill, or chance. Sports are organized, competitive physical activities governed by rules. Rules standardize the competition and conditions so that individuals can compete fairly, sports provide meaningful opportunities to demonstrate one's competence and to challenge one's limits. Competition can occur against an opponent or oneself. Sports can also be viewed as games that emphasize physical involvement and where strategy and skill play a significant role in the determination of the outcome.

People engage in sports for enjoyment, personal satisfaction, and the opportunity to attain victory or obtain rewards. When sport is highly developed, governing bodies regulate sport and oversee its management. At this level, coaches play a significant part, athletes are highly skilled, specially trained officials ensure the fairness of the competition records are kept, events are promoted through the media, and spectators assume an important role. Since the early 1970s, there has been an enormous interest in the scholarly study of sport. Its significant role in our society, its massive impact on us culture, and its far reaching involvement of millions as participants and spectators have drawn the attention of scholars. Scholars have studied the philosophical, sociological, and psychological dimensions of the sport experience. The realm of physical education and sport today embraces many different programs, diverse settings, and people of all ages. This recent growth of physical education and sport has been accompanied by an increased interest in its scholarly study. This research has led to the development of specialized areas of knowledge. The subsequent increase in the breadth and depth of knowledge provides a foundation for professional

practice. The expansion of physical education and sport has led to a tremendous growth of career opportunities for enthusiastic and committed professional

2.3. Physical Education as an Academic Discipline

Life is physical education presently it is the process of transformation to bring physical education in to the mainstream of education. The current mood of the physical education to contribute their resource to the maximum in helping the individual to achieve a fuller growth these authors further speculated on the possible inter-relationships between physical activity and other domains to knowledge. Besides it has been through necessary to enhance the scope, status and purpose of physical education and make it more broad based. Though there was some exploration of the influence of social, physical, cultural and psychological conditions up on human physical activities there was not serious attempt to bring about cohesion among the various factors that stimulate human activity and skill acquisition. For example, although accepted in theory element or issues like motivation, aspiration level, self-estimation, did not find their due place in the physical activities and programs and even in the modifying effects of factors like group interaction, competition and cooperation. To these authors they have been considered in a routine, mechanical and in an unscientific manner.

Bucher (1972:212) argues that: - “education and physical education are passing through a period of change and transformation from traditional roles to modern, purposive roles in accordance with the increased productivity of today’s world through competition and production. “Besides, isolation and segregation of physical activities has had many unhealthy setbacks like developing an inferiority complex in the physical educators with members from other teaching faculties usually referring to them as non-teaching staff. It is suggested that any organization of physical education should start with developing a positive attitude and self-confidence among physical educators themselves and make them feel that physical education should extend itself to the classroom and become the focus or centered point of the educational system. Another scholar Siedentop (1998:225) discusses that: - “Physical education is a field of action, rules and of persons. The significance of self-involving physical participation and movement is really a planned exercise in growth and awareness not possible in other areas of learning”. The facts are theoretically known to many people but are not explicitly expressed them or teach them to other. In other words, physical activities need a theoretical framework where ideas can be collected,

judged and then formulated in to laws; hence we need a strong theoretical orientation for physical education so that the accumulated information can be consolidated and stabilized.

In our interest of helping the student to the maximum, improving our own image, and cutting down the routine and traditional curriculum of the school. The amount the knowledge is not the criterion of successful life but the way in which and individual faces the physical realities of the world and problem of life. There is no doubt, offers and educational dimension to the activity and tries to bridge the gap between school and the physical world (Ram and et.al. 1996, 13-14).

2.4. The Relationship B/N Physical Education and General Education

Kamlesh and Sangral (1997:11) states that: - “the relationship between physical education and general education provides opportunities for exchange of views between the physical education teacher and the subject teacher about the abilities, interests, limitation and scope of each individual student and his/her participation in the school program. In this way, good physical education teacher ascertains how well participation performs the necessary motor skills before permitting him/her to take part in physical activities. “The same authors explicitly elaborated that physical education has been accepted as an essential part of general education and no educational authority, state or organization questions the justification or need for it.

But still there is a considerable confusion in interpreting the scope and the nature of a physical education program and its academic relationship with general education or the contributions of general education to physical education. The physical education teacher is model to the students because his/her concern with his/her pupils’ physical health as well as their intellect and emotions. The development of cognitive and recreational abilities can thus become the guiding force and the outcomes. This widens the educative scope of physical activity and help to give a global definition to education and an educational orientation to physical education. The physical educator should consider psycho physical needs and problems of boys and girls and fit the program to suit the children instead to trying to adapt every boy and girl to the program.” Therefore, the relationship between physical education and education is natural. It is a fact that we cannot conceive of physical education without education value as it cannot exist in and educational vacuum. Physical education is the integral part of the total education process which enhances and integrates that physical, social, and psychological aspect of an individual’s life, through directed physical activity (Arnold, 1976:69) very often the natural relationship between

general education and physical education is forgotten, with the result that the two exist physically together but functionally apart. This has resulted in reducing the scope of the school program in two respects firstly the educational function of physical education has been neglected and secondly, the physical functions of education are not recognized. Arnold (1976:69) also views that through a well-directed physical education program students develop skills for the correct use of leisure time by undertaking activities which are conducive to healthy living social development and a sense of civic responsibility. Bucher (1972:45) cited in Ram and et.al. (1996:45) defines physical education as: “An integral part of the total education processes a field of endeavored that as its aim the development of physically, mentally, emotionally, and socially fit citizens through the medium of physical activities that have been selected with a view to realize these outcomes.”

The above definition depicts that physical education is a process which utilizes activities that are inherent in each individual to develop a person organically, neuron muscular, intellectually, and emotionally. These outcomes are realized whenever physical education activities are conducted in such places as the playground gymnasium and swimming pool.

For centuries, the ideas of a separate mind and body influenced education and the school practice which led to plan for training the mind disregarding the body. But today, the educational orientation has changed and physical education is conducted as a real part of the entire educational process. The basic fact of integration of mind and body, ideas and action, knowledge and application has taken place (Arnold, 1976:68). “The prime responsibility of physical education is to conceive of its work as related to all the reactions that participants experience, to be concerned for interests, moods, manners, morals, habits, and ideas as well as strength, skill, agility, speed, safety and endurance. The whole person participates: the whole person must be served (Ibid)”. In line to this idea, Bucher, (1972) cited in Ram and et.al (1996: 112) states that: “Physical education and health not only affect social development but emotional development as well. Games provide release from tension after long periods of study; furthermore, achievements in physical activities gives students as sense of provide which pays dividends unemotiona satisfaction and well-being. According to Arnold (1976:35), in modern society problems like tension, uncertainty low morality, lack of family cohesiveness, competition, emphasis on materialism and misuse of leisure are to be solved positively. These contribute to the society to

create a totally healthy. Physical environment and understand the influence that are playing up on the personality of a student.

2.5 Benefits of physical Activity

Regular physical activity is a factor in healthy living. According to the Surgeon General's report on physical activity and health, the benefits of regular physical activity for children and adolescence include: building and maintaining healthy bones, muscles and joints, reducing feelings of depression and anxiety, and promotion of psychological well-being. In addition, physical activity helps control weight, reduce fat, build lean muscle, and assists academic performance (cdc.gov/nccdphp/sgr/index.htm).

Researchers and educators agree that movement is essential to learning as the brain is activated during physical activity. Therefore, by incorporating physical activity, physical education can have beneficial effects on both academic learning and physical activity patterns of students. According to several researchers, (Etnier, Salazar, Landers, Petruzzello, Han & Nowell, 1997; Hillman, Castelli, & Buck, 2005; Hollmann & Struder, 1996; Ploughman, 2008; Shephard, 1997; Trudeau & Shephard, 2010; Sibley & Etnier, 2003) when the brain is activated during physical activity, existing brain cells are rejuvenated and new ones are stimulated. Specifically, there is an increase in cerebral blood flow, enhancement of arousal level, changing hormone secretions, and enhanced nutrient intake.

In the very young children (infancy (one month to one year) through early childhood (one year to six years), research demonstrates that daily movement is crucial in brain development as sensory pathways in the brain are developing (Blakemore, 2003; Leppo, Davis, & Crim, 2000; Sibley & Etnier, 2003). Developing control of muscles and movement is important for the infant and child's ability to interact with her environment (Leppo et.al., 2000; Sibley & Etnier, 2003). Movement contributes to the organization of neural circuits that develop through the process of synaptogenesis, which permits children to learn to develop control over their sensory abilities and motor functions. Cognitive functioning is also facilitated by the process of myelination stimulated by movement. In addition, the cerebellum is affected by children's movement especially in the first few years of life as cells are forming functional circuits in the cerebellum

which in turn affect spatial perception, memory, selective attention, language, handling of information, and decision making (Blakemore, 2003; Leppo et.al. 2000; Sibley & Etnier, 2003).

The importance of physical activity for the very young and the older adults is well supported. John Ratey, (2008) integrates hundreds of scientific studies and research papers to demonstrate physical activity improves brain function at every age level. Ratey emphasizes that physical activity enables the cells in the brain to be optimal, which maintains and improves brain functioning, and therefore gives us the ability to learn and focus.

2.6 Effects of Physical Activity on the Brain

Physical activity effects on the brain have been extensively researched (Etnier, et al., 1997; Ploughman, 2008; Trudeau & Shephard, 2010; Sibley & Etnier, 2003), Physical activity benefits that have for the brain includes; increase in cerebral blood flow (moderate to high intensities of exercise have shown large increases), changes in neurotransmitters (acute bouts of exercise cause changes), increases in nor epinephrine and serotonin (after an acute bout of exercise and chronic exercise influences more long-term increases in neurotransmitters), and permanent structural changes in the brain. The increases in cerebral blood flow benefit cognitive functioning due to the increased nutrient and oxygen supply to the brain.

