Comparison of Physical Fitness Level of Urban and Rural Students in Secondary School of Hawassa

By: Fetiya Kedir

A Thesis Submitted to the Department of Science and Mathematics Education

In Partial Fulfillment of the Requirements for the Degree of Master of Education in Physical Education

Addis Ababa University
College of Education and Behavioral Studies
Addis Ababa, Ethiopia
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This is to certify that this thesis prepared by Fetiya Kedir, entitled: *Comparison of Physical Fitness Level of Urban and Rural Students in Secondary School of Hawassa* and submitted in partial fulfillment of the requirements for the Degree of Master of Education in Physical Education complies with the requirements of the university and meets the accepted standards with originality and quality.

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ABSTRACT

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Addis Ababa University,2017

The objective of the present study was to compare the physical fitness level of urban and rural students in secondary schools of Hawassa and to identify the relation of physical fitness with academic achievement. The study was carried out on 400 students of both the sexes in which 219 were rural (113 males + 106 females) and 181 were urban (87 males + 94 females). From the selected participants 215 were from grade 9 and 185 participants were grade 10 students. Selected health related fitness components and all skill related fitness component tests were conducted to compare rural and urban back ground students who are learning in 7 governmental schools of Hawassa town. Descriptive (average, standard deviation) and inferential statistics (independent t- test) were used for data analysis .The results of the study indicated that in most measured parameters there were significant difference between rural and urban students ($p<0.05$). In most health and skill related fitness rural male and female students were better than their urban counterparts.

Key Words: Physical fitness, Health - related fitness, Skill-related fitness, Academic achievement

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Table Contents Page

CHAPTER 1: INTRODUCTION---------- 1
1.1. Background of the Study---------- 1
1.2. Statement of the problem ---------- 5
1.3. Objectives of the study ---------- 5
1.4. Research Questions ---------- 6
1.5. Delimitations of the study ---------- 6
1.6. Limitations of the study ---------- 6
1.7. Significance of the study---------- 7
1.8. Definitions of Terms---------- 7
CHAPTER 2: LITERATURE REVIEW ---------- 9
2.1. What is Physical Fitness ---------- 9
2.2. Physical Fitness Level of Urban and Rural Secondary School Students ----------10
2.3. Relationship between Physical Fitness and Academic Achievement ----------14
CHAPTER 3: METHODOLOGY OF THE STUDY----------18
3.1. Research Method----------18
3.2. Research Design----------18
3.3. Population and Sample----------18
3.4. Source of Data ----------19
3.5. Method of Data Collection ----------20
3.6. Instruments of Data Collection ----------27
3.7. Method of Data Analysis ----------28
3.8. Ethical Considerations----------28
CHAPTER 4: DATA AND DATA ANALYSIS ----------29
4.1. Participants of the Research----------29
4.2. Comparison of Urban and Rural Secondary School Students' General Fitness Level……..30
4.3. Health Related Fitness Level of Urban and Rural Secondary School Students -------31

4.4. Skill Related Fitness Level of Urban and Rural Secondary School Students----------32
4.5. Gender Dependence of Physical Fitness of Secondary School Students ----------33
4.6. Academic Achievement and Physical Fitness of Secondary School Students --------38
4.7. Grade Level Dependence of Physical Fitness of Secondary School Students---------41
CHAPTER 5: DISCUSSIONS AND CONCLUSION ----------47
5.1. Summary of Findings----------47
5.2. Discussion ----------48
5.3. Conclusions----------51
5.4. Recommendations----------51
References----------53
Appendices----------I

Table No List of tables' page

3.1. students' total number and residence data ----------19
3.2. Total sample size distribution ----------19
3.3. Cardiovascular Endurance Rating Scale.....20
3.4. Muscular Endurance Rating Scale----------21
3.5. Push-ups and modified push-ups Rating Scale----------21
3.6. Sit -and -reach test Rating Scale ----------22
3.7. Agility Rating Scale ----------23
3.8. Balance test Rating Scale ---------- 24
3.9. Coordination Rating Scale ----------25
3.10. Power Rating Scale----------25
3.11. Reaction time Rating Scale ----------26
3.12. Speed Rating Scale ----------27
4.1 Background Characteristics of Participants of the Research ----------29
4.2. Comparison of urban and rural secondary school students total fitness level --30
4.3. Health related fitness level of urban and rural secondary school students ------31
4.4. Comparison of skill related fitness level of urban and rural secondary school students---------- 32
4.5. Comparison of urban and rural secondary school male students' total fitness level ----------33
4.6. Health related fitness level of urban and rural secondary school male students ----------34
4.7. Comparison of Skill related fitness level of urban and rural secondary School male students.....35
4.8. Comparison of urban and rural secondary school female students' total fitness level ----------36
4.9. Health related fitness level of urban and rural secondary school female students ----------37
4.10. Comparison of Skill Related Fitness Level of Urban and Rural Secondary School Female Students ----------38
4.11. Comparison of Rural and Urban Secondary School Students Total Fitness by Academic Achievement Level ----------39
4.12. Comparison of Rural and Urban Secondary School Students Health Related Fitness by Academic Achievement Level---------- 39
4.13. Comparison of Rural and Urban Secondary School Students Skill Related Fitness by Academic Achievement Level ---------- 40

4.14. The overall correlation of total fitness, health related fitness and skill related fitness ----------40

4.15. Comparison of urban and rural grade 9 students' total fitness level ----------41

4.16. Urban and rural secondary school grade 9 students' health related fitness level ----------42

4.17. Comparison of skill related fitness level of urban and rural secondary school grade 9 students ---------- 43

4.18. General comparison of urban and rural grade 10 students' fitness level ----- 44

4.19. Health related fitness level of urban and rural secondary school grade 10 students ----------45

4.20. Comparison of skill related fitness level urban and rural secondary school grade 10 students ----------45

CHAPTER 1: INTRODUCTION

1.1. Background of the Study

In the life of mankind the concept of fitness has a long history. Some literatures indicated that it can be traced to the work done by Charles Darwin the survival of the fittest. Accordingly fitness means the ability of an animal or mankind to work and play with a maximum degree of physical efficiency and to be prepared to meet different challenges. In the modern time due to the advancement of science and technology in different aspects of human attempt scientific procedures are followed according to principles, experience, understanding and application of scientific knowledge. Due to research, experimentation and scientific knowledge of the field of sports and games has been made (Kumar, 2014).

Physical fitness has been considered an essential element of everyday life of mankind. For physical survival the ancient people were mainly dependent upon their individual strength, vigor and vitality. In the primitive society in hunting for their livings involved mastery of some basic skills like strength, speed, endurance, agility for running, jumping and climbing (Manmeet, Nishan and Ramanjit, 2010).

Physical fitness is defined as the ability of an individual to perform daily activity effectively and efficiently without fatigue, to enjoy leisure, to be healthy, to develop immunity that resist disease, and to cope with emergency situations. Physical fitness is classified into two broad categories. These are health- related fitness and skill-related fitness components. Health-related fitness component is closely related with health and well-being whereas skill-related fitness is related with the specific aspects of sports or occupations (Hian ,Mahmud & Choong, 2013).

Health-related fitness components comprise cardiovascular endurance, muscular endurance, muscular strength, flexibility and body composition (Ganley,Patemo,Miles,Stout,Brawner & Girolami,2011). Skill-related fitness includes components like agility, balance, coordination, power, reaction time, and speed (Hian et al., 2013).

Physical education develops the skills, knowledge, values and attitudes needed for establishing and enjoying an active and healthy lifestyle, as well as building student confidence and competence in facing challenges as individuals and in groups or teams, through a wide range of learning activities. It emphasizes the connection between theory and practical skills and is

designed to develop the interest and potential of students in the areas of physical education and sports. It will help students gain a deeper understanding of theories and applications in the fields of human movement and health, and it will promote the well-being of individuals and society (World Health Organization, 2002).

The Taiwan Ministry of Education conducted a series of nationwide surveys that evaluated the health-related physical fitness of students in elementary and high schools (Chen,Lin,Peng, Li,Wu,Chiang & Huang, 2003; Huang and Malina, 2007). The results of the survey provide a preliminary reference regarding the health-related physical fitness of children and adolescents in Taiwan. Adolescents spend considerable quantities of time at school, and it is therefore essential to understand what opportunities they are given for school-based physical activity. To improve the physical fitness of school-age children and adolescents, the Taiwan Ministry of Education recommended that students exercise three times per week for 30 min, raising their heart rate to 130 beat per minute (Liu and Hsieh 2004).

The education and training policy of the Federal Democratic Republic of Ethiopia (ETP,1994) elaborates; education enables individuals and society to make all rounded contribution in the development process by acquiring knowledge, ability, skills and attitudes. In the design of the curricula two cardinal principles have also been determined to guide the development of the contents for each of the five core subjects (Language, Mathematics, Natural science, Social science and Aesthetics). (Institute of Curriculum Development and Research 1994: 2). These are: to connect theoretical knowledge with practical real life situation; and to use the problem solving approach. The mechanism of selection and organization of each of the five content areas as well as the rational and assumption behind it have also been well founded on the goals of general education at each levels as well as at the tertiary level. In addition, the profiles of students completing the general education at each cycle within the primary derived from the Educational Policy (grades 1-4 and grades 5-8) and secondary (grades 9-10 and 11-12) have been instrumental.

Many factors can be related to level of physical fitness among students Loucaides ,Sue,Chedzoy & Bennett(2004) stated five factors that would contribute to the level of physical fitness among students in their study "Differences in Physical Activity Levels between Urban and Rural School students in Cyprus". They stated that the aspects that contribute are seasonal factors, space and safety, exercise equipment availability, transportation to and daily activity. Other aspects that

would be related to students physical activity are, participation in organized sport, physical education classes in schools, transport patterns, electronic and screen based entertainment, and socio cultural changes(Dollman, 2005). These factors, some lead to the result of the urban students to have higher level of physical activity such as the equipment availability and transportation while some factors lead to the result that rural students have better level of physical activity (Loucaides et al., 2004).

The environmental factors lead to changes in the physical fitness level among children. The impact of socioeconomic status, ethnicity and area of residence (urban or rural) has been reported on the level of physical fitness among students, with no consistent patterns emerging. Observed that greater physical fitness of students had a significant relationship with larger living space and residing in rural areas. Rural area is generally linked to a more strenuous, physically dynamic way of life that is advantageous to physical fitness. On the other hand, changes in lifestyle due to living in urban settings may also affect physical fitness. Environmental and social changes related to living in urban areas such as crowding, changing neighborhood, safety worries and inadequate grounds for play may possibly contribute to lower level of physical fitness among children (Pena Reyes ,Tan & Malina, 2003).

The main reasons for the betterment of rural students in physical fitness compared to urban students were high participation of rural students in agriculture related work ,the way of life (more activity oriented routine) in rural areas, more open spaces and play fields compared to urban areas (Singh , Mandeep, and Sukhdev,2016).

