

**THE EFFECTS OF PARTICIPATION IN PHYSICAL  
ACTIVITIES ON SECONDARY SCHOOL STUDENTS'  
ACADEMIC ACHIEVEMENTS IN WESTERN SHOWA  
ZONE**

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September, 2019**

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This is to certify that the thesis prepared by Bayisa Muleta entitled: “The Effects of Participation in Physical Activities on Secondary School Students’ Academic Achievements in Western Showa Zone” and submitted in partial fulfillment of the requirements for the degree of Master of Education (Physical Education) complies with the regulation of the university and meets the accepted standards.

Signed by the examining committee

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## **ABSTRACT**

*The purpose of this thesis was to examine the effects of participation in physical activities on secondary school students' academic achievements in Western Showa Zone. For this quasi-experimental study the academic achievement records of 728 secondary school students for 6 academic subjects such as Mathematics, English, Biology, Chemistry, Geography and Civics were collected from Olankomi, Ginchi and Liban Mecha secondary schools. The 364 students were divided into experimental group those participating in 3 hours per week physical activity and control group those who do not. The data was analyzed quantitatively using parametric statistics such as independent sample t-test and one-way ANOVA to compare the mean academic achievement of the two groups of students to see if there are differences in the mean values due to participation in physical activities. According to that, the results of this study indicates that participating in physical activities three hours per week for three months has positive effects on the students' academic achievements. Furthermore, despite difference between schools regarding the effect of participation in physical activity, no such difference was observed between male and female students and also based on students' age levels. This means, the three hours per week involvement in physical activity helped students to improve their academic achievement without discrimination. Based on this finding, it was recommended that physical education teachers encourage all students, female and male students alike, at all grade levels (all age) to participate in physical activity at least during the curricular time and preferably by creating opportunities outside class.*

**Keywords:** *Physical Education, Physical Activity and Academic Achievements*

## **ACRONYMS AND ABBREVIATION**

ADHD = Attention Deficit Hyperactivity Disorder

BDNF= Brain-Derived Neurotrophic Factor

BMI = Body Mass Index

DMT = Dance Movement Therapy

FMRI= Functional Magnetic Resonance Imaging

GCSE = General Certificate of Secondary Education

LTP= Long-Term Hippocampus Potentiating

NASPE = National Association for Sport and Physical Education

NCLB= No Child Left Behind

PA= Physical Activity

PE=Physical Education

PEP= Physical Education Program

RPA = Regular Physical Activity

## TABLE OF CONTENTS

| Contents                                                                               | Page |
|----------------------------------------------------------------------------------------|------|
| Acknowledgement.....                                                                   | I    |
| Abstract.....                                                                          | II   |
| Acronyms.....                                                                          | III  |
| CHAPTER ONE: INTRODUCTION                                                              |      |
| 1. Background of the Study.....                                                        | 1    |
| 2. Statement of the Problem .....                                                      | 4    |
| 3. Objective of the Research.....                                                      | 5    |
| 4. Research Questions .....                                                            | 6    |
| 5. Delimitation of the Study .....                                                     | 6    |
| 6. Limitation of the Study.....                                                        | 7    |
| 7. Significance of the Study .....                                                     | 7    |
| 8. Definition of Terms .....                                                           | 9    |
| 9. Organization of the Study.....                                                      | 9    |
| CHAPTER TWO: REVIEW OF THE LITERATURE                                                  |      |
| 2.1. Effects of Physical Education and Physical Activity on Academic Achievement ..... | 10   |
| 2.2. Benefits of Physical Activity and Exercise on Academic Success.....               | 12   |
| 2.3. Importance of Physical Activity and Exercise on Brain and Body Functions- .....   | 13   |
| 2.4. Physical Activity and Academic Achievement.....                                   | 14   |
| 2.5. Physical Activity and Cognitive Function .....                                    | 18   |
| 2.6. Effects of Physical Activity on the Brain .....                                   | 20   |
| 2.7. Motivating Students to Participate and Meet Goals .....                           | 23   |
| 2.8. Important Safety in daily Physical Activity.....                                  | 24   |
| 2.9. Impacts on Learning in Classroom .....                                            | 25   |
| 2.10. Development of Motor Skills.....                                                 | 26   |
| 2.11. Physical Fitness and Gender .....                                                | 34   |
| CHAPTER THREE: RESEARCH DESIGN AND METHODOLOGY                                         |      |
| 3.1 The Research Design .....                                                          | 36   |
| 3.2 Research Site and Population of the Study .....                                    | 37   |

|                                               |    |
|-----------------------------------------------|----|
| 3.3 Sample Size and Sampling Techniques-..... | 37 |
| 3.4. Research Instrument.....                 | 39 |
| 5. Data Collection Procedure .....            | 39 |
| 6. Data Analysis -.....                       | 40 |

#### CHAPTER FOUR: PRESENTATION, ANALYSIS AND INTERPRETATION OF DATA

|                                                            |    |
|------------------------------------------------------------|----|
| 4.1. Demographic Characteristics and Analysis of Data..... | 41 |
| 4.2. Discussion- .....                                     | 47 |

#### CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATION

|                             |    |
|-----------------------------|----|
| 5.1. Summary .....          | 51 |
| 5.2. Conclusions .....      | 53 |
| 5.3. Recommendations- ..... | 54 |
| Reference .....             | 56 |

## List of Tables

|                                                                                                                       |    |
|-----------------------------------------------------------------------------------------------------------------------|----|
| Table4.1. Demographic Characteristics Group of Students.....                                                          | 41 |
| Table4.2. Comparison of Achievements before and after Intervention.....                                               | 42 |
| Table4.3. Comparison of Genders with Physical Activity and Academic<br>Achievements by Independent Sample t-test..... | 43 |
| Table4.4. Comparison of Two Grades with Student's Academic Achievements<br>Before Intervention.....                   | 44 |
| Table4.5. One way ANOVA Result Concerning Experimental Versus Control<br>Group on Age Categories Variables.....       | 45 |
| Table4.6. One way ANOVA Result Concerning Experimental Versus Control Group on Schools<br>Variables.....              | 46 |

# CHAPTER ONE

## INTRODUCTION

### 1.1. Back Ground of the Study

This study relies on previously published literature and online resources to defend the effects of physical activity and academic achievement.

The curriculum and schedules in schools are often full of academics, and there is little time for activity and one period per week for PE in our country, but it is important that teachers understand the variety of ways it can be integrated for academic success. Desai, Kurpad, Chomitz, and Thomas (2015) state that aerobic exercise and activity positively support mental health, influence health behaviors, and are associated with academic achievement. A child's cognitive performance in school has the potential to be enhanced through the integration of physical activity and exercise into the school day, with or without adding in programs. There are several ways that educators can get the students moving with mathematics problems, taking brain breaks, providing after school exercise programs, and much more. The researcher is interested in the many positive effects that physical activity and exercise have on students and their academic success. Teachers are capable of providing students with many life lessons as well as academic lessons, and being physically fit is one lesson where students will be able to see success. There have been numerous studies to determine the effects of exercise on children and their academic success, and with more positive results, students can become more academically fit as well as physically fit, which will lead to more success.

Theoretical background in 1983, the United States was labeled "A Nation at Risk." The United States has found itself competing with other countries academically. Since then, and even as early as the 1920s, there have been a plethora of reforms to help improve the academia in schools. For example, when Sputnik was launched in October of 1957, new math and science curriculums were adapted. Content that is not tested, such as physical education, has become a lower priority (National Association for Sport and Physical Education, 2006). Exercise for students appears to be decreasing (Mulrine *et al.*, 2008) which has resulted in more children

becoming obese since the 1960s (Hinkle, 1992). More specifically and across all age groups, girls tend to be less physically active than boys (DeBate *et al.*, 2009). With the current implications of No Child Left behind (NCLB), schools and teachers have felt accountability pressure to increase performance until all students are performing on grade level (Maeda and Murata, 2004).

The effects of participation in physical activities improve cognitive development and academic achievements. Physical activities have been shown to have positive effects on cognition and concentration. Physical activity helps secondary school students concentrate and focus (Young, 2001). To date, while some published evidences positively link physical activity to academic achievements in the classroom, few studies have utilized standardized physical activity and academic achievement scores to examine these relationships. Physical activity increases students' capacity for Learning (Kong, 1999). Learning through movement is vital for a successful experience in school. "Exercise, besides shaping up bones, muscles, heart and lungs also activates major growth of neurons and nerve nets in the basal ganglion, cerebellum and corpus call sum of the brain. Aerobic exercise increases the supply of blood and oxygen to the brain". A potential effect of physical activities to cognitive function may be explained by both physiological and psychological mechanisms. Exercise has been proven to improve classroom behavior as well as increase academic achievement (Dwyer *et al.*, 2001). Physical activity is also consistently related to higher levels of self-esteem and lower levels of anxiety and stress each of which has been associated with enhanced academic achievement. In reviews of physical activity and academic achievements, researchers concluded that student attention was likely to be greater in an active rather than in a sedentary student. This may facilitate favorable interactions between the learning environment and the cognitive development. Yet, the question remains as to whether the level of physical activity can be directly linked to students' academic achievement on standardized achievement tests.

The role of participation in physical activities for secondary school students in the educational process has been a topic of debate for decades. Critics observed that sport activities deflect time away from the classroom (Melnick, *et al.*, 1992). Supporters of high school sport programs argue that sport participation improves students' achievement motivation (Casey, 1989; Parker and Johnson, 1981), improves students' grades, keeps them in school, raises their educational aspirations (Melnick, *et al.*, 1992), helps them appreciate health, exercise and fitness, helps them

learn about themselves and learn to handle adversity, and helps them experience team work and sportsmanship (Rasmussen, 1999 and 2000). While the quantity of research literature in this field is growing, its uneven quality provides no evidence to afford a clear understanding of the nature on the issue (Greenn, 1987). Instead of focusing on the traditional sport education model, which involves learning team sports, the intention of this PEP grant was to focus more on enhancing students' physical activity and increasing participation in moderate and vigorous physical activity. According to Mood, *et al.*, (2007), children should be engaged in moderate physical activity for thirty minutes per day for five or more days per week and vigorous physical activity for twenty minutes per day for three or more days per week. The relationship between physical education, health education, with personal, and social development are occurring in some countries. Not untypical of curricular aims, and especially but not exclusively so, in higher income countries, are those which embrace cognitive (knowledge/knowing), psycho-motor (skills/doing) and affective (attitudes/values) outcomes associated with a healthy, active life-style philosophy and connected with physical literacy and the notion of the physically educated person. Another feature of changes taking place is increasing attention devoted to Quality Physical Education concepts and Programs (UNESCO, 2014). There is many benefits of physical education provide today's students and society. Within a school setting, a physical education program can serve society in many ways if implemented and utilized appropriately. There are many areas physical education can serve and positively affect students and society. The actions continued dramatic increases in secondary students' health issues, physical education programs are being shaped more than ever to make room for more score academic time. This trend continues even though the current evidence shows physical education to be positively related to increased academic performance; when time is allocated for quality physical education, there is no detriment to academic achievement (Smith and Lounsbery, 2009). However, teachers have the flexibility and an obligation to address other student needs while maintaining focus on the over arching role of increasing student understanding of curricula; addressing health needs such as diet and nutrition has shown to improve student academic performance and behavior (Storey, *et al.*, 2011; Vinciullo and Bradley, 2009). If active lessons or time spent on physical activity do not affect student performance, then teachers will have to use their own judgment on whether physical activity is worthwhile; given the enormous costs of obesity to both individuals and society (Finkelstein,*et al.*, 2009), `teachers may be justified in providing physical activity during

the school day. However, if physical activity has a positive effect on academic achievement, then educators should find ways to incorporate activity and exercise into academic lessons.