Additionally, the increases in nor- epinephrine found in humans are significant due to the fact that studies on rats have shown high levels of nor epinephrine associated with improved memory. For example, Isaacs, Anderson, Alcantara, Black, and Greenough, (1992) conducted an experiment where rats were assigned to one of four conditions. The first group was a motor skill learning group that trained for 30 days on obstacle course that was periodically increased in difficulty. The second group was also trained for 30 days to 21 walk rapidly and then jog one hour each day. The third group was housed individually with a running wheel, and the activity was voluntary. The fourth group was an inactive group with identical cages as the other groups. Their results found that both the motor skill learning group and the repetitive physical activity group had permanent changes in the brain which demonstrated that physical activity and motor skill learning stimulated angiogenesis (a physiological process in the body that involves the growth of new blood vessels). There are also several health benefits from engaging in physical activity, including increased strength and decreased chance of injuries.

Those who are more active experience a Reduction in low-density lipoproteins and an increase in high-density lipoproteins (Field, Diego, & Sanders, 2001).

According to Conyers & Wilson, (2015) study, Exercise increases serotonin levels, endorphins, and melatonin, which increase positive emotions. These neurochemicals help to make individuals increase their attention and focus as well as boosting moods, which can enhance mastery of skills. The physical and scientific effects of exercise on the brain and body go beyond academic success and are beneficial for a person's well-being. As the health improves, this can begin to create an atmosphere of achievement and success. More recently a review conducted by Trudeau and Shephard, (2010) highlighted the relationship of physical activity to brain health and academic performance of schoolchildren.

Also, studies in elderly humans have demonstrated that endurance physical activity is protective against cognitive decline, and the previously mentioned increase in antioxidants from the physical activity could protect the brain against functional loss.

A study conducted by Chaddock, Erickson, Prakash, Van Patter, et al. (2010) explored the association between childhood aerobic fitness and basal ganglia structure and function. The researchers used the MRI technique to detect changes in the basal ganglia that is involved in attention control. Their results demonstrated that higher-fit children (aged nine and 10) showed superior performance on an attention and inhibition task, and greater volumes in the basal ganglia area of the brain were observed, compared to similar aged lower fit children. The conclusion of that research was that aerobic fitness in children is connected to the increased volumes in the brain which is related to enhance cognitive control. The second study conducted by Chaddock, Erickson, Prakash, Kim, et al. (2010), was also performed on nine- and 10- year old children, and extended the previous research on animals and elderly adults that have demonstrated aerobic physical activity's connection to increased memory. Developing control of muscles and movement is important for the infant and child's ability to interact with her/his environment (Leppo et.al. 2000; Sibley &Etnier, 2003). Movement contributes to the organization of neural circuits that develop through the process of synaptogenesis, which permits children to learn and develop control over their sensory abilities and motor functions. Cognitive functioning is also facilitated by the process of myelination stimulated by movement. In addition, the cerebellum is

affected by children's movement especially in the first few years of life as cells are forming functional circuits in the cerebellum which in turn affect spatial perception, memory, selective attention, language, handling of information, and decision making (Blakemore, 2003; Leppo et al. 2000; Sibley & Etnier, 2003). The importance of physical activity for the very young and the older adults is well supported. John Rate, (2008) integrates hundreds of scientific studies and research papers to demonstrate physical activity improves brain function at every age level. Rate emphasizes that physical activity enables the cells in the brain to be optimal, which maintains and improves brain functioning, and therefore gives us the ability to learn and focus.

There are several proven indicators that have shown physical activity benefits the human brain, its basic functions, and abilities. One of the most critical brain functions that can predict academic success is memory. So, (2012) found that physical activity may increase memory functions and in turn create academic success for students who engage in moderate to vigorous physical activity multiple times a week. According to Chaddock Heyman et al. (2015) study, students who are at higher fitness levels have superior performance on tasks that challenge working memory and standardized tests of mathematics and reading relative to less fit students. On a scientific level, there are several effects that occur within the brain as a result of exercise. In specific brain growth and development, a study conducted by Chaddock Heyman et al., (2015), found that differences in aerobic fitness levels in children play a role in cortical gray matter structure, which is important for academic success.

Children who have a higher level of aerobic fitness are shown to have cognitive and brain plasticity, which can correlate with success in academic areas, especially mathematics. Also higher levels of aerobic fitness have been associated with larger brain volumes in two regions of the brain that are critical for memory and learning the hippocampus and dorsal striatum. Conyers and Wilson (2015) agree, by stating that the hippocampus is essential for creating new memories and for learning. Neurogenesis is the creation of new brain cells within areas of the brain associated with recall, and Conyers and Wilson (2015) believe that exercise enhances this process, while also forming connections between neurons in response to learning and sensory input, known as experience-dependent synaptogenesis.

In addition to the physical benefits of movement, researchers have found relationships between the amount of movement one participates in and cognitive functioning (Emery, et al., 2003). Past literature consistently supports participation in movement and exercise, which leads to the reduction of stress, improvement of emotional state, and helps one to function comfortably (Steinberg, Nicholls, & Sykes, 1998). Brain Gym exercises and balanced movements have been proven to reduce anxiety (Wolfont, 2002). Regular physical activity increases the amount of oxygen delivered to the brain, which increases children's capacity to learn (Galley, 2002). Allowing oxygen to flow to the brain enables one to cognitively function and make decisions.

Many research results indicated a significant positive relationship on the relationship between cognition and physical activity. For example, Sibley and Etnier (2003) conducted a meta-analysis of 44 studies that showed a positive correlation with a significant overall effect size of 0.32 between physical activity and seven categories of cognitive performance (perceptual skills, intelligence quotient, achievement, verbal tests, mathematics tests, developmental level and academic readiness) among 24 school-aged children. Additionally, the review demonstrated that all design types and different types of physical activity produced cognitive function benefits (Grissom, J.B., 2005). More recently Tomporowski, et al. (2008) reviewed research studies that examined physical activity effects on children's intelligence, cognition, and academic achievement. The studies were evaluated in light of the executive function hypothesis. Executive function involves scheduling, response inhibition, planning, and working memory. In his studies physical activity effects on executive function in adults have experienced the most significant results out of the four types of cognition's mental processing: executive function controlled processing, visuospatial processing, and speeded processing. When the executive and non-executive cognitive processes in older adults were assessed following an aerobic training and non-aerobic toning program, there were post-training differences. The aerobic training group performed tests that required executive function more efficiently and rapidly than the non-physical activity group. Adult research on the executive function hypothesis can be extended to predict the physical activity related improvements in children's cognitive function (The cross-sectional studies Tomporowski, et al., 2008) reviewed by the researchers indicated that the children who were physically fit performed cognitive tasks more rapidly and displayed greater mobilization of brain resources than less fit children. For the experimental studies reviewed by Tomporowski, et al. (2008), academic achievement was the common outcome measure with the

most evidence for chronic physical activity having positive effects on academic achievement. Due to variation in methods with few randomized studies, the overall conclusion from that study was that the children's academic progress was not hindered due to the time spent in physical education. Overall, the evidence so far indicates gains in children's mental functioning from the physical activity interventions on tasks that involve executive functions.

There are many unanswered questions, for instance, if the cognitive benefits decline when the physical activity is terminated, and if there is a relationship to the type, duration, or intensity of the programs (Tomporowski, Davis, Miller, & Naglieri, 2008). With the many physiological benefits of physical activity to the positive effects on brain development and cognition, it is evident that physical activity enhances learning. Neurogenesis is important because it activates the higher order cognitive functions in the brain, which is essential for monitoring, maintaining, and strategizing higher-level cognitive abilities that enhance academic performance. There are many processes in the brain that occur when the body is engaged in physical activity, and the more students are exposed to these activities, the more these functions will continue to increase. There is also evidence that the prefrontal cortex may function at a more efficient level after engaging in physical activity programs (Tomporowski, et al, 2008; cited in: Hanna et al, 2009). There are also several health benefits from engaging in physical activity, including increased strength and decreased chance of injuries. Those who are more active experience a reduction in low-density lipoproteins and an increase in high-density lipoproteins (Field, Diego, & Sanders, 2001).

2.7 Effect of Physical Activity on Academic Achievement

There are a number of explanations for the effect physical activity has on academic performance. Research has shown that regular exercise can alleviate stress, anxiety and depression, and boost self-esteem. All of these are problems that have the potential to adversely affect school performance (Vail, 2006). There is also evidence that increases in physical fitness levels can have an effect on classroom behavior by decreasing disruptive behaviors. The positive relationship between academics and physical activity could be that students who are motivated in one area are more likely to strive to be successful in other areas. Emerging evidence suggests that physical activity may promote the growth of new brain cells, stimulate blood vessels in the brain, and

enhance the communication among brain cells (Troost& Mars, 2010). The statement “healthy children learn better” is supported by the evidence in the literature of a study conducted by (Ehrlich, 2008). Perhaps the most established relationship of health and achievement is between eating breakfast at school and academic performance. This is a relationship that persists regardless of socioeconomic status. Less established but increasingly supported by the literature is the link between school based physical activity and academic performance (Castelli, Hillman, Buck, & Erwin, 2007; Chomitz et al. 2009). A study conducted by Trudeau and Shepard (2008) cited evidence demonstrating that physical activity was positively associated with better cognitive functioning in children, with some age groups benefitting more than others. Published research has reported mixed results on the relationship between physical fitness and academic achievement; however, findings suggest that physical activity can have beneficial influences on student behavior that may result in increased academic performance. One study’s results indicated that there was “a consistent positive relationship between overall fitness and academic achievement” (Vail, 2006, p. 15). The US National Longitudinal Study of Adolescent Health reported a positive association between physical activity and several components of mental health, including self-esteem, emotive well-being, spirituality, and future expectations (Trudeau &Shephard, 2010). Similarly, it has been stated that the positive impacts of physical activity on anxiety, depression, mood, and wellbeing are not disputed (Tomporowski, 2003). Regular physical activity in adolescents is significantly related to a favorable self-image, in addition to physical and psychological well-being (Kirkcaldy et al., 2002). A study conducted on German adolescents observed lower anxiety and depression scores, as well as less social behavioral inhibition, than their less active peers. The significant relationship between physical activity and self-image also remains after controlling for socioeconomic status (Tremblay et al., 2000). There is a wealth of literature to suggest that physical activity is significantly related to increased self-esteem and speculated “knock-on” effects of this are benefits in all aspects of school life, including improved classroom behavior and academic performance (Shephard, 1996). The influence of physical activity on self-esteem may be influenced by the activity mode undertaken, although positive cognitive behavioral modifications have been observed across aerobics, strength, dance, and flexibility activities (Strong et al., 2005). One recent study by DeBate et al., (2009) has shown improvements in self-esteem following running activities in girls. Psychosocial and behavioral changes amongst girls participating in two developmentally focused youth sport

programs were assessed. Girls in grades three to eight participated in „Girls on the Run“ and „Girls on Track“. The programs aimed to increase physical activity during the greatest age-related activity decline, whilst also addressing gender barriers. The programs resulted in beneficial increases in global and specific self-esteem, enhanced satisfaction with body image, and increased physical activity frequency and commitment. It is of particular interest that increased self-esteem is often thought to provide the impetus to participate in physical activity and sport, and that low-self-esteem is often a key barrier preventing participation. Thus, development and inclusion orientated interventions shown to increase self-esteem could be the trigger for increasing youth engagement in physical activity. Conducting such interventions in schools means that little effort is required for pupils to become involved (compared to specialist, out of school clubs), and could provide the catalyst for the cyclical trend of increased self-esteem leading to increased participation.