Level of individuals' physical fitness varies based on place of work situation, the fitness level of a person and an interaction between the daily activities. Continues activity produces physical fitness improvements. Rural areas life style is more active when compared to the life style in urban areas which produced high level of physical and physiological functioning in rural residents. On the other hand civilization, advancement of science and technology minimized physical activity level of urban population due to dependency in mechanization, automation and computerization (Manmeet et al.,2010).

Students who live in rural areas spend more time out in the open space, use sports fields much more Neljak ,Novak, & Podnar (2011) and are more involved in outdoor activities than students who live in urban areas (Bathrellou, Lazarou, Panagiotakos and Sidossis , 2007). Students from urban areas spend significantly more time in front of television and playing computer games

(Albarwani, Phil, Al-Hashmi, Al-Abri, Jaju, & Hassan , 2009). This may be one reason why the students from rural areas showed better physical fitness than urban students.

According to the study of Stojiljković (2003) level of flexibility increases at higher temperature and decreases at lower temperature. So the temperature of the environment in which sport is practiced significantly affects the level of flexibility. In addition to that the type of activities students perform may affect the level of flexibility (Nikolic ,Kocic ,Beric, , Cvetkovic & ,Krzalic,2015).

Many factors affect the student's activities and consist of environment, lifestyle, socio – economic status, different geographic regions, parent, living in city and country ,cultural influences, health conditions, physical education classes and regular participation in sport and physical activity can be named (Seryozha, Josko, Serdar, Andrijana & Lence , 2013; Anupama, Josko, Serdar, Andrijana, 2013).

The study of Chillón ,Ortega , Ferrando & Casajus (2011) showed that urban students are better in physical fitness components of muscular endurance ,agility and flexibility compared to rural students.

Physical education has its own positive impact on students who are learning in schools. The study of Tomporowski, Davis, Miller, Naglieri & Shephard (2008)reported that physically active children are to be better in their academic competence compared to those who are not physically fit. School sport and physical education improve students' concentration, memory, behavior and academic achievement. In addition to that from the different studies at different times, physical activity is directly related to academic achievement as measured by improved grades and standardized test scores (Hanson and Austin, 2003; Robert Wood Johnson Foundation, 2007).Raine, Lee, Saliva, Chaddock-Hayman, Hillman & Kramer (2013) found that physical activity and movement improve such cognitive functions such as memory, spatial orientation, attention, language, and decision making, and that most of the brain is activated during physical activity.

The study of Taras & Potts-Datema (2005) justified that a student's physical fitness may reflect better overall health, better nutrition, physical activity, and good health may contribute positively to academic achievement and Taras (2005) reported that physical fitness contribute to academic achievement by enhancing students' concentration and classroom behavior in school.

The study of Vail (2006) reported that regular exercise can also avoid depression, anxiety and stress problems that can affect students' academic performance and through that physical fitness may improve mental health and self esteem.

Mixed results are reported by different authors in relation to physical fitness parameters in students living in urban and rural settings (Tsimeas & Tsigilis 2005).Some authors reported that better living conditions have been shown to offer a potential advantage for improved physical fitness in urban compared with rural children (Pena Reyes et al.,2003,).On the contrary, urban areas are related to sedentary lifestyle due to automatic transportation and computerization of many activities and lack of sufficient place for play (Bathrellou et al.,2007).Different scholars studied it and found mixed results and this has not been studied in our country.

1.2. Statement of the problem

As discussed in the background, the environmental factors lead to changes in the physical fitness level among students. Furthermore, it has been noted from literature that the impact of socioeconomic status, ethnicity and area of residence (urban or rural) to be significant influences on the level of physical fitness among students (Dollman,2005;Loucaides et. al., 2004).However, the significant physical fitness difference among students in Ethiopian schools has not been subjected to research so far. Besides, the research conducted elsewhere is not conclusive because they are either part of general studies and therefore did not focus on such factors as residence of students or inconclusive as the group of students compared do live under different environment during the study. Therefore, it is necessary to conduct the research by comparing physical fitness of students who originated from different conditions but learning under similar conditions. Hence, in this research the physical fitness of students who came from urban and rural regions but who are learning under similar schools will be investigated.

1.3. Objectives of the study

The general objective of this study is to measure and compare the physical fitness of students with rural and urban residential background while students are studying in Hawassa City in similar schools without being differentially treated. To successfully address this objective of the study attempts will be made specifically

1. To measure and compare total physical fitness level of urban and rural students in secondary schools of Hawassa;

2. To determine if there are difference between urban and rural students in their health-related physical fitness level and/or skill related fitness levels; and
3. To find out if there is relationship between physical fitness and academic achievement of school students.

1.4. Research Questions

The main question this research would address is if there is (there is not) difference in physical fitness level between students with urban and rural residential background In order to answer this question in details the following specific questions are formulated.

1. Is there a difference in physical fitness between urban and rural secondary school students of Hawassa City?
2. Are there differences in specific physical fitness levels between urban and rural secondary school students of Hawassa City? (Health and Skill fitness were considered).
3. Are there relationship between physical fitness and academic achievement in secondary school students of Hawassa City?

1.5. Delimitations of the study

The Geographical area of the study is to be confined to Southern Nations Nationality Peoples Regional Government Hawassa City only. The study participants were grade 9 & 10 government secondary schools rural and urban students and it is delimited to males (200) and females (200) aged 15-17 years .Study was also delimited to: skill related fitness components(agility, balance, coordination, power, reaction time and speed) and health related physical fitness components (cardiovascular endurance, muscular endurance, muscular strength, and flexibility)body composition is not considered in this research because the measurement of this variable requires clinical setups and clinical measurement of such a large number of students is beyond the capacity of the researcher.

1.6. Limitations of the study

- The participants' age was from 15-17. This is a narrow age range that variations in physical fitness can be complicated due to the students' difference in rate of growth. Therefore, age dependent analysis was not conducted.

- Due to constraints of the schools' time table, the fitness tests were conducted for some of the students in the morning while for others in the afternoon. This may have unnoticed variations in students' fitness scores.
- In order to minimize the effect of students' inclinations to one or the other field of study, selected 5 subjects' averages were used to represent students' academic achievement. However, still the true academic achievement of the students at the time of the data collection was not known.

1.7. Significance of the study

The main significances of the study are mentioned as follows:

- Physical Education teachers may find the result of this study helpful in identifying which type of students are more susceptible of one or the other fitness deficiencies;
- Physical Education curriculum developers may find advice from this research when they want to diversify the curriculum for urban and rural schools; etc
- The result of this study may attract the interest of others in order to carryout similar research work using different variables and methods in other areas.

1.8. Definitions of terms

Physical fitness is the ability of an individual to perform day to day activities effectively and efficiently without fatigue.

Health related fitness is the ability for a person to cope with the physical demands of everyday life.

Skill related fitness the ability for an athlete to perform well in their specific sport. This skill related fitness is associated with way of performing different activities.

Academic achievement: School formal written test and examination scores of students. That is result obtained by students in different academic subjects.

Urban area: is over crowded with ministries and industries and the population is very high. There are also social amenities the occupants are a combination of indigenes and foreigners.

Rural area: is a small community where there are no or small industries and ministries and where most of the social amenities are lacking, it is mostly occupied by the indigenes.

Government school: School which is administered by national government.

Secondary school: secondary school in this study refers to the Governmental secondary schools of grade 9 & 10 in Hawassa.

Students: in this research refers to the boys and girls who are from rural and urban attending in the secondary schools of Hawassa.

CHAPTER 2: LITERATURE REVIEW

In this chapter, the literature review is presented in three sections. The first section presents the concept of physical fitness and description of its categories. The second section deals with the literature that is pertaining to the comparative study of physical fitness of urban and rural students. In the last section, the effect of other variables than students' residence on physical fitness levels has been discussed.

2.1. What is Physical Fitness?

Physical fitness represents a multi-factorial hierarchical concept which can be defined as a state of being that (1) enables people to carry out daily, primarily physical-related, activities with vigor and alertness without undue fatigue, with sufficient reserve to enjoy active leisure, and is further (2) related to present and future health outcomes (Hian et al.,2013). It can be classified in to two categories. These are health related and skill related fitness components. Health related fitness is the ability for a person to cope with the physical demands of everyday life. The everyday life of an average person involves activates that may increase heart beats or requiring hard breezing, lifting of heavy objects or holding some load for lengthy period of time. It is also common for everyone to be involved in activities requiring speedy change of direction or folding and bending of the body or part of the body. Therefore, in order to accomplish these daily requirements, one should have an appropriate level of health-related physical fitness which are identified as: cardiovascular endurance, muscular endurance, muscular strength, flexibility and body composition (Ganley et al., 2011). Cardio vascular endurance is the ability of the body to perform high-intensity activity for a prolonged period without undue physical stress or fatigue. Muscular endurance is the ability to resist repeated contractions over time or to maintain a voluntary contraction for a prolonged period of time. On the other hand, muscular strength is the ability of a specific muscle or muscle group to generate force. That is like in pushing, pulling, or lifting of a heavy object. Flexibility is ability of a specific muscle or muscle group to move freely through a full range of motion. In addition to the above four variables there is one more variable known as Body Composition. Body composition relates to the relative amounts of muscle, fat, bone, and other vital parts of the body. However, the measurement of this variable

requires clinical setups and therefore it is not considered in this research as clinical measurement of such a large number of students is beyond the capacity of the researcher.

Skill related fitness is the ability for an athlete to perform well in their specific sport. This skill related fitness is associated with way of performing different activities. Different types of sports and different activities require their unique way of performing. Skill depends on repeated duty of different activities. To perform activities like: walking, jogging, running, jumping and throwing an individual needs different skills. Therefore, in order to accomplish these activities efficiently and effectively, one should have an appropriate level of skill-related physical fitness which is identified as: Agility, coordination, power, balance, speed and reaction time.

The term Agility in Physical Education can be defined as one's ability to change position of the body in a rapid manner and with accuracy while coordination is the ability to use the senses, such as sight and hearing, together with body parts in performing motor tasks smoothly and accurately. Power is the rate at which one can perform work. It is the ability to exert muscle force quickly. Balance is about maintaining equilibrium while being stationary or moving. On the other hand, speed is the ability to perform a movement within a short period of time and reaction time is ability that relates to the time elapsed between stimulation and the beginning of the reaction to it. (Hian et al., 2013).

2.2. Physical Fitness Level of Urban and Rural Secondary School Students

Manmeet et al, (2010) conducted comparative study of physical fitness components of rural and urban female students and the study result showed that rural students' physical fitness level was higher than urban students in most physical fitness components than urban students in Punjabi Patiala, India. In the study participated 100 students (50 rural students and 50 urban students).In muscular strength, muscular endurance and speed rural female students were higher than urban female students whereas in agility and flexibility urban students were higher than rural students. Active life style of rural area students became the main reason for higher physical fitness level in rural students than urban students.

