UNIVERSITY OF EDUCATION, WINNEBA

AN EVALUATION OF SPEED AND STRENGTH STANDARDS FOR LOWER PRIMARY SCHOOLS IN THE AKUAPEM NORTH DISTRICT OF GHANA.

FRANK OPOKU

8100090012

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DECLARATION

STUDENT'S DECLARATION

I, Frank Opoku, declare that this Thesis, with the exception of quotations and references contained in published works which have all been identified and duly acknowledged, is entirely my original work, and has not been submitted, either in part or whole, for another degree elsewhere.

SIGNATURE…….

DATE…….

SUPERVISOR'S DECLARATION

I hereby declare that the preparation and presentation of this work was supervised in accordance with the guidance for supervision of Thesis as laid down by the University of Education, Winneba.

NAME OF SUPERVISOR: Prof. H.A. Pufaa

SIGNATURE: ……..

DATE: ……

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DEDICATION

I dedicate this work to

My parents, wife and children

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Glossary/Abbreviations

AAP -	American Academy of Pediatrics
ACSM -	American College of Sports Medicine
CAC -	Coaching Association of Canada
CDC-	Centers for Disease Control and Prevention
CSA -	Cross sectional area
FMS -	Fundamental Motor Skills
HHS-	Health and Human Services
NASPE -	National Association for Sport and Physical Education
NSCA-	National Strength and Conditioning Association
SPED-	Special Education
SISD-	Southeast Island School District

ABSRACT

.Physical activity should help improve muscular strength and endurance, flexibility, and cardiovascular endurance, as well as serves as a vehicle that helps children establish self-esteem and strive for achievable, personal goals. Improving the quality of physical education is necessary to achieve potential health-benefits in the child and adolescent populations. A calculated shift to national standards will provide teachers with a timely opportunity to examine the direction of their own physical education programmes (NASPE, 2004).This study was carried out as an evaluation of speed and strength standards of lower primary schools in Ghana. In the study 1200 pupils in the lower primary class 1-3 from the Akuapem North District of Ghana were used. This was made up of 600 boys and 600 girls. The sample size was drawn from twenty selected schools in Akuapem. The tests administered were the 30m dash and the standing broad jump. The 30m dash test was used to measure speed and standing broad jump test used to measure the horizontal leg strength of the subjects. The quasi experiment research design was employed for this project. Data collected was analyzed using the t-test and conclusions were drawn. Generally it was observed that the boys performed better than the girls in all the grade levels. The average performance of the girls in the speed test was 6.50sec and of boys was 6.30sec. In the broad jump the girls and boys had an average score of 1.2m and 1.3m respectfully. It was recommended that teachers specify exactly what will be assessed in order to return more useful information about student achievement.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Akuapem North District is part of the districts that make up the Eastern Region. It has about 119 public primary schools and pupils' population of 19,226. The private schools are 10 with a population of about 1,000. The district is divided into ten circuits which include the following, Akropong, Adawso, Adukrom, Amanfro, Mampong, Larteh, Mangoase, Okorase, Special Education (SPED) and Tinkong. There are 786 teachers in this district out of which 67 are untrained who teach in the primary schools. These schools have physical education as part of their curriculum and teachers are supposed to be teaching it. (Akuapem North Education Office)

The main aim of each training process is transformation of abilities, characteristics, and overall potential of an individual, from the certain initial to the desired final stage. The difference in the final compared to the initial state should be reflected in how effective the changes are in his/her anthropological status with all its components. The process of motor learning requires the involvement of many operators, each of which causes specific changes that would made a transformation of the characteristics that are important for creating a dynamic stereotypes of an individual. The acquisitions of motor skills that are necessary for the execution of various motor tasks are an important part of training in sport (Horga, 1993), but also in the process of education. Learning of motor skills is the intellectual task because it depends on many mental processes such as memory, problem solving, and processing of information in the central nervous system

etc. (Horga, 1993). This implies that the school lessons with the instructional approaches adopted by the teacher forms the basis for exposing children to fundamental motor skills proficiency in the early stages of schooling which has the potential to intrinsically motivate children in future engagement in physical activities or sports.

For motor learning, essential items are the characteristics of the participants that are involved in the learning process and the level of the abilities that are required for motor learning and the finalization of the learned motor task. Also, in order to achieve meant transformation by using kinesiology stimulus's, the basic conditions such as the frequency of stimulation, appropriate training load and selection of appropriate methods for motor learning, especially if the learned movements are using in everyday life must be fulfilled. The final result of motor learning and its efficiency is suitable for research in various dimensions of the motor space (Lorger, M. et al 2012).

For over a century, schools have played a central role in providing opportunities for children and adolescents to participate in physical activity. Traditionally, students have engaged in physical activity during physical education, recess breaks, walking or biking to and from school, and participation in school sports. Physical education has been a part of the school curriculum since the late 1800's and school sports has been a component of educational institutions since the early 1900's. However, alarming health trends are emerging suggesting that schools may need to reevaluate and expand their role in providing physical activity to children and adolescents. Improving the quality of physical education is necessary to achieve potential health-benefits in the child and adolescent populations as posited by (Vissher & Seidell, 2001).

Physical education plays a critical role in educating the whole student. Research supports the importance of movement in educating both mind and body. Physical education contributes directly to development of physical competence and fitness. It also helps students to make informed choices and understand the value of leading a physically active lifestyle. The benefits of physical education can affect both academic learning and physical activity patterns of students. The healthy, physically active student is more likely to be academically motivated, alert, and successful. In the preschool and primary years, active play may be positively related to motor abilities and cognitive development. As children grow older and enter adolescence, physical activity may enhance the development of a positive self-concept as well as the ability to pursue intellectual, social and emotional challenges. Throughout the school years, quality physical education can promote social, cooperative and problem solving competencies. Quality physical education programmes in our nation's schools are essential in developing motor skills, physical fitness and understanding of concepts that foster lifelong healthy lifestyle.

The Southeast Island School District (SISD 2005) developed an adventure-based lifetime-fitness curriculum in their school district. Although the district does not employ a single certified physical education specialist, content experts and support from the school district helped teachers to develop a curriculum that embodied the national standards. Adventure activities were selected based on criteria that included historical appropriateness, cultural appropriateness, health-enhancing potential, and adaptability to cross-curricular lesson plans. Due to the training received as a result of this project, teachers expressed increased feelings of confidence in their ability to teach meaningful physical education classes. The dramatic and positive changes in attitudes among the teachers bode well for the future of physical education in the SISD. Furthermore, the

successful results attained through these activities over the span of a single year demonstrate the powerful changes that can be made when teachers and administrators share a common vision. (SISD)

Physical education and sports in primary schools in Ghana should provide a wide range of learning experiences through play and sport movement for the pupils. The most important purpose of physical education at this level is the development of mechanical efficiency i.e. coordination, awareness, relationships and skills characterized by the use of large muscles in vigorous activities featuring manipulative, locomotor and non-locomotor skills. The key words at this level are play and fun. The syllabus places premium on mass participation of pupils in games and sports, rather than on competitive sports which is only one aspect of the total physical education programme. The coverage or scope of the syllabus is therefore that of width rather than of depth in which case, few pupils are always selected and trained in sporting activities to represent the school. The syllabus is designed to allow for inclusive education and no child should be left out of Physical Education.

Physical education is unique to the school curriculum as the only programme that provides students with opportunities to learn motor skills develop fitness and gain understanding about physical activity. In Ghana every primary school child should have 70minutes of physical education. The physical education curriculum for primary schools in Ghana indicate that teachers are to guide pupils through physical activities such as activities involving shuffle relays, number games, short sprints, scoring runs, "Mr. Wolf, what is the time", etc. Other activities include leap frog, hopping, jumping over obstacles and objects like benches, sticks, hoops, etc.

The school children at this level engage themselves in various movement activities. Notably among these activities are those that advance the course of natural movement namely walking and running. The after effects of these movements are the development of speed and strength. The physical education (P.E.) syllabus has been designed such that it addresses the issue of speed and strength development through properly organized physical education lesson.

The syllabus further provides criteria for teachers to assess these fitness components of the school child at the end of each term. This behooves upon the physical education teacher to attach seriousness to the teaching of physical education at this level. Physical education is allocated two periods a week. Each period last thirty (30) minutes.

Mostly those who teach physical education at the primary level in Ghana are the generalist teachers from the Colleges of Education. Most students therefore do not offer the subject but are expected to teach physical education after completion of their course. How will such a teacher guide pupils if he/she has no inept knowledge about physical education?

In Ghana, even though physical education is part of the school curriculum from the basic schools through to senior high schools, there are no national standards defined as to what pupils and students will be expected to learn from a high-quality physical education programme and their records to indicate the individual levels.

A lot of research supports the assertion that speed thrives on strength and as bedmates it is imperative that pupils in primary schools in Ghana should have these qualities in order to participate meaningfully in physical education lessons.

1.2 Statement of the Problem

Physical education plays a critical role in educating the whole student. Research supports the importance of movement in educating both mind and body. Physical education contributes directly to development of physical competence and fitness.

Mastering fundamental movement skills at an early age establishes a foundation that facilitates further motor skill acquisition and gives students increased capacity for a lifetime of successful and enjoyable physical activity experiences. Similarly, the patterns of physical activity acquired during childhood and adolescence are likely to be maintained throughout one's life span, providing physical, mental, and social benefits

Clark and Metcalfe (2002), opined that children with advanced levels of fundamental motor skill proficiency are more likely to participate in physical activities and develop future habits for physical activities as also stated by Garcia and Garcia, (2008). That is children are not miniature adults, they must be taught to be able to acquire fundamental motor skills in early years.

The physical education activities in Ghana do not stipulate any benchmark by which a good or quality physical education lesson could be measured as pertains in the National Standards of Physical Education in United States of America known as NASPE National Standards. For instance, pupils are to perform 30m sprint dash. What are the speed levels for the teacher to know the ability level of each child? Again what do we use in measuring the strength levels of pupils during a physical education lesson.

It is through the teaching of physical education that these children can improve upon their biomotor abilities such as speed and strength. The physical education syllabus has established standards in all physical activities enshrined in it. These standards cover skill performance as well as biomotor abilities of the child.

It is from this notion that the researcher will attempt to establish the speed and strength levels of the primary school child as a basis for evaluating speed and strength standards for lower primary schools in Ghana.

1.3 Purpose of the Study

Standards are important because it helps in establishing a model to compare or measure the quality or performance of a practice or procedure. The purpose of this study is to evaluate speed and strength standards which will help to measure the pupils speed and strength levels in a physical education curriculum in our basic schools. This will be for pupils in the basic schools in Ghana.

1.4 Significance of the Study

The recommendation from this study will help establish standards for upper primary classes. Recommendations from this study will help teachers and administrators in the effective teaching of physical education.

This study will also help encourage further research on the evaluation of speed and strength standards for lower primary pupils in other districts.

The study can also be beneficial to physical education teachers as it provide useful information for physical educators in assessing pupils in the lower primary schools.

More so, the researcher also believes that, this study has the potential of changing the Ghana Education Service Kindergarten Physical Education curriculum about the types of instructional activities that may be valuable in promoting the motor development and perceived motor competence of young children enrolled in all preschools in the country. Additionally, it also provides opportunities for children to participate in games via learning.

1.5 Research Questions

The research questions for this study include the following

1. What type of speed is relevant to the lower primary school child?
2. What type of strength is relevant to the lower primary school child?
3. What are the speed levels of pupils in the lower primary schools?
4. What are the strength levels of pupils in the lower primary schools?

1.6 Delimitations of the Study

There are a lot of primary schools in Ghana. Every district has primary schools both private and public. This study was delimited to public lower primary schools in the Akuapem North District in the Eastern Region.

1.7 Limitations of the Study.

Due to time constraint the researcher did not cover all the schools in Akuapem North District.

1.8 Operational Definition of Terms

Astride jumps- jumping and running forward after three jumps

Benchmark- rating norms to be used for assessing pupils in Akuapem North District.

Lower primary- from class one to class three in Ghana school system.

Lower primary pupil-a child between the ages of 6-9 years and is in either class one, two and three.

Slow jogging- walking briskly and swinging the arms forward and backwards.

Toe walking- walking with heels raised.

CHAPTER 2

LITERATURE REVIEW

This chapter was broken down into the theoretical framework of the study. It also looked at the speed relevant to the lower primary child. It also focused on the speed levels of the lower primary child. The relevance of strength to the primary child as well as the strength levels were also looked at.

2.1 Theoretical Framework

According to Payne & Isaacs (2007), “Movement is a product of the cooperation of many subsystems in the body such as muscular strength, neurological status, and skeletal systems”. They further emphasized that “These subsystems are frequently interacting and changing, and each movement pattern requires different subsystems that are important for the specific skill or activity”. It can be deduced from the above that maturation, concise instruction and suitable environment plays a major role in the success or failure of children motor skill acquisition and improvement.

Speed is the ability to move quickly across the ground or move limbs rapidly to grab or throw. Speed is not just how fast someone can run (or cycle, swim etc.), but is dependent on their acceleration (how quickly they can accelerate from a stationary position), maximal speed of movement, and also speed maintenance (minimizing deceleration). Movement speed requires good strength and power, but also too much body weight and air resistance can act to slow the person down. In addition to a high proportion of fast twitch muscle fibers, it is vital to have efficient mechanics of movement to optimize the muscle power for the most economical movement technique.