2.8 Physical Fitness and Academic Achievement

Physical fitness was assessed using the New Physical Fitness Test. It is a Japanese national survey implemented by Ministry of Education, Culture, Sports, Science, and Technology of Japan .The fitness test was composed of the following: 50-m sprint, standing broad jump, repeated side-steps, sit and reach, sit ups, hand-grip strength, handball throw, and 20-m shuttle run or endurance run(1500 m for boys; 1000 m for girls) . Elective choice between 20-m shuttle run and endurance run was allowed in each school. Each measured value was converted into a score ranging from 1 to 10 for each sex based on performance-to-score conversion tables standardized by the Japanese nationwide survey. Then, these were summarized as a total score (range of 8 to 80). All measurements were conducted by the Physical Education teachers at each school in accordance with the test manual

Academic achievement was evaluated using the student’s overall grade point average (GPA) for Japanese Mathematics, Science, Social Studies, and English subjects. These subjects have to be learned by junior high school students and are commonly used for the entrance examination in high School. Each student was rated on a five-point scale for each subject by school teachers. Schoolteachers assessed the students based on the evaluation standards set out in the Japanese government 'curriculum guidelines. This method of assessment is being implemented in almost all junior high schools in Japan and is generally used as an evaluation indicator in entrance

examinations for high school. However, as the evaluation standards are commonly adjusted to the educational level of students of each school, the mean and variance of grades differ. These differences were observed in the current study (data not shown). Therefore, we standardized the GPA to z-score by each school. The z-score measures the number of standard deviations above

2.9. Advantages of Physical activity

Regular physical activity is a factor in healthy living. According to the Surgeon, (2006) General's report on physical activity and health, the benefits of regular physical activity for children and adolescence include: building and maintaining healthy bones, muscles and joints, reducing feelings of depression and anxiety, and promotion of psychological well-being. In addition, physical activity helps control weight, reduce fat, build lean muscle, and assists academic performance.

Physical fitness includes physical abilities such as body composition and neuromuscular coordination, cardiovascular capacity, stamina, speed, flexibility and overall strength. Physical fitness contributes a lot to maintain an optimal state of health. Among the many benefits, it prevents the occurrence of a variety of diseases, develops a capacity to fight infections and certain other diseases, and helps to prevent many of the major cardio vascular disease. Moreover, physical fitness is responsible for the postponement of the process of aging. A healthy body contributes a lot for a healthy mind. Physical fitness prevents mental disease by facilitating a sound psychological state (Corbin, 1997).

Researchers and educators agree that movement is essential to learning as the brain is activated during physical activity. Therefore, by incorporating physical activity, physical education can have beneficial effects on both academic learning and physical activity patterns of students.

According to several researchers, (Etnier, Salazar, Landers, Petruzzello, Han & Nowell, 1997; Hillman, Castelli, & Buck, 2005; Hollmann & Struder, 1996; Ploughman, 2008; Shephard, 1997; Trudeau & Shephard, 2010; Sibley & Etnier, 2003) when the brain is activated during physical activity, existing brain cells are rejuvenated and new ones are stimulated. Specifically, there is an increase in cerebral blood flow, enhancement of arousal level, changing hormone secretions, and enhanced nutrient intake.

2.10. The Concept of Physical Fitness

Physical fitness has defined by many scholars in different literature. Baltimore et al., (1995), defined physical fitness as, the ability of the body to perform moderate to vigorous levels of physical activity without undue fatigue and capability of maintaining such abilities throughout the life. American College of Sports Medicine has also defined physical fitness as a set of characteristics (i.e. the work capacity of heart and lungs, the strength and endurance of muscles and the flexibility of joints) that relate to the ability to perform physical activities (Singh A. et al., 1999). Physical fitness is associated with a person's ability to work effectively, enjoy leisure time, be healthy, resist hypo kinetic diseases or conditions, and meet emergency situation (Corbin et al., 2006). So, it is the basic requirement of life, which is achieved through participating in regular movement.

Although physical fitness is influenced by genetics and environmental factors, physical exercise is one of the main determinants (Andersen, 2003). Physical educators classify physical fitness as skill related (related to sport performance) and health related fitness (associated with disease prevention and health promotion) which includes components such as cardio-respiratory endurance, muscular strength and muscular endurance, body composition and flexibility (Hawley, 2001). There are many factors which help to develop physical fitness, but regular physical activity is the key aspect to achieve optimal physical fitness (Caspersen & et al., 1985).

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. It is a relative term, depending on individual circumstances and for what a person needs to be fit (Baltimore et al., 1995).

2.11. Components of Health Related Physical Fitness

Health related fitness components are those which focuses on optimum health benefits and prevents the onset of disease and problems associated with insufficient movement. According to Garzón (2009), health related physical fitness includes those components of physical fitness that have shown to be more clearly related to health status and it could also relate to well-being and happiness. Health-related fitness considered as the ability to perform daily activities with vigor,

alertness and without undue fatigue, as well as traits and capacities that are associated with a low risk of chronic diseases and premature death (Caspersen & et al., 1985). Having an appropriate level of health-related fitness allows a person to: meet emergencies, reduce the risk of disease and injury, work efficiently, participate and enjoy physical activity (sports, recreation leisure) and be ones physical best (Connecticut State Department of Education, 2009).

In addition to improving quality of life, health-related fitness: increases muscle tone and strength, decreases susceptibility to injuries and illness, improves bone mineral density, reduces risk of osteoporosis, improves posture, increases efficiency of the respiratory and circulatory systems, decreases risk of cardiovascular disease and stroke, improves blood pressure, decreases risk of diabetes and some cancers, improves self-esteem and self-confidence, decreases body fat and improves metabolism; and increases energy level and academic achievement (Virginia Department of Education, 2006). According to USDHHS, cited in 1996, Health-related physical fitness consists of those components of physical fitness that have a relationship with good health. According to Sunni (1996), the following five components of health related fitness are basic: The Commonly known components are body composition, cardiovascular fitness, flexibility, muscular endurance and muscular strength.

2.11.1. Cardio-Respiratory Fitness

Aerobic fitness offers many health benefits and is often seen as the most important element of fitness. Cardiovascular endurance is the ability of the heart, the blood vessels, and the respiratory system to deliver oxygen efficiently over an extended period of time. To develop cardiovascular endurance, activity must be aerobic in nature. Activities that are continuous and rhythmic in nature require that a continuous supply of oxygen be delivered to the muscle cells. Activities that stimulate development in this area are paced walking, jogging, biking, rope jumping, aerobics, and swimming. The better your cardiovascular fitness, the easier it is to complete your daily tasks and still have energy to enjoy other activities.

According to Bouchard et al., (1990), Cardiovascular Endurance (sometimes called aerobic fitness or cardio respiratory fitness) is considered to be a key component of health related physical fitness. It is a measure of the hearts ability to pump oxygen-rich blood to the working muscles during exercise. Cardio respiratory 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. A person simply cannot live very long or very well without a healthy heart. It is also measure of muscles ability to take up and use the delivered oxygen to produce the energy needed to continue exercising. In practical terms, cardio respiratory endurance type exercise includes, jogging, distance running, cycling, swimming, rope skipping and others. Cardio respiratory fitness lowers the risk of heart disease and increased longevity, reduce the risk of type II diabetes, lower blood pressure, and increase bone density in weight-bearing bones. Further, (Physiology of Exercise: Responses and Adaptations, 2nd Ed), states cardio respiratory fitness is the efficiency with which the body delivers oxygen and fuels to the working muscle and transports waste products from the cells.

In general, aerobic endurance is the most critical element of physical fitness. Research indicates that healthy levels of aerobic endurance are associated with reduced risk of high blood pressure, coronary heart disease, obesity, diabetes, some forms of cancer, and other health problems in adults (U.S. Department of Health and Human Services, 1996). According to a recent report from the surgeon general lack of regular exercise and physical activity contribute to the development of other coronary heart disease risk factors. Research suggests that by engaging in regular exercise and physical activity that improves the cardiovascular system, the individuals can reduce many risk factors associated with coronary heart diseases (Insel& Roth, 2002). Cardiovascular fitness is also referred to as cardiovascular endurance, aerobic fitness and cardio respiratory fitness. 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, step test, 1.5 mile run test and treadmill tests. Exercise increases heart rate as the heart needs to pump more blood to the different muscles than the usual condition. This increment of heart rate is directly related to the increase of intensity of exercise. Average heart rate is 60-72 beat per minute, and but during exercise it increases to 165-190 beat per minute. Aerobic exercise as being long in duration and low in intensity, resting heart rate decreases as a result of endurance training. Heart rate during sub maximal exercise also decreases about 20-40 beat per minute following regular aerobic exercise. Participating in aerobic exercise with the involvement of large muscle groups for a period of 15-20 minutes or longer while maintaining 60-80% of maximum heart rate, maximum heart rate remains either unchanged or decreases slightly with training (Shephard. R., 2001: cited in Alemayehu Ayalew, 2006).