Ghosh and Goon (2015) conducted study to investigate the effects of environmental factors on physical fitness of rural and urban children. In the study participated 20 students of 9 to 12 years old living in urban and rural districts from Barasat schools of North 24 parganas West Bengal. The variables of the study were speed, strength, cardiovascular endurance. The result of the

study indicated that rural students were significantly higher than urban students in all fitness components. The reason for high fitness level of rural female students may be due to the fact that the students belonging to rural area performs various extra activities walk to school, market, various type of play, regular physical activity. On the other hand the reason for lower fitness level of urban students may indicate lower habitual physical activity level.

Awati (2014) conducted a study to found out the a comparative analysis on physical fitness of rural and urban high school students. For the study selected 80 male students (40 from urban high school students and 40 from rural high school students). The selected students were from grade 8 to grade 10 and they were 15 to 17 years old. The study result indicated that rural and urban male students have similar in speed, endurance, agility, strength and flexibility.

Gahlawat (2007) conducted a study to compare the physical fitness level of urban and rural male students in Kurukshetra. In the study participated 100 student (50 students were from rural and 50 students were from urban) aged 18 to 21 years old. The study variables were cardiovascular endurance, agility, flexibility, power and speed. The study result showed that that rural students are significantly more fit than the urban students in all fitness components.

Narges and Zahra (2015) conducted a study to compare physical fitness level of urban and rural students. For the study selected 270 urban students and 158 rural students . The results of the study indicated that in all measured health related and skill related fitness parameters rural students were significantly better when compared to urban students. The reason for high fitness level of rural students was the life style of rural students.

The study of Kavitha, Phil & Venkatesh (2016) compared fitness level of urban and rural area students in different physical fitness components. In the study participated 20 urban and 20 rural students from Shivamogga district, Karnataka, India .The study result indicated that except in agility in all other fitness components rural students were better than urban students, whereas in agility urban students were better than rural students. The reason for less performance of urban students in most of fitness components may be due to minimized the opportunities for vigorous physical activities to cause physical exertion, mechanization, automation and computerization in urban population.

Kumar (2014) conducted the study to compare the endurance and agility between rural and urban male basketball players. To fulfill the objective of the study, 40 Basketball (20 each) players of Rohtak India aged 15 to 19 years were selected. To measure the physical fitness of players'

endurance and agility test was conducted. On the basis of the analyses of the data using t-test the investigator observed the significant different between Rural and Urban basketball players of Rohtak and Rural Basketball players were having better mean values among Endurance and Agility than Urban Basketball players of Rohtak.

Gulshan (2014) conducted a study to compare the selected physical variable speed, flexibility and agility of school level Athletes of urban and rural areas. Total 60 Athletes (30 from urban area and 30 from rural area) male Athletes from Sonepat district in Haryana state of India were selected for the study. Study concluded that significant difference found between the mean of selected physical variables such as speed, (50 meters. dash test),Flexibility (Bend and Reach test), and Agility (ZigZag run) of school level Athletic Athletes of urban and rural areas and the study result indicated that rural male students are better than urban students in the mentioned fitness variables.

Santhosh & George (2015) conducted a study to assess flexibility and agility of urban and rural high school students. In the study participated 15 urban and 15 rural students. To assess flexibility used sit and reach test and to assess speed utilized 50 meter run test. The result of the study showed that rural students were better than urban students in flexibility and speed finess components.

Saha & Haldar (2012) conducted a study to compare health related fitness and skill related fitness ability between rural and urban school children .For the purpose of Comparison of Health related physical fitness variables and skill related fitness between Rural And Urban School going children, Student's t-test statistical technique was used (SPSS Version 18) to analyze the data. The level of significance was set at $p<0.05$ level. The results showed significant differences between Rural and Urban school going children in all the Health related Physical fitness components as well as in Reaction ability under psychomotor ability and rural school going children was found better than urban school going children. The result of the study indicated that rural students possess better health related and reaction ability than urban school students.

The study of Singh et al,(2016) demonstrated that the main reasons for the better level of physical fitness in rural students compared to urban students were the way of life(more activity oriented routine), high participation of rural students in agriculture related work , more open spaces and play fields in rural areas compared to urban areas.

Raghupathi (2013) conducted a study to compare fitness level of urban and rural students of Bangalore district. In the study participated 90 rural and 90 urban boys aged 10 to 15 years. The result of the study showed that significant differences are observed in rural and urban students in the coordinative and balancing abilities. In coordination and balance ability level according to the study result rural students were better than urban students.

Tinazci & Emiroglu (2009) conducted a study to investigate the effects of environmental factors on physical fitness of rural and urban students. In the study participated 3939 boys volunteered from 90 schools (Sixty-three schools n = 3223 were from urban areas and 27 schools n = 716 were from rural areas). The result of the study showed that rural students were significantly better than urban students in flexibility, muscular endurance and muscular strength. The significantly lower health related fitness of urban children might be due to lower habitual physical activity levels in urban students.

More ,Ranmale ,Dhage and Chavan(2013) conducted a study to compare the physical fitness level of rural & urban female collegiate students from Karad city. For the study fifty female urban students and fifty female rural students were selected .The result of the study showed that in cardiovascular endurance and muscular strength rural students were higher than urban students. The reason for high health related fitness of rural students was physical work and exercise performance of rural female students.

Bebcakova , Vadasova, Kacur, Junger, Borzikova, Zvonar & imunova (2015) conducted a study to compare urban and rural students level of flexibility. In the study participated 46 urban boys and 37 rural boys and sit and reach test was used to evaluate their flexibility level. The study result indicated that urban male students' flexibility level was higher than rural male students flexibility level.

Pena Reyes et al ,(2003) conducted a study on the physical fitness of school children resident in an urban Colonia and in a rural indigenous community in Mexico, was mentioned in comparison two measures of health related fitness (grip strength, sit and reach, sit ups, distance race) were taken on sample 355 rural which is a total of 175 boys and 184 girls and 324 urban, 163boys, 161 girls school students. Even though absolute grip strength did not consistently differ the rural and urban, strength was proved to be greater in rural children from age and body size aspect. Urban rural differences were observed in various disciplines athletics performances. Younger rural children and urban older girls accomplished better in the distance race. On the other side,

older rural and urban boys didn't differ in endurance. The differences may be related to activity habits associated with school physical education and lifestyle in the respective communities. Chaudhary (1998) studied the differences in physical fitness of urban and rural students of grade 9 and 10, and the revealed that rural students were better in physical fitness than urban ones.

As Shashidhard (2016) research result shows, rural high school boys are better in skill related fitness than that of the urban high-school boys as seen from vigorous lifestyle perspective. However, some contradicting ideas were stated in these studies. This study primarily targets on investigating the skill related fitness levels of rural and urban high school boys.Accordingly,50 urban and 50 rural high school boys in the age group of 14-16 years were tested as a sample using" standardized Oregon fitness test battery". The data was analyzed by simple t-test using SPSS version 21 statistical package. The study revealed a substantial difference between urban and rural school boys. From that result, it was concluded that the urban school boys of Raichur district have higher level of skill related fitness.

Nikolic ,Kocic , Beric, Cvetkovic & Krzalic (2015) conducted a study to compare skill related fitness level of urban and rural students .In the study participated rural students and urban students and the study result indicated that rural students were better in muscular strength and speed where as urban students were better in muscular endurance and flexibility.

2.3. Relationship between Physical Fitness and Academic Achievement

Grissom (2005) conducted a study on relationship of physical fitness and academic achievement and results indicate that as the overall physical fitness test score improved, the mean score on the Californian Standard Test in English–language arts, and mathematics improved for grade 5, 7, and 9 students. According to the above study there is a consistent positive relationship between total fitness and academic achievement. That is, as overall fitness scores improved, mean achievement scores also improved. The Californian Standard Test scores were measures of academic achievement in English–language, arts, mathematics, history, social science, and science.

Cardiovascular fitness was positively associated with performance in the majority of academic subjects. The association among muscular strength, muscular endurance, and flexibility with academic achievement was less consistent. These findings suggest differential relationships

between components of health-related fitness and academic achievement (Chu, Chen, Matthew ,Pontifex & Chang ,2016).

Wilson (2015) conducted a study and assessed the impact of optimal versus minimal physical fitness state on student academic achievement. He has identified that optimally fit students had significantly higher ($p < 0.05$) scores in math and English language art tests relative to minimally fit students.Several authors reported positive associations among physical fitness, physical activity and cognitive ability and academic achievement. Some authors have shown detrimental cognitive effects during acute high intensity exercise (Labelle, Bosquet, Mekary, & Bherer, 2013) and only a few researchers have debated no relationships by the use of secondary analyses of other authors' data (Martin & Chalmers, 2007).

Kwak, , Kremers, Bergman, Ruiz, Rizzo & Sjostrom (2009) stated that his research did not show that increasing school time in physical education or activity negatively affected academic performance. No researchers indicated that physical fitness was associated with a decrease in academic achievement (Dwyer, Sallis, Blizzard, Lazarus & Dean , 2001; Grissom, 2005).The results indicated a statistically significant positive correlation between fitness and standardized test scores in Language Arts and Math. Given that students who were more fit had higher test scores. This finding warrant consideration in the educational policy making process.

The analysis of physical fitness and academic achievement finds a strong link between students health and their academic performance. Following Students who improve their physical fitness generally do slightly better academically than students whose fitness declines. There is a strong and consistent pattern of physically fit students performing better on the California Standardized Test in math and English Language Arts than students who are not physically fit .Findings contribute to a growing body of evidence indicating a significant relationship between students' academic achievement and physical fitness (Rebecca, 2009).

A cross-sectional study completed by Trost (2007), included a sample of nine grade (279,000). The study individually matched Stanford Achievement Test Ninth Edition standardized test scores with results of the state-mandated, teacher administered, physical fitness test, known as the Fitnessgram. The six fitness standards included in the Fitnessgram are cardiovascular endurance, body composition, abdominal strength and endurance, trunk strength and flexibility, upper body strength and endurance, and overall flexibility. Study results of Trost (2007) included a statistical analysis indicating a distinct and linear correlation between students' academic

achievement and fitness scores; higher academic performance was positively related to higher levels of fitness with the greatest academic gains in students who met three or more physical fitness standards. 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. 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).

Positive associations between cardiovascular fitness and academic achievement were observed with the academic achievement indexed using total academic scores (Castelli , Hillman, Buck, & Erwin (2007). Further, cardiovascular fitness has been consistently reported to exhibit a positive association with mathematics (Eveland-Sayers, Farley, Fuller, Morgan & Caputo , 2009). For instance, Eveland-Sayers et al. (2009) examined the 20-m endurance shuttle run and one-mile run, respectively, and reported a positive relation of cardiovascular fitness to mathematics achievement scores.

Cardiovascular fitness also appears to be positively associated with other academic areas (Hansen, Herrmann, Lambourne, Lee & Donnelly , 2014). For example, Wittberg, Northrup, & Cottrell (2009) observed a positive association between cardiovascular fitness and performance on academic achievement tests in the areas of science and social studies in a sample of 968 preadolescent children and cardiovascular fitness has been positively correlated with language arts performance

Grissom (2005) conducted a study and found that as the overall physical fitness test score improved, the mean scale score on the Californian standard test in English–language and arts also improved. The average scale score on the Californian standard test in English–language and arts for ninth- grade students who did not achieve any of the fitness standards was 304. The average scale score on the Californian standard test in English–language and arts for ninth-grade students who achieved all six fitness standards was 352. The change in average scale scores on

the Californian standard test in English–language and arts from those who achieved none of the fitness standards to those who achieved all six was around 50 points. Results indicated a positive relationship between academic achievement and physical fitness. As fitness measure improved, so did the achievement.