Speed is one of the main fitness components, important for success in many sports. For some athletes such as Track and Field sprinters, sprint swimmers, cyclists and speed skaters, speed is the most important aspect of fitness. In many other sports, including team field sports, good speed is also very important as part of the overall fitness profile. A vote of the top sports requiring speed has the obvious ones of track and field sprinters on top. To improve your running speed requires a training programme that focuses on leg strength and power, with appropriate technique training to best utilize your strength and power development.

In sports we need speed in order to perform better. It helps one to accelerate, change direction quickly as well as deceive the opposition. Energy, strength and knowledge concerning that sport are other key components of performing better. In most sports it's pretty common to hear about the importance of speed. In specific, running speed (how fast someone can run) has garnered a wide range of respect among sports performance coaches because it's pretty common to see faster athletes' excelling in sports.

Speed is important in sports because it helps the sportsmen to beat their opponents. A game like football requires one to pass the ball with the appropriate velocity while running with a lot of power. In athletics, swimming and cycling, you require a lot of speed training in order to win. The athletics games will provide children with the opportunity to make the most of the beneficial practice of Athletics, in terms of Health, Education, and Self-fulfillment.

The three types of speed are Acceleration speed, Maximum Velocity and Speed Endurance. This is classified into Acceleration speed 0 – 30m, Maximum Velocity 30m – 60m and Speed Endurance 60m – 600m.

Most sports are played in a confined space, forcing athletes to stop and start quickly while reacting to each other and the flow of the game. A play is often decided by an athlete's first few steps, whether it is a wide receiver beating someone off the line or 100-meter sprinter coming out of the blocks. Because of this, first-step quickness and acceleration are incredibly important for all athletes.

The primary school child needs speed and any athlete who can produce a powerful first step and use proper mechanics during the acceleration phase will reach top-end speed as quickly as possible. This is a deadly weapon for any athlete. Speed test was selected because the primary school child needs Acceleration speed that is 0-30m because of initial speed to build their confidence in every day activity. Also Acceleration is what we spend a great deal of time training so that if at an early stage the child has acquired this skill they will not find it difficult to improve on in future. Speed is one component of physical fitness and is considered an indicator of bone health and developmental stage. (Vicente-Rodriguez, Ara et al., 2004; Vicente-Rodriguez, Dorado, Perez-Gomez, Gonzalez-Henriquez, & Calbet, 2004).

Speed is not just about genetics. With the right training methods using techniques that top sports scientists have discovered and confirmed even "slow" athletes can become quick. Modern day sports are becoming more and more about speed. Right or wrong, if you're quick and powerful you can often compensate for a lower skill level. Whatever

your talent, nothing will impact your game (or that of your athletes) like a noticeable gain in speed and fitness.

Strength is the maximal force you can apply against a load. Training to improve muscle strength includes lifting weights or otherwise increasing the resistance against which you work. Strength is one of the main fitness components, important for success in many sports. Certain sports, such as weight lifting, wrestling and weight throwing, it is the most important physical attribute. In many other sports, including team sports like rugby, good strength is also very important as part of the overall fitness profile. A vote of the top sports requiring strength has the obvious sport of weightlifting ranked highest.

Strength is an important component of success in most athletics events, and therefore should be an essential part of most training programs. The time spent in training for strength should be proportional to the requirement for these components in your event, and your deficiencies in this area. The stronger the muscles and the more forceful the contractions, the faster the athlete will run, higher he will jump, further he will throw/kick, and harder he will hit. An added bonus of strength training is injury prevention. Athletes who strength train tend to have fewer injuries. This is because strength training strengthens the muscle attachments and increases density of bones at the sites of muscle origins and insertions. And if an injury does occur to an athlete who has been strength training properly, it will probably not be as serious and will tend to heal fast. (Defranco, 2013)

The types of strength are Muscular Strength which is the greatest force that is possible in a single maximum contraction, Elastic Strength is the ability to overcome a

resistance with a fast contraction and Muscular Endurance is the ability to express force many times over.

Strength is the maximal force you can apply against a load, and power is proportional to the speed at which you can apply this maximal force. Training to improve in this area can include lifting weights, throwing heavier implements, running against a resistance, and plyometrics (depth jumping and bounding).Strength training can be commenced as young as thirteen. For the beginner, a gradual introduction is necessary to learn the correct techniques, to prevent injuries occurring, and to gain good baseline strength on which more intensive and complex weight training programs can be developed.

Improvements in strength follow the overload principle. That is, to increase muscle strength the muscles need to be stressed with a load greater than normal. The muscles are thus stimulated to adapt to the increased load. Once you have good baseline strength, more complex and specific programs can then be performed. The exercises chosen should be specific to the muscle groups used and the actions performed in your event. Variation is also important to maximize the gains in strength. Varying intensity (amount of rest, weight lifted) and volume (repetitions, sets, sessions per week), provides greater stimulus for strength gains than simply following a set program and progressively increasing the amount of weight lifted. Weight training three times a week, with at least one day between sessions is generally adequate. Rest days between sessions are necessary for recovery and the adaptation to take place.

Speed thrives on strength and they are bedmates. A lot of study has concluded that for one to improve on speed he needs to have acquired strength in the legs. This

study chose these two fitness components Speed and Strength because of its importance enumerated above to the primary school child.

In the United States of America the various states have also developed their own standards as a guideline in teaching and learning of physical education. Massachusetts standards indicate that: PreK–12 STANDARD 2: Physical Activity and Fitness: Students will learn by repeated practice, acquire and refine a variety of manipulative, locomotor, and non-locomotor movement skills, and will utilize principles of training and conditioning,. By the end of grade 5 – Through the study of Motor Skill Development students will**:** Apply movement concepts including direction, balance, level (high, low), and pathway (straight, curve, zigzag), range (expansive, narrow), and force absorption (rigid, with bent knees) to extend versatility and improve physical performance biomechanics and exercise physiology, and will apply the concept of wellness to their lives.

Colorado's comprehensive health and physical education standards lay out a vision for these vitally important disciplines, and describe what all students should know and be able to do at each grade level through eighth grade and in high school.

The Physical Education Model Content Standards for California Public Schools, Kindergarten through Grade Twelve affirms the standing of physical education; rigor is essential to achievement, and participation is not the same as education. These standards focus on the content of physical education and incorporate the detail required to guide the development of consistent, high-quality physical education instructional programs aimed at student learning and achievement.

Standards-based education uses standards to help educators and their communities identify explicitly what students must know and be able to do. It brings what is to be learned into focus and holds learning as a constant while treating other traditional constants (time, location, instructional materials, etc.) as variables. (NASPE 2005)

The Illinois Learning Standards are statements which define a core of essential knowledge and skills that all Illinois students enrolled in public schools are expected to know and be able to do.

The following reasons were given when the Illinois state standards were developed.

• To set uniform high expectations for all students;

• To provide a basis for equal opportunity to learn;

• To clarify the intended results of schooling for all audiences;

• To ease transitions for students who move from school to school and from grade to grade;

• To specify exactly what will be assessed in order to return more useful information about student achievement;

• To establish criteria for a meaningful accountability system;

• To provide a foundation for defining the knowledge and skills teachers need in order to provide instruction for students

The National Association for Sport and Physical Education (NASPE) sets the standard for excellence in physical education, physical activity and sport and offers a

broad array of informational conferences, professional development opportunities, books and cutting edge resources to help you become a leader in your classroom, school, and community.

In United States of America, forty-eight states (92%) have their own state standards for physical education, but only 67% (34 states) require local districts to comply or align with these standards. The six national standards for physical education are usually addressed within these state standards: 98% (46 states) address development of motor/movement skills, knowledge and application of movement concepts, and personal/social responsibility; 94% (44) address regular participation in physical activity and development and maintenance of physical fitness; and 85% (40 states) address valuing physical activity. Only 37% of states (19) require some form of student assessment in physical education. Among the states that do require assessment, 74% (14) require assessment of physical fitness, 37% (7) require assessment of knowledge of physical education content, 26% (5) require assessment of participation in physical activity outside of physical education class, and 32% (6) require assessment of personal/social responsibility in physical education. Just 10% (5 states) send this assessment information to the state department of education as congregate data for each school, and only 8% (4 states) note that these data are sent from the schools to the students' parents or guardians. Five states—New Hampshire, New Mexico, New York, Vermont and Virginia require assessment in every grade. (NASPE 2010)

When it comes to physical education, what should students know and be able to do? The National Association for Sport and Physical Education (NASPE) has assisted in the work toward answering that question by developing National Standards for Physical

Education (2004). These standards define what students will be expected to learn from a high-quality physical education program.

Under NASPE's National Standards, a physically educated person:

Standard 1. Demonstrates competency in motor skills and movement patterns needed to perform a variety of physical activities.

Standard 2. Demonstrates understanding of movement concepts, principles, strategies and tactics as they apply to the learning and performance of physical activities.

Standard 3. Participates regularly in physical activity.

Standard 4. Achieves and maintains a health-enhancing level of physical fitness.

Standard 5. Exhibits responsible personal and social behavior that respects self and others in physical activity settings.

Standard 6. Values physical activity for health, enjoyment, challenge, self-expression and/or social interaction.

Included with these standards is the identification of various assessments linked to them. Fitness measurement, for example, is just one of the assessments that have been used to connect to Standard 4 and help students identify their personal levels of health-related fitness and provide them with a baseline for developing personal fitness plans. Through the process of developing personal fitness plans, students connect with the knowledge and skills found in Standard 3 as they discover the importance of regular physical activity and how that activity can help improve general health and wellness.

The physical education model content standards represent the essential skills and knowledge that all students need to maintain a physically active, healthy lifestyle. California law clearly establishes the priority of physical education instruction. Education Code Section 51210 requires 200 minutes of physical education every ten school days for

students in grades one through six. Education Code Section 51222 provides for 400 minutes of physical education every ten school days for students in grades seven through twelve. The model content standards provide guidance for developing physical education programs by identifying what each student in California should know and be able to do at each grade level. With adequate instruction and sustained effort, students in every school should be able to achieve the standards. Some students with special needs may require appropriate accommodations, adaptations, and modifications to meet the standards.

The American Academy of Pediatrics (AAP), NASPE, the American Heart Association, the U.S. Department of Health and Human Services, the U.S. Department of Education, the President's Council on Physical Fitness and Sport and the Centers for Disease Control and Prevention (CDC) all are on record as supporting the need for physical activity for youth and for quality physical education in schools. 31% of physical education teachers perceive increased interest and support from parents regarding students' physical activity; and 27% perceive increased interest/support from parents regarding students' physical education. According to one survey by AAP, nearly all parents (95%) think that regular daily physical activity helps children do better academically and should be part of a school curriculum for all students in grades K-12. Three out of four parents (76%) think that more school physical education could help control or prevent childhood obesity. The majority of parents believe that physical education is at least as important as other academic subjects. The percentages range from 54% to 84%, depending on the subject being compared.

A survey report from the Harvard Health Forum indicates that 91% of parents surveyed feel that there should be more physical education in schools, particularly for

fighting obesity. Overweight among youths: Among children ages 6-11, 33% are overweight and 17% are obese. 34% of adolescents and teens ages 12-19 are overweight and 17.6% are obese. These rates have roughly doubled since 1980. Eight of the 10 states with the highest rates of obese and overweight children are in the South, as are nine of the 10 states with the highest rates of poverty. Physical Fitness and Academic Performance.

A 2004 California Department of Education study, using data from a standardized health-related fitness testing protocol and the California Standards Tests, showed a significant positive relationship between physical fitness and academic achievement. A 2007-08 study of more than 2.4 million Texas students found that students who were physically fit were more likely to do well on the state's standardized tests than students who were not physically fit. In 2009, the New York City Health Department and Department of Education reported that physical fitness was associated with higher academic achievement among their public school students. A 2010 CDC report analyzes a large body of evidence linking physical education and school-based physical activity with academic performance, including cognitive skills and attitudes, academic behaviors and academic achievement.

The majority of states in America mandate that students must take physical education. Just more than 84% of states (43) mandate physical education for elementary school students, 78% of states (40) mandates it for middle/junior high school students and 90% (46) mandate it for high school students. Of those states that mandate physical education for elementary school students, 86% (36) require classes in kindergarten, 93% (39) require physical education in grades 1 through 5, and 71% require physical education in grade 6.

According NASPE, the U.S. Department of Health and Human Services (HHS) has noted a direct correlation between regular physical activity and health among children and adolescents. For example, kids who are physically active have vigorous cardiopulmonary and respiratory systems: strong hearts and lungs. They have less body fat. And they have strong bones and muscles. All these factors, according to HHS not only make for a healthy childhood, they increase the chance of a healthy adulthood. Risk factors for chronic diseases such as heart disease, high blood pressure, type 2 diabetes, and osteoporosis can develop early in life, and regular physical activity can be a significant preventative measure. (NASPE 2010)

Major health organizations such as the American College of Sports Medicine (ACSM), the American Academy of Pediatrics (AAP) and the National Strength and Conditioning Association (NSCA) support children's participation in appropriately designed and competently supervised strength training programs. Benefits include increasing the muscular strength of kids and improvements in a child's muscular endurance, body composition and sports performance.