Physical activity and cardio respiratory fitness are associated with a variety of health benefits in children and adolescents. In addition to the benefits on physical and mental health, studies in neuroscience have shown that physical activity and cardio respiratory fitness are related to brain structure and function. The pathways by which they may change brain structure and function include: firstly, alterations in thickness of grey matter in specific cortical regions and integrity of white matter tracts that support executive function; Secondly, alterations in brain plasticity that change the structure of the neuron and strengthen its signaling capability; and thirdly improvements in attention, memory and executive function. Accordingly, it is expected that the benefits of cardio respiratory fitness and physical activity on brain structure, function, plasticity and cognition might translate to improvement in academic achievement (Adilson Marques and et al, 2017).

2.11.2. Muscular Endurance

Muscular endurance is the ability of a muscle, or a group of muscles to exert force over an extended period of time. Endurance postpones the onset of fatigue so that activity can be performed for lengthy periods. Sport activities require muscular endurance, because throwing, kicking, and striking skills have to be performed many times without fatigue. When you rake leaves, shovel snow, or do sit-ups, you are performing acts of muscular endurance. The better your muscular endurance, the longer you can continue activities without fatigue.

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 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). Muscular endurance is specific in nature. 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) such as static push up (flexed-arm support push-up) and or isotopically (dynamic

contractions) (Gezahagne Abate and Araya Dechasa, 2006; cited in: Grade 12th Physical Education Text Book, p-11-35). 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 contractions can assist 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). Chia-Lin Li, et al, (2005) evaluated on the effects of aerobic exercise intervention with goals of improving health-related physical fitness conducted as a quasi-experimental design. The study concluded that 12-week aerobic exercise program was effective in improving the abdominal muscle strength and endurance.

2.11.3. Muscular Strength

Strength is a health-related component of physical fitness that relates to the ability of the muscle to exert force (USDHHS, 1996), and 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 groceries, 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). Strength is specific in nature. 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. In the absence of the above measurement we can also use field tests such as wall-sit test. In this case we simply hold in the correct position as much as possible, and record the time (in seconds) till we fail to hold. Strength can be measured isometric ally (static contractions) or isotopically (dynamic contractions) (Gezahagne Abate and Araya Dechasa, (2006); cited in: Grade 12th Physical Education Text Book).

Muscular strength is the ability of muscles to exert or resist force. Most activities do not build strength in areas where it is needed—the arm-shoulder girdle and the abdominal— trunk region. When you push, pull or lift objects, for example, your muscles are exerting a force. Muscular

strength is the ability of a muscle to produce force at high intensities for short intervals. The greater muscular strength you have the easier and safer it is to accomplish most daily activities

2.12. Factors Influencing Fitness

Physical fitness is influenced by various factors. According to Sharkey, (1990) physical fitness is mainly influenced by the following factors.

1. Heredity: Genetically 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.

2. Training: Training improves the function and capacity of the respiratory and cardiovascular systems and boosts blood volume, but the most important changes take 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.

3. 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 time

CHAPTER THREE

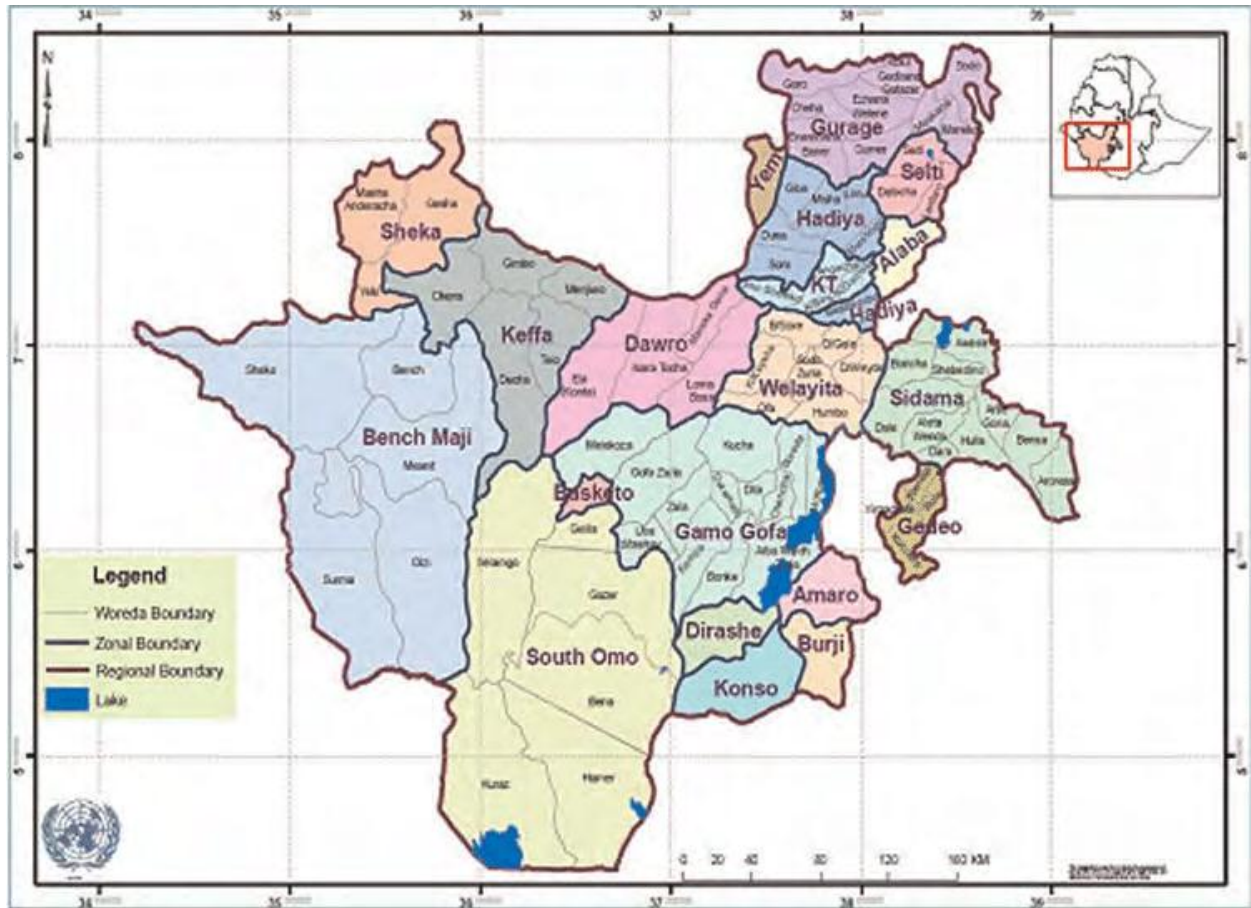
RESEARCH METHOD

This chapter is dealing with participants of the study, procedures of both data collection & analysis as well as different tests that are used to collect the basic data for the study. In addition to this the chapter also contains location & description of the study area, research design, sample & sampling technique & finally the main sources of data for the study.

3.1 Description of study area

This study was conducted at general secondary school, in Mirab Badawacho Woreda of Hadiya Zone, South Nation Nationality People Regional State (SNNPRS). The administrative center of Hosana, is also the administrative center of, Mirab Badawacho Woreda which lies 120 Km SW of Awassa (the regional capital) and 300 Km of Addis Ababa. The mirab badawacho is one of the woreda in SNNPRS in Ethiopia & found in Hadiya zone. The geographical location of Mirab Bedacho Woreda is bordered in the South Wolayita, on the north Kembata Tembaro zone & in the East Misraq badawacho woreda. Based on 2007 census conducted by the CSA the woreda has total population of 83,439 of whom 40,876 are men & 42,563 women, 2114 (2.53%) of the population were live in urban area. The Economic of the population are Agriculture & 84.65% of the population are protestant, 7.17% were catholic & 6.09% are Orthodox Christianity. The school, which study was under taken was located in Danama Town Onjojo kebele and high school was established in in 2007 E.C opened. Now it is serving from grade 9-10 levels in one shifts (morning), and the total number of the students in the school are 500 (290 male and 210 female), students have been attended in academic year of 2019GC

Figure 1. Map of SSSNP Regional state



3.2 Research Approach

The approach of this study were quantitative approaches of the research were employed .This is why because the research design is Experimental &used different statistical numerical values such as mean ,standard deviation, mean difference ,&p-values to collect &analyze the data properly by using dependent or paired sample t-test.

3.3 Research Design

To conduct this study experimental research design was used. This method had selected because it is helpful to identify the student health related physical fitness variables level with pre-test and post- test of cardio respiratory endurance, muscular endurance and muscular strength with their

average score result. The physical fitness exercise training was scheduled for twelve weeks, and it was arranged between the first semester final exam and Second Semester final- Exam. The intensity for exercises are low to moderate, for three days per week (Monday, Wednesday and Friday) before their regular classes for experimental group. There was no exercise treatment for control group but both the pre and post tests were taken from them.

3.4 Population, Sample and Sampling Techniques

In Onjojo kebele high school are two grade levels (9-10) grade ten was selected because of that the researcher was only teach at this grade level. The total numbers of population/grade ten male students were 200. Since the research is experimental to properly administer the test and manage the samples during fitness training only 36 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 (36) samples 18 subjects were randomized to the control group and the rest 18 subjects were categorized to experimental group by using simple random sampling techniques.

3.5 Inclusion and Exclusion Criteria

Individuals who have any health problems are not participated in this study. Such as hypertension or uncontrolled diabetes other conditions that would be contraindicated for exercise test and training was 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.

3.6 Source of Data

The main data for this study was collected from primary source of data such as from student's pre and post test results of the selected variables and secondary source of data from student's first and second semester average score result from school record office.

3.7 Data Collection Instrument

In order to collect the data which was very important for the analysis& finding of the study, the researcher used health related physical fitness variables test results and the student's first and

second semester average score result from the school record office. The use of appropriate tests helps to collect data from the selected health 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 and Academic average score results of both first and second semesters were recorded especially before and after training in terms of pre-test and post-test.