The research brief of 2015 regular participation in physical activity and higher levels of physical fitness have been linked to improved academic performance and brain functions, such as attention and memory. These brain functions are the foundation for learning. Long-term studies have demonstrated that increases in physical activity, resulting from greater time spent in physical education, were related to improved academic performance. Even single sessions of physical activity have been associated with better scores on academic tests, improved concentration, and more efficient transfers of information from short- to long-term memory.

The study of Castelli ,Centeio, Hwang, Barcelona, Glowacki, Calvert, & Nicksic (2014), physical activity and fitness lift up both health and academic achievement for children. Taking a look at the fact that Physical activity can have immediate and long-term merits on academic achievement. Almost immediately after engaging in physical activity, children are better able to concentrate on classroom tasks, which can enhance learning. And through time, the children's improved physical fitness can have additional positive effects on academic performance in mathematics, reading, and writing.

Chomitz, Slining, McGowan, Mitchell, Dawson & Hacker.(2009) conducted a study to determine relationships between physical fitness and academic achievement in different, urban public school students. In the study participated 1847 students and from them 1103 students took Mathematics test and 744 took English test. In addition to this the study participants were taken physical fitness test. At the end of the study the result indicated that as the number of fitness tests passed increased both Mathematics and English test results increased significantly and this showed that there is a significant relationship between fitness and academic achievement. So academic achievement may be improved due to enhancement of opportunities to increase physical activity during physical education classes and out of school time.

CHAPTER 3: METHODOLOGY OF THE STUDY

In this chapter included are the research method, research design, population and sample, source of data, method of data collection, instruments of data collection, methods of data analysis and ethical considerations. This chapter includes the above elements of methodology of research and deals with each one of them separately and clearly. The researcher aims at stating the research method, explicitly put the research design which has a lot to do with the sampling techniques. The population is also part of this chapter, which the researcher considered with sample. The researcher has carefully conducted the data collection from reliable source using appropriate instruments of data collection from reliable source.

3.1. Research Method

The objective of the present study was to compare physical fitness level of urban and rural secondary school students of Hawassa. Therefore, comparison of different groups of students from urban and rural residences and coming to the same school environment is needed. Such comparison requires to quantitatively measuring the fitness levels and making quantitative comparison is essential. Hence, for this study quantitative research method was found useful. Quantitative method of data collection helps for collecting numerical data that are analyzed using mathematically based statistics.

3.2. Research Design

The research design for this study was descriptive survey research design, which always concern with finding, describing and interpreting what it is. It is not intended to examine new phenomenon but the concern with relation or condition that exists. The survey design is advantageous to study large sample size with very little effort, within short period of time and in a cost effective manner.

3.3. Population and Sample

In Hawassa city there are seven government secondary schools and all of them are taken as area of the study. The total population of the study were taken from Addis Ketema, Adare Millenium, Adare, Alamura, Halade , Tabor and Misrak Chora secondary schools of grade 9 and 10 students. The total number of students' data is mentioned in table 3.1

Table 3.1. Students total number and residence data

Schools	Residence						School Total
	Urban			Rural			
	Male	Female	Total	Male	Female	Total	
Tabor	741	708	1449	961	603	1564	3013
MisrakChora	358	390	748	50	49	99	847
AdisKetema	827	889	1716	50	66	116	1832
Halade	45	53	98	161	208	369	467
Adare	90	110	200	293	272	565	765
Adare Millenium	64	96	160	186	296	482	642
Alamura	164	235	399	1287	1300	2587	2986
Total	2289	2481	4770	2988	2794	5782	10552

As mentioned on table 3.1.the total population of the study was 10552, from which 5678 were grade 9 students and 4874 were grade 10 students. The sample size was determined by applying Cohen, et al.,(2000) research book and sample size table of Krejcie and Morgan,(1970) .A survey style usually requires a large sample, particularly if inferential statistics are to be calculated. Sample size formulas provide the number of responses that need to be obtained. 400 students were selected as a sample population for the study .Sample size in terms of residence and gender was selected using stratified sampling method. Sample size distribution is mentioned on table 3.2.

Table3. 2. Total sample size distribution of 400 students

Grade-9: n=215						Grade-10: n=185					
Urban			Rural			Urban			Rural		
Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
46	51	97	61	57	118	41	43	84	52	49	101

3.4. Source of Data

Data was collected from grade 9 and 10 students' by applying physical fitness test and gathering first semester students average results in 5 selected academic subjects.

3.5. Method of Data Collection

Data was collected by applying Likert scale measurement instrument. Physical fitness level test was prepared and the researcher gave training for eight physical education instructors on how to conduct the test. In addition to that the sample participants' 2009 E.C. first semester result of 5 academic subjects' average was taken from their school documents. After that the recruited instructors conducted the test or collected data accordingly on selected participant students based on the given procedure below.

3.5.1. Three-minute Step Test is used to assess cardiovascular endurance

Equipment: 30.5 centimeter(cm) bench and stop watch.

Procedure: face bench .Complete 24 full steps (both feet on the bench both feet on the ground) per minute for 3 minutes. After finishing sit down, data collector find pulse rate of the student within 5 seconds, and take pulse for 1 minute. Score is the student pulse rate for 1 full minute. Scoring standards beats per minute (bpm).

Table 3.3. Cardiovascular Endurance Rating Scale

Male Age 15-19 years		Female Age 15-19 years	
Very good	<72 bpm	Very good	<76 bpm
Good	72-97 bpm	Good	76-102 bpm
Average	98-128 bpm	Average	103-133 bpm
Poor	129--159 bpm	Poor	134--164 bpm
Very poor	>159 bpm	Very poor	> 164 bpm

Source: Understanding your health,7th edition(2002).

3.5.2. Curl-ups to Assess Abdominal and Low Back Muscular Endurance

Procedure: lie flat on upper back, knees bent, shoulders touching the floor, arms extended above the participant thighs or by side, palms down. Bend knees so that feet are flat and 30 centimeters (cm) from the buttocks. The data collector counts the curl-ups performed and calls a stop to the test if he or she notices any incorrect form or drop in the pace. The score is the number of completed curl-ups.

Table3. 4. Muscular Endurance Rating Scale

Male Age 15-19 years		Female Age 15-19 years	
Very good	23-24 curl-ups	Very good	22-24 curl-ups
Good	21-22 curl-ups	Good	17-21 curl-ups
Average	16-20 curl-ups	Average	12-16 curl-ups
Poor	11-15 curl-ups	Poor	6-11 curl-ups
Very poor	< 11 curl-ups	Very poor	< 6 curl-ups

Source: Canadian Physical Activity Guidelines,© 2011, 2012.

3.5.3. Push-Ups to Assess Upper Body Strength

Push-ups (Men)

Procedure: Assume a front leaning position. Lower your body until chest touches the floor. Raise and repeat as many push-ups as you can without stopping. The score is the number of completed push-ups by the test performer.

Modified push-ups (Women)

Procedure: Assume a front leaning position with knees bent up, hands under shoulders. Lower your .chest to the floor, raise, and repeat. Raise and repeat as many modified push-ups as you can without stopping. The score is the number of completed modified push-ups by the test performer.

Table 3.5. Push-ups and modified push-ups Rating Scale

Male Age 15-19 years		Female Age 15-19 years	
Very good	29-38	Very good	25-32
Good	23-28	Good	18-24
Average	18-22	Average	12-17
Poor	11-17	Poor	6-11
Very poor	< 11	Very poor	< 6

Source: Canadian Physical Activity Guidelines, © 2011, 2012.

3.5.4. Sit-and-Reach Test to Assess Hamstring Flexibility

Equipment: ruler 50cm length ,firm box 30cm high

Procedure: using a firm box about 30 centimeters(cm) high attached at right angles to each other. Attach a metric ruler to measure the extent of reach. With the low numbers of the ruler toward the person being tested, set the 26-cm mark of the ruler at the foot line of the box. (Individuals who cannot reach, as far the foot line will have scores below 26 cm, those who can reach past their feet will have scores above 26 cm.)

Preparation

Warm up your muscles with a low-intensity activity such as walking or easy jogging. Then perform slow stretching movements.

Instructions

1. Remove your shoes and sit facing the flexibility measuring device with your knees fully extended and your feet flat against the device about 10 centimeters (4 inches) apart.
2. Reach as far forward as you can, with palms down, arms evenly stretched and knees fully extended, hold the position of maximum reach for about 2 seconds.
3. Perform the stretch 2 times, recording the distance of maximum reach to the nearest 0.5 centimeters. The number of performed sit and reach is the score of the participant.

Table 3.6. Sit -and -reach test Rating Scale Rating/score (cm)*

Male Age 15-19 years		Female Age 15-19 years	
Very good	34-38cm	Very good	38-42cm
Good	29-33cm	Good	34-37cm
Average	24-28cm	Average	29-33cm
Poor	20-23cm	Poor	25-28cm
Very poor	< 20cm	Very poor	< 25cm

Source: Fahey,T.D.(2005). Fit and Well sixth edition.

3.5.5. Illinois Agility Runs to Assess Agility

An agility course using four chairs about 3 meters apart, and a 9 meters running area will be set.

The test is performed as follows:

1. Lie prone with your hands by your shoulders and your head at the starting line. On the signal to begin, get on your feet and run the 60 meters distance as fast as possible.

2. Your score is the seconds required to complete the distance.

Table 3.7. Agility Rating Scale

Male	Age 15-19 years	Female	Age 15-19 years
Very good	15.9-16.7 seconds	Very good	17.5-18.6 seconds
Good	16.8-18.6 seconds	Good	18.7-22.3 seconds
Average	18.7-18.8 seconds	Average	22.4-23.4 seconds
Poor	18.9-19 seconds	Poor	23.5-24.4 seconds
Very poor	slower than 19 seconds	Very poor	slower than24.4 seconds

Source: Concepts of fitness and wellness. A Comprehensive Lifestyle Approach fourth edition 2002

3.5.6. The Bass Test to Assess Balance

Eleven circles (24.13 centimeters) are drawn on the floor in zigzag position.

The test is performed as follows:

1. Stand on the right foot in circle x. Leap forwards to circle 1, and then circle 2 through 10, alternating feet with each leap.

2. The feet must leave the floor on each leap and the heel may not touch. Only the ball of the foot and toes may land on the floor.

3. Remain in each circle for 5 seconds before leaping to the next circle.(A count of five will be made for you aloud).

4. Practice trials are allowed.

5. The score is 50, plus the number of seconds taken to complete the test, minus the number of errors.

6. For every error, deduct three points each. Errors include touching the heel, moving the supporting foot, touching outside a circle, or touching any body part to the floor other than the supporting foot. The final calculated result as mentioned above is the score for the test performer.