2.2 Speed Relevance to the Lower Primary School Child.

Speed is the ability to move all or part of the body as quickly as possible. Speed is an elusive creature, a complex mobile human ability consisting of various elements. By enhancing these abilities with special games and drills, a smart coach will help develop and increase a child’s overall speed. Speed drills are special exercises intended to increase speed through the development of motor skills.

For our bodies to achieve speed, we have to supply energy to our muscles very quickly.

Including speed training as part of your running workouts increases your body's ability to oxidize fat, as found by a Canadian study published in a 2007 issue of the Journal of Applied Physiology.

Speed is an elusive creature, a complex mobile human ability consisting of various elements. It's perhaps more appropriate to talk about speed abilities than about speed as a unique ability. Speed has various elementary components: speed of reaction, frequency of movement, speed of each single movement, acceleration ability, and maximum speed. It is very interesting that there is no significant connection between these forms of speed. In other words, a player can react quickly, but demonstrate poor acceleration ability at the same time. Therefore, to increase speed in a young athlete, it is best to work separately on the development of each speed element. Natural development of these elements is not simultaneous some are developed earlier, others later. Coaches must be aware of this in order to fully develop a young player's speed abilities.

Speed of reaction and frequency of movements are abilities that are initially developed very early on, generally at the preschool age, and very dynamically between 7 to 11 or 12 years of age. The basic reason for this is the fact that parts of the nervous system concerned with speed and reactions are mostly formed during puberty. After this optimal growth period, the central nervous system is changed very little, and so the possibilities to influence speed of reaction and frequency of movement are very small.

Speed of each single movement, acceleration ability, and maximum speed should be developed early, since the conditions for that are mutual and the same. Maximum movement speed is mostly a hereditary ability that depends on the number and percentage of "fast-twitch muscle fibers" an athlete has. Each muscle is a distinct genetically-determined blend of what's called slow twitch, or Type I fibers, and fast twitch, or Type

II fibers. It's the slow-twitch fibers that are called upon during low-intensity exercise, such as bicycling and walking. However, for explosive actions, such as sprinting down a basketball court or jumping for a rebound, it's the powerful fast-twitch fibers that spring into action. Young athletes may have a ratio of these fibers in the range of 60:40 or 40:60, while a select few may have as much as 90 percent of one type of fiber. The problem with fast-twitch fibers is that they decline with age. If you don't use them, then you lose them.

Progressive weight-training exercises can strengthen fast twitch fibers. These fibers will be mobilized to perform the high-intensity exercises, while the slow-twitch provide the endurance to perform each exercise over an extended period of time. Having fast twitch fibers does not impart speed. This potential for fast movement will remain unrealized unless it is stimulated and helped through specialized training. Koprivica (2003) postulates that, we will never make a fast basketball player out of a naturally slow boy, but on the other hand, we have to train a naturally quick boy properly in order to make him really fast.

Many aspects of speed are related to speed of thought and decision making. Therefore, the coach must not be deceived during the selection process by estimates of elementary speed levels because the basketball player is naturally not a sprinter. It is much more important to observe the children at play, judging them according to how fast they switch from one movement to another. Search for children who are fast in play and train them to become like that when they play basketball. Many naturally fast players are not able, for various reasons, to use their maximum straight-ahead speed when they play basketball. They may be slow with the ball or they may move too fast and are not able to coordinate their speed with the pace of the game. The cause of this can be poor training,

but it is more often due to poor coordination. On the other hand, a slower child (who is still fast!) can have the ability to use his maximum speed playing the game.

According to Koprivica (2003), when working with young players, the Yugoslav basketball school demands speed in various movements. Elementary speed (simple movements) is directed by a pyramidal motor path. But, an extrapyramidal path is more important for basketball because it is responsible for the delicate movements that are necessary for successful technique performance. Thus, when working with young players, special attention should be paid to developing complex speed forms. The young player needs a certain level of muscle power. It is very important to prepare the muscles for speed games. Great care must be taken by coaches when having children perform these sprints because all the stopping and starting places great stress on the still-developing knee joints of the young athletes. Be sure to have a good warm-up period before beginning these high-intensity drills.

Speed of improvising and combining different movements is the most complex speed form, since it consists of all the other forms. This type of speed is usually developed in basketball play and in various elementary games (more often with children).

What children don't learn is how to run correctly so they learn incorrect techniques from an early age and unless corrected these stay with the children for the rest of their sporting careers. Teaching a young child the basic mechanics of correct running techniques will give them the 'edge' in most sports whether it’s with a ball, bat (stick) or racquet. Once a young child has mastered the skill of running correctly they then can also learn: How to run fast, How to be explosive off the mark, Faster reaction times, How to jump higher, Greater agility, Run efficiently for longer, Control balance and co-ordination, and be less susceptible to injury due to imbalances in the body. Metzl, J.

(2010). It is therefore important to avoid this by either teaching your child to run correctly or find an experienced coach who can do it for you. What a difference it will make.

Young athletes have become more sport specialized in recent years. The athletes are focusing on one sport rather than participating in multiple sports. The competition levels have increased and athletes are beginning to train at younger ages. Speed, agility, and strength training are essential for athletes that are focused on excelling in sports. Physical training benefits the athlete in building endurance, strength, and mobility. Psychological benefits can include raised self-esteem, increased self-confidence, and improved self-discipline. Speed, strength, and endurance conditioning are imperative in a highly trained young athlete; thus creating a more disciplined athlete in good physical shape.

While I was working as an assistant soccer coach, the head coach informed me that his only losing season was the year he focused on skill over speed, agility, and strength training. He emphasized that he would never make that mistake again. Apparently his philosophy is successful: the coach has not had a losing season in more than ten years of coaching soccer. A well-conditioned athlete can out endure an unconditioned, yet highly, skilled athlete, in any sport. A balance of power can build speed, agility, and strength. (Grasso, 2010) Grasso was emphasizing that a child who has develop his or her speed will perform better than a child without speed. Speed is therefore relevant in the skills development of a child.

When working with children, a variety of competitive speed drills is preferable, with adequate time given for rest. In this way, the practices will be interesting for the children as well as great ways for enhancing speed in children. If the goal is the development of some segment of speed, and if the coach knows the basic methodology,

it is easy to choose some of the familiar drills, or else he can combine them and create new ones. Drills that young children (7 - 9 years old) can master and enjoy include (but not limited to) are: Agility Ladder- single legs, double legs, hop scotch, shuffle, scooter, Small hurdles- single leg, double leg, single hops, double hops, Agility Poles. All of these drills can gradually be made more complex as the child progresses. A fantastic source of drills is Training for speed, agility and quickness. Other speed drills help develop speed in movements that are necessary for a specific sport. A soccer player may do speed drills that develop speed and agility, the ability to change directions quickly and move side to side.

According to Metzl, 2010 it is vital for footwork, through agility training, not be implemented until the core muscle groups of the body are stronger and the young athlete has more controlled range of motion of the lower extremities. Proper footwork agility training can result in an increased rate of acceleration and deceleration providing maximum movement and speed. Footwork agility drills should be age and skill appropriate, beginning with basic drills. Forward and backward foot movement and side to side movement are the most basic foot work agility drills. Good training practice can result in the reduction of occurrences of ankle and knee injuries.

2.3 Speed Levels of the Lower Primary School Child.

In sports today speed is the name of the game. To maximize speed proper running techniques need to be taught.

The physical education syllabus in Ghana indicates that athletics should be taught throughout the six-year period. From Primary 1-3, the activities to be taught should be informal and should include locomotor skills (walking, running, pawing, jumping,

hopping, skipping, leaping, galloping, etc.), and non-locomotor skills (bending, twisting, stretching, lifting, turning, balancing, pushing, etc.). Basic rules should be introduced to control performance, e.g. walking like a soldier. The specific objective is that pupils in class one will be able to run fast over a distance of 30m in 7-15 sec. using standing start. In primary two the syllabus stipulates that the child run fast over a distance of 30m in 6.6-12 sec. The primary three pupils are supposed to run fast over a distance of 30m in 6.2-10sec.

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Many naturally fast players are not able, for various reasons, to use their maximum straight-ahead speed when they play basketball. They may be slow with the ball or they may move too fast and are not able to coordinate their speed with the pace of the game. The cause of this can be poor training, but it is more often due to poor coordination. On the other hand, a slower child (who is still fast!) can have the ability to use his maximum speed playing the game.

According to Davis B et al (2000), the following sprint ratings were proposed for men and females in a 30 m dash in one of their study. This is for people who are above 20 years. For male they proposed the following rating in seconds; Less than 4.0sec as excellent, above average ranges from 4.2sec-4.0sec, average from 4.4sec-4.3sec, below average from 4.6sec-4.5sec and poor greater than 4.6sec. For the female they have the following ratings: Excellent as less than 4.5sec, above average ranges from 4.6sec-4.5sec,

average from 4.8sec-4.7sec, below average from 5.0sec-4.9sec and poor as greater than 5.0sec.

The school environment is where children learn Fundamental Motor Skills (FMS), and physical education programs provide opportunity for children to practice and develop motor skills (Graham, Holt/Hale, & Parker, 2005). It is therefore important that early and effective instructional strategies are used to develop and correct movement patterns so that children can acquire advanced movements used in sport and their everyday physical activities. It is also clear that children and adults who are physically active on a regular basis are healthier than those who are not active. It is also evident from research findings that "Many children and adults do not regularly take part in physical activities that contribute to a healthy lifestyle" (Sanders, 2002).

2.4 Strength Relevance to the Lower Primary School Child.

The standing long jump is an athletic event that can trace its origins back as far as the Olympic Games of Ancient Greece. Although the standing long jump was discontinued from the Modern Olympic Games after 1912, it remains in common use as a test of explosive leg power. It is used as a physical aptitude test in vocations such as firefighting, law enforcement, and the military, and many sports coaches use it to monitor an athlete's response to a training program. The standing long jump has high correlations with isokinetic measures of leg strength, and it is a good predictor of sprint and long jump performance (Wiklander & Lysholm, 1987).

One minor limitation in using the standing long jump as a physiological or performance test is that it is a moderately complex movement. To achieve the best

possible performance a jumper must execute a coordinated pattern of countermovement, forward rotation of the whole body, and a double-arm swing. The magnitude and sequencing of the movements must ultimately project the jumper's centre of mass at high speed and at an appropriate angle to the horizontal. Studies of standing long jumps by adult males have yielded projection angles of 29– 38º, but the biomechanical reasons for this choice of projection angle are not well understood (Horita, Kitamura, & Kohno, 1991; Ashby & Heegaard, 2002;). The purpose of the present study was to identify the optimum projection angle in the standing long jump and to explain the biomechanical rationale for this optimum angle.

In the flight phase of the standing long jump the centre of mass of the jumper behaves like a projectile in free flight. However, the optimum projection angle that maximises the distance of the jump is not expected to be 45º. A projection angle of 45º is only appropriate if the magnitude of the projection speed generated by the jumper is the same for all projection angles. In the long jump, javelin, and shot put, the projection speed of the athlete (or implement) is known to decrease with increasing projection angle (Red & Zogaib, 1977; Linthorne, 2001; Linthorne, Guzman, & Bridgett, 2005;). That is, the athlete has a bias towards the production of horizontal speed, and this bias reduces the optimum projection angle to below 45º.

In the shot put, the decrease in projection speed arises partly because a higher projection angle requires a greater fraction of the athlete's muscular force to be expended in overcoming the weight of the shot, and partly because the structure of the human body favours the production of putting force in the horizontal direction more than in the vertical direction. In the long jump the athlete uses a fast run-up to produce a high horizontal speed, and then plants the take-off leg on the ground to convert some of this speed to

vertical speed. However, high take-off angles require a progressively slower run-up speed to enable sufficient time for the jumper to generate the necessary upward impulse. The overall result is that the projection speed decreases rapidly with increasing projection angle.

In the shot put and long jump the athlete's optimum projection angle may be calculated by substituting a mathematical expression for the relation between the projection speed and the projection angle into the equation for the range of a projectile in free flight (Linthorne, 2001; Linthorne et al., 2005). This method produces optimum projection angles that are in good agreement with measured competition projection angles (about 36º in the shot put, and about 21º in the long jump).

For health-related fitness we describe strength as the ability of our muscles to carry our daily task easily. Muscle power is the ability to contract the muscles with speed and force in one explosive act. Stronger muscles will give more power and therefore more speed.

Today, more reliable methods of testing strength and a better understanding of the physiologies behind neuromuscular strength are known. Children as young as age six can improve strength when they follow age-specific resistance training guidelines. Improvement in self-esteem is an important and often overlooked benefit of strength training programs. Some studies have reported that parents observed positive personality effects in their children, including increased readiness to perform household chores and homework.

In an age when childhood obesity statistics continue to increase along with the concomitant risk of developing related diseases such as diabetes and hypertension, children should be encouraged to establish healthy lifestyles at an early age. Strength

training may have a cholesterol-lowering effect. Weltman et al (1986) reported that a moderate-load resistance-training program with a high number of repetitions had a favorable effect on the blood lipid profiles of prepubescent children. Resistance training combined with aerobic exercise may be the ideal solution for fat loss and weight maintenance in overweight children.

To design and administer a strength training program appropriate for young children, it is imperative to understand that the unique physical and psychological nature of children differs tremendously between individuals at this stage of development. Children must be mentally and emotionally mature enough to follow directions, and this typically occurs when a child is ready to participate in organized sports. Young children need overall strength so that they can participate in a wide variety of activities, derive pleasure from those activities, gain confidence in their abilities to "do things" and, in fact, have the strength to "do things" - particularly new things.