Table 1. The type of Test used for the selected variables to collect appropriate data

Variables	Tests
Cardio respiratory endurance	12-minute run test (it's the most popular field test)
Muscular strength	Wall sit test (is the most easy test than other strength test)
Muscular endurance	push up(it requires only few equipment and it's a more favorable)
Academic achievement	First and second semester GPA (easily performed than preparing standard exam/ test)

3.8 Data Collection Procedures

Quantitative data was collected through the three health related physical fitness test parameters' and average score results. These data were collected through the appropriate health related Physical fitness test measures such as, cooper's 12-minuteruntest, push up test and wall sit test. In addition to this the 2011 E.C student's first and second semester average score results were taken from the school record office. For the success of the study necessary Experimental materials and facilities such as exercise mats, cones, corner flags, stop watch, record sheets, measuring tape (meter), and whistle was used. Before the experimental group exposed to health related physical fitness exercise training the student's first semester average score and the selected fitness variables pre-test were taken from both control and experimental groups. The second semester students average score results and fitness variables Post-test result were also taken from both groups after 12 weeks' health related physical fitness exercise training programs were complete.

3.9.1 Test Procedures

3.9.1.1 Cooper's 12 minute run test

Adopted from Mackenzie, B. (1997) Cooper's 12 minute run test (Cooper, 1968) is a popular field test used for measuring aerobic fitness. This fitness test was initially used to estimate the VO_2 max. Dr. Cooper found that there is a very high correlation between the distance someone can run (or walk) in 12 minutes and their VO_2 max value, which measure the efficiency with which someone can use oxygen while exercising. Students were familiar with the 12-minute run/walk test protocol prior to the pre-testing date. Is measuring the distance covered in twelve minutes, involves running for twelve minutes around the 400-meter track marked out area and register how far covered in that time with the nearest 50 meters. The purpose of the distance runs is to measure maximal functional capacity and endurance of the cardio respiratory system. Subjects were instructed to run as far as possible in twelve minutes.

- ❖ The students were conducted a warm up for five minutes.
- ❖ The students began on the signal, "Ready, start."
- ❖ Participants were continued to run until a whistle was blown at twelve minutes.
- ❖ Walking was permitted, but the objective was to cover as much distance as possible during the twelve minutes.
- ❖ After completing the test, the distance covered was registered near to 50m.
- ❖ Required equipment includes stopwatch or wrist watch, 400m track marked every 50m, assistance and data recording forms.



3.9.1.2. Push up Test

The push-up is a test of upper body muscle strength and endurance. Strength and endurance of the muscles of the upper body are important in activities of daily living, maintaining functional health and promoting good posture. The push-up is the most commonly used assessment of muscular endurance. The push-up was selected as the recommended test item in the CPFA3P because it has some very practical advantages over the pull-up. The most important advantages are that it requires no equipment and very few zero scores occur. The majority of children can successfully perform the push-up assessment and have a more favorable experience. The purpose of this test is to evaluate the endurance of the arm and chest muscles.

This test has also been proposed in FITNESSGRAM® physical fitness test battery to be used for measuring the endurance, strength and resilience of the muscles of the arm and shoulder (Cooper Institute for Aerobics Research, 2007). The equipment needed to measure this test is flat and clear floor or level field, and stopwatch.

Test procedures:

- Hands shoulder width apart and directly below the shoulder joint.
- Make sure your eyes are looking at the floor, so the chin is not tucked in or the head up.
- Perform as many repetitions as possible, maintaining a cadence of 20 push-ups per minute (1.5 seconds going down and 1.5 sec. going up).
- The timing starts when your body is set in the correct position and the upper arm are parallel to the floor and do push-ups repeatedly by lowering the body until the arms the upper arms are parallel to the floor.
- Finally, the number of pushups able to perform in one minute was recorded.
- The score is the number of the push- ups performed.
- First miss counts; second miss ends assessment



Figure 2. Push up Test

3.9.1.3 Wall-Sit Test

The Wall-sit test assessment is important to measure lower body strength. It involves the hip, thigh, lower back, legs, and calves. The score is also highly involved. The wall-sit assessment is used to observe the strength of the core, the power of the hip and thigh, the stability of the knees and ankles, and to define lower back discomfort (if any). The objective of this test was to measure the strength of the lower body particularly quadriceps muscle group. Equipment required to measure this test were smooth wall and a Stopwatch.

The Procedures of the test were undertaken as follows:

- ✓ Stand comfortably with feet approximately shoulder apart, with your back against the smooth vertical wall, and Stand with eyes straight forward, arms folded or straight outward.
- ✓ Slowly slide your back down the wall, and bend knees, back flat, and Squat and hold without raising or lowering from the squat position.
- ✓ Maintain your knees in a 90degree angle, and Place your back flat against the wall.
- ✓ The timing starts when the umpire is set and stopped when the subject cannot maintain/hold the position.
- ✓ Measure the time in seconds and record on scoring sheet.

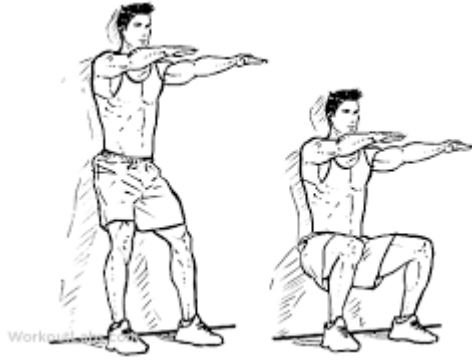


Figure 3. Wall Sit Test

3.10. Method of Data Analysis

The Data was analyzed by using computer system software (SPSS) i.e. dependent T-test (to calculate descriptive statistics mean, mean difference, standard deviation and to know the significant change or difference between pre and posttest. To analyze the result mean, mean difference, and significance value (p) of the data were used. During analysis of the result differential/separate relationship between healths related physical fitness components and academic achievement were used.

3.11. Ethical Considerations

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 us potential benefits and the possible risks of participation in this study was explained and written consent was given to the participants and their parent

CHAPTER FOUR

RESULT AND DESCUSION

This chapter deals with the analysis of pre and post test data collected by using fitness variables tests & academic performances the student's. The purpose of this study was to investigate the effect of 12 weeks health related physical fitness components training on students' academic achievements with the sample of (n=18,18) for both experimental & control groups respectively. The components selected for this study were, CVE, muscular strength & endurance & as well as their test 12min run test, wall sit & push-up tests respectively. The collected data were analyzed by using paired sample t-test to analyze pre-test and post-test results of the students.

4.1. Results of the Study

Table 2. The descriptive statics of study participants

Group	No	Age		Height (in meter)		Weight (in kg)	
		Mean	Std	Mean	Std	Mean	Std
Exp. Group	18	16.388	6.255	1.5728	.08943	55.28	4.522
Control group	18	17.611	1.144	1.5778	.09020	51.33	2.029

The above table indicated that the general characteristics of the study participants regarding to age, height and weight. That means the experimental group's age, height and weight were 16.388 years, 1.5728 and 55.28kg, and their standard deviation were 6.255 .08943 and 4.522 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 17.611 years, 1.5778m and 51.33kg, and the standard deviation were 1.144, .09020 and 2.029 respectively. This showed that the selected samples of the two groups (EG and CG) were homogenous.

Table 3. Paired sample statics of 12 min run pre and posttest in meter result of both EG&CG.

Subjects								
Test	Experimental group				Control group			
12 min Run test	Mean		Std		Mean		Std	
	Pre	Post	Pre	Post	Pre	Post	pre	Post
	1800.06	1860.89	46.755	52.461	1796.94	1792.83	58.736	56.639

The above table shows that the mean and standard deviation of the experimental and control groups of the 12-minute run test. The mean values of the 12-minutes run Pre-test and Post-test results of the experimental groups were 1800.06 m and 1860.89m, and the standard deviation was 46.755 m and 52.461m respectively. Whereas the mean values of the control group 12-minutes run test were 1796.94 m and 1792.83 m, while their standard deviation were 58.736 m and 56.639 m respectively, this implies that improvement were observed in the EG cardiovascular endurance after the 12 weeks' fitness exercise training, but improvements were not seen on the control groups of the study the participants.

Table 4.Paired sample statics of wall sit test pre and post results of both EG & CG (sec).

Subjects								
Test	Experimental group				Control group			
Wall sit	Mean		Std		Mean		Std	
	Pre	Post	Pre	Post	Pre	post	pre	Post
	24.372	25.278	2.4724	2.5976	24.244	24.078	2.5213	2.4359

The above table indicates that the mean and standard deviation of the pre and post-test results of wall-sit test. The mean values of the pre and post-test results of wall-sit test for the experimental group were 24.372 sec and 25.278 sec, while their standard deviations were 2.4724sec and 2.5976 sec respectively.

Furthermore, the mean values of the pre and post-test result of wall-sit test for the control group were 24.244 sec and 24.078 sec, while their standard deviations were 2.5213 sec and 2.4359 sec respectively. This indicates that there was an increment in the mean values of the experimental group from pre-test to post-test result (24.372 sec to 25.278 sec respectively). On the other hand, the mean values of the control groups showed slight decrement from pre to post test results (24.244 sec to 24.078 seconds).

Table 5. Paired sample statics of muscular endurance (push up) test pre and post results of both EG & CG (rep).

Subjects								
Test	Experimental group				Control group			
push up	Mean		Std		Mean		Std	
	Pre	Post	Pre	Post	Pre	Post	pre	Post
	7.61	9.33	1.243	1.138	7.78	7.67	1.396	1.085

The above table indicated that, the mean and standard deviation of the EG and CG of muscular endurance.

The mean values of the EG muscular endurance pushup pre and post-test result were 7.61 and 9.33 while the standard deviation was 1.243 and 1.138 respectively.

On the other hand, the mean values of the CG of muscular endurance pre and post-test result were 7.78 and 7.67, while their standard deviation was 1.396 and 1.085 respectively. This shows that improvement was seen in the EG of pushup test from pre to post test. But, the CG pushup test shows a slight reduction from pre to post test.