Table 3. 8. Balance test Rating Scale for both sexes

Rating	Score
Very good	80-89
Good	60-79
Average	30-59
Poor	16-29
Very poor	0-15

Source: Concepts of fitness and wellness. A Comprehensive Lifestyle Approach fourth edition 2002

3.5.7. The Stick Test of Coordination

Equipment:

The stick test of coordination requires juggling three wooden sticks. The sticks are used to perform a one –half flip and a full flip as follows.

Procedure:

1. One half flip –Hold two 24 inch (one-half inch in diameter) dowel rods, one in each hand. Support a third rod of the same size across the other two. Toss the supported rod in the air so that it makes a half turn. Catch the thrown rod with the two held rods.

2. Full flip-Perform the preceding task, letting the supported rod turn a full flip.

The test performed as follows:

1. Practice the half-flip and full flip several times before taking the test.

2. When you are ready, attempt a half-flip five times. Score one point for each successful attempt.

3. When you are ready, attempt the full flip five times,. Score two points for each successful attempt.

4. The score of the test is the sum of points of number 2 and number 3.

Table 3.9. Coordination Rating Scale

Male Age 15-19 years		Female Age 15-19 years	
Very good	11-13 points	Very good	10-12 points
Good	5-10 points	Good	5-9 points
Average	3-4 points	Average	3-4 points
Poor	1-2 points	Poor	1-2 points
Very poor	< 1 points	Very poor	< 1 points

Source: Concepts of fitness and wellness. A Comprehensive Lifestyle Approach fourth edition 2002

3.5.8. The Vertical Jump Test of Power

Equipment: A plane wall and chalk

Procedure:

1. Hold a piece of chalk so its end is even with your fingertips.
2. Stand with both feet on the floor and your side to the wall and reach and mark as high as possible.
3. Stand away from the wall, and jump vertically as high as possible using both arms and legs to assist in projecting the body upwards.
4. Touch the wall at the highest point of the jump.
5. Measure the distance between the reaching height and the jumping height.
6. The difference in distance between the reach height and the jump height is the score.
7. Your score is the best of three jumps.

Table 3.10. Power Rating Scale In cm

Male Age 15-19 years		Female Age 15-19 years	
Very good	53-67	Very good	48-59
Good	42-52	Good	37-47
Average	31-41	Average	27-36
Poor	17-30	Poor	15-26
Very poor	< 17	Very poor	<15

Source: Concepts of fitness and wellness. A Comprehensive Lifestyle Approach fourth edition 2002

3.5.9. The Stick Drop Test of Reaction Time

Equipment: ruler, a table and a chair, and a data collector to conduct the test.

Procedure:

1. Sit in the chair next to the table so that your elbow and lower arm rest on the table comfortably. The heel of your hand should rest on the table. So that only your fingers and thumb extend beyond the edge of the table.
2. Your data collector holds a yardstick at the very top, allowing it to drop between your thumb and fingers.
3. The yardstick should be held so that 60 cm mark is even with your thumb and index finger. No part of your hand should touch the yardstick.
4. Without warning, your data collector will drop the stick , and you will catch it with your thumb and index finger.
5. Your score is the number of centimeters (cm) read on the yardstick just above the thumb and index finger after you catch the yardstick.
6. Try the test three times. Your data collector should be careful not to drop the stick at predictable time intervals so that you cannot guess when it will be dropped. It is important that you react only to the dropping of the stick.
7. Use the middle of your three scores (example: if your scores are 21, 18.and 19, your middle score is 19). The higher your score, the faster your reaction time.

Table 3.11. Reaction time Rating Scale for both sexes in cm

Rating	Score
Very good	48-52
Good	41-47
Average	33-40
Poor	21-32
Very poor	<21

Source: Concepts of fitness and wellness. A Comprehensive Lifestyle Approach fourth edition 2002

3.5.10. Running Test of Speed

Equipment

To perform the running test of speed necessary to have a specially marked running distance, a stopwatch, a whistle, and a partner to help you with the test.

Procedure:

1. Mark a running distance on a hard surface so that there is a starting line and a series of nine additional lines, each 1.84 meters apart, the first marked at a distance 9.2 meters from the starting line.

2. From a distance 0.92 meters or 1.84 meters behind the starting line, begin to run as fast as you can. As you cross the starting line, your partner starts a stopwatch.

3. Run as fast as you can until you hear the whistle that your partner will blow exactly 3 seconds after the stopwatch was started. Your partner marks your location at the time when the whistle was blown.

4. Your score is the distance you were able to cover in 3 seconds. You may practice the test and take more than one trial if time allows. Use the better of your distances on the last two trials as your score.

Table 3.12. Speed Rating Scale in meters

Male Age 15-19 years		Female Age 15-19 years	
Very good	20-21.9	Very good	18-19.9
Good	16.5-19.9	Good	14.5-17.9
Average	14.5-16.4	Average	13-14.4
Poor	11-14.4	Poor	10-12.9
Very poor	< 11	Very poor	<10

Source: Concepts of fitness and wellness. A Comprehensive Lifestyle Approach fourth edition 2002.

3.6. Instruments of Data Collection

Physical fitness tests and first semester selected academic subjects (English, Mathematics, Physics, Chemistry and Biology) average result were used as instrument of data collection.

Physical fitness tests were prepared by adopting standardized tests. Especially health related physical fitness: cardiovascular endurance, muscular endurance, muscular strength and flexibility test and skill related components: agility, balance, coordination, power, reaction time and speed tests were used. In addition to this measurement and working equipments like stop watch, meter, step bench and ruler were applied as instruments of data collection. procedures of data collection are mentioned under appropriate physical fitness test(on pages 23 to30).

3.7. Method of Data Analysis

The data collected was analyzed using statistical package for social science (SPSS), version 16. It was examined using statistical analysis procedure in which arithmetic mean, standard deviation and t-test used to compare the data.

3.8. Ethical Considerations

The researcher gave all information to the participants in maintaining privacy and confidentiality. The researcher promised to the participants of the study that the information which was collected from the respondents should not be transferred to third party or it will not be exploited for undertaking other than the purpose of the research study.

Besides this, the process of data collection was done anonymously without writing their name, identification number, telephone number. Before the data collection parents of each student gave written consent and students were volunteer participate in the study. Letter from Addis Ababa University Department of Science and Mathematics Education was given for Hawassa governmental schools and permission was obtained from schools principals.

CHAPTER 4: DATA AND DATA ANALYSIS

The general objective of this study was to compare physical fitness level of urban and rural students in secondary schools of Hawassa. To this end data was gathered from seven secondary schools by measuring the health and skill related fitness of students from urban and rural background. In this chapter the data regarding total fitness, health related fitness, skill related fitness, gender and physical fitness, grade level and physical fitness, and relation of physical fitness and academic achievement analyzed.

4.1. Participants of the Research

Research participants were selected from seven government secondary schools from Hawassa city. All government secondary schools in Hawassa were considered for source of participants. As students with urban and rural backgrounds were none evenly distributed in all government schools of Hawassa, hence stratified sampling was taken. Urban students are constant dwellers of Hawassa city, whereas rural students are who learned from grade one to eight in rural areas and came to Hawassa from rural areas for their high school study. The following table presents the characteristics of the 400 participants of this research in terms of their distribution with respect to gender, residence type, grade level, and age.

Table 4.1. BackGround Characteristics of Participants of the Research

		Frequency	Percent
Sex of the students	Female	200	50
	Male	200	50
Students residence	Rural	219	54.75
	Urban	181	45.25
Grade	9	215	53.75
	10	185	46.25
Age of participants	15-16 years old	244	61
	17 years old	156	39

Concerning gender, residence type and grade level the research participant's general data mentioned on table 4.1 was almost balanced and these were not influenced on the result of the study. In addition to that, age difference of participants was limited and this did not affect the result of the study.

4.2. Comparison of Urban and Rural Secondary School Students' General Fitness Level

The first objective of this research was to measure and compare total physical fitness level of urban and rural students in secondary schools of Hawassa. As indicated in the previous chapter, data pertaining to this was gathered by measuring the fitness levels of the sample students using a Likert scale of measurement. The mean of mean scores of the rural and urban students are presented and compared in the table below.

Table 4.2. Comparison of urban and rural secondary school students total fitness level

Variable	Residence	No of students	Mean of mean	Pooled Std. Deviation	t calculated	t critical
Health related fitness	Rural	219	3.82	1.48	4.25	
	Urban	181	3.4	0.76		1.965
Skill related fitness	Rural	219	3.26	0.52	4.90	
	Urban	181	2.9	0.58		1.965
Total fitness	Rural	219	3.49	1.0	3.97	
	Urban	181	3.1	0.67		1.965

Significant at 0.05 level of significance, df (degree of freedom) =398

It is evident from table 4.2 that the obtained t calculated test applied to the skill related fitness for rural and urban students mean total value was 4.90 which was greater than the table value(t critical) of 1.965 for df 398 required for significance at 0.05 level. This proved that there was significant difference in skill related fitness mean total between rural and urban students. In addition the obtained t calculated for total fitness mean of urban and rural students was 3.97 which was greater than the table value (t critical) of 1.965 for df 398 required for significance at

(M=3.7, SD=1) showed no differences when compared to rural students (M=3.8, SD=0.8) and t=0.8,p=0.45.

This result therefore indicates that rural students have significantly higher cardiovascular endurance and muscular strength than urban students.

The reason for high level of flexibility in urban students may be due to high temperature of Hawassa city. Flexibility increases at higher temperature and decreases at lower temperature. So the temperature of the environment in which students live significantly affects the level of flexibility (Stojiljković ,2003).

4.4. Skill Related Fitness Level of Urban and Rural Secondary School Students

One of the second objectives of this study was to measure and compare skill related fitness level of urban and rural students in secondary schools of Hawassa. Skill related fitness level of Hawassa secondary school students were compared using the fitness variables of agility, balance, coordination, power, reaction time and speed. The mean scores of the rural and urban students' skill related fitness were presented and compared below in the table

Table 4.4. Comparison of skill related fitness level of urban and rural secondary school students

Variable	Residence	No of students	Mean	Std. Deviation	t	p-value
Agility	Rural	219	3.4	0.7	-3.6	<0.0001
	Urban	181	3.6	0.8		
Balance	Rural	219	3.3	0.7	9.1	<0.0001
	Urban	181	2.7	0.6		
Coordination	Rural	219	3.2	0.6	11.4	<0.0001
	Urban	181	2.5	0.5		
Power	Rural	219	3.0	0.6	3.6	<0.0001
	Urban	181	2.7	1.1		
Reaction time	Rural	219	2.8	0.9	6.2	<0.0001
	Urban	181	2.3	0.7		
Speed	Rural	219	3.9	0.8	4.1	<0.0001
	Urban	181	3.6	0.9		

The mean agility was significantly higher in urban students (M=3.6, SD=0.8) when compared to rural students (M=3.4, SD=0.7) and t= -3.6, p<0.0001. However, the rest skill related fitness categories were significantly higher in rural students when compared to urban students.