Developmental Movement identifies the fundamental attributes that relates with all physical movements, while the Spectrum of Teaching Styles identifies the underlying structure of the teaching learning process-decision making (Muska, 1925-1994). Physical fitness and physical activity have been shown to have positive effects on cognition and concentration. To date, while some published evidence positively links physical activity, fitness, or PE to academic achievement in the classroom, few studies have utilized standardized activity and academic achievement scores to examine these relationships, (Chomitz, *et al.*, 2009). Researchers believe that, with children and adolescent students, increased participation in sport and other forms of physical activity also enhances cognitive functioning or information processing, memory, Concentration, behavior and academic achievement (Smith, 2015). In other words, research is telling us that there's a positive relation between children and adolescent students being active and playing sport and their abilities to get better marks at school. However Inactivity in students can negatively impact brain health and aspects of cognition known as executive control (also called cognitive control in adults). These negative impacts can involve inhibition (the ability to resist distractions and maintain focus), working memory (mentally holding and manipulating information) and cognitive flexibility (multi-tasking), which are considered vital to success at school, at work and in life (Hillman, *et al.*, 2014). Unfortunately, with increasing pressure on schools to ensure students achieve academic success, physical activity classes (such as physical education and Sports) are increasingly being pushed down the curriculum priority list. It is important that all activities be conducted in accordance with school board policies.

## **1.2. Statement of the Problem**

This is to investigate the effects of participation in different physical activities for three hours per week for three months on secondary school students' academic achievement. Daily physical activities have benefits on the brain and cognitive functioning of the students. Physical activity can develop the students' cognitive health and academic achievement. But, the effect of physical activity on students' academic achievement is still unclear in Western Showa Zone secondary schools. Most of the time, the students or other people did not understand the effects of physical exercises in our country. They only use physical activities as a recreational activity.

In secondary schools most of the students were very much interested to participate in different physical activities and in other way some students were not interested to participate in different physical activities. But, there are many challenges which decrease the interests and motivation of the students to participate in different physical activities. There is no comfortable sport fields at schools, lack of sport teachers, lack of sport equipments at schools, one period per week for physical education (lack of time) and a traditional sport was applied at the schools rather than modern physical exercises are the main challenges which decrease the student's interest to participate in different physical activities at the schools. All of these problems are decrease the students' interests to participate in different physical activities in and out of the school and it reduces the students' cognitive capacity and academic achievement. However, most of secondary school students' were very much interested to participate in physical activities and where as some students were no having interest to participate in physical activities. To find out the relationship between physical activities and academic achievements in secondary school the researcher classifies the students in to two groups. These groups were experimental and control groups. After that, the researcher gave chance for experimental group as they participated in extra physical activities for three hours per week for three months and where as the other group would be left with no participation in the planned extra physical activity. Then after, the researcher took the scores of both group of students from each school record office before and after intervention would be measured.

### **1.3. Objective of the Study**

The objective of this study is to examine the effects of participation in physical activities three months for three hours per week on the students' level and gender differences on selected secondary school students' academic achievements.

This is the general purpose of the study was to investigate the effect of participation in physical activity on academic achievement of secondary school students. To appropriately address the aim of the research, the above general objective was further divided into the following specific objectives:-

- ✓ To identify if the students academic achievement would have difference as a result of a three month three-hours per week participation in physical activity;

- ✓ To identify the effects of physical activity three hours per week for three months on the students achievement levels and gender differences.
- ✓ To identify which group of students will most benefit or disadvantaged in academic achievement because of participation in physical activity.

#### **1.4. Research Questions**

The purpose was to determine the effects of participation in different physical activities three hours per week for three months on secondary school students' academic achievements in Western Showa Zone. In order to achieve the above-mentioned objectives, the researcher collected the students' score from Western Showa Zone three selected Woreda Secondary school Students. This study was applied in Olenkomi, Ginchi and Liban Mecha secondary school students on the effects of physical activity and academic achievements in particular selected subjects like Mathematics, English, Chemistry, Biology, Geography and Civics. According to that the research questions were listed as the follows:

1. Is there difference among Experimental and Control group students on their academic achievements based on their participation in different exercises?
2. Is there difference among grade 9<sup>th</sup> and grade 10<sup>th</sup> students those similarly participated actively in different physical activity on their academic achievement?
3. Is there difference among male and female students those similarly participated actively in different physical activity on their academic achievement?

#### **1.5. Delimitation of the Study**

This study is delimited to investigate the effect of participation in physical activity on secondary schools students' academic achievement in Oromia regional state Western Showa zone in Ejersa Lafo Woreda (at Olenkomi secondary school), Dandi Woreda (at Ginchi secondary school) and Ambo Town Liban Mecha Secondary school in grade nine (9) and ten (10) selected class students.

### **1.6. Limitation of the study**

Throughout the process of doing this research, the researcher has faced some problems. Beside the quasi-experimental methods, to done in three Woreda secondary school was hard to manage all barriers and get genuine and fruitful information from some teachers while gathering the data. Because, some teachers were not gave the students result what they done in the proper ways. This means, when the students score less academic result than what the teachers' expects score from each student; they gave some bonus to reduce the students' failures. In other ways, when the students participating in different exercises for one hour per day-three hours per week is very difficult to control all conditions. Because, they lose high amount of energy and they must had replaced the expenditure energies by taking additional meals. In this case, it needs more budget to support the students as they participated from the beginning to the end of the study without withdrawal from the training session. However, the researcher hopes that these issues do not affect the findings of the research significantly.

### **1.7. Significance of the Study**

This study is expected to provide participation in physical activity on secondary school students which helpful to implement the integrative skills in actual academic achievement appropriately and it helps as useful and necessary for the next generation's and it would be used reference for other researcher's on the field of the study. The importance of this study was to aware the person who did not know the benefits of physical activity have on academic achievement and put the sciences supported with evidences and the students have beneficial to engaged on regular physical activity by all aspects, especially on academic success via academic year. This study was arrived the message for the concerned body to encourage the society especially students pushing in participation physical activity for its' have advantage of on wellbeing through investigate good learning process and academic achievement. the quality of physical education and physical activity experiences have the potential to impact on physical ,cognitive aspect ,on academic outcome and on-task behavior in the school setting.

This study contributes to the existing body of knowledge about the importance of physical activities. Physical activity is one component that can influence student performance. Together, schools and families can work together to develop a plan for a healthy lifestyle that includes

physical activity. Our society is becoming more and more sedentary. It is hoped that school leaders can learn from the study about the importance of physical activities and its effect on student achievement. All students should be encouraged to participate in extracurricular activities that involve physical activity.

## **1.8. Definition of Term**

**Academic achievement:** the results of students those actively participated in different physical activities three hours per week for three months and inactive students in physical activity on six different subjects scores.

**Physical activity:** Any bodily movement produced by the contraction of skeletal muscle that increases energy expenditure above a basal level and increases the students' academic achievements and physical education class.

**Physical education:** is an integral part of total education process that has its aim the improvement of human performance through the medium of physical exercise that has been selected with view of realizing this outcome.

## **1.9. Organization of the Study**

This chapter has presented the background, statement of the problem, identified the objectives of the study, the research questionnaires, significance of the study, and delimitation of the study and discussed the limitations of the study. Chapter Two reviews the related literature. In this chapter, discussing the effects of physical education and physical activity on academic achievement, discussed the benefits of physical activity and exercise on academic success, discussed the importance of physical activity and exercise on brain and body functions and so on. Chapter Three presents the methodology used in the study, research design. Sampling techniques and sampling size, data collecting procedure and data analysis were included in this chapter.

Chapter Four deals with the presentation, analysis and interpretation of the study. Finally, Chapter Five presents the summary, conclusions and recommendation of the study.

## **CHAPTER TWO**

### **2. REVIEW OF RELATED LITERATURE**

This literature review examines the effects of participation in different physical activities on academic achievements of secondary school students in Western Showa Zone. The first section will discuss the Effects of physical education and physical activity on academic achievement with more specific scientific references. The second section of this study is the benefits of physical activity and exercise on academic success with different references. The third section is the importance of physical activity and exercise on brain and body functions of secondary school students. The fourth section examines the physical activity and academic achievement specifically. The fifth section provides strategies to physical activities and cognitive function into the secondary school level classes. The sixth section is to determine the effects of physical activity on the brain of secondary school students. The seventh section is motivating students to participate in physical activities and meet goals of academic success. The eighth sections are important safety in daily physical activity to improve the students' academic achievements. The ninth section is the impacts of physical activities on learning in classroom. The tenth section is development of motor skills depending on participating in different physical activities and finally, physical activity and gender difference on academic results of secondary school students.

#### **2.1. Effects of Physical Education and Physical Activity on Academic Achievement**

The effects of physical education and physical activity plays great role in the developments of human being intellectual capacity, cognitive development and the students' academic achievements. This pressure has resulted in less time and fewer resources being allocated to physical education during an epidemic of overweight and obesity in children. Less physical activity also may lead to poorer cognitive development and academic achievement. These trends have prompted renewed interest in studies that examine the links between fitness and physical activity and cognition and academic achievement in secondary school students. In a study of secondary school students', Tuckman and Hinkle found that students randomly assigned to a 12-week aerobic running program (60 minutes per session, 3 times a week) performed better than students in a regular physical education class on a test of executive function conceptualized as

creativity (cognitive flexibility measured by the alternate uses test but not on a test of planning (i.e., a maze tracing test). The same investigators found similar results in grade ninth and tenth. Many cross-sectional studies have documented better cognition and academic achievement in secondary school students who are fitter; however, the evidence that physical activity directly benefits student's cognition and achievement remains tentative. To date, only a few randomized trials have tested the effect of physical training on cognition or academic achievement in secondary school students.

More recent studies by Davis and colleagues and Kamijo and colleagues provide further evidence that executive function is sensitive to aerobic exercise training. This review focuses on experimental evidence in this area. To be successful, it is essential to have good executive function, or supervisory control of cognitive processes. Good executive function, which is necessary for planning and carrying out goal-directed behavior, includes goal-setting, use of strategies, self-monitoring, self-control (i.e, inhibition), and allocation of attention and memory. Executive function develops during childhood and adolescence and is crucial for adaptive behavior and child development. Working towards goals often requires a student to suppress behaviors that lead to immediate reward in order to increase the possibility of later rewards (ie, delayed gratification).

The capacity to self-regulate behavior is important to a student's readiness for secondary school, and executive function in early childhood tracks into adolescence. Vigorous activities increase brain and memory functions and can have a positive influence on boys and girls (Bellarin, 2016). Preschoolers' ability to delay gratification using strategies to divert attention away from temptations has been shown to predict performance on an inhibitory task in adolescence. The executive function research question posits that the benefits of exercise on cognition are specific to, or stronger for, processes that require cognitive control. Some experimental evidence supports the idea that exercise might improve children's cognition. Participants in an aerobic running program performed better on evaluations of creative thinking than did those assigned to regular physical education classes. These results partially support the research questions that executive function is sensitive to the effects of aerobic exercise training in secondary school students.

In the first study to explicitly test the executive function hypothesis in children, <sup>1</sup> Davis' team randomly assigned 171 sedentary, overweight or obese 7- to 11-year-olds (56% female, 61% black) to either low-dose aerobic exercise (20 minutes per day), high-dose aerobic exercise (40

minutes per day), or a control group offered no exercise program. Aerobic exercise included running games, jump rope, and modified basketball and soccer, and the emphasis was on enjoyment and intensity rather than on competition or skill enhancement. Exercise conditions of the intervention (5 days per week for about 13 weeks) were equivalent in intensity (average heart rate was 166 beats per minute) and differed only in the volume of daily exercise.

Cognitive functioning was assessed by the cognitive assessment system, a standardized psychological assessment that measures 4 interrelated cognitive processes: planning, attention, Simultaneous processing, and successive processing. Only the planning scale measures executive function (i.e, strategy generation and application, self-regulation, intentionality, and use of knowledge). The investigators predicted and observed a dose-response benefit of exercise specific to executive function as measured by the cognitive assessment system planning score.

## **2.2. Benefits of Physical Activity and Exercise on Academic Success**

Regular physical activity (RGA) can have a positive impact on students' physical, mental, and social well-being. In particular, physical activity is likely to have an impact on students' achievement, readiness to learn, behavior, and self-esteem. Positive experiences with physical activity at a young age also help lay the foundation for healthy, productive lives. Research also indicates that children are in danger of developing serious diseases associated with obesity, which can result from a lack of physical activity "Studies demonstrate the positive effects daily physical activity has on student performance and academic achievement in terms of memory, observation, problem-solving and decision-making, as well as significant improvements in attitudes, discipline, behaviors and creativity."( Keays and Allison, 1995).