Table 6. The paired sample statics of 1st and 2nd semester average score results of both EG & CG

Subjects								
Test	Experimental group				Control group			
Average score results	Mean		Std		Mean		Std	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
	63.78	66.78	11.275	11.548	60.39	60.22	8.651	7.109

The above table shows that, the mean and standard deviation of the experimental and control groups first and second semester Average score result. The mean values of the experimental

group's first and second semester Average score result were 63.78 and 66.78, and the standard deviations were 11.275 and 11.548 respectively.

While, the mean values of the control groups' first and second semester Average score result were 60.39 and 60.22, and the standard deviations were 8.651 and 7.109 respectively. This reveals that the mean values of the experimental group Average score results were increased from first to second semester (63.78 to 66.78), in contrast the mean values of the control groups Average score results were decreased from first to second semester (60.39 to 60.22).

Table 7. Mean difference value compression & significance level of health related fitness variables, 1st and 2nd sem average score results of both EG & CG.

Variables	Subjects		Paired difference				Standard error of mean	Df	T	Significance(tailed p value)
					95% confidence interval					
	Mean	Std	Lower	Upper						
CVE	EG	Pot-pt	60.83	42.964	-82.199	-39.468	10.127	17	-6.007	.000
	CG	Pot-pt	-4.111	13.607	-2.656	10.878	3.207	17	1.282	.217
MS	EG	Pot-pt	-.9056	.7596	-1.2833	-.5278	.1790	17	-5.058	.000
	CG	Pot-pt	.1667	.5831	-.1233	.4566	.1374	17	1.213	.242
M.E	EG	Pot-pt	-1.722	.575	-2.008	-1.437	.135	17	-12.718	.000
	CG	Pot-pt	.111	.900	-.337	.559	.212	17	.524	.607
GPA	EG	FSR-SSR	-3.000	5.213	-5.592	-.408	1.229	17	-2.442	.026
	CG	FSR-SSR	.167	2.895	-1.273	1.606	.682	17	.244	.810

CVE=Cardiovascular Endurance, BMI=Body Mass Index, ME= Muscular Endurance, MS=Muscular Strength, GPA= Average score results, PT=Pre-test, POT=Post-test, EG=Experimental Group, CG=Control Group, MD=mean difference, FSR=First semester Average score result, and SSR= second semester Average score result.

The above table indicates that the comparison of both the experimental and control group's pre and post-test results of the health related physical fitness variables and the first and second

semester Average score result, and it also indicate whether this change/ difference was statistically significant or not. According to the result presented in the table above, the EG 12-minutes run test result shows a statistically significant improvement from pre to post test result (MD =60.833, SD = 42.964, p = .000) when exposed to 12 weeks' health related fitness exercise. But there was no statistically significant improvement in the 12-minutes run test result of the CG (MD = -4.111, SD = 13.607, p=.217), hence $p > 0.05$. In the former table 2 above, the mean value of EG in 12 minute run test before fitness exercise was 1800.06 m and it was increased to 1860.89 m after the fitness exercise was delivered, and the pretest mean value of CG was 1796.94 m and it was decreased to 1792.83m during posttest. Therefore, the mean difference value of EG was 60.83m and the CG mean difference value were -4.111m. This value indicates that, a statistically significant improvement was seen from pre to posttests results in 12-minutes run test of EG, but statistically significant improvement was not observed in the CG.

Table4 above also displays that the significance differences values of the pre and posttest push-up test results of the two groups (EG and CG). According to the data presented in the table, statistically significance improvement was observed in the EG in push-up test result (MD = -1.722, SD =.575, p = 0.000) when exposed to 12 weeks' fitness exercise. But there was no statistically significant improvement in the CG (MD =.111, SD =.900, p=.607), hence ($p > 0.05$). In the former table 5 it was indicated that the mean score of EG Push-up test result before the fitness training was 7.61 and it was increased to 9.33 after fitness exercise were conducted, and the pretest mean score of CG was 7.78 and it was decreased to 7.67 during posttest. The mean difference value of the EG from pre to post test results were -1.722, while the CG mean difference were .111. This value indicates that muscular endurance of the EG shows a statistically significance improvement from pre to post test results ($p < 0.05$), but not in CG ($p > 0.05$). Similarly, the above table 6 also indicates that the statistical significance difference values of the pre and posttest Wall-sit test results of the two groups (EG and CG).

According to the result presented in the table the EG shows statistically significance improvement in Wall-Sit test from pre to post test results (MD =-.9056, SD = .7596, p = .000) when exposed to 12 weeks' fitness exercise. But, no significant differences were found between pre and post test results of wall-sit test in the CG (MD = .1667, SD = .5831, p=.242), since $p > 0.05$.

The above table 3 shows that the mean values of the EG wall sit test before fitness exercise was 24.372 sec and it was increased to 25.278 sec after the fitness exercise was delivered, and the pretest mean value of CG wall sit test was 24.244 sec and it was decreased to 24.078 sec during posttest. The mean difference value of EG pre to post test result shows -.9056 sec, while MD = .167 sec were observed in the CG side. These indicate that the Wall-Sit/muscular strength of the EG shows statistically significant improvement from pre to post test result.

The above table 6 also displays that the statistical significance difference values of students first and second semester Average score result of the two groups (EG and CG). According to the result presented in the table, the first and second semester arithmetic mean (GPA) result of the EG showed a statistically significant increment (MD = -3.000, SD = 5.213, $p = .026$) from first to second semester. But, statistically no significant difference ($p > 0.05$) was observed in the Average score results of CG between first and second semester (MD = .67, SD = 2.895, $p = .810$).

Table 6 above indicates that the subjects Average score results mean value of EG before the fitness exercise was 63.78 and it was increased to 66.78 after the fitness exercise were given, and the first semester Average score result mean values of the CG was 60.39 and it was reduced to 60.22 during second semester. Therefore, the mean difference value of the EG were -3.000, while the CG mean difference shows .167 reductions.

4.2 Discussions

The purpose of this study was to investigate the effect of twelve weeks' health related physical fitness exercise on student's academic achievement of grade ten Male students at Onjojo general secondary school. Participating in physical fitness exercise programs regularly has significant positive effects on the overall health and wellbeing of individuals which improves the student's total health & their academic achievement (Hall and Kramer, 2009). In this study physical fitness exercise training shows improvements on student's health, physical abilities and academic achievement. The following findings of this study suggest differential relationships between components of health related fitness and academic achievement in each variable:

During cardiovascular endurance: When we compare the mean score values of EG 12-minutes run test result before Physical fitness exercise which was 1800.06 m with the mean score after 12 weeks Fitness exercise 1860.892 m, moderate improvement were observed from pre to post test result (MD = 60.833m), While we compare the mean score values of CG 12- minutes run test before exercise (1796.94 m) with after fitness exercises was given (1792.83 m) a slight reduction were seen (MD= -4.11)from pre to post test result. The result suggests that the EG shows statistically significant improvement in 12-minutes run test (MD = 60.833, SD = 42.964, $p = .000$) from pre to post test result. In the case of CG, a slight reduction was found from pre to post test (MD = -4.111, SD = 13.650 $p=.217$), but this change was not statistically significant at 0.05 level of confidence. Therefore, since improvement were observed in the cardiovascular endurance fitness level of EG the null hypothesis that say twelve weeks' physical fitness exercise has no significance effect on student's academic achievement was rejected at 0.05 level of confidence.

The results of cardiovascular endurance discussed above was in agreement with the finding of (Castelli et al., 2007; Kwak et al., 2009) which was conducted on association of health related physical fitness and academic achievement and they concluded that Positive associations between cardio respiratory fitness and academic achievement were observed with the academic achievement indexed using total academic scores. Cardio respiratory fitness also appears to be positively associated with other academic areas (Castelli et al., 2007, Hansen et al., 2014, Roberts et al., 2010, Wittberg et al., 2009). For example, Wittberg et al. (2009) observed a positive association between cardio respiratory fitness and performance on academic achievement tests in the areas of science and social studies in a sample of 968 preadolescent children.

A similar positive association between cardio respiratory fitness and spelling has also been reported by Hansen et al. (2014) and de Greeff et al. (2014). Additionally, cardio respiratory fitness has been positively correlated with language arts performance (Roberts et al., 2010; Wittberg et al., 2009).

During muscular endurance: When we compare the mean score of the pushup test result of the EG before physical fitness exercise (7.61) with the mean score after 12 weeks' physical fitness exercise (9.33) moderate increments were observed (MD = -1.722), whereas the mean score values of pretest CG push up test was 7.78 and posttest 7.67 a slight reduction were seen with the MD = .111 The result suggests that EG shows a statistically significant improvement in push-up (MD = -1.722 SD=.575, $p = .000$), which is significant at 0.05 level of confidence. But no significant difference was observed on the CG muscular endurance fitness level (MD = .111, SD = .900, $p = .607$ s), since $p > 0.05$.

Therefore, the formulated hypothesis twelve weeks' health related physical fitness variables exercises have significant effect on students' academic achievement (Average 66.78score result) were accepted in case of muscular endurance at 0.05 level of confidence.

The finding of this study contradict with the finding of Ronald W Bass, Dale D Brown, Kelly R Laurson, and Margaret M Coleman (2013), which found that Muscular endurance was significantly related to academic achievement or GPA.