As children grow in size and develop muscle mass, they also develop increased strength. These strength improvements are independent of training. In other words, children grow bigger and stronger until full maturity.

A lot of research supports the idea that training improves strength development in children. One of the most important studies investigating the strength-training potential of young children was completed by Ramsay et al in 1990. They studied the effects of a 20-week strength-training programme on 9-11-year-old boys - specifically, elbow-flexion and knee-extension strength. Ramsay et al found that elbow-flexion force increased by 37 per cent and knee-extension force increased by 21 per cent in comparison with a non-training control group who showed no improvement.

The research describing how a child develops strength, both through natural growth and through training, helps us to design appropriate strength programmes for young athletes.

One of the main benefits of a well-designed strength program is that it balances the strength of muscle pairs. This balance is an important aspect of injury prevention. For children, strength training should be seen as only one of the many components of fitness. Alain Marion, a consultant with the Coaching Association of Canada, (CAC) recommends that before resorting to weights, children should be directed to use body weight as the basis of strength training. This allows a more natural strength-building progression. Calf raises, push-ups, and chin-ups are all examples of strength-training methods using body weight.

Pre-puberty, both boys and girls have similar strength, and at this age children have developing neuromuscular systems. Strength training for pre-pubertal athletes should focus on skills and techniques; since all the improvements from strength training come from neuromuscular development, this is the ideal time to teach coordination and stability. For example, the average six-year-old boy can do five press-ups, a 12-year-old boy can do 15 press-ups and 18-year-olds can do 25 press-ups. In contrast, the average six-year-old girl can do five press-ups, a 12-year-old girl can do 12 press-ups and an 18-year-old girl can still only do 12 press-ups. (Metz, 2010)

Children should be taught all the big muscle-group, free-weight and bodyweight movements with light loads. For example, power clean, bench press, press-ups and squats. Any child taught these has an advantage because good technique is learned at a young age, which allows for high-intensity training to be performed safely and effectively as the child gets older. During the pre-puberty years, particular attention should be paid to

posture and stability, since children need good strength in the trunk muscles to support the body correctly.

Strength training refers to all the exercises and activities that develop strength and power. Until recently, strength training in prepubescent children was discouraged because it was thought to be ineffective and dangerous. Today, new research shows that it is possible for pre-adolescents to increase strength with little risk of injury in properly supervised programs. In fact, by strengthening muscles that cross a joint, strength training may even offer some protection to the child already participating in sports such as athletics, alpine skiing, ice hockey, and figure skating which require bursts of power and impose a lot of stress on young muscles and bones.

Some people question whether children can gain strength and enhance muscular development in light of their low levels of testosterone. But, if this were a true limitation, then women and elderly individuals would also be unresponsive to strength training, which is obviously not the case. In fact, studies have revealed significant increases in muscle strength and mass in preadolescent boys and girls (Faigenbaum et al. 1993; Morris et al. 1997; Pikosky et al. 2002; Westcott et al. 1995). Furthermore, research has shown that these strength training effects are relatively long-lasting (Faigenbaum et al. 1996). Although some of the strength gains are due to motor learning, children add muscle tissue through increased protein synthesis, in much the same way that adults do.

In addition to a muscle's Cross Sectional Area (CSA), a muscle-specific development of strength may be a factor that leads to changes in force production between children and adults. For instance, Asmussen & Heebøll-Nielsen (1956) investigated muscular strength of the leg extensors, elbow flexors and finger flexors in 200 male children ranging from 7 to 17 years of age. The authors found that the increase in

muscular strength was different between the three muscle groups tested (i.e., 42; 33; 30% increase for the leg extensors, elbow flexors and finger flexors, respectively). Asmussen and Heebøll-Nielsen suggested that in addition to quantitative changes (i.e., size of the muscle), qualitative changes may have occurred. That is, changes in muscle fibre type or an increased ability to voluntarily mobilise the muscle may have played an important role in strength enhancement.

From the observation of differences in muscular strength found among different muscle groups the authors speculated that the leg muscles could develop more rapidly than the other muscles tested (i.e., finger flexors and elbow flexors). Data from different muscle groups have been reported by Sunnegardh, Bratteby, Nordesjo, and Nordgren (1988). These authors studied the isometric and isokinetic muscle strength in 8 and 13 year old children (girls and boys). Knee, handgrip, and trunk flexion and extension strength was assessed. Knee strength was also recorded isokinetically at 12, 90 and 150 deg.s-1. Firstly, strength variables were, in general, found to be very similar in the 8 year old boys and girls.

However, by the age of 13, the boys were stronger than the girls. Secondly, knee strength increased by 60% at every speed tested (0, 12, 90 and 150 deg.s-1) with increasing age. Similarly, handgrip strength was 58% greater in 13 year-old children than in 8 year-old children. However, the age-related increases observed in trunk flexion and extensions were somewhat lower at 52 and 47%, respectively. These results are in agreement with Asmussen and Heebøll-Nielsen (1956) who suggested that the age-related changes in strength may be muscle specific. The similarity observed between knee and handgrip strength may be explained by older children's increased ability to recruit these muscles.

Furthermore, Kanehisa, Ikegawa, Tsunoda, and Fukunaga (1995) observed differences in strength between the flexors and extensors of both the knee and elbow. As an explanation of the differences of this increase in strength between muscle groups, a muscle-specific growth of CSA, the degree of maturation of the nervous system and the development of the neuromuscular coordination in a specific muscle group have been hypothesized.

Because of the relationship between muscle size and strength, it is to be expected that an increase in muscle mass will be the main contributor of an increase in muscle strength. However, in addition to the size of the muscle, maximum force production also depends on the degree of neural activation (Enoka, 1988; Sale, 1988).

A muscle's force output can be modulated over an enormous range. This modulation is accomplished by the recruitment of motor units (Clamann, 1993). It is well know that the Central Nervous System (CNS) controls two parameters of motor unit activation to produce a desired force output: the number of recruited motor units and their firing rate (Erim, De Luca, Mineo, & Aoki, 1996). The CNS triggers action potentials along a motor axon and across the neuromuscular synapse at all its muscle fibres. Most muscle contractions are evoked by trains of repetitive action potentials. In the case of a high level of force required, the action potential rate is increased and the twitches summate until peak force is reached.

Following strength training programmes increases in maximal torque and muscle CSA have been reported in adults (Garfinkel & Cafarelli, 1992; Narici, Hoppeler, Kayser, Landoni, Claassen, Gavardi, Conti, & Cerretelli, 1996). However, it is difficult to attribute all of the relatively large increases in torque to muscle hypertrophy at the onset

of a training programme. Early increases in muscular strength after a training intervention are often attributed to neural factors (Del Balso & Cafarelli, 2007).

During exercises such as running or cycling, a synergistic activity is developed between the lower limb muscle groups, and muscular adaptations are developed between agonist and antagonist muscles, and between synergistic muscles (flexors or extensors) (Moritani, 1993). Thus, muscular performance is not only dictated by a muscle's size but also by the nervous system's ability to activate it (Sale, 1988).

In children, although increases in muscular strength are closely related to changes in muscle CSA, strength enhancement can also be explained by an increase in their capacity to recruit their muscles. In a study aiming for identifying the development of arm and thigh muscles in relation to muscle size during adolescence, results showed evidence that pre-pubertal children do not develop strength in proportion to their muscle CSA. (Kanehisa, Ikegawa, Tsunoda, & Fukunaga, 1995).

Since previous findings suggested that preadolescent children do not fully activate their motor units during voluntary maximum muscle actions, Kanehisa, Ikegawa, Tsunoda, and Fukunaga (1995) pointed out that the absence of proportionality between muscle CSA and strength might be due to children's lack of ability to mobilize their muscles voluntarily. In another context, results from Jubrias, Odderson, Esselman, and Conley (1997) showed that the decline in force with age was not only due to a decrease in CSA but also to changes in magnitude of muscle activity and contractile function.

As mentioned earlier, strength is one of the basic determinants of performance and most of the studies have focused on changes in isometric strength or on the strength-muscle size relationship. Nevertheless, in addition to its mass, a muscle's activity is another important determinant of muscles' performance. Among 6-year-old children,

Asai and Aoki (1996) found that children's electromechanical delay was greater than their adult counterparts. Lambertz, Mora, Grosset, and Perot,(2003) found that triceps surae activation required to maintain a level of torque was higher in the 7-year-old children compared with the 10 year-old ones. These findings suggest that muscle recruitment patterns are age-dependent. It seems that children do not activate all of their motor units.

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2.5 Strength Levels of the Lower Primary School Child

Physical Education and sports in Primary Schools should therefore provide a wide range of learning experiences through play and sport movement. The most important purpose of Physical Education at this level is the development of mechanical efficiency i.e. coordination, awareness, relationships and skills characterized by the use of large muscles in vigorous activities featuring manipulative, locomotor and non-locomotor skills. The key words at this level are PLAY and FUN.

The P.E. syllabus in Ghana places premium on mass participation of pupils in games and sports, rather than on competitive sports which is only one aspect of the total Physical Education programme. The coverage or scope of the syllabus is therefore that of width rather than of depth in which case, few pupils are always selected and trained in sporting activities to represent the school. The syllabus is designed to allow for inclusive education. No child should be left out of Physical Education.

The syllabus indicates that in the lower primary school children should jump a height of 30-60cm using single take-off. Pupils should throw light objects over a distance of 5-15m. from the side across the body. In addition, Pupils should push or put objects about 500 grams forward from the shoulder to a distance of 7m. Pupils are to perform continuous horizontal jumping (alternating the legs) over a distance of 10m.

According to the Mayo Clinic, weight training, also known as strength training, offers a variety of benefits for young athletes when performed properly. While light hand weights, resistance bands and medicine balls are options, many weight training exercises such as push-ups or sit-ups can be performed using body weight. The benefits of weight training for kids include increased muscle strength and endurance, improved athletic performance, decreased risk of injury, and improved self-esteem. Two to three days of strength training per week on nonconsecutive days is appropriate. Weight or strength training should not be confused with weightlifting or bodybuilding. These types of exercise can put excessive strain on your child's muscles and are not recommended for children.

In children, skeletal muscles undergo structural and functional changes (Blimkie, 1993). Fibre area increases 15 to 20 fold from birth through childhood, adolescence and young adulthood (Lexell, Sjostrom, & Nordlund, 1992). In addition, as children grow older, they acquire the ability to recruit their muscles more efficiently leading to greater strength and maximum power production (Ramsay, Blimkie, et al, 1990). It has been suggested that some of the increase in strength may be due not solely to the quantitative changes that occur while growing up but also to qualitative changes taking place simultaneously (Asmussen, 1955). These changes are influenced by children muscle mass and their ability to recruit their muscles (i.e., motor unit activation).

During childhood, kids improve their body awareness, control and balance through active play. As early as age 7 or 8, however, strength training can become a valuable part of an overall fitness plan as long as the child is mature enough to follow directions and practice proper technique and form. If your child expresses an interest in strength training,

remind him or her that strength training is meant to increase muscle strength and endurance. Bulking up is something else entirely and most safely done after adolescence.

The potential benefits of youth strength training extend beyond an increase in muscular strength and may include favorable changes in selected health- and fitness-related measures. If appropriate training guidelines are followed, regular participation in a youth strength-training program has the potential to increase bone mineral density, improve motor performance skills, enhance sports performance, and better prepare our young athletes for the demands of practice and competition. Despite earlier concerns regarding the safety and efficacy of youth strength training, current public health objectives now aim to increase the number of boys and girls age 6 and older who regularly participate in physical activities that enhance and maintain muscular fitness. Parents, teachers, coaches, and healthcare providers should realize that youth strength training is a specialized method of conditioning that can offer enormous benefit but at the same time can result in serious injury if established guidelines are not followed. With qualified instruction, competent supervision, and an appropriate progression of the volume and intensity of training, children and adolescents cannot only learn advanced strength training exercises but can feel good about their performances, and have fun. Additional clinical trials involving children and adolescents are needed to further explore the acute and chronic effects of strength training on a variety of anatomical, physiological, and psychological parameters. (Faigenbaum 2000)

The National Strength and Conditioning Association (NSCA) Research Committee reviewed this report before the formal endorsement by the NSCA. For the purpose of this article, the term children refers to boys and girls who have not yet developed secondary sex characteristics (approximately up to the age of 11 years in girls

and 13 years in boys; Tanner stages 1 and 2 of sexual maturation). This period of development is referred to as preadolescence. The term adolescence refers to a period between childhood and adulthood and includes girls aged 12-18 years and boys aged 14-18 years (Tanner stages 3 and 4 of sexual maturation).

The terms youth and young athletes are broadly defined in this report to include both children and adolescents. By definition, the term resistance training refers to a specialized method of conditioning, which involves the progressive use of a wide range of resistive loads and a variety of training modalities designed to enhance health, fitness, and sports performance. Although the term resistance training, strength training, and weight training are sometimes used synonymously, the term resistance training encompasses a broader range of training modalities and a wider variety of training goals. The term weightlifting refers to a competitive sport that involves the performance of the snatch and clean and jerk lifts.