This result therefore indicates that rural students have higher skill related individual fitness categories than urban students except agility. The main reasons for high skill related fitness level of rural students compared to urban students were high participation of rural students in agriculture related work ,the way of life (more activity oriented routine) in rural areas, more open spaces and play fields compared to urban areas(Singh et al.,2016).

4.5. Gender Dependence of Physical Fitness of Secondary School Students

4.5.1. Comparison of urban and rural secondary school male students' fitness level

Under this section compared urban and rural male students' level of total fitness, health related fitness and skill related fitness. The mean scores of the rural and urban male students' level of total fitness, health related fitness and skill related fitness were presented and compared below in the table number 4.5, 4.6, and 4.7 respectively.

Table 4.5. Comparison of urban and rural secondary school male students' total fitness level

Variable	Residence	No of students	Mean of mean	Pooled Std. Deviation	t calculated	t critical
Health related fitness	Rural	113	3.78	0.52	4.2	1.984
	Urban	87	3.42	0.63		
Skill related fitness	Rural	113	3.4	0.51	4.4	1.984
	Urban	87	2.98	0.36		
Total fitness:	Rural	113	3.55	0.52		
	Urban	87	3.16	0.46	3.6	1.984

Significant at 0.05 level of significance, df (degree of freedom) =198

It is evident from table 4.5 that the obtained t calculated test applied to the total fitness for rural and urban male students mean total value was 3.6 which was greater than the table value(t

critical) of 1.984for df 198 required for significance at 0.05 level. This proved that there was significant difference in total fitness mean total between rural and urban male students. In addition the obtained t calculated for skill related fitness mean of urban and rural male students was 4.4 which was greater than the table value (t critical) of 1.984 for df 198 required for significance at 0.05 level. This showed that there was significant difference in skill related fitness mean total between rural and urban male students.

Thus, the mean change for skill related fitness, health related fitness and total fitness between rural and urban male students showed statistically significant difference. This result therefore indicated that rural male students have higher fitness level than urban male students in skill related fitness, health related fitness and total fitness.

The reason for low fitness level of urban students may be that high dependency in technology and civilization in urban areas and that minimized fitness level of urban students (Manmeet et al.,2010) .

Table 4.6. Health related fitness level of urban and rural secondary school male students

Variable	Residence	No of students	Mean	Std. Deviation	t	p-value
Cardiovascular endurance:	Rural	113	4.2	0.7	17.9	<0.0001
	Urban	87	2.6	0.5		
Muscular endurance:	Rural	113	3.4	0.7	-4.4	<0.0001
	Urban	87	3.9	1.0		
Muscular strength	Rural	113	3.8	0.7	3.9	<0.0001
	Urban	87	3.3	0.9		
Flexibility	Rural	113	3.7	0.8		0.02
	Urban	87	3.9	0.7	-2.4	

The mean flexibility of urban male students (M=3.9, SD=0.7) are better than rural male students (M=3.7,SD=0.8) and t -2.4, p = 0.02.

The mean flexibility of urban students (M=3.8, SD=1.0) are better than rural students (M=3.7,SD=0.8) and t -1.7, p = 0.09.

This result therefore indicates that rural male students have significantly higher cardiovascular endurance and muscular strength than urban male students. Flexibility increases at higher temperature and decreases at lower temperature. So the temperature of the environment in which

students live significantly affects the level of flexibility (Stojiljković ,2003). In addition to that the type of activities students perform may affect the level of flexibility (Nikolic et al.,2015).

Table. 4. 7. Comparison of Skill related fitness level of urban and rural secondary school male students

Variable	Residence	No of students	Mean	Std. Deviation	t	p-value
Agility	Rural	113	3.6	0.7	4.8	<0.0001
	Urban	87	3.1	0.1		
Balance	Rural	113	3.5	0.7	10.1	<0.0001
	Urban	87	2.6	0.5		
Coordination	Rural	113	3.3	0.7	7.4	
	Urban	87	2.6	0.5		<0.0001
Power	Rural	113	3.0	0.6	-6.7	<0.0001
	Urban	87	3.5	0.6		
Reaction time	Rural	113	3.1	0.8	6.2	<0.0001
	Urban	87	2.4	0.7		
Speed	Rural	113	3.9	0.8	1.4	0.15
	Urban	87	3.7	0.8		

The mean power was significantly higher in urban male students (M=3.5, SD=0.6) when compared to rural students (M=3, SD=0.6) and t= -6.7, p<0.0001. Further speed did not show significant differences in urban male students (M=3.7, SD=0.8) when compared to rural male students (M=3.9,SD=0.8), t 1.4, p= 0.15.

This result therefore indicates that rural male students have higher skill related individual fitness categories than urban male students except power. The reason for better physical fitness in rural areas may be due to rural areas is most of the time related to a more vigorous, physically dynamic way of life that is advantageous to physical fitness (Pena Reyes et al.,2003). The reason for less performance of urban students in most of fitness components may be due to minimized the opportunities for vigorous physical activities to cause physical exertion, advancement of technology and computerization in urban population (Kavitha et al.,2016).

4.5.2. Comparison of Urban and Rural Secondary School Female Students' Fitness Level

Under this section compared urban and rural female students' level of total fitness, health related fitness and skill related fitness. The mean scores of the rural and urban female students' level of total fitness, health related fitness and skill related fitness were presented and compared below in the table number 4.8, 4.9, and 4.10 respectively.

Table 4.8. Comparison of urban and rural secondary school female students' total fitness level

Variable	Residence	No of students	Mean of mean	Pooled Std. Deviation	t calculated	t critical
Health related fitness	Rural	106	3.85	0.59	4.3	1.984
	Urban	94	3.35	0.72		
Skill related fitness	Rural	106	3.11	0.45	3.1	1.984
	Urban	94	2.81	0.5		
Total fitness	Rural	106	3.4	0.52		
	Urban	94	3.03	0.61	4.4	1.984

Significant at 0.05 level of significance, df (degree of freedom) =198

It is evident from table 4.8 that the obtained t calculated test applied to the total fitness for rural and urban female students mean total value was 4.4 which was greater than the table value (t critical) of 1.984 for df 198 required for significance at 0.05 level. This proved that there was significant difference in total fitness mean total between rural and urban female students. In addition the obtained t calculated for health related fitness mean total of urban and rural female students was 4.3 which is greater than the table value (t critical) of 1.984 for df 198 required for significance at 0.05 level. This showed that there was significant difference in health related fitness mean total between rural and urban female students.

Therefore the mean total change for health related fitness, skill related fitness and total fitness between rural and urban female students showed statistically significant difference. This result therefore indicated that rural female students have higher fitness level than urban female students in health related fitness, skill related fitness and total fitness.

The reason for high fitness level of rural female students may be due to the fact that the students belonging to rural area performs various extra activities walk to school, market, various type of play and regular physical activity (Ghosh and Goon ,2015).

Table 4.9. Health related fitness level of urban and rural secondary school female students

Variable	Residence	No of students	Mean	Std. Deviation	t	p-value
Cardiovascular endurance	Rural	106	3.4	0.8	8.6	<0.0001
	Urban	94	2.5	0.5		
Muscular endurance	Rural	106	4.2	0.7	5.6	<0.0001
	Urban	94	3.6	0.9		
Muscular strength	Rural	106	4.1	0.8	4.3	<0.0001
	Urban	94	3.6	0.8		
Flexibility	Rural	106	3.7	0.8	-0.3	0.75
	Urban	94	3.7	1.1		

The mean flexibility of urban female students (M=3.9, SD=0.7) was similar with rural female students (M=3.7,SD=0.8) and t -2.4, p = 0.02 .

This result therefore indicated that rural female students have significantly higher health related fitness than urban female students. The reason for high health related fitness of rural students was physical work and regular exercise of rural female students (More et al., 2013). The reason for less performance of urban students in physical fitness may be that urban areas lack of sufficient place for play and way of life is related to sedentary lifestyle due to automatic transportation and computerization of many activities and (Bathrellou et al., 2007).

Table 4. 10. Comparison of Skill Related Fitness Level of Urban and Rural Secondary School Female Students

Variable	Residence	No of students	Mean	Std. Deviation	t	p-value
Agility	Rural	106	3.1	0.5	-12.1	<0.0001
	Urban	94	4.1	0.7		
Balance	Rural	106	3.1	0.5	2.7	0.007
	Urban	94	2.9	0.6		
Coordination	Rural	106	3.1	0.5	9.0	<0.0001
	Urban	94	2.4	0.5		
Power	Rural	106	3.0	0.6	11.5	<0.0001
	Urban	94	1.9	0.8		
Reaction time	Rural	106	2.5	1.0	2.8	0.006
	Urban	94	2.2	0.7		
Speed	Rural	106	3.9	0.8	4.2	<0.0001
	Urban	94	3.4	0.9		

The mean agility was significantly higher in urban female students (M=4.1, SD=0.7) when compared to rural female students (M=3.1, SD=0.5) and t -12.1, $p<0.0001$.

This result therefore indicates that rural female students have higher skill related individual fitness categories than urban female students except agility. Both urban and rural students have unbalanced fitness biased towards their skill related fitness. Furthermore, this result indicates that both urban and rural male students have unbalanced fitness bias in individual skill related fitness categories. Nevertheless, reaction times of both groups were below average and balanced. The reason for high fitness level of rural students was the active life style of rural students (Narges and Zahara,2015).

4.6. Academic Achievement and Physical Fitness of Secondary School Students

Under this section are compared total fitness, health related fitness and skill related fitness level of urban and rural students by academic achievement level. The mean total fitness, the mean health related fitness, and the mean skill related fitness scores of urban and rural students in low and high achievement a presented and compared below in the tables 4.11, 4.12, and 4.13 respectively.

Table 4.11: Comparison of Rural and Urban Secondary School Students Total Fitness by Academic Achievement Level

	Residence	No	Mean	SD	t	p-value
Low achievement (<50)	Rural	31	29.2	1.4	4.7	<0.0001
	Urban	61	27.3	2.0		
High achievement (≥50)	Rural	188	35.7	3.2	8.7	<0.0001
	Urban	120	32.8	2.1		

The mean total fitness of rural students (M=29.2, SD=1.4) was better than urban students (M=27.3, SD=2) in low achievement and t 4.7, p <0.0001. In addition, the mean total fitness of rural students was significantly higher when compared to urban students in high achievement.

This result therefore indicates that rural students have better total fitness when compared to urban students in both achievement levels. The reason for better physical fitness in rural areas may be due to rural areas is most of the time related to a more vigorous, physically dynamic way of life that is advantageous to physical fitness (Pena Reyes et al., 2003).