During muscular strength: When comparing the mean score of wall-sit test results of the EG before physical fitness exercise (24.372sec) with the mean score of after 12 weeks' physical fitness exercise(25.278 sec) moderate increments were observed (MD = -.9056 sec), whereas the CG were decreased from pre (24.244 sec) to post test (24.078 sec) with MD = .1667. The result suggests that the EG shows statistically significant improvement from pre to post test in muscular strength fitness (MD = -.9056, SD= 2.4724, $p = .000$), which is significant at 0.05 level of confidence. But no significant change was observed in the CG of muscular strength pre to post test result (MD = .1676, SD =2.5213, $p = .242$), since $p > 0.05$. Therefore, the proposed null hypothesis twelve weeks' physical fitness exercise have no significance change on student's academic achievement were rejected at 0.05 level of confidence. The finding of muscular strength discussed above contradicts with the finding of Ronald W Bass, Dale D Brown, Kelly R Laurson, and Margaret M Coleman (2013), which found that Muscular strength was significantly related to academic achievement

CHAPTER FIVE

SUMMARY, CONLUSSION AND RECOMMENDATION

5.1 Summary

The purpose of this study was to evaluate the effect of twelve weeks' health related physical fitness exercise on students' Academic achievements in case of Onjojo general secondary school grade ten male students. For this purpose, the researcher reviewed the available literatures in order to decide the focus of the study and methodologies. In order to attain the general objective of the study, the following specific objectives were formulated:

- ❖ To evaluate the effect of twelve weeks' health related physical fitness exercise on academic achievement of the students.
- ❖ To know the effect of health related physical fitness exercise on student's academic achievement. Based on the above specific objectives, the hypotheses were formulated. Dealing with these basic objectives, the study was conducted on grade ten male students at Onjojo general secondary school. Among the total population of 200 grade ten male students 36 samples were selected using simple random sampling techniques, and 18 students (EG) were underwent fitness exercise training for three months and three (3) days per week, and the rest 18 students were serving as control group. A pretest and posttest from selected physical fitness variables were taken from both groups and the first and second semester students Average score result were taken from the school record office to gain the necessary data required to conduct the study.
- ❖ Through SPSS by using paired t-test the change from pre to posttest were known. Following this analysis, the following findings were obtained.
- ❖ The finding of this study indicates that the EG Average score result had statistically significant change from first to second semester. But no significant change was observed in the CG GPA results.

- ❖ The finding of this study shows that twelve weeks' health related variables exercise had positive statistically significant effect on students' Academic Achievement in case of EG cardio respiratory endurance. But, it had no significant effect on student's academic achievement of the CG.
- ❖ The finding of this study also indicates that Muscular Endurance of both EG and CG had no statistically significant effect on Students Academic achievement.
- ❖ The finding obtained from this study also indicates that the Muscular strengths of both EG and CG had no statistically significant effect on students' Academic Achievement.

5.2. Conclusion

In this section the main focus of the study was to conclude that either health related physical fitness components had a significant effect on student's Academic result or not, and depending up on the findings of the study the following conclusion was drawn:

- Twelve weeks' health related fitness exercises have a statistically significant effect on student's academic achievement of the EG from pre to post test results.
- Cardio Vascular Endurance had a statistically significant effect on student's academic achievement or GPA, On the other hand, muscular endurance and strength have no statistically significant effect on student's academic achievement.
- The health related physical fitness variables exercise of the CG had No statistically significant effect on student's academic achievement.

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5.3 Recommendation

Depending up on the results of the findings the researcher recommended that the following main points to the stake holders and who seeks to improve student's academic achievements.

- ❖ The finding of this study and other many researchers (Castelli et al., 2007; Hansen et al., 2014; Roberts et al., 2010; Wittberg et al., 2009) finding reveals that most health related physical fitness variables have a positive relation with students' academic achievement, so the students would be engage actively in a regular fitness training to improve their fitness and academic achievement.
- ❖ The result of this study indicated cardio respiratory fitness variables have high positive statistically significant effect on students' academic achievement, therefore the researcher recommend as the students would more engage in aerobic types of Fitness exercise.
- ❖ The result of this study and the study conducted by Hansen et al. (2014) and Greeff et al. (2014) indicates that health related physical fitness variables improvement had a positive significant effect on student's academic achievement, therefore PE teachers' needs to encourage and conduct physical fitness exercises for the students.
- ❖ The result of this study shows that regular physical fitness exercise improves health and 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.
- ❖ The result of this study shows that regular fitness exercise had a positive effect on student's academic achievement, so it is better if the Ministry of Education would rearrange the time allotment for physical education class.
- ❖ This study was used only fiend tests to get the data for the finding, therefore it is better if the future researcher uses laboratory test.

REFERENCES:

- Aklilu Seifu Adesa, Sangeeta Rani, Negussie Bussa (2014); Relationship between Physical Fitness and Academic Achievement:
- Amykathleen shannonh (2012),the effects of physical Activity on academic achievements ,Pittsburgh Univrsity.
- Anjana Varghese (2013); the benefits of physical exercise on Human brain, p4-6).
- Brandi M. Eveland-Sayers, Richard S. Farley, Dana K. Fuller, Don W. Morgan, and Jennifer L. Caputo (2009); Physical Fitness and Academic Achievement in Elementary School Children Journal of Physical Activity and Health, 6, 99-104
- Buchard, (1990); Foundations of physical education and sport (12th ed.): Mosby-year book Inc.
- Castelli DM, Hillman CH, Buck SM, Erwin H (2007); physical fitness and academic achievement in third and fifth grade students.
- Chien-Heng Chu, Feng-Tzu Chen, Matthew B. Pontifex, Yanlin Sun & Yu-Kai Chang (2016); Health-related physical fitness, academic achievement and neuro electric measures in children and adolescents, International Journal of Sport and Exercise Psychology, p 7-11.
- Cooper K., (1968); A Means of Assessing Maximal Oxygen Uptake, Journal of the American Medical Association.
- Corey A. Nunlist (2013); the relationship between physical activity and academic performance, unpublished paper (Evergreen State College), p11-21.
- Daley AJ, Ryan J. (2000); Academic performance and participation in physical activity by secondary school adolescents. Percept Mot Skills; 91:531-534.
- Dematteo. D., Marczyk.G, and Festinger. D, (2005); Essentials of research Design and methodology. Hoboken new jersey: John Wiley and sons, Inc.
- Dorita Du Toit, Anita E. Pienaar & Leani Truter (2011); relationship between physical fitness and academic performance in south African children; South African Journal for Research in Sport, Physical Education and Recreation, 33(3): 23-35.
- Dwyer, T., Sallis, J.F., Blizzard, L., Lazarus, R., & Dean, K. (2001). Relation of academic performance to physical activity and fitness in children; Pediatric Exercise Science, 13(3), 225-238.

- Erin K. Howie, Russell R. Pate: Physical activity and academic achievement in children: A historical perspective; *Journal of Sport and Health Science* 1 (2012) 160-169.
- Etnier, J.L., Nowell, P.M., Landers, D.M., & Sibley, B.A. (2006); A meta-regression to examine the relationship between aerobic fitness and cognitive performance. *Brain Research Reviews*, 52, 119_130.
- Evans W.J. (1999); Exercise training guidelines for the elderly; *Med Science sport exercise* 31:12-7.
- Eveland-Sayers, B.M., Farley, R.S., Fuller, D.K., Morgan, D.W., & Caputo, J.L. (2009); Physical fitness and academic achievement in elementary school. *Journal of Physical Activity and Health*, 6(1), 99_104. 66
- Flook, L., Repetti, R. L., and Ullman, J. B., (2005); Classroom social experiences as predictors of academic performance. *Developmental Psychology*, 41 (2):319-327.
- Fox, C.K., Barr-Anderson, D., Neumark-Sztainer, D., & Wall, M. (2010); Physical activity and sports team participation: Associations with academic outcomes in middle school and high school students; *Journal of School Health*, 80(1), 31-37.
- Gezahagne Abate and Araya Dechasa (2006); *Grade 12th Physical Education Text Book*, p-11 35.
- Grissom, J.B. (2005); Physical fitness and academic achievement. *Journal of exercise physiology*, 8(1), 11-25.
- Haley Mull, BS (2014); *Physical Activity and Academic Success: Links on a University Campus: focus on colleges, universities, and school's* volume 8, number 1.
- Hanna K.M., Ruth F.Santos, Ricardo Cassilhas (2006); *Reviewing on Physical exercise and the cognitive function*, vol.12.
- Hill man C. H, Erickson, k.I and Kramer, A.F (2008); be smart, exercise your heart, exercise effect on brain and cognition, *Neuro science*.
- Hillman, C.H.; Erickson, K.I. &Krame R, A.F. (2008); be smart, exercise your heart: Exercise effects on brain and cognition. *Nature Reviews Neuroscience*, 9(1): 58-69
- Kantommaet.als (2010) and McAuley (1994), Sunstroke (1984); *Academic effect of exercise* p 8-12
- Karen Rodenroth, (2010); a study of the relationship between physical fitness and academic performance, p-4.

- Kevin, W., Nesta, W.J., Graham, T. Sue, H (2005); sport & PE, complete guide to advanced Level study. 3rd ed. Londo, p 534. 67
- Lambert, M.I., Mabanbo, Z.H. &Stclair Gibeson, A. (1998); heart rate during training and competition for long distance running; Journal of sport sciences.
- Laurson, P.B &tenkis, D.G. (2002) the scientific basis of high interval training; Optimizing training programs and maximizing performance.
- Leonare, C.T. (1998) the neuro science of human movement. Mosby, St Lovis, mo.
- Ministry of education (1994); The New Education and Training Policy; Ethiopia, Addis Ababa Printing Press, National Institute of health Technology Assessment (1994), and Omron Health care (2008).
- Mohammed AbouElmagd, Abubakr H Mossa, Manal Mahmoud Sami, Tamer Salama El-Marsafawy, Omar Al Jadaan, Mohamed Salah EldinMudawi (2015); The Impact of Physical Activity on the Academic Performance among Medical and Health Sciences Students: International Journal of Physical Education, Sports and Health vol 2(1), p 92-95.
- National Institutes of Health and National Heart, Lung, and Blood Institute, (1998); Clinical guidelines on the identification, evaluation, and treatment of overweight and obesity in adults. Evidence Report. Obes Res, vol 6 (suppl. 2):51S-209S.
- Panbilnathan A. and Kulothungan P., (2011); Effect of Different Intensity Aerobic Exercise on Body Composition Variables among Middle Aged Men, Recent Treads in Yoga and Physical Education, Vol. I.
- Pangrazi R.P. &Darst P.W., (2002); Dynamic physical education for secondary school students, (3rded.).
- Rebecca A. London and Sebastian Castrechini, (2009); Exploring the Link between Physical Fitness and Academic Achievement, p3-7.
- Robert J. Wingfield Joseph P.H. McNamara David M. Janicke, (2011); in is there a Relationship between Fitness, and Academic Performance Volume 14, Number 2. 68