The American Academy of Pediatrics (AAP) and exercise physiologists do not have a minimum age set for a child to begin a resistance training program. Research has been done on moderate weight training programs with children as young as 8 years. However, researchers also recognize the use of callisthenic-type exercises such as push-ups and sit-ups that are commonly used in elementary school physical education classes. Body-weight resistance exercises are a good starting point for most children under the age of 8, or those at any age who are just starting a strength training program. The object of this type of program is to introduce the body to the stresses of training and to teach basic technique.

After a foundation is established, light weight training can be introduced. Kraemer

et al (2002) recommend a training scheme of 10-15 repetitions and 1-3 sets per muscle group. The weight should be one that the child can lift for 10-15 repetitions without going to muscular failure.

Once a base has been established, the amount of exercises and the weight lifted can be increased. When a child has reached puberty (around age 13 for girls and 15 for boys) and a training foundation has been established, a more advanced periodized routine can be incorporated.

To design and administer a strength training program appropriate for young children, it is imperative to understand that the unique physical and psychological nature of children differs tremendously between individuals at this stage of development. Children must be mentally and emotionally mature enough to follow directions, and this typically occurs when a child is ready to participate in organized sports. Body-weight exercises, (e.g., push-ups, sit-ups) are great for beginners. "Prehabilitation" of the abdominal and shoulder muscles should be implemented to reduce the likelihood of back and shoulder overuse injuries when the strength training program begins.23 The ability to perform sport-specific plyometric exercises, such as rebounding and long jumping, may be a marker of readiness to engage in formal weight training exercises. For those ready to start using weights, proper form and technique should be emphasized throughout the program. A focus on safe training and individual self-improvement, rather than competition, is key.

Guidelines for strength training have been developed by the American College of Sports Medicine (ACSM), AAP, and NSCA to promote a safe and worthwhile activity for children (table 1). Equipment specifically designed for use by children is recommended to prevent injury. To prevent increased risk of potentially serious or even

fatal injury, an appropriately designed and competently supervised strength training programme for children must be safe.4,15 Good programmes can enhance strength, flexibility, motor fitness skills, sports performance, and overall health. Parents may also notice improved psychosocial well-being in their children and fewer injuries in youth sports and recreational activities.

Youth Strength Training Guidelines

Basic Concepts

• Strength training is one part of a well-balanced youth fitness program

• Training takes place at least 2-3 times per week with a minimum of 1 day of rest between sessions

• Training involves all major muscle groups, with a balance between opposing muscle groups

• Resistance exercises are done through a full range of motion to develop strength while maintaining flexibility

• Participants are encouraged to maximize their athletic potential by optimizing their dietary intake (i.e., adequate hydration, proper food choices)

Basic Guidelines for strength training.

• Include adequate warm-up and cool down stretching in every session

• Begin with 1 light set of 10-15 repetitions of 6-8 different exercises

• Encourage success by choosing the appropriate exercises and workload for each child

• Focus on participation and proper technique rather than the amount of weight lifted

• Perform 1-3 sets of a variety of single- and multiple-joint exercises, depending on time, goals, and needs

• When necessary, adult spotters should assist the child in the event of a failed repetition.

• Teach students how to use workout cards and regularly monitor progress.

• Vary the strength-training program over time to optimize training and prevent boredom. According to AAP, ACSM and NSCA when Proper Technique Is Mastered, Weight can be added

• If a child cannot do at least 10 repetitions per set with a given weight, the weight is too heavy and should be reduced

• When 15 repetitions become too easy, the next weight increment can be attempted (typically a 5% to 10% increase on average is recommended)

• A child should be able to do 3 sets of 15 repetitions of a given exercise in 3 consecutive sessions before more weight is attempted.

The minimum requirements for a well-run program include supervision at all times provided by trained and qualified adults, appropriate clothing and footwear worn by all participants, and a child-friendly environment that is safe and free of hazards. Realistic goals should be established based on each child's abilities, needs, and expectations. A 10-minute warm-up of light aerobic exercise and stretching should be done before each session, and at least 10 to 15 minutes of stretching to cool down should follow.

Strength training in pre-pubertal children can be a safe and effective way to improve muscle strength and joint flexibility while potentially decreasing the rate of sports-related injury. A properly designed and supervised program can help improve children's overall health and sense of psychosocial well-being. Current published literature demonstrates that the benefits of strength training far outweigh the potential risks. When a child or adolescent is involved in strength training, the emphasis must be on technique rather than the amount of weight lifted, and qualified supervision is essential to reduce the risk of injury.

As chronic childhood diseases (e.g., obesity, diabetes, and hypertension) become more prevalent among youth, it seems prudent to foster healthy lifestyles that are both effective for disease prevention and enjoyable. If appropriate training guidelines are followed, regular participation in a youth strength training program can increase bone mineral density, enhance motor performance, and better prepare young athletes for the demands of practice and competition. Thus, by getting children active at early age, strength training can foster healthy habits that may last a lifetime.

Metzl (2010) is of the view that the individual differences in age, weight, and fitness levels can vastly affect the body's response to training and conditioning. An overweight young athlete will need a different training and conditioning program than a young athlete with average body weight. A more active youth will have a higher level of fitness. A six year old should train differently than a thirteen year old. The six-year-old's training and conditioning program should be more skilled focused, whereas the thirteen-year-old should be prepared to begin aerobic and anaerobic practices. The maturation process and mental capacity is improved with age.

CHAPTER 3

RESEARCH METHODOLOGY

The purpose of this study was to establish speed and strength standards for lower primary schools in Ghana. This chapter looked at the research design, the population, sample and sampling technique, instrumentation, validity and reliability of the instrument, testing procedures, procedure for data collection and procedure for data analysis.

3.1 Research Design

Evaluating speed and strength standards for lower primary schools in Ghana was done using the quasi experiment research design. Research design is an arrangement of conditions for collection and analyzing data which will be relevant to the researcher in the most economical manner. It is the programme that guides the researcher in the process of collecting, analyzing and interpreting an observation.

The study therefore employed the quasi-experimental design. This kind of research design is normally used when randomization is impractical and/or unethical; they are typically easier to set up than true experimental designs, which require random assignment of subjects. Additionally, utilizing quasi-experimental designs minimizes threats to external validity as natural environments do not suffer the same problems of artificiality as compared to a well-controlled laboratory sitting. As researchers consider possible study designs, statistical analysis, and final reports about any particular topic, it is critical that they maintain focus on the questions to be answered by the research. Those questions will determine the appropriate approach to the investigation and its resulting

methodology. From the argument allured above the researcher chose the quasi experiment research design because it takes care of the research questions as well as using averages to analyze the data.

3.2 Population

The target population for the study was all pupils in the lower primary schools in the Akuapem North District of Ghana. The population of pupils in Akuapem North District was 19,226. This includes 9,852 for boys and 9,374 for girls. The study was conducted using pupils in the lower primary class. The population of the lower primary in the district was 9,697. The girls were 4,799 while the boys were 4,877. Twenty primary schools in the district out of 119 were used for the study.

3.3 Sampling and Sampling Technique

The twenty schools were purposively selected from the ten circuits in the district. This was done due to the fact that most of the number on roll for the lower classes fell below ten and therefore could not have used the simple random technique to select the pupils.

This information was obtained from the enrolment statistics for term one in the Akuapem North District. Twenty pupils were randomly selected in each of the primary classes 1-3. That is ten boys and ten girls each from classes. In all 60 pupils were used from each lower primary school. The names of all boys in the class were put in a basket and ten names picked by the class teacher. The same was conducted for the girls.

The sampling size was 1200 pupils from twenty primary schools. The simple random sampling technique was employed to select 1200 pupils from the district. The simple

random technique was used in order to give equal opportunity to all pupils in the various schools.

3.4 Instrumentation

The instruments used for this study were two. These are well-known instruments used all over the world to test for speed and strength of children and adults.

Speed test-30m Dash

Speed or sprint tests are commonly conducted as part of a fitness test battery.

For the speed test the 30m dash was used in order to collect the data for the study.

Strength test-Standing broad jump

To determine the power in the legs of the subjects, the standing broad jump was used for the strength test.

3.5 Validity and Reliability of Instrument

The validity of the research was supported by two factors. Content validity was supported by making sure that five approved IAAF regulation stop watches with new batteries were used as well as 50m steel measuring tape. . This was accomplished by asking a panel of experts from the Health Physical Education Recreation and Sports Department of the University of Education, Winneba to validity the instruments.

Pilot testing is often a method used to create certainty in research methods, as well as fine tune instrumentation. In order to ensure reliability of the instrument, a pilot test was conducted on a group of pupils from the Demonstration Primary School in Aburi in the Akuapem South District in the Eastern Region.

This test was conducted using subjects who were similar to that for the actual test. The subjects were of the same age group and were randomly selected from classes 1-3 as targeted for the actual study. At the end of the pilot test the degree of variance was negligible and therefore the proposed test instrument for the study was used without changes for the actual study.

3.6 Testing Procedure

Prior to the study, and after the researcher had purposively selected the school from the cluster of schools for the study, the informed consent letter from the Department of Health, Physical Education, Recreation and Sports of the University of Education, Winneba endorsed by the Head of Department was delivered to the Heads of the selected school. The researcher briefed the Heads and the class teachers on the main purpose of the study. A day was arranged and five teachers from each school were trained on how to use the stop watches as well as the measuring tapes.

After selecting the pupils with the help of the class teachers, data was collected during a speed test and a standing broad jump activity. Before each test was conducted the children had five minutes of general warm-up by performing a slow jogging around the field and some stretching exercises which included ‘toe walking’ and astride jumps.

3.6.1 Procedure for Speed Test (30m Dash)

The data was collected using the following procedures for the speed test using a 30m sprint dash. Each pupil was made to perform a 30m dash for the speed test. The pupils run a 30m dash on a grass field. The measurement of the straight line lane was one

metre wide. The length of the lane was 30m. The measurement was taken from the finish line to the starting point. The participants used the standing start technique and the hand signal was used to start the race by a starter. Each child had to run the distance on his or her own speed and timed by two teachers with stop watches. A recorder recorded the time. The participants had two trials of 30m dash each with at least ten minutes rest period. The best time was recorded for each pupil. The test was conducted between 7.00 am and 10.00am.

3.6.2 Procedure for Standing Broad Jump Test

During the standing broad pupils stood behind a demarcated line 30cm away from a landing pit which was in front of them. The line was perpendicular to the landing pit. Pupils performed this activity with their feet together, bent their knees and swinging their arms, jumped forward as far as possible into the pit at their own time. The measurement was recorded from the mark made by the rear heel of the pupil to the start line. Every child had two trails with the best distance selected. The subjects rested for a period of at least ten minutes. Two teachers took the measurement and a recorder recorded the distance.

3.7 Procedure for Data Analysis

Data was analyzed using descriptive method for this project since data was in the form of means and averages. For as to know how each pupil's time or jump differs from one another within the group we need measures of variability. The range is simplest measure of variability which tells us about the interval between the highest and the lowest

scores in a distribution. The range will indicate how wide the distributions of the scores are spread.

The raw scores collected during the test were entered into the “Statistical Package of Social Science version 16.0 for windows” (SPSS16.0) software for analysis.

The Means (M) and Standard Deviation (SD) of the best times and distances recorded by the subjects during the speed and strength test for the various schools were calculated using the t-test as a statistical instrument. The means from the twenty schools were used to establish the range due to the standard deviation of the various means.

CHAPTER 4

RESULTS AND DISCUSSIONS

The purpose of this study was to evaluate speed and strength standards for lower primary schools in Ghana. This involved class one to class three pupils. This chapter deals with the descriptive statistics of the mean and standard deviation of the time and distance of the subjects from the various schools in the district.

The data that was collected from the study were organized in tables generated using Microsoft Excel 2010 and were analyzed using the statistical programme SPSS 16.0. Prior to analysis, the data was tested to meet the assumptions of the statistical test being used. The one sampled t-test was used as the statistical instrument to analyze the data collected for this project since data was in the form of means and averages.

4.1 Results

4.1.1 Thirty Meters (30m) Dash for Girls and Boys

The thirty metres (30m) dash was employed to test for speed of the subjects during this study. Speed or sprint tests are commonly conducted as part of a fitness test battery. The purpose of using this test is to determine acceleration, maximum running speed and speed endurance, depending on the distance run. Speed is necessary in many sports and the ability to generate it quickly is a coveted skill.