Table 4.12: Comparison of Rural and Urban Secondary School Students Health Related Fitness by Academic Achievement Level

	Residence	No	Mean	SD	t	p-value
Low achievement (<50)	Rural	31	13.1	1.1	4.3	<0.0001
	Urban	61	11.7	1.6		
High achievement (≥50)	Rural	188	15.6	1.5	5.5	<0.0001
	Urban	120	14.6	1.6		

The health related fitness mean scores of rural students (M=15.6, SD=1.5) was found to be significantly higher than the health related fitness mean scores of urban students (M=14.6, SD=1.6) in high achievement level and t=5.5, p<0.0001. In addition to that the present study result indicated that in low achievement rural students have better health related fitness mean score compared to urban students. Regular participation in physical exercise and being physically fit improve brain functions, such as attention and memory, because brain functions are the foundation of learning (Research brief, 2015).

Table 4.13: Comparison of Rural and Urban Secondary School Students Skill Related Fitness by Academic Achievement Level

	Residence	No	Mean	SD	t	p-value
Low achievement (<50)	Rural	31	16.1	1.0	1.7	0.09
	Urban	61	15.6	1.4		
High achievement (≥50)	Rural	188	20.1	2.4	7.7	<0.0001
	Urban	120	18.2	1.6		

The mean skill related fitness of rural students was (M=16.1, SD=1.0) and urban students (M=15.6, SD=1.4) in low achievement and t 1.7, p = 0.09. However, the mean skill related fitness of rural students (M=20.1, SD=2.4) was higher when compared to urban students (M=18.2, SD=1.6) in high achievement and t=7.7 and p<0.0001.This result therefore indicates that rural students have higher skill related fitness when compared to urban students in high achievement. Both urban and rural students have no any differences in skill related fitness in relation to low achievement level. The reason for high fitness level of rural female students may be due to the fact that the students belonging to rural area performs various extra activities walk to school, market, various type of play and regular physical activity (Ghosh and Goon ,2015).

Table 4.14. The overall correlation of total fitness, health related fitness and skill related fitness with academic achievement

Variable	Pearson correlation (r)	p-value
Total fitness vs. academic achievement	0.98	<0.0001
Total skill related fitness vs. academic achievement	0.66	<0.0001
Total Health related fitness vs. academic achievement	0.82	<0.0001

The present study result indicated that total fitness, skill related fitness and health related fitness were strongly correlated with academic achievement, (r=0.98, r =0.0.66, and 0.82 and p<0.0001 for the above three mentioned variables respectively). The reason for relationship between academic achievement and physical fitness is that immediately after engaging in physical activity, students are better able to concentrate on classroom tasks, which can enhance learning and through time, the children's improved physical fitness can have additional positive effects on academic performance (Castelli et al., 2014).

4.7. Grade Level Dependence of Physical Fitness of Secondary School Students

4.7.1. Comparison of urban and rural grade 9 students' total fitness, health related fitness and skill related fitness level

Table 4.15.Comparison of urban and rural grade 9 students' total fitness level

Variable	Residence	No of students	Mean of mean	Pooled Std. Deviation	t calculated	t critical
Health related fitness	Rural	118	3.85	0.5		
	Urban	97	2.21	0.7	4.9	1.984
Skill related fitness	Rural	118	3.2	0.5		
	Urban	97	2.86	0.6	3.3	1.984
Total fitness	Rural	118	3.46	0.5		
	Urban	97	3.05	0.7	4.1	1.984

Significant at 0.05 level of significance, df (degree of freedom) =213

It is evident from table 4.15 that the obtained t calculated test applied to the total fitness for rural and urban grade 9 students mean total value was 4.1 which was greater than the table value (t critical) of 1.984 for df 213 required for significance at 0.05 level. This proved that there was significant difference in total fitness mean total between rural and urban grade 9 students. In addition the obtained t calculated for health related fitness mean of urban and rural grade 9 students was 4.9 which was greater than the table value (t critical) of 1.984 for df 213 required for significance at 0.05 level. This showed that there was significant difference in health related fitness mean total between rural and urban grade 9 students.

This result therefore indicates that rural grade nine students have higher fitness level than urban grade nine students in general including skill related and health related fitness. The reason for high fitness level of rural students was the active life style of rural students (Narges and Zahara,2015).

Table 4.16. Urban and rural secondary school grade 9 students' health related fitness level

Variable	Residence	No of students	Mean	Std. Deviation	t	P value
Cardiovascular endurance	Rural	118	3.9	0.8	14.0	<0.0001
	Urban	97	2.5	0.5		
Muscular endurance	Rural	118	3.8	0.7	1.5	0.15
	Urban	97	3.6	0.9		
Muscular strength	Rural	118	3.8	0.7	4.9	<0.0001
	Urban	97	3.3	0.8		
Flexibility	Rural	118	3.9	0.7	-0.1	0.94
	Urban	97	3.9	1.0		

Mean flexibility ability were similar in urban grade 9 students (M=3.9, SD=0.7) when compared to rural grade 9 students (M=3.9, SD=0.7), t -0.1, p= 0.94.

This result therefore indicated that rural grade nine students have significantly higher health related fitness level than urban grade nine students. The result indicated that both urban and rural grade nine students have unbalanced fitness bias in health related fitness components of cardiovascular endurance, muscular endurance and muscular strength. The reason for high flexibility level of urban students may be the type of activities students perform may affect the level of flexibility (Nikolic et al.,2015).

Table 4.17. Comparison of skill related fitness level of urban and rural secondary school grade 9 students

Variable	Residence	No of students	Mean	Std. Deviation	t	P value
Agility	Rural	118	3.3	0.7	-2.8	0.005
	Urban	97	3.6	0.9		
Balance	Rural	118	3.1	0.5	7.1	<0.0001
	Urban	97	2.6	0.6		
Coordination	Rural	118	3.1	0.6	8.7	<0.0001
	Urban	97	2.5	0.5		
Power	Rural	118	3.0	0.6	2.6	0.01
	Urban	97	2.7	1.1		
Reaction time	Rural	118	2.9	0.8	6.1	<0.0001
	Urban	97	2.3	0.7		
Speed	Rural	118	3.8	0.8	3.0	0.003
	Urban	98	3.5	0.8		

Mean agility was higher in urban grade 9 students (M=3.6, SD=0.9) when compared to rural grade 9 students (M=3.3,SD=0.7), t -2.8, p= 0.005 .

This result therefore indicated that rural grade nine students have significantly higher skill related fitness level than urban grade nine students. The difference may be associated with life style in the respective communities (Pena Reyes et al.,2003).

4.7.2. Comparison of Urban and Rural Grade 10 Students' Total Fitness, Health Related Fitness and Skill Related Fitness Level

To identify fitness level of urban and rural students with regard to grade level, in this section compared grade 10 students' level of total fitness, health related fitness and skill related fitness. The mean scores of the rural and urban grade 10 students' level of total fitness, health related fitness and skill related fitness were presented and compared below in table number 4.17, 4.18, and 4.19 respectively.

Table 4.18. General comparison of urban and rural grade 10 students' fitness level

Variable	Residence	No of students	Mean of mean	Pooled Std. Deviation	t calculated	t critical
Health related fitness	Rural	101	3.77	0.76	2.1	1.984
	Urban	84	3.5	0.81		
Skill related fitness	Rural	101	3.33	0.59	3.2	1.984
	Urban	84	2.97	0.54		
Total fitness	Rural	101	3.51	0.68.	2.7	1.984
	Urban	84	3.18	0.67		

Significant at 0.05 level of significance, df (degree of freedom) =183

It is evident from table 4.18 that the obtained t calculated test applied to the total fitness for rural and urban grade 10 students mean total value was 2.7 which was greater than the table value (t critical) of 1.984 for df 183 required for significance at 0.05 level. This proved that there was significant difference in total fitness mean total between rural and urban grade 10 students. In addition the obtained t calculated for health related fitness mean of urban and rural grade 10 students was 2.1 which is greater than the table value (t critical) of 1.984 for df 183 required for significance at 0.05 level. This showed that there was significant difference in health related fitness mean total between rural and urban grade 10 students.

Thus, the mean change for health related fitness, skill related fitness and total fitness between rural and urban grade 10 students showed statistically significant difference. This result therefore indicated that rural grade 10 students have higher fitness level than urban grade 10 students in health related fitness, skill related fitness and total fitness. The reason for low level of physical fitness in urban students may be due to lower habitual physical activity in urban students (Tinazci and Emiroglu, 2009).

Table 4.19. Health related fitness level of urban and rural secondary school grade 10 students.

Variable	Residence	No of student	Mean	Std. Deviation	t	p-value
Cardiovascular endurance	Rural	101	3.7	0.9	9.9	<0.0001
	Urban	84	2.6	0.5		
Muscular endurance	Rural	101	3.8	0.9	-0.3	0.79
	Urban	84	3.9	1.1		
Muscular strength	Rural	101	4.1	0.9	3.3	0.001
	Urban	84	3.7	0.9		
Flexibility	Rural	101	3.5	0.8	-2.3	0.02
	Urban	84	3.8	1.0		

Mean flexibility was higher among urban grade 10 students (M=3.8, SD=1.0) when compared to rural grade 10 students (M=3.5, SD=0.8), t -2.3, 0.02, $p<0.05$. In addition, non-significant difference was observed in muscular endurance.

This result therefore indicated that rural grade ten students have significantly higher health related fitness level than urban grade ten students. The reason for high fitness level of rural female students may be due to the fact that the students belonging to rural area performs various extra activities walk to school, market, various type of play and regular physical activity (Ghosh and Goon ,2015).

Table 4.20. Comparison of skill related fitness level urban and rural secondary school grade 10 students

Variable	Residence	No of student	Mean	Std. Deviation	t	p-value
Agility	Rural	101	3.5	0.7	-2.3	0.02
	Urban	84	3.7	0.7		
Balance	Rural	101	3.6	0.7	6.5	<0.0001
	Urban	84	2.9	0.6		
Coordination	Rural	101	3.2	0.7	7.5	<0.0001
	Urban	84	2.6	0.5		
Power	Rural	101	3.0	0.5	2.6	0.01
	Urban	84	2.7	1.1		
Reaction time	Rural	101	2.7	1.1	3.0	0.004
	Urban	84	2.3	0.8		
Speed	Rural	101	4.0	0.8	2.8	0.006
	Urban	84	3.6	1.0		

Mean values of agility was significantly higher among urban grade 10(M=3.7,SD=0.7), students when compared to rural grade ten students (M=3.5,SD=0.7), t -2.3, p=0.02.

This result therefore indicated that rural grade 10 students have significantly higher skill related fitness level than urban grade 10 students. The main reasons for high skill related fitness level of rural students compared to urban students were high participation of rural students in agriculture related work ,the way of life (more activity oriented routine) in rural areas, more open spaces and play fields compared to urban areas(Singh et al.,2016).

CHAPTER 5: DISCUSSIONS AND CONCLUSION

This chapter deals with the summary, the discussions, the conclusions drawn from the major findings of the study, and recommendations made on the basis of findings and conclusions. In the first part all the major results from the previous chapter were collected and listed down in their logical order fitting to the research questions. In the discussion part, the findings are compared and discussed with literature so as to answer each of the research questions we have in this research. Finally, conclusions and recommendations are presented.