- Shahana A, Nair US and Hasrani SS, (2010); Effect of aerobic exercise program on health related physical fitness components of middle aged women. *British Journal of Sports Medicine* 44 19-23.
- Shepard, R., 1983. Physical activity and the health mind. *Canadian Medical Association Journal*, 128:525-530.
- Shephard, Roy J. (1997); curricular physical activity and academic performance. *Pediatric Exercise Science* 9:113–26.
- Shepherd, BS, Irene T. Pintado, PhD, Mark H. Bean, PhD (2011); Physical Education and Academic Achievement; *Delta Journal of Education*, Vol1, No.1.
- Shriharan, S., Samarasinghe, S, M. (, 2014); the Impact of Physical Fitness on Academic Performance of Grade Five School Children: *Journal of Education and Practice* Vol.5, No.19.
- Sibley, Benjamin A., and Jennifer L. Etnier (2003); the relationship between physical activity and cognition in children: A meta-analysis. *Pediatric Exercise Science* vol15, p 243–56.
- Sing-Manoux, A., Hillsdon, M., Brunner, E., & Marmont, M. (2005); Effects of physical activity on cognitive functioning in middle age: *American Journal of Public Health*, 95(12), 2252_2258).
- Taras, H. (2005). Physical activity and student performance at school; *Journal of School Health*, 75(6), p 214_218.
- Tema Ewnutie (2018), Effect of physical exercises on health related fitness component & academic achievement of the students unpublished paper Bahidar University.
- Thomas J.H. Keeley and Kenneth R. Fox (2009); the impact of physical activity and fitness on academic achievement and cognitive performance in children: *International Review of Sport and Exercise Psychology* Vol. 2, No. 2, September, 198_214.
- Tomprowski, P.D. (2003); Effects of acute bouts of exercise on cognition; *Acta Psychological*, 112(3), 297_324.
- Tomprowski, P.D.; Davis, C.L.; Miller, P.H. & Naglieri, J.A. (2008), Exercise and children's intelligence, cognition, and academic achievement. *Educational Psychology*, 20(2): 111-131.
- Tsui-Er Lee (2013); *International Journal of Sport and Exercise Science*, Vol. 5. No.1. 69
- Yilkaal Chalie, (2017); effects of twelve weeks' aerobic exercise on selected physical fitness variables; unpublished paper, Bahir Dar University.

APPENDICES

APPENDEX-A: Selected physical fitness variables parameters pretest, posttest and difference (posttest-pretest) results of both Groups: CVE;

12-minutes Run pre, post-test and difference results (in m)

Experimental Group				Control Group			
Name	Pretest	Post test	differen ce	Name	Pre-test	Post- test	differen ce
1	1861	1915	54	A	1850	1839	-11
2	1812	1864	52	B	1820	1821	1
3	1832	1835	3	C	1890	1884	-6
4	1832	1834	2	D	1705	1700	-5
5	1791	1795	4	E	1810	1815	5
6	1819	1910	91	F	1820	1814	-6
7	1815	1861	46	G	1800	1769	-13
8	1765	1896	131	H	1690	1710	20
9	1718	1820	102	I	1850	1844	-6
10	1815	1905	90	J	1810	1804	-6
11	1821	1915	94	K	1811	1809	-2
12	1809	1880	71	L	1692	1695	3
13	1695	1700	5	M	1780	1801	21
14	1721	1864	143	N	1720	1712	-8
15	1788	1869	81	O	1790	1756	-34
16	1821	1868	47	P	1815	1809	-9
17	1856	1900	44	Q	1861	1854	-7
18	1830	1865	35	R	1831	1835	4

APPENDEX-B: Selected physical fitness variables parameters pretest, posttest and difference (posttest-pretest) results of both Groups: Muscular strength Wall sit test

in second, pre to post-test and difference results

Experimental Group				Control Group			
Name	Pretest	Post test	difference	Name	Pre-test	Post-test	difference
1	27.1	28.6	1.5	A	27.3	27.5	0.2
2	26.2	28.1	1.9	B	25.3	24.9	-0.4
3	22.3	24.2	1.9	C	22.4	22.6	0.2
4	21.00	22	1	D	21.6	21.9	0.3
5	24	24.6	0.6	E	23.8	23.4	-0.4
6	26.8	26.9	0.1	F	27.1	26.6	-0.5
7	21	22	1	G	20.6	21.2	0.6
8	25.4	25.8	0.4	H	26.3	25.8	-0.5
9	24.9	25.1	0.2	I	25.2	25.6	0.4
10	22.1	22.5	0.4	J	21.8	20.4	-1.4
11	28.4	28.9	0.5	K	28	27.8	-0.2
12	25.3	25.8	0.5	L	24.3	25	0.7
13	22.3	22.9	0.6	M	21.9	21.4	-0.5
14	21.9	22.4	0.5	N	22.4	21.9	-0.5
15	24.6	25	0.4	O	25.2	25.1	-0.1
16	25.7	25.8	0.1	P	24.6	23.8	-0.8
17	28.3	29	0.7	Q	28.2	27.4	-0.8
18	21.4	22.4	1	R	20.4	21.1	0.7

APPENDEX-C: Selected physical fitness variables parameters pretest, posttest and difference (posttest-pretest) results of both Groups: Muscular endurance push up test; pre, post-test and difference results (REP)

Experimental Group				Control Group			
Name	Pretest	Post test	difference	Name	Pre-test	Post-test	differenc e
1	9	11	2	A	10	9	-1
2	7	10	3	B	8	9	-1
3	6	7	1	C	9	8	-1
4	9	10	1	D	7	8	1
5	8	9	1	E	6	7	1
6	6	8	2	F	8	7	-1
7	7	9	2	G	11	10	-1
8	8	10	2	H	9	8	-1
9	7	9	2	I	7	6	-1
10	7	9	2	J	7	7	0
11	6	8	2	K	8	7	-1
12	8	9	1	L	6	7	1
13	10	11	1	M	7	7	0
14	7	9	2	N	8	9	1
15	9	11	2	O	9	8	-1
16	6	8	2	P	7	8	1
17	8	10	2	Q	6	6	0
18	9	10	1	R	7	7	0

APPENDEX-D :First& Second sem GPA students results for both experimental and control group

Experimental Group				Control Group			
Name	Pretest	Post test	difference	Name	Pre-test	Post-test	difference
1	61	64	3	A	56	56	0
2	56	60	4	B	61	60	-1
3	59	61	2	C	50	52	2
4	70	68	-2	D	68	60	-8
5	71	72	1	E	49	54	5
6	65	70	5	F	52	55	3
7	64	65	1	G	54	51	-3
8	63	73	10	H	56	57	1
9	68	60	8	I	59	60	1
10	75	78	3	J	66	64	-2
11	81	85	4	K	75	72	-3
12	55	54	-1	L	80	78	-2
13	91	96	5	M	65	64	-1
14	64	65	1	N	61	62	1
15	56	60	4	O	67	66	-1
16	44	46	2	P	62	64	2
17	50	68	18	Q	50	52	2
18	55	57	2	R	56	57	1

APPENDIX-E: 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	-Jumping jacks -push-up -Bicycle crunches -plank -lunges -jogging exercise on Track - trunk and quadriceps stretching	-aerobics exercise squat jump - sit-up -crunches -wall-sit -side plank - rope jumping -hip and hamstring stretching exercise	-jumping jacks -mountain climbers -wall sit -Crunches -Planks -Triceps dips -Lunges & stretching Exercise -running on track
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 –F: 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 -Jumping jacks -push-up -Bicycle crunches -plank -lunges -jogging -trunk and quadriceps Stretching	2x10 3x5 2x15 2x10sec 3 minutes each 1x12 minute 1x5minutes	High	30sec. b/n sets and 10sec 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 H: Profile of participants

A. Experimental Group

No.	Name	Code	Grade& sect	Age	Height(m)	Weight(kg)
1	MalaseMasebo	1	10B	17	1.64	54
2	MiratuBalata	2	10B	17	1.58	51
3	TashumaLarebo	3	10B	16	1.79	58
4	MulatuMinebo	4	10B	16	1.65	61
5	TaddelaLamango	5	10B	16	1.60	68
6	AlemuGodiso	6	10B	18	1.59	58
7	SamatoGatiso	7	10B	19	1.56	51
8	SalemuMandado	8	10B	18	1.70	54
9	AshenafiSorato	9	10B	18	1.40	56
10	SabisibeYoseph	10	10B	16	1.45	52
11	TigistuHelore	11	10B	17	1.55	56
12	GaramuAntashe	12	10B	18	1.50	56
13	TumisoBadore	13	10B	19	1.52	54
14	BareketLodamo	14	10B	19	1.50	57
15	AssefaAkako	15	10B	19	1.54	50
16	PetrosLale	16	10B	17	1.58	51
17	KassaBelango	17	10B	16	1.60	58
18	AbagazShugute	18	10B	18	1.56	50

Appendix I: Profile of participants

B. Control Group

No.	Name	Code	Grade& Sect	Age	Height(m)	Weight(kg)
1	Ayala Sorato	1	10B	18	1.50	52
2	AlemuBayana	2	10B	18	1.66	54
3	BirhanuLalago	3	10B	16	1.54	55
4	BereketBalilo	4	10B	17	1.64	48
5	Markos Manedo	5	10B	19	1.74	48
6	TigabuYohannis	6	10B	19	1.80	49
7	TamireShashigo	7	10B	17	1.50	54
8	TassemaMangasha	8	10B	17	1.54	52
9	NigatuSamato	9	10B	20	1.55	51
10	MaharuMalese	10	10B	18	1.60	50
11	WondimuAnshebo	11	10B	18	1.58	50
12	TadiwosMakango	12	10B	16	1.64	50
13	DagafuTalore	13	10B	17	1.61	53
14	Elias Lambebo	14	10B	17	1.52	51
15	AbrhamAshebo	15	10B	17	1.50	53
16	Adana Horidofo	16	10B	17	1.49	52
17	Indrias Mankango	17	10B	18	1.50	52
18	Iyob Abera	18	10B	19	1.50	50

Picture 3 Push Up Test



YÜREKİM

Picture 4 Wall Sit Test