Table 1: Schools Mean Scores for Girls in the 30m Dash

SCHOOLS	Primary 1 Mean(sec)	s.d	Primary 2 Mean(sec)	s.d	Primary 3 Mean(sec)	s.d
Adawso Roman Catholic	7.4	0.80	6.3	0.30	6.2	0.45
Adawso Presby	6.5	0.42	6.5	0.42	6.1	0.29
Adukrom Presby	6.6	0.32	6.6	0.56	6.4	0.20
PCE Demonstration 'A'	7.5	0.64	7.1	0.34	7.3	0.95
Akropong Presby	6.8	0.84	6.8	0.65	6.8	0.38
Amanokrom Presby	6.9	0.46	6.8	0.28	6.5	0.38
Obosomase Presby	7.1	0.41	7.1	0.52	6.6	0.43
Abiriw Presby	6.7	0.39	6.7	0.62	6.6	0.38
PCE Demonstration'B'	7.3	0.50	7.0	0.54	6.3	0.43
Larteh Presby	7.0	0.46	6.6	0.36	6.2	0.41
Dawu Methodist	6.4	0.31	6.3	0.41	6.1	0.33
Mampong N A T	7.0	0.50	7.0	0.55	6.9	0.42
Okorase Presby	6.0	0.38	6.0	0.30	5.9	0.18
New Mangoase Methodist	6.1	0.30	5.9	0.34	5.8	0.29
Tinkong Methodist	6.2	0.30	6.1	0.30	6.0	0.30
Nkyenoa D/A	6.4	0.40	6.1	0.30	6.1	0.30
Mampong Anglican	6.5	0.41	6.4	0.31	6.0	0.25
Tinkong Presby	6.3	0.44	6.2	0.34	6.0	0.26
Mamfe Methodist	6.5	0.55	6.4	0.43	6.2	0.31
Okorase Methodist' B'	6.2	0.31	6.0	0.30	6.0	0.34

Table 1 showed the descriptive data of the mean scores of those females/girls who participated in the 30m dash in their various schools from class one to class three. The ten pupils in class one from Adawso Roman Catholic primary school had a mean score of 7.40sec.and a standard deviation of 0.80. Class two also had a mean score of 6.30sec and 0.30 as the standard deviation. In the same school class three girls got a score of 6.20sec and standard deviation of 0.45 for the study.

The mean score for the twenty schools in table 1 in class one was 6.70sec and the standard deviation was 0.44. The pupils in class two had a mean score of 6.50sec and a standard deviation of 0.38. In the case of primary three pupils, their mean score realized for the twenty schools during the study was 6.30sec and a standard deviation of 0.38.

During the study it came out that on the average a girl in class one will run 30m in 6.70sec and that of class two will do it in 6.50sec whilst the class three pupil will do it in 6.30sec. The study indicated that class two pupils in Presbyterian College of Education

(PCE) Demonstration ‘A’ School will run faster than their class three colleagues. The class two girls recorded a mean score of 7.10sec as against 7.30sec for class three.

The pupils in class one and two in Adwaso Presby both had the same mean score of 6.50sec indicating that in terms of speed they are equal. The class three girls had a mean score of 6.10sec and therefore performed significantly better than class one and two.

Adukrom Presby School, from table 1 shows the same mean score for both class one and class two pupils. They had 6.60sec and class three recorded a score of 6.40sec. In Akropong Presby School, the girls in class one to three recorded the same mean performance score of 6.80sec.

The girls in class three had significantly better scores than class two and one girls in Obosomase Presby School. Their scores were 6.50sec and 7.10sec respectively. The mean scores recorded during the study in Amanokrom Presby School were 6.90sec for class one, 6.80sec for class two and 6.50sec for class three. Class three pupils recorded a significant better performance than class two and one whilst class two performed better than class one.

During the study, the girls in Abiriw Presby School class one and two had the same mean score of 6.70sec and that of class three was 6.60sec. The study showed that class one and two girls have the same speed levels. The girls in class three performed significantly better than class two and one girls in PCE Demonstration ‘B’ School. The class two girls also performed better than the class one girls. Their mean scores were 6.30sec, 7.00sec and 7.30sec respectively.

There was a significant performance between the class three and class two pupils as well as class one in Larteh Presby School. Class one had an average score of 7.00sec, class two got 6.60sec and class there had 6.20sec.

The mean scores recorded during the study in Mampong Nana Ankobea School were 7.00sec for both class one and two pupils. Class three performed slightly better than class one and two with a score of 6.90sec. Dawu Methodist School girls recorded the following mean scores; class one 6.40sec, class two 6.30sec, class three 6.10sec. The study indicated that class three girls performed significantly better than class one and class two pupils.

The pupils in Okorase Presby School had a mean performance score which was significantly better than pupils in Mampong Nana Ankobea School (N.A.T.). The mean scores of 6.00sec showed that both class one and two performed equally. The class three did better than class one and two with a score of 5.90sec.

New Mangoase Methodist School recorded a mean performance which was significantly better than all the schools during the study. The class three pupils had a score of 5.80sec which was better than all the scores in the study. Class two pupils had a score of 5.90sec and class one pupils got 6.00sec.

Dinucci and Shows (1977) in a research work determined possible age and race differences between black and Caucasian girls ages 6, 7 and 8 years. Ninety female subjects were administered 28 test items measuring speed, muscular power, agility, flexibility, balance, muscular endurance and cardiorespiratory endurance. Few significant differences were observed between adjacent ages but 8 years old females were significantly superior to the six-year-old subject on most motor performance variables

utilized. This study is similar to the one conducted and it indicates that girls with higher ages will perform better than those with lower ages.

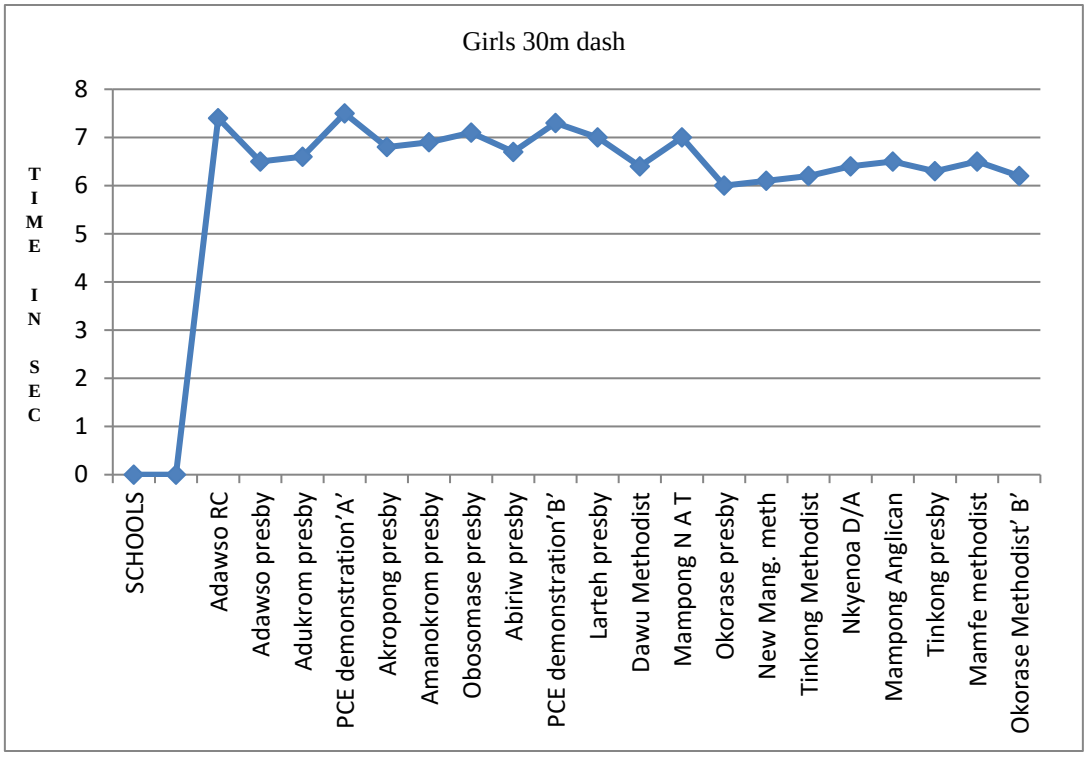

Figure 1. Graphical Representation of Class One Girls in the 30m Dash.

The graph depicts the mean scores of all the girls in the twenty schools used for the study who were in primary one in the district. The mean score for all twenty schools was 6.70sec and the standard deviation was 0.44. The standard error was 0.10.

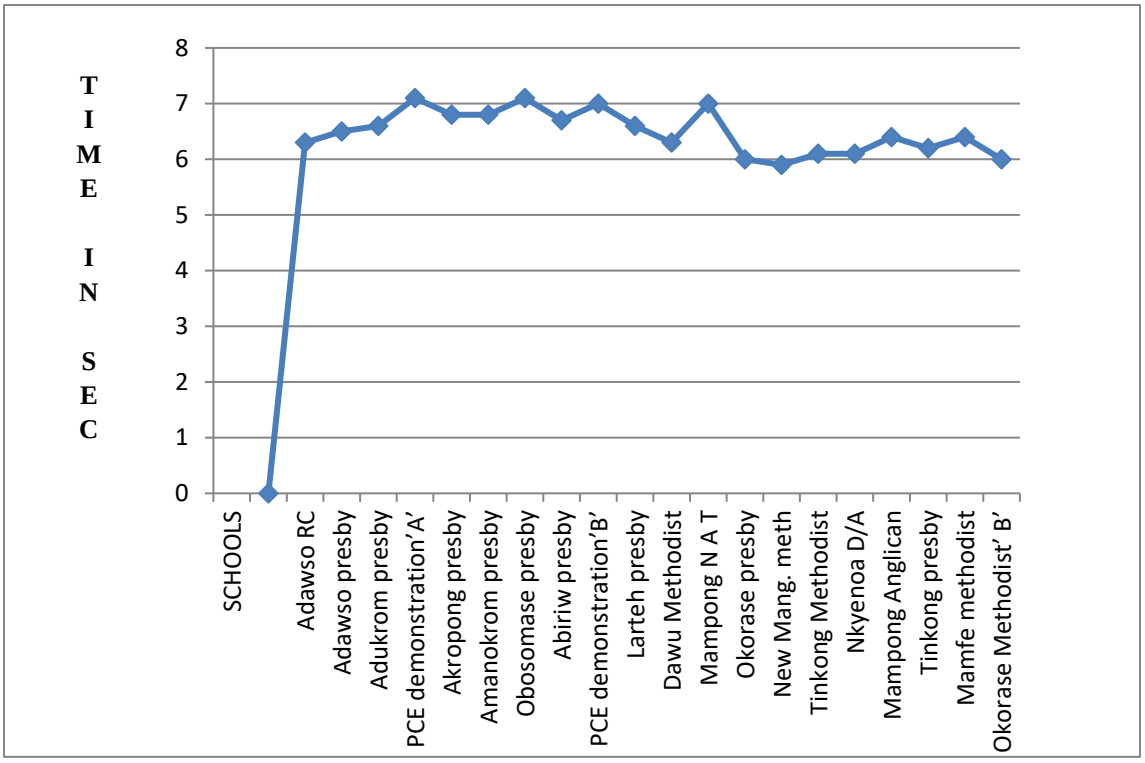

Figure 2. Graphical Representation of Class Two Girls in the 30m Dash

Figure two represents the schools in the district for pupils in class two. The girls had a mean score of 6.50sec and a standard deviation of 0.39. The standard error was 0.09. The girls in class two performed better than class one girls.

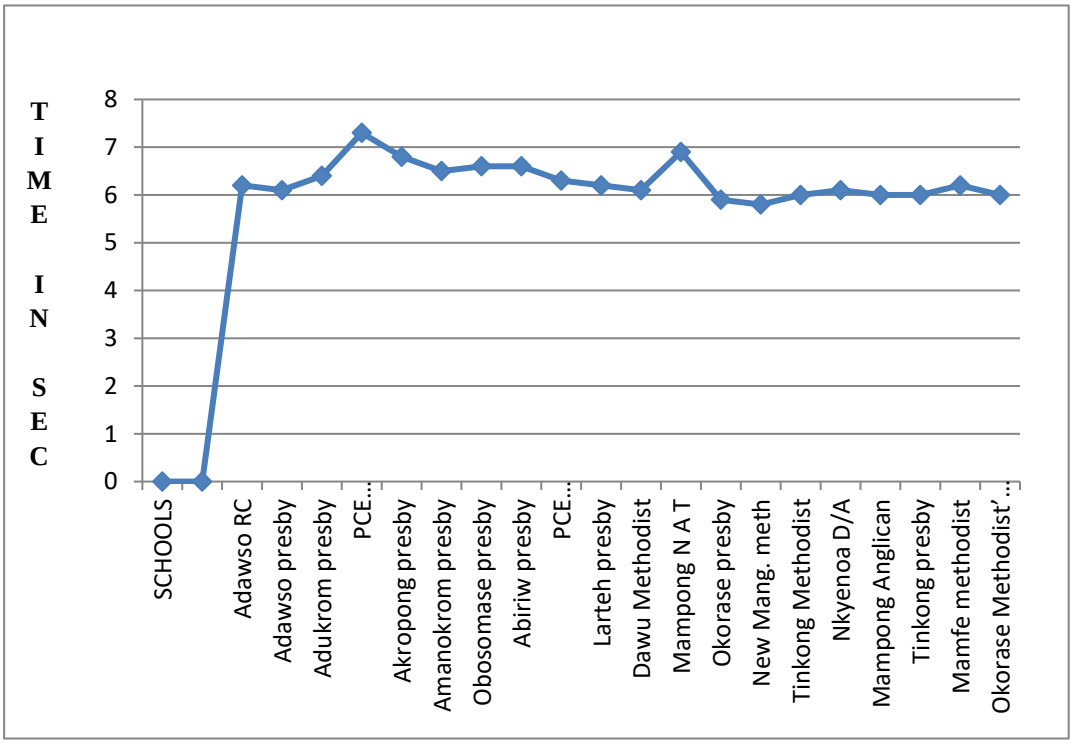

Figure 3.Graphical Representation of Class Three Girls in the 30m Dash

This is the graphical representation of the mean scores of class three girls during the 30m dash from the twenty schools. The group means performance in the 30m dash for the twenty schools was 6.30sec with a standard deviation of 0.38. The standard error obtained was 0.09.