Due to the many benefits of physical activity on the brain, this in turn results in a higher correlation of academic success with students as well as an increase in positive behavior. Youth receiving additional physical activity tend to show improved attributes such as increased brain function and nourishment, higher energy/concentration levels, changes in body build affecting self esteem, increased self-esteem and better behavior which may all support cognitive learning (Cocke, 2002) (Tremblay,*et al.*, 2000) (Dwyer, *et al.*,1983); (Shephard, 1997) Field *et al.* (2001) found that among the health benefits of physical activity, exercise has been noted to increase performance on cognitive tasks as well as maintaining a sense of well being. In students who

perform higher rates of exercise, it has been shown that those same students will have higher grade point averages.

The level of physical activity has so improved brain attributes associated with regular physical activity consist of increased cerebral blood flow, changes in hormone levels, enhanced intake nutrient and greater arousal (Shephard, 1997). Cocke (2002) states "a trio of studies presented at the 2001 Society for Neuroscience Conference suggest that regular exercise can improve cognitive function and increase levels of substances in the brain responsible for maintaining the health of neurons." Brain function may also indirectly benefit from physical activity due to increased energy generation as well as from time outside of the classroom away from studying; The increased energy levels and time outside of the classroom may give relief from boredom resulting in higher attention levels during classroom instruction (Linder 1999). Then an effect on the academic success rate when comparing vigorous exercises, moderate exercises, and strengthening exercises to one another.

According to So (2012), vigorous activities may include soccer, basketball, aerobics, and swimming; moderate activities include badminton, table tennis, carrying light loads and cycling at a regular pace, and strengthening exercises can include push-ups, weight lifting, sit-up, and weight training. Vigorous exercises will raise heart rate higher than strengthening exercise. So to demonstrate that higher levels of physical activity result are the higher correlation of academic success than lower levels of physical activity.

### **2.3. Importance of Physical Activity and Exercise on Brain and Body Functions**

There are several truth 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), 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, Chaddock-Heyman *et al.*, (2015) found that differences in aerobic

fitness levels in students play a role in cortical gray matter structure, which is important for academic success. 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 (Chaddock-Heyman et al., 2015). Conyers and Wilson (2015) agree, 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 Synapse to genesis. 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. There are also several health benefits from engaging in physical activity, including increased strength and decreased chance of injuries.

#### **2.4. Physical Activity and Academic Achievement**

Participating in different Physical activities on the secondary school students has positive effects on the students' academic achievement in Western Showa Zone according to this study.

The connection between physical activity and intellectual achievement has been a long-standing issue since Davis and Cooper first reported a positive association between school physical activity and academic achievement. It remains the subject of recent investigations. The competitive dimension of most sports introduces particular problems, even in the school context, as the educational dimension tends to be relegated to a secondary level.

The literature comprises mainly cross-sectional data and the results are more equivocal than for PA; unfortunately, most of the earlier studies did not control for biases common to athletic and academic achievements.

Data from the longitudinal Maryland adolescent development in context study included 67% African-Americans and 33% European-Americans; it found that participation in extracurricular PA was a significant predictor of better academic results and of higher academic expectations.

Furthermore, sports participation by 8th grade African-American males resulted in aspirations to continue their studies toward college, with less likelihood of acting inappropriately in school. In their female counterparts, sports participation also resulted in higher aspirations and in a reduction of absenteeism.

Cooper et al. found that even after eliminating confounding factors, extracurricular activities, including sports and PA were predictors of better academic achievement in 2,200 American high school students. Their conclusion is in line with the point that Marsh made in 1992, that such activities may have an effect on academic achievement by increasing motivation and investment in school. Another study on 11,957 American adolescents found that even after standardization for SES, sports participation with parental presence was associated with an increased probability of good grades in English and mathematics, the adjusted relative risk being 1.23 for both subjects. Dexter examined the relationship between sports knowledge, sport performance, and academic ability, the last being measured by scores on the British General Certificate of Secondary Education (GCSE). They observed a small but significant positive correlation between sports performance and GCSE score for both mathematics and English (Melnick. *et al.*, 1992). Detected no relationship between academic achievement and sports participation in 3,686 African-American and Hispanic students from the "High-school and Beyond Study". However, sports participation was associated with a lower drop-out rate. Therefore, they suggested that if sports participation contributes to academic achievement, it may do so indirectly, by encouraging retention in school.

Harvard students involved in varsity teams had a slightly lower GPA than their peers, but reported a higher degree of satisfaction with their university experience. This also seemed the case in other institutions examined by Light. Athletes have more friends and a stronger sense of belonging to their institution. They are, according to Light, "the happiest on campus". Generally, this same trend is seen among high-school athletes. Students engaged in extracurricular PAs do not achieve different academic scores than their peers, but they feel a greater engagement with their institution. This may reflect in part the greater attention directed towards these specific students. Indeed, participants in extracurricular activities (including sports) have more interactions with significant adults than non participants. Sport is a very complex phenomenon. There are many cultures within school sports, and any effect on academic achievement is influenced by gender, race, and type of sport.

Academic integration of children with various behavioral and developmental problems is a growing trend in industrialized countries. The question arises in terms of their academic achievement. Reviews of exercise programmers for children with learning disabilities have suggested that in order to increase the likelihood of positive outcomes, such programmed should have a low student-instructor ratio. Benefits (with the exception of increased PF) may reflect increased attention toward the participants.

In hyperactive impulsive children, PA is associated with global satisfaction in boys and an absence of depressive emotions in both sexes. An outdoor education programmed also decreased behavioral problems in children with attention deficit hyperactivity disorder.

In children with reading disabilities, a school-based program of balance and coordination training, throwing, catching, and stretching produced significant improvements in both reading and semantics. Positive changes were maintained for at least 18 months following the programmed, reducing the likelihood of a Hawthorne effect.

A 10-week PA intervention in children with learning disabilities improved classroom behavior and the perception of academic competence was increased. However, a similar outcome was seen in the control group, indicating that there had been no specific effect from the programmed. The effects of school PA upon children with learning problems thus remains an open field for research.

School sport offers the school community opportunities to build a strong identity and culture of excellence. Traditional values of respect, fairness, responsibility and resilience are developed as part of students' participation. School sport is often a partnership between the school and local community organizations, which work together to develop students' abilities and foster student aspirations for interesting and rewarding lives (François *et al.*, 2008).

School sport and physical education improve students' concentration, memory, behavior and academic performance. Schools can lift the performance and outcomes for their students by offering programs designed to maximize participation, enjoyment and personal reward. High-performing schools utilize school sport and physical education programs to help motivate students and support learners in their academic work. This position is supported by growing evidence that sport and physical education have positive influences on student academic achievement. Physical activity is also learned and developing through school sport and physical

education. Physical activity has been demonstrated to have the positive effects on concentration, Memory and classroom behavior. Students who have increased time participating in sport and physical education have increased academic performance. So all the concerned body and society should have support and developed the culture of participation in different physical activity in the schools or other place. In addition, studies of the benefits of school sport and physical education has shown that as a result of investigate these activities the schools themselves become 'happier, healthier and more successful; pupils have greater confidence and self-esteem (Qualifications and Curriculum Development Agency (UK), 2007).

Physical education empowers students to develop positive attitudes towards physical and lifelong habits of participation. It engages them in the ongoing development of the knowledge, understanding, skills and values to participate in healthy physical activity. Teach students that movement skills, sport and physical activity can play an important part in everyone's life.

Physical activity is defined as any bodily movement produced by skeletal muscles that requires energy expenditure (Caspersen, *et al.*, 1985; World Health Organization, 2013), and includes exercise as well as other activities which are done as part of playing, working, active transportation, house chores, and recreational activities (World Health Organization, 2013). Regular of Physical Activity (RPA) in children and youth improves cardio respiratory and muscular fitness, bone health, coordination and movement control, maintenances of a healthy body weight, and have been associated with cognitive skills in academic learning processes (Bates, 2006; World Health Organization, 2013). Amounts of PA greater than 60 minutes on a daily basis provide additional health benefit (World Health Organization, 2013). In addition, PA participation can assist in the social development of young people by providing opportunities for self-expression, building self-confidence, social inter action and integration (World Health Organization, 2013). In turn, it has been suggested that physically inactive young people more readily adopt unhealthy behaviors (World Health Organization, 2013).

A national movement to eliminate recess began in the late 1980's (Sutton-Smith, 1990). Many school systems are choosing to follow this trend of eliminating recess and excluding physical activity. Elementary physical education programs are diminishing, (Hall, 2007). Although most states require physical education, forty percent allow exemptions from physical education requirements (Burges *et al.*, 2001). This is a result of being more concerned with satisfying

political needs rather than educational needs (Gratz, 2000). Currently, Illinois is the only state that requires daily physical education classes for students in grades Kindergarten through twelfth grade (Brink, 2002). Certified elementary physical education teachers are required in only twenty-eight states (Hall, 2007). Lastly, eight percent of elementary schools in the United States provide daily physical education classes for the entire year (Burges *et al.*, 2001). Thus, the reduction in physical activity and exercise, an increase in poor eating habits, and sedentary lifestyles are causes of the increased number of children and adults with obesity and diabetes, high blood pressure, and other health risks.

Incorporating physical education and activity into the school day assists in educating the whole child (Rairigh and Townsend, 2001). Teachers need to integrate physical movement in their lesson plans. There are current efforts in integrating content areas into physical education classes (Hill, 1991) and interdisciplinary teaching (Nilges and Usnick, 2000). Integration, when used as a teaching method, has helped increase student learning (Blaydes, 2000; California Department of Education, 2005; Michaud & Wild, 251991; NASPE, 2002). Additionally, “physical movement, such as stretching every twenty minutes in the classroom, can help stimulate the BDNF in a child’s brain and help learning occur more easily” (Hall, 2007, p. 4). Integrating physical activity on a daily basis into the school day is a powerful teaching method with an abundance of benefits.

There are many factors that affect learning, and physical education is one of the many factors that impacts academic achievement. In this day in age, it is necessary to integrate physical activity with other content areas to enhance learning in the physical education setting, as well as the classroom setting. Movement improves cognitive functioning, and learning is more fun (Leppo& Davis, 2005).

## **2.5. Physical Activities and Cognitive Function**

Physical education is a field that advocates a holistic approach to human development. According to (Meta, 2003) .This approach emphasizes that the mind and body are one entity, and that anything that happens to one will affect the other. That means when our mind is ill other our body can’t done properly different work like to the normal function. In cause of that mental illness can be lead physical illness. Physical educators therefore believe that the “whole students”

comes to school to be educated and that this requires both mental and physical training. The relationship between physical activity and mental functioning is of particular interest in the school system because such a large portion of the school day is spent working in the cognitive domain (human kinetic publishers, Inc, 2003). In these cases, when the physical and mental is in a good condition it forms good teaching-learning processes or environments.

According to that when teaching-learning environment is suitable to secondary school students; simply it may improve the students' academic achievements. Specially, when the students got the chance to participate in moderate and vigorous physical activities the students' improve academic achievements. Because, the students need good physical and mental condition to improve their academic results. In the 1950s and 1960s, there were a great number of studies that explored the mind-body relationship. However, since that time there have been relatively few studies in this area. According to Kirkendall (18), studies in the 1950s and 1960s were likely conducted in an attempt to justify the presence of exercise and physical education (PE) in our schools. However, in the 1970s it became widely accepted that PE programs are needed for their physical benefits, and therefore, the need to justify these programs for their cognitive benefits no longer existed.

A potential relationship of physical activity to cognitive function may be explained by both physiological and psychological mechanisms. Results from animal studies show that physical activity stimulates neural development including a greater density of neuronal synapses and higher capillary volume. Physical activity is also consistently related to higher levels of self-esteem and lower levels of anxiety and stress-each of which has been associated with enhanced academic achievement. According to some reviews of physical activity and academic performance, researchers concluded that student attention was likely to be greater in an active rather than in a sedentary student. This may facilitate favorable interactions between the learning environment and the cognitive development (Chomit. *et al.*, 2009).

## **2.6. Effects of Physical Activity on the Brain**

The purpose of this subtopic is to teach the effects of physical activity on the human being and other animals' brain. According to this theory, participating in different extra physical activities in and outside of the school has positive effects to improve the capacity of the brain. In other ways, if physical activity has positive effect on the brain, there is a positive effect on the students' academic results. Similar to this theory, the researcher need to study the effects of physical activity on the brain and academic achievements of secondary school students in Western Showa Zone three selected Woreda.