5.1. Summary of Findings

In this study data were collected from 400 secondary school students from 7 schools in Hawassa City in order to satisfy the objective of this research. The main objective of this study was to compare physical fitness of urban and rural secondary school students currently learning in under similar school conditions. After quantitatively comparing the group and sub-group mean total(M_{tot})fitness scores, the following major findings were obtained.

- The total fitness mean total scores of rural students (M_{tot}=3.49, Pooled SD=1.0) was found to be significantly higher than the total fitness mean total scores of urban students (M_{tot}=3.1, Pooled SD=0.67).
- The physical fitness of rural students was found to be significantly higher than those of the urban students in health-related as well as skill related fitness.
- The health related fitness mean total scores of rural students (M_{tot}=3.82, Pooled SD=1.48) was found to be significantly higher than the health related fitness mean total scores of urban students (M_{tot}=3.4, Pooled SD=0.76).
- The health related fitness components of rural students was found to be higher than those of the urban students except flexibility.
- The skill related fitness mean total scores of rural students (M_{tot}=3.26, Pooled SD=0.52) was found to be significantly higher than the skill related fitness mean total scores of urban students (M_{tot}=2.9, Pooled SD=0.58).
- The skill related fitness of rural students was found to be significantly higher than those of the urban students except agility.
- The total fitness mean total scores was higher in rural male students (M_{tot}=3.55, Pooled SD=0.52) when compared to urban male students (M_{tot}=3..6, Pooled SD=0.46).

- Rural male students have higher fitness level than urban male students in general including with skill related and health related fitness.
- The total fitness mean total scores was higher in rural female students (M_{tot}=3.4, Pooled SD=0.52) when compared to urban female students (M_{tot}=3.03, Pooled SD=0.61).
- Rural female students have higher fitness level than urban female students in general including skill related and health related fitness.
- The present study result indicated that total fitness, skill related fitness and health related fitness were strongly correlated with academic achievement, (r=0.98, r =0.0.66, and r= 0.82 and p<0.0001 for total fitness, skill related fitness and health related fitness respectively).
- The total fitness mean total scores was higher in grade 9 rural students (M_{tot} =3..6, Pooled SD=0.5) when compared to urban students (M_{tot} =3.05, Pooled SD=0.7).
- Rural grade nine students have higher fitness level than urban grade nine students in general including skill related and health related fitness.
- The total fitness mean total scores was higher in grade 10 rural students (M_{tot} =3.51, Pooled SD=0.68) when compared to urban students (M_{tot} =3.18, Pooled SD=0.67).
- Rural grade ten students have higher fitness level than urban grade 10 students in general including skill related and health related fitness.

5.2. Discussion

This study was focused in comparing physical fitness level of urban and rural secondary school students and identifying the relationship of physical fitness and academic achievement of students. For this study health related and skill related physical fitness components are used and the results are discussed as follows:

The result of the study indicated that the total fitness level was significantly higher in rural students when compared to urban students. The result of this study agreed with Singh et al.(2016), Kavitha et al.(2016), Narges and Zahra (2015).But the results were opposed with findings of Huang & Malina (2000). Probably the causes of contradiction with results of the present study were geographical location and life styles of individuals (Seryozha et al.,2013; Anupama et al.,2013). More activity oriented routine in rural areas, engagement in agriculture related work and more open spaces in rural students lead to increase their total fitness (Singh et al.,2016). In general rural students were better than urban students regarding total physical fitness level.

The result of this study showed that health related fitness level was higher in rural students when compared to urban students except flexibility. The result of this study were agree with Saha & Haldar(2012), Hian et al.(2013) Narges and Zahra (2015) except flexibility. But in flexibility urban students were better than rural students. Regarding flexibility the result of this study was agree with Bebcakova *et al* .(2015), Petroski et al.(2012), Chillón et al. (2011)but were opposed with findings of Haldar (2012) that likely the causes of contradiction may be age of participants,environment (climate of the area) and ethnicity. The present study of Urban students were dwellers of Hawassa. Hawassa is lowland area and the temperature of the area is high when compared to the surrounding rural areas from which came rural background students. According to the study of Stojiljković (2003) flexibility increases at higher temperature and decreases at lower temperature. So the temperature of the environment in which students live significantly affects the level of flexibility. In addition to that the type of activities students perform may affect the level of flexibility(Nikolic et al.,2015).

The results of the present study indicated that skill related fitness were significantly higher in rural students when compared to urban students except agility. The result of this study was agree with Singh et al.,(2016),and Santhosh & George (2015)except agility. But in agility urban students were better than rural students. The result of this study was agreed with Kavitha et al.(2016) but opposed with Nikolic et al.(2015). The reason for less performance of urban students in most of skill related fitness components may be due to minimized the opportunities for vigorous physical activities to cause physical exertion, mechanization, automation and computerization in urban population.

The study result of Manmeet et al.(2010) indicated that civilization, advancement of science and technology minimized physical activity level of urban population due to dependency in mechanization, automation and computerization. On the other hand continues activity produces physical fitness improvements in rural students.

The result of this study showed that rural male students have higher total fitness level than urban male students. This result was agreed with Chaudhary (1998). The result of the present study indicated that rural male students have higher fitness level than urban male students in skill related fitness. This study was agreed with the findings of Shashidhara (2016). The result of the present study indicated that rural female students have higher total physical fitness level than urban female students. The result of the study was agreed with Manmeet et al.(2010).The result

of the study showed that rural male and female students are better when compared with urban male and female students' in health related and skill related fitness. This result was agreed with the finding of Saha and Haldar (2012).This result was found may be due to active and energetic life style of rural students, rural areas life style is more active when compared to the life style in urban areas which produced high level of physical and physiological functioning in rural residents. On the other hand civilization, advancement of science and technology minimized physical activity level of urban population due to dependency in mechanization, automation and computerization (Manmeet et al.,2010).

The mean score of total fitness, health related fitness and skill related fitness of rural female students were higher when compared to urban female students. This result was agreed with the study of Ghosh and Goon (2015).The reason for high fitness level of rural female students may be due to the fact that the students belonging to rural area performs various extra activities walk to school, market, various type of play, regular physical activity (Ghosh and Goon ,2015).

The result of study showed that there is positive relationship between total physical fitness and academic achievement of students. The result of this study was agreed with Grissom (2005), Wilson (2015), and Chomitiz et al.(2009). The reason for relationship between academic achievement and physical fitness is that immediately after engaging in physical activity, students are better able to concentrate on classroom tasks, which can enhance learning and through time, the children's improved physical fitness can have additional positive effects on academic performance(Castelli et al. ,2014).

The results of the present study indicated that health related fitness had positive relationship with academic achievement. The result of this study was agreed with Trost (2002). Regular participation in physical exercise and being physically fit improve brain functions, such as attention and memory, because brain functions are the foundation of learning (Research brief, 2015).

The results of the present study indicated that grade 9 students' total physical fitness, health related fitness and skill related fitness had positive relationship with academic achievement. This result was agreed with the findings of Grissom (2005) but was opposed with the findings of Chu et al.(2016). Probably the causes of contradiction with results of the present study were geographical location and life styles of individuals and ethnicity.

5.3. Conclusions

The results of the present study confirm that rural students are comparatively better than urban students in the level of majority of total physical fitness components, health related fitness and skill related fitness components. Physical fitness was positively associated with academic achievement according to the result of the study.

Based on the analysis of data, interpretation of results, and discussion of findings as well as possible limitations of the study the following points were stated as conclusions by the researcher.

- The physical fitness of rural students was found to be significantly higher than those of the urban students.
- The health related fitness of rural students was found to be higher than those of the urban students except flexibility.
- The skill related fitness of rural students was found to be significantly higher than those of the urban students except agility.
- Rural male students have higher fitness level than urban male students in general including with skill related and health related fitness.
- Rural female students have higher fitness level than urban female students in general including skill related and health related fitness.
- According to the present study there was positive relation between the students' academic achievement with physical fitness.

5.4. Recommendations

On the basis of literature review, the findings of the study and the conclusion in order to improve physical fitness level and academic achievement of secondary school students the following recommendation are forwarded.

1. Curriculum developers should be aware of the difference among students and design mechanisms to address the observed gap in fitness level between urban and rural students.
2. Physical Education teachers should note and adjust their Physical Education instruction to make up for the fitness deficiencies of urban students.
3. In this research urban and rural students were compared without making reference to their actual life styles, therefore, additional research is also needed regarding the role of urban

and rural students' lifestyle in secondary school students' physical fitness and academic achievement.

4. This research was delimited to Hawassa City and therefore, the effect of geographic variation was not considered. Hence further research is required concerning fitness level of urban and rural secondary school students using similar method in other regions of Ethiopia.

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APPENDICES

Appendix A

Research Instrument

The Main purpose of this instrument is to compare health related and skill related physical fitness level of urban and rural students attending in Hawassa secondary high school.

Please √tick one of the options below

Part I students personal information

1.Name_____

2 .Age_____ 3. Sex : Male ☐ B. Female ☐

4 .Grade: 9th ☐ 10th ☐ 5. First semester average_____

6. Residence: Urban ☐ rural ☐ Moved from rural recently ☐

Part II main instrument

A. Selected health-related fitness test

Place a √mark in the appropriate box that corresponds to fitness level of student for the following health related and skill related fitness testes.

	Fitness score				
	Very good (5 points)	Good (4 points)	Average (3 points)	Poor (2 points)	Very poor (1 point)
1. Cardiovascular endurance	☐	☐	☐	☐	☐
2. Level of muscular endurance	☐	☐	☐	☐	☐
3. Level of muscular strength	☐	☐	☐	☐	☐
4. Level of flexibility	☐	☐	☐	☐	☐

B. Skill related fitness test

1. Level of agility	☐	☐	☐	☐	☐
2. Balance capacity of student	☐	☐	☐	☐	☐
3. Coordination ability	☐	☐	☐	☐	☐
4. Current level of power	☐	☐	☐	☐	☐
5. Reaction time	☐	☐	☐	☐	☐

6. Speed ☐ ☐ ☐ ☐ ☐

Ratings for each test and scoring (points)

Rating	score
Very good	5
Good	4
Average	3
Poor	2
Very poor	1

Interpretation for health related fitness total points _____

4-5	- very poor
6-10	- poor
11-14	- average
15-17	- good
18-20	- very good

Interpretation for skill related fitness test total points_____

6-9	-very poor
10-14	- poor
15-20	- average
21-25	- good
26-30	- very good

APPENDICES

Interpretation for total fitness (health related and skill related) test total points_____

10-14	-very poor
15-23	- poor
24-34	- average
35-42	- good
43-50	- very good

DECLARATION

The Undersigned Declare that this Thesis is my Original Work and has not been Presented for a Degree in any other University and that all Sources of Materials Used for the Thesis have been Duly Acknowledged.

Name of the Candidate:- **Fettiya Kedir Abdela**

Signature:- _____

Advisor:- **Dr. Mekbib Alemu**

Signature:-_____

Place and Date of Submission **:- Addis Ababa University**

September,2017