From the three graphs above it was realized that class three pupils performed significantly better than that of class two and class one pupils. Seils (1951) in one of his analysis of means of running performance of boys and girls in terms of grade levels concluded that the mean performance of boys and girls become higher at each grade level.

Table 2: Schools Mean Scores for Boys in the 30m dash

SCHOOLS	Primary 1		Primary 2		Primary 3	
	Mean(sec)	s.d	Mean(sec)	s.d	Mean(sec)	s.d
Adawso Roman Catholic	6.7	0.56	6.7	0.46	5.7	0.26
Adawso Presby	6.5	0.38	6.2	0.35	5.9	0.19
Adukrom Presby	6.5	0.29	6.1	0.36	6.1	0.39
PCE Demonstration 'A'	6.6	0.54	6.3	0.55	5.7	0.41
Akropong Presby	7.1	0.54	6.3	0.35	6.0	0.35
Amanokrom Presby	6.4	0.32	6.2	0.42	6.1	0.43
Obosomase Presby	6.8	0.66	6.5	0.33	6.6	0.65
Abiriw Presby	6.3	0.44	6.0	0.34	5.6	0.23
PCE Demonstration 'B'	6.7	0.52	6.3	0.30	6.1	0.36
Larteh Presby	6.5	0.42	6.3	0.47	6.1	0.31
Dawu Methodist	6.3	0.34	6.1	0.44	6.0	0.35
Mampong N A T	7.0	0.57	6.7	0.23	6.5	0.44
Okorase Presby	6.4	0.41	6.0	0.37	5.8	0.20
New Mangoase Methodist	6.1	0.30	6.0	0.30	6.0	0.29
Tinkong Methodist	6.3	0.44	6.0	0.34	5.8	0.20
Nkyenoa D/A	6.4	0.56	6.1	0.36	6.0	0.33
Mampong Anglican	6.4	0.44	6.4	0.43	6.0	0.31
Tinkong Presby	6.2	0.38	6.1	0.33	5.9	0.41
Mamfe Methodist	6.3	0.46	6.3	0.35	6.0	0.36
Okorase Methodist 'B'	6.3	0.42	6.2	0.43	6.1	0.31

The data for boys during the study for the 30m dash is depicted in table 2 above. The table showed the mean score and the standard deviations for boys from class one to class three. It represents the twenty schools that were selected for the study. The SPSS was used to derive the mean and standard deviation. From table 2, the class one pupils in Adawso Roman Catholic School had a mean score of 6.70sec and a standard deviation of 0.56 representing the ten boys used for the study. The ten boys in class two from the same school also had the same mean score of 6.70sec and 0.46 as the standard deviation. In class three, the mean score for the ten boys was 5.70sec and a standard deviation of 0.26.

The study showed that class one boys from New Mangoase Methodist School had better mean performance of 6.10sec than the rest of the boys from the various schools. It also indicated that class one pupils in three schools had the same mean scores as those in

class two. The schools and their scores are as follows; Adawso Roman Catholic, 6.70sec; Mampong Anglican 6.40sec and Mamfe Methodist 6.30sec.

From table 2, class two pupils from four schools had the best mean performance score of 6.00sec. The schools were Abiriw Presby, Okorase Presby, New Mangoase Methodist and Tinkong Methodist. They performed significantly better than the other class two boys.

The class three pupils from Abiriw Presby School were the best performers as showed from the results of this study. They recorded a significant mean score of 5.60sec which was best in all the schools. Adukrom Presby School and New Mangoase Methodist were the two schools whose class three pupils had the same mean score 6.10sec and 6.00sec respectively as those in class two as indicated from this study. Morehouse and Miller (1959) have studied that ability of boys to perform athletic activities requiring strength, speed endurance and they concluded that skill increased steadily between the age of five and twenty.

In another study investigated by Haley (1972) on the effects of age on physical performance of elementary school boys in grade one to six. Thirty boys were randomly selected from each grade between the age group five to twelve years. Twelve motor performance tests were administered to measure sprint, speed, power agility, reaction time, static balance and dynamic balance, hip flexibility and elbow flexion, strength. The result of the analysis of variance revealed a significant difference between the grade levels on all 12 variables.

The result from this research is similar to that of Morehouse and Miller (1959) and Haley (1972). The upper classes performed better than the lower classes.

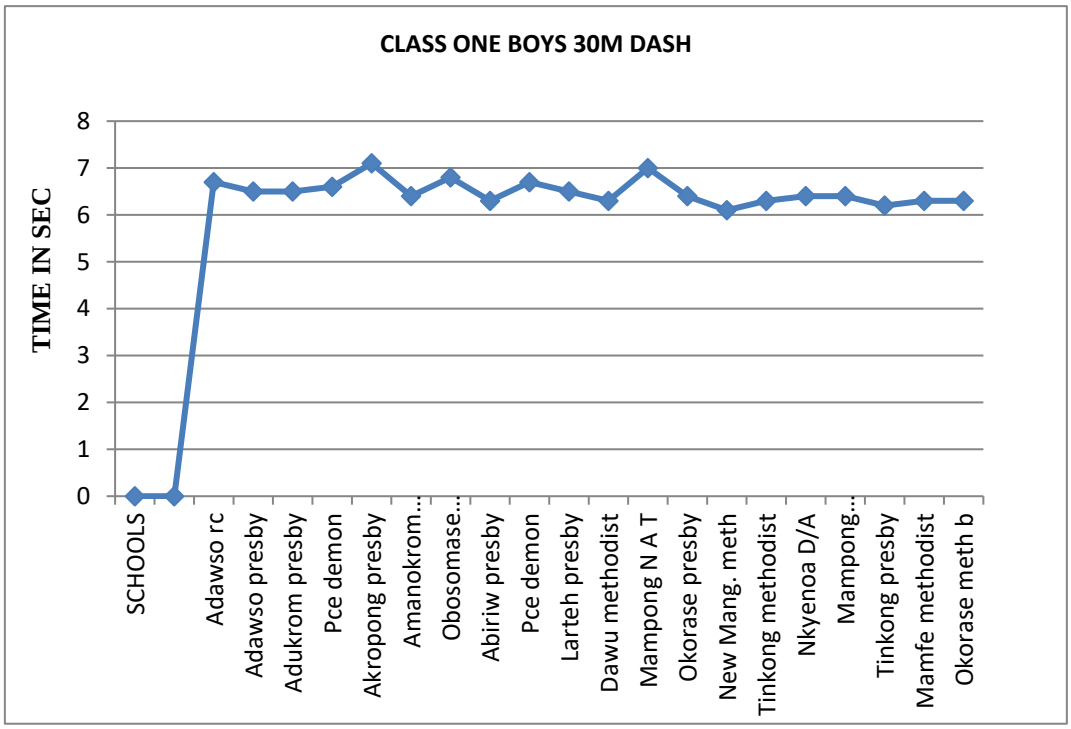

Figure 4.Graphical Representation of Class One Boys in the 30m Dash

The group means score for the twenty schools put together in class one boys was 6.50sec with a standard deviation of 0.25. The standard error was 0.06. This is shown in the graph above. Comparing the boys' group mean to that of the girls in class one there was a significant performance. The boys performed better than the girls. Espenschade (1968), in one of her studies on the Brass Test of General Motor Ability observed that girls' scores did not improve after the age of 14, while boys showed steady improvement from 8 to 18 years of age. She concluded that all studies agree in showing increase with age, in running, jumping and throwing for boys from the earliest measures made in childhood through, the last years.

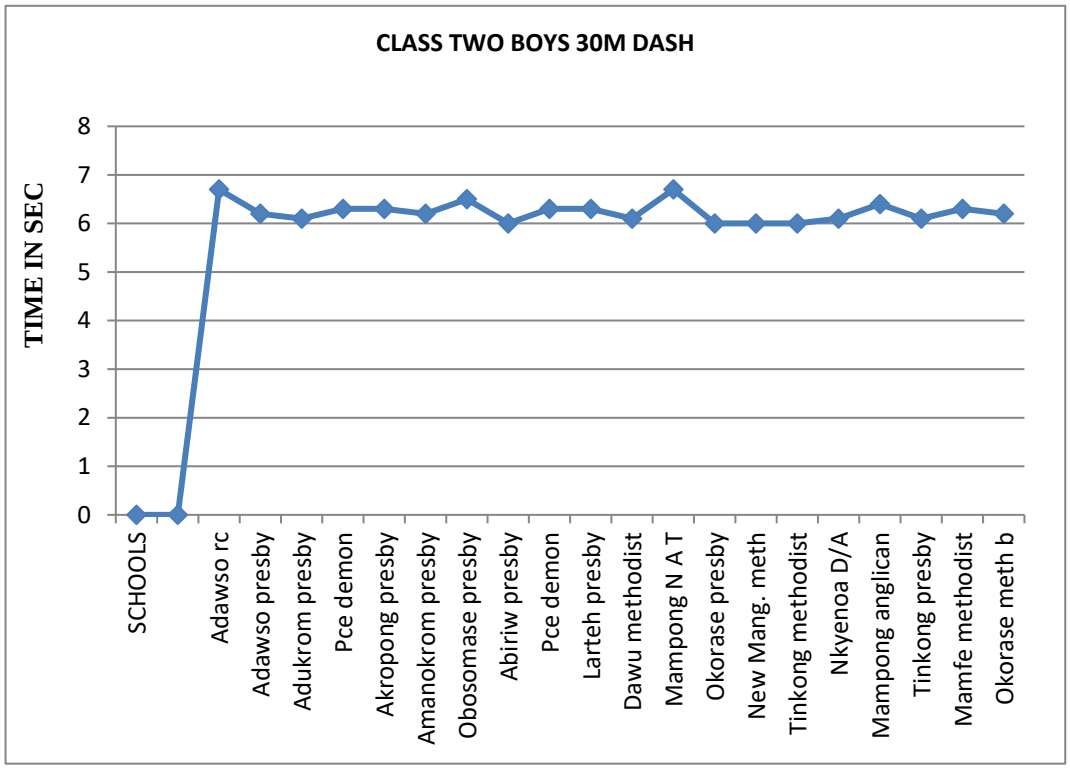

Figure 5.Graphical Representation of Class Two Boys in the 30m Dash

Class two recorded a mean score of 6.20sec for the twenty schools and a standard deviation of 0.22. Their standard error was 0.05. The study showed that class two boys run faster in the 30m dash than the class one boys.

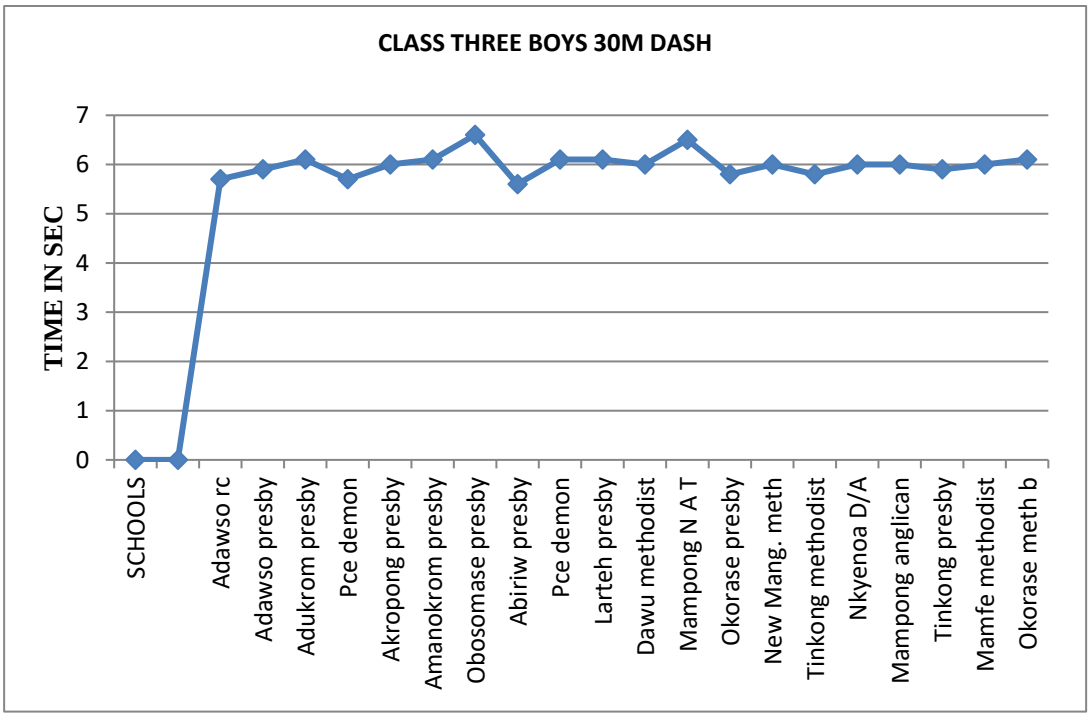

Figure 6.Graphical Representation of Class Three Boys in the 30m Dash.

The mean for the pupils within the twenty schools in class three was 6.00sec with a standard deviation of 0.24. These results indicate that pupils in primary three had a better time as compared to that of primary one and two. The above result is similar to that of the studies conducted by Robson, Uppal, and Bose in 1981. They found out that boys in grade five in elementary school were superior to girls in 50 metres and shuttle run. Upadhyaya (1985) conducted a study on 105 subjects aged between 6 and 12 years on motor fitness test and concluded that there was a significant difference in 30metre dash for boys and girls.