Physical activity effects on the brain have been extensively researched (Etnier, et al., 1997; Ploughman, 2008; Trudeau and Sheppard, 2010; Sibley and Etnier, 2003). Physical activity benefits for the brain have included 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. If physical activities have positive effects on the brain, indirectly there is a positive effect on the students' academic achievements. The increases in cerebral blood flow benefit cognitive functioning due to the increased nutrient and oxygen supply to the brain. In this case, when the brain got the high amount of nutrient and oxygen in case of engaging in different physical activities the students' academic achievement is also increased rather than passive students in PA. Additionally, the increases in norepinephrine found in humans are significant because studies on rats have not shown high levels of norepinephrine associated with improved memory. For example, Isaacs, *et al.*, (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 a obstacle course that was periodically increased in difficulty. The second group was also trained for 30 days to 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).

More recently a review conducted by Trudeau and Shephard (2010) highlighted the relationship of physical activity to brain health and academic performance of schoolchildren. The experimental studies on physical activity and cognition on rats and humans focused on the hippocampus, which is related to memory. The focus of these investigations was on long-term hippocampus potentiating (LTP). This is a necessary process in the consolidation of memory and is characterized by an increase in synaptic efficacy. The LTP appears to be facilitated by physical activity through the following mechanisms: improved synaptic transmission, increased concentrations of neurotrophins, protection against the adverse effects of free radicals, and increased Neurogenesis (development of neurons).Trudeau and Shephard (2010) reviewed several experimental studies showing improved synaptic transmission after running, and faster learning of maze pathways for rats. Additionally, several adult animal studies have demonstrated increases in brain-derived neurotrophic factor (BDNF) and other growth factors in response to physical activity (Ploughman, 2008; Trudeau and Shephard, 2010). for young human adults the BDNF increases have been observed with acute bouts of physical activity. BDNF promotes neural growth and protects neurons from oxidative damage.

The increase of antioxidants in the brain of trained animals has been observed, and this increase Further protects the hippocampus cells from damage (Shephard and Trudeau, 2010; Ploughman, 2008; Etnier, 1997). 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. The next three studies discuss functional magnetic resonance imaging (fMRI) techniques to assess the effects of physical activity on brain functions. FMRI is a neuro imaging technique used to study brain activity to determine which structures are active during specific mental functions. The first study (Colcombe, et al., (2004 a,b) examined adults using the magnetic imaging techniques (FMRI) to assess brain functions prior and following a 6-month aerobic walking program for 29 sedentary older men. The men in the program were able to perform complex decision tasks more rapidly than those who did not participate. The (FMRI) detected that physical activity had modified brain function in the prefrontal cortical area of the brain that regulates and controls behavior. Most recently, two recent studies are the first to explore changes in the preadolescent brain by use of (FMRI) techniques. Chaddock, 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 intention 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 the 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, 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. The structure of the brain studied through the MRI was the hippocampus. Researchers compared the hippocampus volume of high versus low- fit children, and whether the differences were related to performance on an item and relational memory task. The results were consistent with previous research on animals and elderly adults in that higher-fit children demonstrated greater bilateral hippocampus volumes and superior relational memory task performance compared to the lower fit children. These findings are the first to demonstrate the positive effects of aerobic fitness on the structure and function of preadolescent brains.

Overall, the above mentioned mechanisms of increased cerebral blood flow, changes in neurotransmitters and permanent structural changes in the brain have shown a potential for enhancing learning and memory in adult rats and in adults there is evidence that regular physical activity increases the protection for the brain against functional loss. In young animals this evidence for the benefits of physical activity on the brain have not yet been demonstrated, but it is possible that the evidence to date on adult animals may have a greater influence on the more plastic brains of young children (Trudeau &Shephard, 2010).

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, et al., (2000); Sibley &Etnier, 2003). Developing control of muscles and movement is important for the infant and child's ability to interact with her environment (Leppoet.al, 2000; Sibley &Etnier, 2003). Movement contributes to the organization of neural circuits that develop through the process of synap to genesis, which permits children to learn to develop control over the 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; Leppoet, 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.

## **2.7. Motivating Students to Participate and Meet Goals to Improve Academic Results**

The effects of participating in different physical activities three hours per week for three months to secondary school students in Western Showa Zone three selected Woreda. The researcher selected 364 students those actively participated in different physical activities three hours per week for three months.

According to this study result, participating in different physical activities has positive effects on the students' academic results.

We are seen many advantages have get from engaged regular physical activity on academic propose, quality of life, well being and social well being. Whatever those good awards are not obtain from sedentary life, it need hardly working and regularly engaged in appropriated exercises with our levels. For to doing these good things are ask all society, governed body, and the HPE teachers in the school have the responsibility to motivate and encourage the students and the person who did not know the advantages of participating in physical activity. The researcher tries to listed below some key steps or strategies that teachers or other person can use, in combination, to help students try new behaviors and develop new life patterns.

Make young people active participants in the process of changing their behavior. We know that youth are far more motivated when they are part of the decision-making process and not just passive recipients of instruction! Help students become aware of how active they are. For example, ask them to keep a record of the time they spend every day doing something that involves physical activity. This awareness will help students pay attention to what they do with their time, which is essential to the next step.

Have students set goals. Goal setting is part of any change process and helps students monitor their behavior and measure their own progress. In the classroom, students can contribute to setting a class goal for physical activity, or each student can set an individual short- or long-term goal. Encourage students to set goals that can be broken down into small, incremental steps. Students should try to reach their goal, then assess their progress, revise and reset their goal, and try again. Help students establish their own goals so that they can take responsibility for their progress and are involved in revising their plans.

Give specific feedback and encouragement. Provide helpful, specific feedback, on a regular basis, about activities students have tried and progress they have made towards the goals they have set. Encourage students along the way.

Get students to commit to their goals. Making a commitment is critical for success. Provide frequent opportunities to discuss goals, in order to help students strengthen their commitment.

Recognize and celebrate successes. Reinforce positive behaviors, and celebrate successes throughout the year.

## **2.8. Important Safety in daily Physical Activity to Improve the Students' Academic Result**

When the students get the opportunity to participate in moderate and vigorous physical activities for three months the students' academic result improved rather than inactive students in physical activity. The implementation of daily physical activity requires careful and creative planning to ensure that every student has access to daily physical activities that are safe and of high quality and that promote positive health behaviors and improves academic achievements of the students can draw upon for a lifetime. When planning to implement daily physical activity, teachers should be aware of any school-wide plans that provide support and coordination with respect to facilities, implementation models, and resources. Because of, in some school there are no well infrastructure which to helping done physical activity. Depend on the contextual of our country in some city and town there are the problem of enough field or (narrow space), these situation is also make as the students lack interests to engaging in physical activity. It is also important for teachers to be aware of all existing areas that are available for physical activity (e.g., outdoor space, activity room, multipurpose room, classroom, and gymnasium) and the different approaches that can be used to implement daily physical activity.

However, in secondary school level there is no multipurpose room and gymnasium in Western Showa Zone secondary schools. But, there is sport field such as football and athletics track is found in Olankomi, Ginchi and Liban Mecha secondary schools.

Planning daily physical activity time for students requires careful attention to safety, inclusion of all students, scheduling and timetabling, and use of facilities. This chapter provides support for teachers in integrating daily physical activity into their regular programs.

Safety considerations are integral to the planning and implementation of daily physical activity for students. The primary responsibility for the care and safety of students rests with each school board and its employees.

Reasonably foreseeable risks must be identified, and procedures must be developed to help prevent or minimize the risk of accidents or injuries. Teachers need to be aware of up-to-date information, observe students carefully, and act with common sense and foresight. Effective supervision, as well as the development of consistent routines and expectations for all facilities and activities, will allow teachers to manage risks (daily physical activity 2005 p.9-10).

## **2.9. The Impacts of Physical Activities on Learning in Classroom**

Participating in Physical activities has positive impacts on the students learning conditions. When the students actively participated in vigorous physical activities three hours per week for three months, the students learning in classroom and the students' academic results increased rather than the students those not participated in physical activities according to this study. Physical activity increases students' capacity for Learning. Learning through movement is vital for a successful experience in school. "Exercise, besides shaping up bones, muscles, heart and lungs also activates major growth of neurons and nerve nets in the basal ganglion, cerebellum and corpus callosum of the brain. Aerobic exercise increases the supply of blood and oxygen to the brain". Being physically active in school has positive impacts on learning in the classroom.

Thanks to advances in brain research, we are now aware that most of the brain is activated during some sort of physical activity, much more than when sitting behind a desk (Maier, 2001). Movement expands blood vessels that allow for the delivery of oxygen, water, and glucose to the brain, which optimizes the brain's performance (Pica, 2004). Therefore, physical activity increases the blood flow, which in turn, increases cognitive functioning. So that, participating in a regular physical activities increased the students' academic results.

One Canadian study conducted by Pica (2004) shows how academic scores increased when a third of the school day was devoted to physical education. Another study by Pica (2004) demonstrated children participating in five hours of vigorous physical activity a week had stronger academic performance in math, English, natural sciences, and French than children with only two hours of physical activity per week. Children who participate in daily physical education have been shown to perform better academically and to have a better attitude toward school (Sadler & Tentinger, 1993). Physical activity and fitness may actually help students do better in the classroom. According to Hannaford (2005), movement is vital on how individuals embody and express their learning, their understanding, and themselves. Movement integrates and anchors new information and experiences into the brain; therefore, it activates one's mental capacities (Field, Diego, & Sanders, 2001). Movement assists brain growth and health for a lifetime, and exercise may improve the functioning of the brain (Jarret, Hoge, Davies, Maxwell, Yetley, & Dickerson, 1998). Physical activity has been shown to develop greater academic performances in children (Larson & Zaichkowsky, 1995). Thus moving by learning has implications for increasing academic achievement.

## **2.10. Development of Motor Skills and Academic Achievement based on Physical Activity**

Physical activity and active play are vital to the development of children and young people cognitive function and academic achievements (Hessler, 2009). School grounds, therefore, have become important places, where children and young people can enjoy and benefit from physical activity and active play. Active play is an important part of children's culture and should be valued for its own sake, but it is also fundamental to their development of learning, creativity, and independence (Garaigordobil, 2006). Children love to move, and play keeps children healthy and active (Williams, 1999). Regular physical activity and active play form the basis of a healthy lifestyle, which will help children to be fit and well throughout their lives. Increased Energy Burning up energy by participating in physical activity may pay off with increased energy in the long run (ECU, 2007). Regular exercise can increase energy levels (West & Shores, 2008). Physical activity every day can provide the energy students need. Regular exercise increases energy and reduces fatigue (U.S. Department of Health and Human Services, n.d.). In his book, *The Minds of Boys*, Gurian (2005) comments that "the boy, fueled by his boy energy, tends to learn by innovating in risk-taking ways, wearing goggles so the dangerous game can go on.

One of the most basic benefits of physical activity is the development of motor skills. Every secondary school earliest learning is based on motor development (Wolfson, 2000). Fundamental movement skills, including loco-motor and object control skills, usually evolve between the ages of one year of age to seven years old (Burton & Miller, 1998). Providing students with these opportunities to learn these skills is important (Richardson, 2006). It is believed that there is a relationship between motor skills, fitness, and physical activity (Haga, 2009). Children with low motor competence are likely to have poor physical fitness when compared to children with high motor competence (Haga, 2009). Physical activity helps children learn and develop their complex, fine, and gross motor skills in order to be successful in being physically active.

This energy involves a lot of physical movement and manipulation of physical objects". All students, boys and girls, need time during the day to be active so they can have the energy to get through the rest of the day. Historical Background from what Seem not too long ago, children ranging in various ages played together until it was dark outside (Ray, 2007). Unfortunately, busy lifestyles and new technology invented for children have been the cause of the decline in physical activity. Nowadays, it is prevalent to hear that both parents of the household are working, instead of just the father. With both parents working, this has caused more families to live busy life styles and eat unhealthy food, including dinners from fast food restaurants. Additionally, new video game systems, computer games, and television are growing in popularity, allowing children to stay inside and remain sedentary while they play sitting down.

Together, families and schools must work together by creating a shared vision to increase the health and well-being of children of all ages. Physical activity has research to support its claims of increasing student achievement. Remaining physically active can be the answer to both increasing student achievement and physical fitness levels. Since the time period of the ancient Greeks, there have been beliefs that physical activity is linked to intellectual capabilities. However, the relationship between physical activity or physical activity and academic achievement was not researched thoroughly until the 1950's. Since then, many have learned that by eating a healthy and substantial breakfast and by being physically fit, academic achievement can improve. A study, conducted by Brown (1967), assigned 40 twelve year old boys, with a mean IQ of 135, randomly to either a six-week exercise program or an attention control condition group. The exercises in the exercise program consisted of twelve different yoga-like

exercises. These activities required the subjects to exert muscle tension to maintain their body position. For academic data, the Stanford–Binet Intelligence test was utilized. Children, who participated in the exercise program, when compared to those who did not exercise, improved on the IQ test. In conclusion, Brown hypothesized that the exercise related improvements were due to the mental demands the children had to undergo. Furth and Wachs (1974) documented a study in their book, *Thinking Goes to School: Piaget’s Theory in Practice*. They titled their study, “The Project at Charleston” in which they observed teachers incorporating movement games with learning disabled students instead of utilizing a traditional education system. The results of the study showed that movement in the classroom can assist in child development and help students acquire traditional academic skills (Furth & Wachs, 1974). Two years after the study was finished, the experiment spread into other areas of the participating school.

This study is a significant resource for the future study because Furth and Wachs investigated the correlation between movement and classroom performance long before other related research was published and available. Furth and Wachs’ study demonstrates how movement can be used to fuel learning in classroom, which supports this study design and hypothesis. Dennison is the creator of the Brain Gym curriculum and programs which are built on the idea that physical movement leads to mental organization and mental organization leads to learning and productivity. Dennison believes that integrating movement into the classroom scheduled both before and during learning can help with focus, information processing, information retention, and improve functioning. Dennison’s programs were implemented into school settings and became notorious for their improvement in learning. Because of Dennison’s research and initiation of the Brain Gym exercises, his literature strongly supports the hypothesis of this study, which believes that a relationship exists between physical fitness and achievement in the classroom. Related Research Childhood obesity is now one of the leading health issues facing U.S. children, and it continues to increase in numbers (Ogden, et al., 2008). Obesity has become an urgent health concern among children. Physical education programs in schools can engage students in regular physical activity to help children learn the skills and habits necessary to live a healthy lifestyle. School based physical education programs can help prevent childhood obesity. However, physical education classes are being cut from the daily school schedule. According to a national study, and since the passing of No Child Left Behind, 62 percent of elementary schools and 20 percent of middle schools have increased instructional time to accommodate for

reading, language arts, and mathematics (Center on Education Policy, 2007). Additionally, this same study found that 44 percent of school districts reported cutting time in instructional areas as social studies, art, music, physical education, and recess. On average, schools reduced the time in these subjects by more than 30 minutes per day. However, some studies have shown that increasing instructional time for physical education has resulted in an improvement in academic achievement (Trost & Vander Mars, 2010).

**Childhood Overweight and Obesity** There has been an increased prevalence in childhood obesity. The statistics have more than doubled the past two decades. In 1980, 6.5 percent of children aged six through eleven were considered obese, and in 2006, seventeen percent of children from the same age group were obese. The percentage of obese children ranging in age from twelve through nineteen more than tripled. In 1980, five percent of children from twelve through nineteen were considered obese, and in 2006, 17.6 percent of children from the same age range were obese (Ogden et al., 2008). Childhood obesity has even turned into a global challenge.

The explanation behind the growing concern of children who are overweight or obese has been a result of a decrease in physical education classes at schools, more families eating out at restaurants or fast food restaurants, and not getting the recommended daily intake of fruits and vegetables (Science Daily, 2009). Starting these habits early in life, have the potential of stretching over into adulthood. Physical education programs are necessary to defeat this national problem in America. The dramatic increase in the number of children and adolescents who are overweight or obese has led to an emergence of other associated health concerns such as dyslipidemia, hypertension, type 2 diabetes, musculoskeletal disorders, respiratory conditions, emotional problems, and increased risk of cardiovascular disease and cancer as adults (Barnard, et al., 2006; Buddeberg, et al., 1999; Harvie, et al., 2005; Must, et al., 1999; Ogden, et al., 1997; Carroll, et al., 2006; Ramirez, et al., 2004; Saltzman, et al., 2008; Strauss & Pollack, 2003).

Ogden, et al., (2006) found that children and adolescents of the Hispanic, African American, and Native American ethnicities are more likely to be overweight and have more cardiovascular and diabetes risk factors than non-Hispanic white children. Non- white Hispanic children and adolescents are the most at risk (Tortolero, et al., 1998; Whitaker & Orzol, 2006). Childhood obesity has been linked to adult obesity (Bouchard, 1997). In addition, overweight and obese children are more prone to be diagnosed with Type II Diabetes and heart disease (Dietz, 2004).

Obesity impacts the physical and psychological health in individuals. Policymakers are now turning to schools to help with the growing concern of children who are overweight and obese. There are studies that examine the impact that school-based physical education programs can have on increased physical activity (Mavis, et al., 2009; Evenson, et al., 2009). Children who have physically active parents have been proven to have lower Body Mass Index (BMI) values than those of children with less active parents (Li & Hooker, 2010). Physically active parents appear to stress the importance of exercising to their children. The number of hours spent in front of a television or playing video games are linked to BMI values (Li & Hooker, 2010). Other research has associated watching television with being overweight (Lowry, et al., 2002).

**Physical Fitness and Health** There are several research studies concerning the relationship between physical activity and the functioning of an individual. Emery et al. (2003) concluded their study with a strong correlation between increased movement and general improved health and healing.

Another correlation has been found between cognitive function and recess (Pellegrini, 1997). Another study regarding movement was performed by Bruning and Frew (1987). These researchers looked at exercise and relaxation techniques and how these factors affect one's physiological stress indicators. As the authors hypothesized, a relationship exists between these variables. Additional studies investigating movement and stress include the studies by Armstrong, et al., (1988) and Campbell, et al., (2002). Armstrong et al. (1988) analyzed the effects of relaxation techniques and found a short-term significance of using these techniques to reduce stress. Campbell et al. (2002) also incorporated movement as a therapy treatment for students struggling with stress and also found a positive correlation between movement and stress reduction. Additionally, Cohen and Walco (1999) researched the effects of dance movement therapy (DMT). This form of movement was used successfully in the implementation with children with cancer and other severe medical conditions. In this particular study, DMT helped these students with the psychological adjustment and reduced stress. One study proved those students who met the physical fitness tests, scored higher on the math and reading portion of the SAT-9 and CST (California Department of Education, 2005). Research conducted in a classroom setting by Case-Smith (1995) suggested that movement could aid fine-motor and academic skills development. Thus, it has implications for this study because it researched movement and academia with preschool aged children.

A study conducted in a primary school found that after six hours a week of doing various forms of exercise, academics, confidence, social skills, and health improved (Harper, 1992). Additionally, physical activity has been found to have a significant effect on reading achievement (Donczik, 2001). Academic learning time in physical education has been used as a predictor of student achievement (Lacy & LaMaster, 1996). All students, especially those who suffer from Attention Deficit Hyperactivity Disorder (ADHD), need exercise to help them concentrate (Mulrine et al., 2008). Consequently, exercise can aid the brain with memory and attention (Olsen, 1994). The Brain Gym program, created by Dennison (1985), is another example of related research that advocates a relationship between movement and children's abilities in the classroom. Brain Gym is based on the theory that includes a battery of structured exercises designed to activate certain brain functions (Dennison, 1985). Physical activity can impact student achievement and increase test scores (Jensen, 2005). Physical activity may be a more precise way to predict health outcomes in children than physical activity (Haga, p. 1095, 2009). Exercise has been proven to improve classroom behavior as well as increase academic achievement (Dwyer et al., 2001). Hall (2007) states, "when the movement part of the brain is stimulated, so is the learning part of the brain" (p. 3). Therefore, physical fitness can be used as a way to optimize learning. Post-recess attention has been found to be greater after outdoor play periods or recess (Pellegrini & Smith, 1993; Jarrett, et al., 1998). Thus, outdoor recess breaks get the blood flowing, which rejuvenates the brain to help them attend better on classroom tasks. A study conducted in Virginia consisted of more than 500 elementary schools across the state. The study examined the effect of decreasing the amount of physical education on academic performance. At the conclusion of the study, the results found that reducing or eliminating the time students spent in physical education classes did not increase academic achievement (Wilkins et al., 2003). This study proves that decreasing physical education time will not increase academic achievement. In fact, there are studies that show when students participate in physical education; achievement is positively affected for some groups (Trost & Vander Mars, 2010).

A Canadian study observed the effects of 546 elementary students and the academic performance after one additional hour of physical education per day. The students in grades 2-6 who participated in extra hours of physical education per day earned better grades in French, mathematics, English, and science when compared to their counterparts who only received

physical education for one period per week (Shephard, 1996). Physical education classes are needed more than once a week. In fact, physical activity should be implemented daily. Tremarche, et al., (2007) studied 311 4th grade students in two schools. Their study found that the students who received 56 or more hours of physical education per school year scored significantly higher on the Massachusetts standardized test in English and Language Arts when compared to the other subjects in the study who only received 28 hours of physical education per year. With the heightened demands and pressures of academic achievement, reducing or eliminating physical education programs from schools cannot be justified. Physically fit youth are more likely to have higher academic achievement than their inactive peers.

National health surveys, including children from around the world, have reported significant positive relationships between physical activity and academic achievement (Trost, 2007). Another study analyzed data from 12,000 high school students across the United States. This study found that the students participating in extracurricular physical activities or played sports were twenty percent more likely to earn an 'A' in mathematics or English than their inactive peers (Nelson & Gordon-Larsen, 2006). After reviewing physical fitness test results of 800,000 California students, this study discovered a positive relationship between physical fitness and academic achievement based on California's achievement tests in reading and mathematics (Grissom, 2005). In an Illinois study, the students who performed well on two aspects of a physical fitness test achieved higher scores in reading and math on state exams than the student who scored lower on the physical fitness tests, regardless of gender and socioeconomic status (Castelli, et al., 2007). The available research provides evidence for schools to grant children more opportunities to help improve their physical fitness levels. In fact, research has shown that aerobic exercise can improve memory and cognitive functioning in children, especially those who are overweight (Buck, 2007). A meta-analysis, consisting of more than 40 studies, analyzed the effects of physical training on cognitive functioning (Sibley & Ethnier, 2003). This study found that regular physical activity can improve the cognitive function in children and adolescents. Sibley and Ethnier found significant improvements in perceptual skills, IQ, achievement scores on verbal and mathematics tests, concentration, memory, achievement, and academic readiness. Providing students with physical activity breaks has the potential and evidence to increase achievement and concentration.

A study conducted in North Carolina involved giving students, in grades Kindergarten through the fifth grade, several ten minute breaks throughout each school day to do some form of physical activity. This study lasted for twelve weeks. The researchers observed the students thirty minutes before and after each break. In conclusion of the study, the researchers found that the physical activity breaks increased on-task behavior by eight percent. For those students who struggled with focusing in class, the physical activity breaks improved on-task behavior by twenty percent (Mahar, et al., 2006). Another related study examined the effects of different recess times on preschoolers' classroom attention.

The findings revealed that the preschoolers' post-recess attention was greater following a recess play period outside (Holmes, et al., 2005). Advances in neuroscience suggest that regular physical activity enhances the growth of new brain cells, stimulates the formation of blood vessels in the brain, and enhances synaptic activity or communication among brain cells (Hillman, et al., 2008). More specifically, girls who are physically active have higher grades, have lower dropout rates, and have higher self-esteem (Marsh, et al., 2003; Sabo, et al., 2004; Tucker Center for Research on Girls and Women in Sports, 2007). Physical Fitness and Rural Areas Since the proposed study will be conducted in a rural school; a review of literature including how physical activity affects rural dwellers is warranted. Rural areas have been shown to have higher amounts of sedentary behavior, lower exercise rates, and a limited access to nutritionists and exercise promotion programs (Tai-Seale & Chandler, 2003). Urban children are more likely to engage in sports on a weekly basis than their rural counterparts (Bathrellow, et al., 2007).

This same study found no substantial difference in physical activity habits among children living in urban and rural areas. Tremblay, et al., (2005) found that children living in rural areas were less active, had lower aerobic fitness scores, and had higher levels of obesity than their urban peers. Another study concluded that children living in a rural area of North Carolina had an odds ratio for obesity by fifty percent (McMurray, et al., 1999). In a qualitative study, the results found that the majority of the rural schools studied had limited or no physical education programs because of budget cuts (Walker, et al., 2005).

### **2.11. Physical Activity and Gender difference on Academic Achievements**

Gender and its effect on physical activities were also analyzed in the study. So, are view of literature regarding this topic is relevant. The Centers for Disease Control and Prevention performed a longitudinal study that consisted of two national samples. The study involved 5,316 students from grades ranging from Kindergarten through 5th grade. The females from the study who participated in physical education for seventy or more minutes per week had significantly higher achievement scores in mathematics and reading than the females who participated in physical education for thirty five or fewer minutes per week (Carlson, et al., 2008). Girls tend to be less physically active than boys (Kimm, et al., 2002). Other research studies parallel this notion (Sallis, 1993; Sherar, et al., 2007; Trost& Pate, 1999). Physical activity can decline in girls as early as the late elementary school age.

Several factors have been contributors to lower physical activity levels observed in girls. Some of these include low self-esteem and body image (Tucker Center for Research on Girls and Women in Sports, 2007), lack of motivation (Dwyer, et al., 2006), enjoyment (Lee, 2004), interest of value of physical activity (Pate, et al., 2007), low athletic competence (Vu, Murrie, et al., 2006) and lack of parental and/or peer support (Xiang, et al., 2006). Therefore, physical activity programs for girls should provide experiences that focus on increasing self-esteem, positive body image, and value for physical activity, motivation to be physically active and fun activities that girls will enjoy (The President's Council on Physical Fitness and Sports, 1997). Based on the research, it seems that females need physical education classes than males. Gender has been found to be a major factor influencing physical activity among students (Chiang, Huang, & Fu, 2005). In this study, gender was found to help determine differences in physical self-concept. Men have been recorded as sitting more than women, as women are more likely to engage in walking or light activities (Larsson, et al., 2004). However, in the same study both men and women who had high Body Mass Index (BMI), also engaged in less physical activity. Another study examining gender and academic achievement found that girls perform better on academic assessments and school conduct (Willingham & Cole, 1997). Willingham and Cole also found that the girls did not have higher self-esteem than the boys. These findings suggest that the girls' self-esteem was not influenced by academic achievement as much as that of the boys. Physical Education School-Based Programs Physical educators have the capability of

encouraging young children to become physically active (Manohar, 2010). These teachers can describe the benefits of remaining physically active, as well as show them different opportunities of how individuals can get physically fit. Physical activity can be encouraged during recess, and after school health programs can be developed to involve children. Curriculum changes may need to be revisited (Pivarnik & Pfeiffer, 2002). Wellness and health lessons need to be integrated more into the physical education classes. Physical educators need to encourage individuals to remain physically active throughout their entire lives. Research justifies the importance of physical education school programs. Reducing or eliminating physical education programs will not increase academic achievement. Schools' physical education programs are crucial for promoting physical activity for young children and adolescents (Kelso, 2009). Students who live sedentary lives need to be encouraged to live a healthy lifestyle. Schools can create positive experiences with physical activity for children, as well as provide students with the knowledge on how to lead active lives. Physical education must remain in schools, and policymakers must stop trying to cut physical education from schools. Physical activity opportunities should be maximized in order to teach the whole child (Luepker, 1999). Summary In conclusion, the importance of physical activity and its implications at the school level have research to back its claim. The past and recent literature supports the hypothesis for this study. Research will continue to expand as the phenomena increases across schools in the United States of America.

### **General Considerations**

Daily physical activities can offer students of all abilities an opportunity to participate in developmentally appropriate, enjoyable activities with their peers. But, most of the students have not got the opportunity to participate in daily physical activities according to western Showa secondary schools. Some students may require additional support and/or assistance to participate in the activities. However, through ongoing participation, all students will have an opportunity to receive the associated health, academic, and social benefits. Effective planning helps to ensure that all students have opportunities to participate in a safe and supportive environment. All daily physical activities should be designed to ensure that students with varying physical abilities can participate and experience enjoyment and success.

## **CHAPTER THREE**

### **3. RESEARCH DESIGN AND METHODOLOGY**

The main objective of this study is to examine the effects of participation in different physical activities in three hours per week for three months as it influences on the students' academic achievements. The key components are research design, sampling techniques, sampling size, data collecting instruments, data collecting procedure and analysis.

#### **3.1. Research Design**

The purpose of this study was to examine the effects of physical activity in secondary School students' academic achievement. This is a quasi-experimental study using a different two groups of the students that were randomly selected. These groups were those who actively participated in physical activities (experimental group) students and not participated in physical activity (control group) students. The study used a pre and post assessment based on different subjects like Mathematics, English, Biology, Chemistry, Geography and Civics scores. In this study, the independent variable is the different exercises which provided to the students as they participated for three hours per week for three months. The dependent variable was the students' scores of six different subjects. The students were observed and scored based on a scale of 1-2, with 1 given to the students who do not participate and 2 given to the students who participated at actively in different extra physical activities three hours per week for three months

The researcher analyzed the students' academic achievements by using an independent sample t-test, mean, standard deviation and One Way ANOVA studies. This independent sample t-test research sought to provide a relationship among the two variables that were used. The purpose of the study was to compare and examine which group are scores were good academic achievement results of grade ninth and tenth students who actively participated in physical activities or physically inactive students. The collected data were gathered from the experimental group students and control group students score from each schools. This study determined that, the students as being actively participated in physical activities whether identified and their score is proved or inactive students in physical activities.

### 3.2. Research Site and Population of the Study

The study was conducted in Oromia Regional State Western Showa Zone three selected Woreda secondary schools. These Woreda were Ejersa Lafo Woreda, Dandi Woreda and Ambo town Liban Mecha Secondary School. The total populations of the selected three schools were 4421 students. The population of each school show that in Olenkomi had 707, Ginchi had 2050 and Liban Macha had 1664 secondary school students.

### 3.3. Sample Size and Sampling Techniques

This study focused in Western Showa Zone three selected Woreda. Western Showa Zone has twenty-two Woreda. From these Woreda three Woreda were selected by random sample size for this study. This Woreda were Ejersa Lafo Woreda (at Olankomi secondary school), Dandi Woreda (at Ginchi secondary school) and Ambo Woreda (at Liban Mecha secondary school). The sample size was calculated from the population by Taro Yamane formula determination.

Taro Yamane formula's is 
$$n = \frac{N}{1 + N(e)^2} \quad e=0.05$$

**Table 3.1:** Distribution of population, Sample Size, School, Gender, and Grade Level

| Schools                   |           | Grade | Gender | Population | Sample size |
|---------------------------|-----------|-------|--------|------------|-------------|
| Olankomi<br>school        | secondary | 9     | Male   | 231        | 20          |
|                           |           |       | Female | 138        | 12          |
|                           |           |       | Total  | 369        | 32          |
|                           |           | 10    | Male   | 200        | 17          |
|                           |           |       | Female | 138        | 12          |
|                           |           |       | Total  | 338        | 29          |
| Ginchi<br>school          | secondary | 9     | Male   | 606        | 50          |
|                           |           |       | Female | 384        | 27          |
|                           |           |       | Total  | 990        | 77          |
|                           |           | 10    | Male   | 599        | 50          |
|                           |           |       | Female | 461        | 38          |
|                           |           |       | Total  | 1060       | 88          |
| Liban<br>secondary school | Mecha     | 9     | Male   | 360        | 30          |
|                           |           |       | Female | 470        | 39          |
|                           |           |       | Total  | 830        | 69          |
|                           |           | 10    | Male   | 366        | 30          |
|                           |           |       | Female | 468        | 39          |
|                           |           |       | Total  | 834        | 69          |
| Grand Total=              |           |       |        | 4421       | 364         |

The total populations of Ambo Liban Mecha secondary school grade 9<sup>th</sup> and 10<sup>th</sup> students were 1664 students to this study. The populations of grade 9<sup>th</sup> students were 830. Number of females was 470 and Number of males were 360. Accordingly, the sample size of grade 9<sup>th</sup> male students in this school is 30 and 39 were female students. In addition, the total populations of grade 10<sup>th</sup> in these school students were 834. From this number of females were 468 and males were 366. According to that, the sample size of grade 10<sup>th</sup> male students in this school is 30 and 39 are female student. Generally, Number of Male students in grade 9<sup>th</sup> and 10<sup>th</sup> in Liban Mecha secondary school are 720 and 938 were Female students in 2010 E.C. Generally, 139 students were selected to participate in school sport club as sample size according to Taro Yamane formula's sample size determination in Liban Macha secondary school.

The total populations of Ginchi secondary school students were 2050. The populations of grade 9<sup>th</sup> the students were 990. Number of grade 9<sup>th</sup> male students were 606 and 384 were females. According to that, the sample size of grade 9<sup>th</sup> male students in this school were 50 and 27 were female student. And the populations of grade 10<sup>th</sup> students were 1060. Number of grade 10<sup>th</sup> male students were 599 and 461 were females. According to that, the sample sizes of grade 10<sup>th</sup> male students in this school were 50 and 38 were female student. The populations' of Male students were 1205 and 785 females in 2010 E.C academic year. Generally, 165 students were selected to participate in school sport club as sample size according to Taro Yamane formula's sample size determination in Ginchi secondary school.

The total number of Olenkomi secondary school is 707 students. The populations of grade 9<sup>th</sup> students were 369. Number of grade 9<sup>th</sup> male students were 231 and 138 were females. According to that, the sample sizes of grade 9<sup>th</sup> male students in this school were 20 and 12 were female student. In addition, the populations of grade 10<sup>th</sup> students were 338. Number of grade 10<sup>th</sup> male students were 200 and 138 were females. According to that, the sample size of grade 10<sup>th</sup> male students in this school were 17 and 12 were female student. The Number of male students was 431 and 276 females in 2010 E.C academic year. According to that, the total sample size of student in this school was 61 and males 37 and 24 were female students. Generally, the total number of all this school were 4421 students. The total number of females students were 2059 and the total number of male students were 2362. The sample size for this study were 197 males and 167 females students were taken from the selected school out of 4421

grade nine and ten total students. Generally, 364 students were selected to participate in sport club as sample size according to Taro Yamane formula's sample size determination from these three schools. This study would be conducted in three-selected secondary school was chosen for this study. This study was focused in six different subjects. The subjects were Mathematics, English, Biology, Chemistry, Geography and Civics of grade ninth and tenth students who were enrolled at the participating school in 2010 E.C academic year. The researcher was given access to the physical activity and academic data. The principal at the participating school was the former assistant principal at the researcher's school. The populations of this study were 4421 grade ninth and tenth students from Olankomi, Ginchi, and Liban Macha Western Showa secondary school. The selected school has grade nine and ten with a population of 4421 students. Out of 4421 students, 2362 were males and 1999 were females. These sport club students were attend physical activities class three times per week for a 60 minute per day. Physical activities classes were held from 1:00 – 2:00 AM and 11:00\_12:00 AM local time for both grade classes. This schedule remains constant for the students until we completed our training session. We train always Monday, Wednesday and Friday.

### **3.4. Research Instrument**

Instruments used in data collection were the results of the students in selected school in 2010 academic year from record office. Depending on this data source, the researcher took first semester and second semester selected subject like Mathematics, English, Biology, Chemistry, Geography and Civics marks of students from Olankomi, Ginchi and Liban Mecha secondary schools record office.

### **3.5. Data Collecting Procedure**

This study determined the effects of participating in different extra physical activities on secondary school students academic achievements in Western Showa zone Oromia regional state. After all, it is possible to conduct the actual intervention regarding physical activity for three consecutive months in the selected schools. Then, the researcher ask and register were the students voluntary to participate in physical activities three hours per week for three months and identifying the students who have relatively the same score were in 2009 before registering sets of sport club students. After that, the researcher tried to classify the students in two classes. The

first class is the experimental group whose engages the chance to participate in different extra physical activities in sport club and the left one is the control group those not get the chance to participate in any physical activities.

### **3.6. Data Analysis**

Data were collected and analyzed to determine the effects of participating in different extra physical activities three hours per week for three months on secondary school students' academic achievement score in Western Showa Zone Oromia Regional state. Then, after the data were collected from each school record office and it was analyzed quantitatively using parametric statistics such as independent sample t-test and one-way ANOVA to compare the mean academic achievement of the two groups of students to see if there are differences in the mean values due to participation in physical activities. When we measure two independent variables we used by independent sample t-test. In this study, gender of students, group of students like control and experimental group students and grade level of participants were measured by independent sample t test. If the variables we measure were three variables, we used one way ANOVA formulas. According to that, age category of students and schools were measured by one way ANOVA in this study.

## **CHAPTER FOUR**

### **4. PRESENTATION, ANALYSIS AND INTERPRETATION OF DATA**

This study deals the analysis of the data gathered from three Selected Secondary School Students Score in Western Showa Zone three Selected Woreda. In order to meet the purpose of the study, this section has analyzing and interpreting the data that can be collected from the selected area of the study.

The schools were Olankomi (in Ejersa Lafo Woreda), Ginchi (in Dandi Woreda) and Liban Mecha (in Ambo town) secondary school. According to that to gain the goal, the researcher selected six subjects from all subjects that were known from common subjects like mathematics and English, from natural science like Biology and Chemistry and from Social science like Geography and Civics in first and second semester students' score. These students have been two groups known as Experimental and Control groups. The experimental groups were the students who had participated in physical activities, three times per week for three months. Furthermore, the main findings of the study were presented with the help of tables followed by SPSS for analysis to give answers to basic questions set in the study.

The total sample size of this study was 728 and from these 394 was male students and 334 were female students. The data gathered were organized using tables and then followed by SPSS of the results. The method of interpretation of these sample selection procedure and variables were measures on ranging scales. In the following table the participants (students) demographic variables or background would be listed in detail.

#### **4.1. Demographic characteristics and analysis of data variables**

The participants demographic variables or background of the student's those actively participated in different physical activities three hours per week for three months and the students who did not participate in every extra physical activities gathered in this study listed in the following table. These variables were gender, age category, grade levels, schools, control group and experimental group students with their academic achievements summarized in table 4.1.below

**Table 4. 1.** Demographic Characteristics group of students

|        |                    | Population | Sample size | Percent |
|--------|--------------------|------------|-------------|---------|
| Gender | M                  | 2362       | 394         | 54.121  |
|        | F                  | 2059       | 334         | 45.879  |
|        | T                  | 4421       | 728         | 100%    |
| Age    | 15-17              |            | 428         | 58.692  |
|        | 18-20              |            | 292         | 40.109  |
|        | Above 20           |            | 8           | 1.109   |
|        | Total              |            | 728         | 100%    |
| Grade  | 9 <sup>th</sup>    | 2189       | 356         | 48.902  |
|        | 10 <sup>th</sup>   | 2232       | 372         | 51.098  |
|        | Total              | 4421       | 728         | 100%    |
| School | Olankomi           | 707        | 122         | 22.251  |
|        | Liban Mecha        | 1664       | 276         | 37.920  |
|        | Ginchi             | 2050       | 330         | 45.329  |
|        | Total              | 4421       | 728         | 100%    |
| Group  | Control group      |            | 364         | 50      |
|        | Experimental group |            | 364         | 50      |
|        | Total              |            | 728         | 100%    |

This table shows the demographic variables and background Information of control group students and experimental group students. This information includes: gender, age category, grade level and number of schools of participants in the study. Accordingly, the researcher gave 1 for control group and 2 for experimental group students. There were 364 of control group (1) and 364 experimental group (2) students in this study. Generally, there were 728 students selected. This table shows the back ground information about male and female students and demographic variables of participating groups in the study. Accordingly, the researcher gave 1 for male and 2 for female students. There were 394 male and 334 female students. This table also shows the back ground Information of grade ninth and grade tenth students and demographic variables of participating groups in these study. Accordingly, the researcher gave 1 for grade ninth (9) and 2 for grade tenth (10) students. There were 356 of grade ninth (1) and 372 were grade tenth students. There are three different classes of age category of participants in the study. There were 728 students in this study. The above table showed that, from 15-17 ages was 428 students and from 18-20 years were 292 students and there were 8 students above 20 years in this study. The researcher gave for 15-17 ages of students 1 code, for in 18-20 ages of students gave 2 codes and

above 20 ages of students gave 3 codes to the analysis in this study. Finally, this table also contains the lists of three different schools used as demographic variables of participating population in this study. All these schools consisted of 728 selected students and the researcher gave 1 for Olankomi secondary school, 2 for Ginchi Secondary school and 3 for Liban Mecha secondary school. Accordingly, the total sample of Olankomi secondary School students who participated in this study were 122, the Ginchi secondary school students were 330 and the Liban Mecha secondary school students were 276. Generally, there were 728 students selected and participated in this study.

The following table discusses the comparison of active and inactive students in physical activities with their academic achievements before and after intervention. The purpose of this study was to determine the effects of participating in different physical activities for three hours per week for three months on academic achievements. So that, the investigated result was discussed as next table.4.2

**Table.4.2.** Comparison of the Two Groups in Academic Achievement After and Before the Intervention

| Group        | N   | Mean  | SD    | sig   | df  |
|--------------|-----|-------|-------|-------|-----|
| Comparison   | 364 | 1.390 | 5.250 |       |     |
| Versus       |     |       |       | 0.036 | 726 |
| Intervention | 364 | 3.456 | 5.511 |       |     |

As we can see from the above Table, statistically significant group difference was found on the experimental versus control group students ( $p = 0.036 < 0.05$ ). This result shows the  $p$  (0.036) value is less than the coefficient value (0.05). According to this study, participating in different extra physical activities for three hours per week for three months has positive effects on the students' academic achievements. In other ways, there is statistically significant difference in the physical activity and academic achievement with the mean score of control group students ( $M=1.390$ ;  $SD=5.250$ ) and the experimental group students ( $M= 3.456$ ,  $SD=5.511$ ). According to this result, there is the score difference between control group and experimental group students' depending on the students' participation in different physical activities for three hours per week for three months. When we compare the mean scores of control group students was less than the

scores of experimental group students in this study. Therefore, participating in physical activities can positively affected on academic achievements of the students. So that to encourage their academic achievements, the students should actively participate in physical activities.

The following table was discusses the impacts of physical activities on male and female (gender) students in physical activities with their academic achievements before and after intervention. The purpose of this study was to identify either male or female students have more advantages to score better academic achievements when they participates in different physical activities for three hours per week for three months. So that, the investigated result was discussed in table.4.3

**Table 4.3:** To Compare Effects of Physical Activity and Academic Achievements of Male and Female by Independent sample t-test

| Gender | N   | Mean  | SD    | sig   | df  |
|--------|-----|-------|-------|-------|-----|
| Male   | 394 | 2.579 | 5.636 |       |     |
| Versus |     |       |       | 0.398 | 726 |
| Female | 334 | 2.223 | 5.268 |       |     |

As the above Table shows, there is no statistically significant gender difference between experimental groups students' ( $p = 0.398 > 0.05$ ). There is no statistically significant difference between gender in the physical activity and academic achievements relations. Because, the significant value was greater than the given coefficient values ( $p = 0.398 > 0.05$ ). In other ways, depending on the mean score of male students' ( $M = 2.579$ ;  $SD = 5.636$ ) and female students' ( $M = 2.223$ ,  $SD = 5.268$ ) there is no statistically significant gender difference between experimental and control group students'. When we compare the mean scores of female students' was relatively equal with the score of male students according to this study. The results show that, when male and female students participated in physical activities, they improve their academic achievements rather than sedentary students did not participate in physical activity. But, most of the time, male students had more chance to participate in different physical activities everywhere in and out of the school more than female students.

The following table was discusses the impacts of physical activities on grade ninth and grade tenth students with their academic achievements before and after intervention. The purpose of this study was to examine if there is a difference on academic achievement between grade ninth and grade tenth students' those actively participated in different extra physical activities three hours per week for three months. So that, the relevant information about the results of the study was discussed as next table.4.4

**Table. 4.4:** Comparison of Grade level Students' Participation in Physical Activities and their Academic Achievements by Independent Sample t-test.

| Grade       | N   | Mean  | SD    | sig   | df  |
|-------------|-----|-------|-------|-------|-----|
| Grade ninth | 356 | 2.538 | 6.907 |       |     |
| Versus      |     |       |       | 0.000 | 726 |
| Grade tenth | 372 | 2.312 | 3.619 |       |     |

The above table shows, there is statistically significant grade difference between grade ninth and grade tenth students who actively participated in physical activities ( $p = 0.000 < 0.05$ ). There is a statistically significant difference academic achievements between grade ninth and grade tenth students of those who actively participated in different extra physical activity for three hours per week and for three months. Because, the significance values  $p$  (0.000) of grade ninth and grade tenth students was less than the common coefficients ( $P = 0.000 < 0.05$ ). If  $p$  value was less than the coefficient value, the gained result would have show positive effects between grade ninth and grade tenth students. In other ways the mean score and standard deviation of grade ninth ( $M = 2.538$ ;  $SD = 6.907$ ) and grade tenth students ( $M = 2.312$ ,  $SD = 3.619$ ) showed difference between grade ninth and grade tenth. When we compare the occurred result from the mean score of grade ninth and grade tenth students, grade ninth students scored good academic result rather than grade tenth students. This result shows that grade ninth students were more successfully than grade tenth students on their academic achievements when they participated in different extra physical activities three hours per week for three months. Therefore, participating in different extra physical activity, especially moderate and vigorous physical activity has positive effects on academic achievements for grade ninth more than grade tenth students.

The following table discusses the impacts of age differences to participates in different physical activities to score good academic results. The purpose of this study was to examine whether younger age students or older age students were more effective to score good results by participating in different extra physical activities for three hours per week for three months. So that, the relevant information about the results of the study was discussed in table.4.5

**Table. 4.5:** One way ANOVA Results Concerning Age Categories and Academic Achievement.

| Age categories | sum of squares | df  | mean square | sig   |
|----------------|----------------|-----|-------------|-------|
| Between groups | 2.607          | 2   | 1.304       | 0.946 |
| Within Groups  | 17001.177      | 725 | 23.450      |       |
| Total          | 17003.784      | 727 |             |       |

This table shows that, the output of the ANOVA analysis to check whether there is statistically significant difference between experimental group students' age difference. That means, the significance values is 0.946 ( $p = 0.946 > 0.05$ ), which is greater than 0.05 and therefore, there is no statistically significant mean difference between age categories on the experimental group students in physical activity and academic achievement relations. This results shows, there is no difference on the classified students' age categories between experimental groups of students' academic achievements. In this study, most of the students were younger and they participated in different physical activities in their environment every time. In this case, there is no difference among the students who actively participated in different physical activities in this study.

The following table discusses the impacts of physical activities on the schools and the school environment students' participation in physical activities and the students' academic achievements before and after intervention. The purpose of this study was to determine if there are difference students' academic achievements of those who actively participated in different physical activities between the schools. So that, the relevant information about the results of the study was discussed in table.4.6

**Table 4.6:** One way ANOVA Result Concerning on Schools and the Students Achievements

| Schools        | sum of squares | df  | mean square | sig   |
|----------------|----------------|-----|-------------|-------|
| Between groups | 17.790         | 2   | 8.895       | 0.684 |
| Within Groups  | 16985.994      | 725 | 23.429      |       |
| Total          | 17003.784      | 727 |             |       |

This table shows that, the output of the ANOVA analysis to check whether there is statistically significant difference between the schools, we can see that the significance values (p) is 0.684 which is greater than 0.05. Therefore, there is no statistically significant difference between the schools on the experimental group students in physical activity and their academic achievement. This result indicates, there were no difference in academic results of students who similarly participated in different extra physical activities for three hours per week for three months between the schools. Therefore, when the students got the chance to participate in different physical activities at every school, they have a chance to improve their academic achievements.

## 4.2. DISCUSSION

The results of this study, participating in different physical activities for three hours per week for three months had positive effects on the students' in Western Showa Zone secondary school academic achievements. The related previous reviews of different researchers also, encourage this study.

More recently Tomporowski, et al. (2008) reviewed research studies that examined physical activity effects on student's intelligence, cognition, and academic achievement.

The cross-sectional studies (Tomporowski, et al., 2008) reviewed by the researcher indicated that students who were physically fit performed cognitive tasks more rapidly and displayed greater mobilization of brain resources than less fit students.

.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 these studies was that the secondary school student's academic progress was not hindered due to the time spent in physical education. Overall, the

evidence so far indicated gains in student's mental functioning from the physical activity interventions on tasks that involve executive functions.

Similar to the previous study, the result of this study showed that participating in different physical activities for three hours per week for three months have positive effects on secondary school students' academic achievements. As we see from this study, statistically significant group difference was found between the experimental and control groups ( $p = 0.036 < 0.05$ ). It also, showed that there was statistically significant difference in the physical activity and academic achievement with the mean score of control group ( $M=1.390$ ;  $SD=5.250$ ) and the experimental group students score mean ( $M= 3.456$ ,  $SD=5.511$ ). According to this research, there was the score difference between control students' and experimental group students' depending on the students' participation in different physical activities for three hours per week for three months. When we compare the mean scores of control group students was less than the mean scores of experimental group students in this study. Therefore, participating in physical activities can positively affected on academic achievements of the students.

In other ways, the researcher checked whether there was a difference between male and female students academic achievements in experimental group students on participating in extra physical activities in three hours per week for three months in this study. The results showed, there was no statistically significant difference in experimental versus control group students result ( $p=0.398>0.05$ ) on gender. Because, the significance value was greater than the coefficient values. Similarly, there was no statistically significant mean difference in physical activities with academic achievements (male mean= 2.579 and females' mean= 2.223), there is no statistically significant gender difference between experimental versus control groups students. When we compare the mean scores of female students was relatively equal to the score of male students according to this study. The results showed that both male and female students participated in physical activities improved their academic achievements more than sedentary students whom did not participate in physical activity.

However, simple or moderate physical activities did not be improves the students' skills and their academic achievements.

From the previous literature reviews made females were compared with males in participating physical activities; girls tend to be less physically active than males (Kimm, Glynn, Krisk, Barton, Kronsberg, and Daniels, 2002).

Due to grade difference on this study, grade 9<sup>th</sup> and 10<sup>th</sup> students were equally succeeded to score good result for those having the same opportunity to participate in school physical activities. The study indicates ( $p=0.000<0.05$ ), there was a statistically significant difference in academic achievements between grade ninth and grade tenth students who actively participated in different extra physical activity for three hours per week and for three months.

The p value was less than the coefficient value, were the gained result showed positive effects between grade ninth and grade tenth students. In other words the mean score and standard deviation of grade ninth ( $M=2.538$ ;  $SD=6.907$ ) and grade tenth students ( $M= 2.312$ ,  $SD=3.619$ ) did not make difference between both grades. When we compare the occurred result from the mean scores of grade ninth and tenth students, there was no difference on their academic results. This result showed that grade ninth and grade tenth students were equally successful on their academic achievements when they participated in different extra physical activities for three hours per week for three months. Therefore, participating in different extra physical activity, especially moderate and vigorous physical activity has positive effects on academic achievements for both grades, grade ninth and grade tenth students.

Additionally, the researcher studied about age difference of students of those who actively participated in different extra physical activities in three hours per week for three months influenced on the students' academic achievements. The result of this study showed, the output of the ANOVA analysis to check whether there was statistically significant difference between experimental group of the students' on age difference. That means values was 0.946 ( $p = 0.946 > 0.05$ ), which is greater than 0.05 and therefore, there was no statistically significant mean difference between age categories on the experimental group students in physical activity and academic achievement. This result showed, there was no significant difference on the classified students' age categories between experimental groups of students' academic achievements. So that, participating in different physical activities have similar positive effects for all ages.

Finally, the researcher studied if there was difference between students' score in those schools who actively participated in different physical activities for three hours per week for three months. According to the result of this study, there was statistically significance difference

between the students' academic achievements on three secondary schools values. Its values was is 0.684 (i.e.  $p = 0.684 > 0.05$ ). This result showed, there was no statistically significant difference between those schools. Therefore, when the students got the chance to participate in different physical activities in every school they scores good results better than the students who not participate in physical activity. But, many schools systems are choosing to follow and tend to include and excluded physical activities at different school levels which different from one to another (Sutton-smith, 1990). Schools and teachers have felt accountability to pressurize to increase performance until all students are performing in grade level (Maeda, Murata, 2004).

## **CHAPTER FIVE:**

### **5. SUMMARY, CONCLUSION AND RECOMMENDATION**

#### **5.1. SUMMARY**

This chapter deals with the summary, conclusions and recommendations of the major findings of the study, the conclusion reached at, and finally the recommendations forwarded based on the findings.

The main focus of this study was to investigate the students' academic achievements that had actively participated in physical activities and did not participate in physical activities in Western Showa Zone three selected Woredas: Ejersa Lafo, Dandi Woreda and Ambo Woreda. The researcher selected one secondary school from each Woredas. These schools were Olankomi secondary school from Ejersa Lafo Woreda, Ginchi secondary school from Dandi Woreda and Liban Mecha secondary school from Ambo Woreda. The populations of these three schools were 4421 students. From all these populations, the researcher selected 364 actively participated students in physical activities (experimental group students) and 364 not participated in physical activities (control group students) by Taro Yamane sample size formula determination. After that, the researcher collected the students' academic results from each school record office of different subjects that include Mathematics, English, Biology, Chemistry, Geography and Civics from their first and second semester scores (results). The main results which occurred on the basis this study the research questions are presented as follows:

- The result of this study showed statistically significant group difference was found on the experimental versus control groups students ( $p = 0.036 < 0.05$ ). This shows, participating in different physical activities for three hours per week for three months has positive effects on the students' academic achievements. Because, the significant value  $p$  (0.036) is less than the coefficient value  $p$  (0.05). In other ways, there is statistically significant difference in the physical activity and academic relations with the mean score and standard deviation of control group ( $M=1.390$ ;  $SD=5.250$ ) and the experimental group ( $M= 3.456$ ,  $SD=5.511$ ). in other ways, there is the mean score difference between control students' and experimental group students' based on the students' participation in different physical activities three hours per week for three months.

The results of these research indicated, participating in physical activities for three hours per week for three months made a difference on the students' academic results of those who actively participated in physical activities and who did not participated in physical activities. According to this research, participating in extra physical activities had positive impacts on academic achievements. However, to improve the students' achievements, the students have been regularly engaged in moderate and vigorous physical activity. Because, participating in simple physical activities cannot prove the students' academic achievements.

- There is no statistically significance of the gender difference between experimental group students result ( $p=0.398>0.05$ ). Because, the significance value was greater than the coefficient values. In other words, there was no statistically significant mean difference in physical activities with academic achievements male students ( $M= 2.579$ ) and females' mean score ( $M= 2.223$ ), there was no statistically significant gender difference between experimental groups students'. When we compare the mean scores, female students' was relatively equal with the score of male students according to this study. The results showed that, when both male and female students were participated in physical activities they may be more successful to improve their academic achievements than sedentary students did not participate in physical activity.
- The students who have actively participated in different extra physical activities for three hours per week for three months in this study had more benefited than the students who not participated in physical activities. This study showed that, there was a positive influence of physical activity on academic achievements and student test scores were improved after engaging in different extra physical activities. Students who were physically active and fit were more likely to perform well in school than their sedentary peers. This study showed when increasing additional time provided for physical activities and active transportation enhances academic performance. Aerobic exercise increased the supply of blood and oxygen to the brain. Physical activity helps secondary school students' concentration. Being physically active in school has positive impacts on

learning in the classroom. So that, every student who had been participated in different in physical activities improved their intellectual capacity and academic achievements.

## 5.2. CONCLUSIONS

The main purpose of this study was to assess students' academic resulted those who actively participated in physical activities and the students' result of those who did not participate in physical activities in Western Showa zone selected Woreda and selected secondary school students. From this three selected secondary schools, the researcher selected 364 students who actively participated in physical activities and 364 students were selected from none participate in physical activities by Taro Yamane formula determination. The data collected were analyzed using SPSS and parametric (by using independent sample t-test and mean score) at significance coefficient. Based on the results of the data analyzed, the major findings of the study were summarized as follows:

- The result of this study indicated the experimental versus control groups' students showed statistically significant group difference. Because, the significance value was ( $p = 0.036 < 0.05$ ). This study indicates participating different physical activities for three hours per week for three months have positive effects on the students' academic results. There was statistically significant difference in the physical activity and academic achievement with the mean score of control group ( $M=1.390$ ;  $SD=5.250$ ) and the experimental group ( $M= 3.456$ ,  $SD=5.511$ ). There was the mean score difference between control students' and experimental group students' depending on the students' participation in different physical activities for three hours per week for three months. Participating in physical activities improved the student's academic achievements better than the students who did not participate in physical activities. In other ways the results of this study showed, there was no statistically significance of the gender difference between in experimental group students result ( $p=0.398>0.05$ ). Because, the significance value was greater than the coefficient values. There is no statistically significant mean difference in physical activities with academic achievements (male mean= 2.579 and females' mean= 2.223). When we compare the mean scores of female students' was relatively equal to the score of male students according to this study. The results showed

that both male and female students who participated in physical activities they succeed to improve their academic achievements more than sedentary students did not participate in physical activity.

- When it was compared the results of grade ninth students with grade tenth students, grade ninth students scored better results than grade tenth students. These results indicated that, most of the time grade tenth students passed their time by reading different guides to prepare themselves for national examination. But, they have to plan to recreate themselves by participating in different physical activities and develop their intellectual capacity for it relaxes them from tension.
- According to the school differences, the results of the study showed, the students who actively participated in physical activities in each of the schools had scores better results than the students who didn't participate in physical activities. So that, participating in different school environment had positive influence on the students' academic achievements. That means the students who actively participated in physical activities scores good result than the students who did not participate in physical activities in each school.
- Finally, as the results of the study indicated, when we compare the ages of the participants, there was no statistically significant mean difference between age categories on the experimental and control groups in physical activity and their academic achievement relations.

#### **5.4. RECOMMENDATIONS**

Based on the major findings and conclusions of the study, it seems reasonable to suggest the recommendation mentioned here, with the hope that they could be helpful to improve the practice of teaching learning of the students at secondary schools to participation in physical activities. This study indicated that vast majority of students did not get adequate knowledge about the advantage of training regarding the development of the students skills and their thinking capacity. Therefore, it is recommendable that an evaluation should be carried out to investigate the emphasis method of training strategies in the contents of the physical education. In addition, it is important that to arrange and provide training for physical education teachers to give modern training in physical activities. The researcher recommends the following:

- The schools, families and PE teachers should work together to encourage the students participation in physical activities, make sport facilities more accessible for students, and advocate about the nature and type of sports that students would be able to participate.
- The school should have to fulfill the important sport materials, which are used for the students' learning in practical session.
- The physical education teachers should give attention to the participation of students by increasing their motivation in doing physical activities; which encourage their mental functioning.
- The condition of the classroom and sport field to implement active learning instructional strategies should be in comfortable places.
- In general, the school and physical education teachers would have encourage the students' as they participate in different physical activities as much as possible by fulfilling different sport materials which attracts the attention of students to physical activities.

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**Declaration:**

I, the undersigned declare that this research is my original work developed in consultation with my advisers Dr. Mekbib Alemu for the research to be conducted for my M.ED thesis.

|                      |           |       |
|----------------------|-----------|-------|
| Name:                | Signature | Date  |
| <b>Bayisa Muleta</b> | _____     | _____ |

This is to certify that this research submitted by Bayisa Muleta entitled: *The effects of participation in different physical activities on secondary school students academic achievement in Western Showa Zone* as a partial fulfillment for the degree of masters of education (M.Ed) has been developed in my consultation and was found up to the standards of the department of Science and Mathematics Education.

|                       |           |       |
|-----------------------|-----------|-------|
| Advisor:              | Signature | Date  |
| <b>Dr.MekbibAlemu</b> | _____     | _____ |