4.1.2 **Standing Broad Jump for Girls and Boys.**

One of the objectives for the research was to test the strength of the children. For the strength, it was specifically for the legs. The horizontal broad jump was used to test the horizontal strength of the children. The standing broad jump was organized to determine the leg strength of the subjects. Standing broad jump is an integral part of the testing process for estimating the efficiency of the physical education classes. During physical education lesson, but also in the training process, it serves as a test of the lower body strength and power (Bowerman, et al., 1998).

Table 3: Schools Mean score for Girls in the Standing Broad Jump Test.

SCHOOLS	**Primary 1**		**Primary 2**		**Primary 3**	
	Mean(m)	s.d	Mean(m)	s.d	Mean(m)	s.d
Adawso Roman Catholic	1.1	0.08	1.3	0.14	1.4	0.13
Adawso Presby	1.1	0.11	1.2	0.11	1.4	0.11
Adukrom Presby	1.2	0.08	1.3	0.11	1.4	0.13
PCE Demonstration A	1.1	0.10	1.2	0.09	1.1	0.10
Akropong Presby	1.0	0.05	1.3	0.18	1.3	0.17
Amanokrom Presby	1.0	0.07	1.2	0.14	1.3	0.12
Obosomase Presby	1.1	0.09	1.2	0.14	1.3	0.15
Abiriw Presby	1.1	0.12	1.2	0.11	1.4	0.13
PCE Demonstration B	1.1	0.15	1.2	0.20	1.3	0.18
Larteh Presby	1.2	0.23	1.3	0.21	1.5	0.14
Dawu Methodist	1.2	0.15	1.4	0.15	1.5	0.10
Mampong N A T	1.1	0.14	1.2	0.20	1.4	0.25
Okorase Presby	1.2	0.13	1.4	0.15	1.5	0.10
New Mangoase Methodist	1.1	0.20	1.3	0.20	1.5	0.10
Tinkong Methodist	1.1	0.11	1.3	0.15	1.5	0.10
Nkyenoa D/A	1.2	0.21	1.3	0.20	1.4	0.15
Mampong Anglican	1.1	0.11	1.3	0.12	1.4	0.15
Tinkong Presby	1.2	0.14	1.4	0.15	1.5	0.10
Mamfe Methodist	1.1	0.20	1.1	0.16	1.3	0.18
Okorase Methodist B	1.0	0.19	1.2	0.14	1.3	0.10

Table 3 summarizes the data collected for girls during the standing broad jump. The data was to find out the strength levels in lower primary schools. Table 3 shows the various results from the schools used during the standing broad jump test. For instances

in Okorase Methodist B school, the average mean score recorded for girls in primary one was 1.1m and the standard deviation was 0.08. The girls in primary two in the same school had an average score of 1.3 m with 0.14 as the standard deviation. Primary three girls in Okorase Methodist B had a mean score of 1.4m in the standing broad jump and a standard deviation of 0.13.

During the study it was realized that the primary two girls in PCE Demonstration 'A' school recorded an average score of 1.2m, higher than that of girls in primary three. Primary one girls recorded the same strength levels as that of primary three girls. They both had a mean score of 1.1m. The result indicates that the primary two girls are stronger than those in primary three when it comes to activities involving the use of the legs.

The girls in Mamfe Methodist school class one recorded the same leg strength levels as those in class two. They both were able to record a mean score of 1.1m. At Akropong Presby School a similar results occurred this time between the class two and class three pupils. Both grade levels obtained a mean performance score of 1.3m. From this study the class two girls were at same level with class three girls in terms of leg strength.

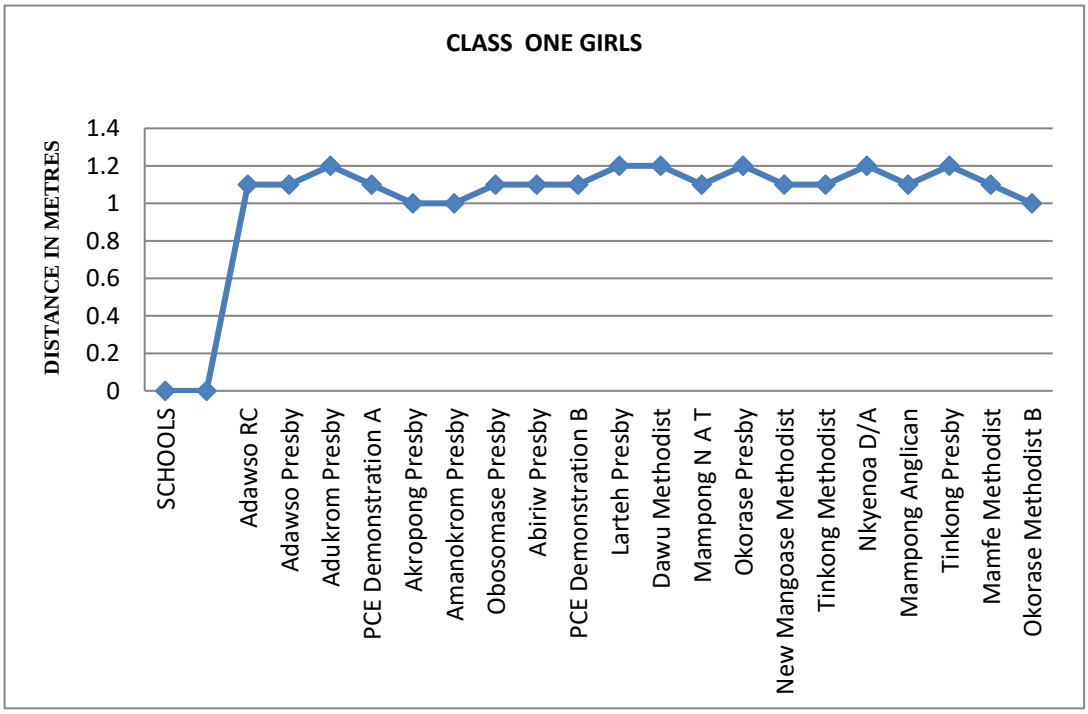

Figure 7. Graphical Representation of Girls Mean Performance for Broad Jump in Class One Pupils.

The collective data for the target group during the study for the twenty schools in the girls' category gave us the following results; for primary one girls, their mean score was 1.1m and a standard deviation of 0.10. Three schools namely, Akropong Presby Amanokrom Presby and Okorase Methodist 'B' recorded a mean score of 1.0m. The schools that recorded a mean score of 1.1m were eleven. The schools are as follows; Adawso Roman Catholic, Adawso Presby, PCE Demonstration 'A', Obosomase Presby, Abiriw Presby, PCE Demonstration 'B', Mampong N A T, New Mangoase Methodist, Tinkong Methodist, Mampong Anglican and Mamfe Methodist. The following six schools in class one recorded the best mean performance score of 1.2m. They are, Adukrom Presby, Larteh Presby, Dawu Methodist, Okorase Presby, Nkyenoa D/A, and Tinkong Presby

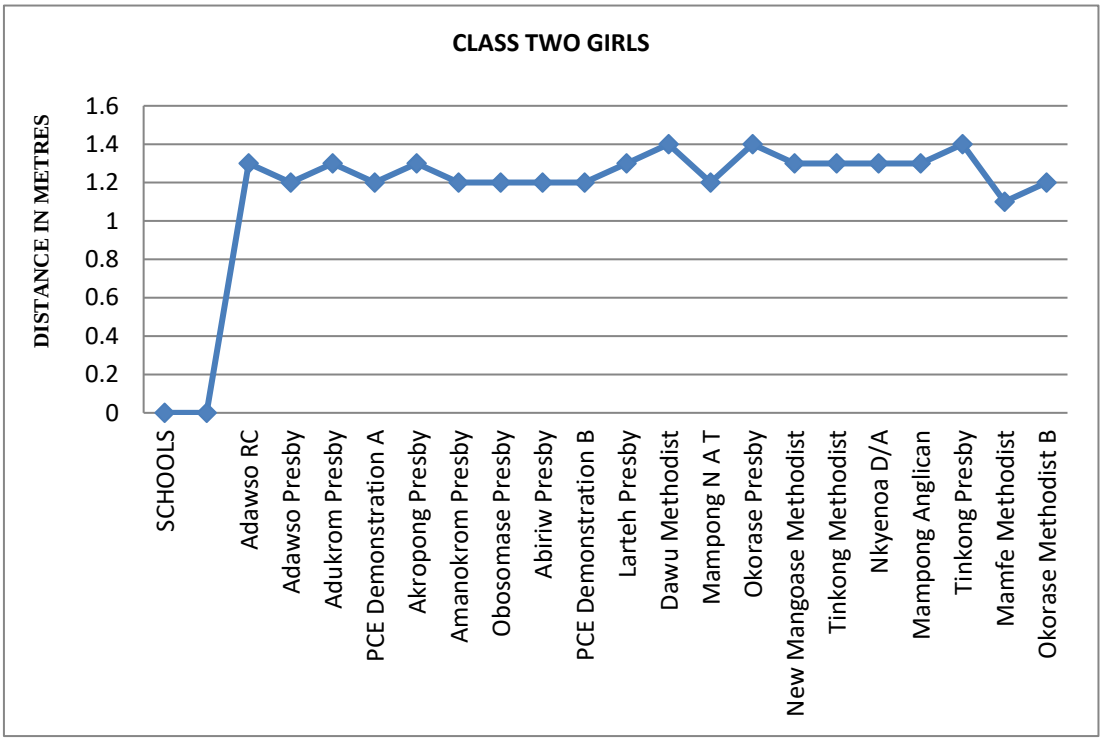

Figure 8.Graphical Representation of Girls Mean Performance for Broad Jump in Class Two Pupils

Primary two had a strength level mean score of 1.2m and a standard deviation of 0.10. Mamfe Methodist School recorded the lowest mean score of 1.1m. The three schools in class two that recorded the highest mean performance score of 1.4m were, Dawu Methodist, Okorase Presby and Tinkong Presby. The schools that had strength levels of 1.3m were eight. They include New Mangoase Methodist, Tinkong Methodist, Nkyenoa D/A, Mampong Anglican, Larteh Presby, Akropong Presby, Adukrom Presby and Adawso RC. Eight others schools also recorded a mean strength levels of 1.2m. The schools are, Adawso Presby, PCE Demonstration 'A', Amanokrom Presby, Obosomase Presby, Abiriw Presby, PCE Demonstration 'B', Mampong N A T and Okorase Methodist 'B'.

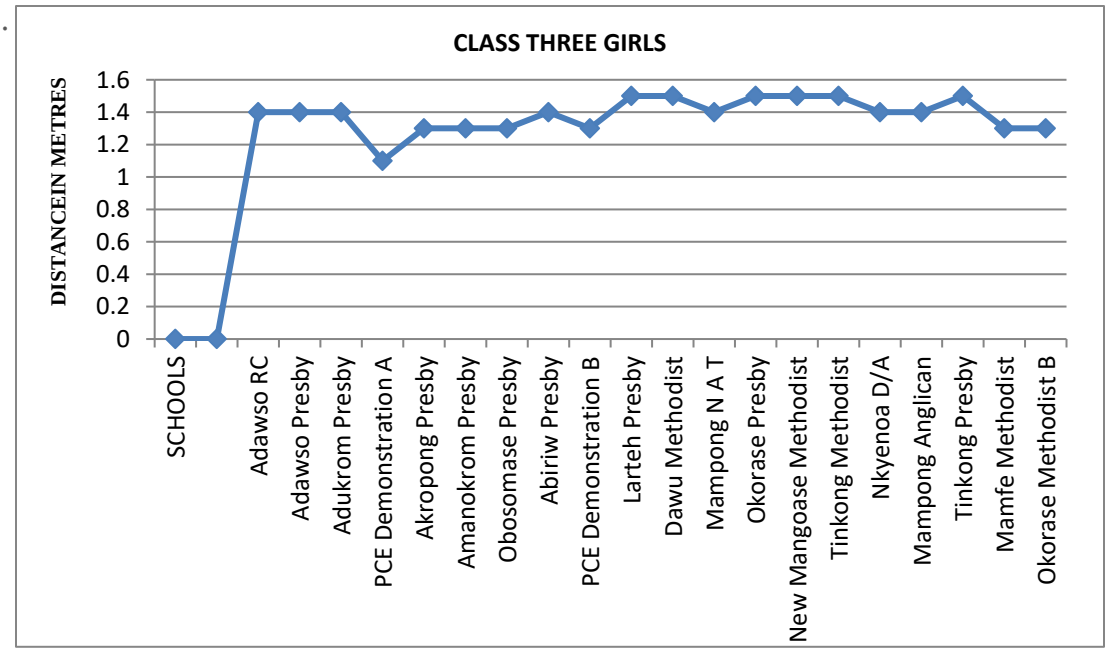

Figure 9. Graphical Representation of Girls Mean Performance for Broad Jump in Class Three Pupils.

In primary three with a mean score for the strength levels was 1.4m and the standard deviation was 0.11. PCE Demonstration 'A' school had the lowest mean score of 1.1m. Six schools recorded the best mean performance score of 1.5m. The schools were Larteh Presby, Dawu Methodist, Okorase Presby, New Mangoase Methodist, Tinkong Methodist and Tinkong Presby. These schools obtained a mean score of 1,4m each; Adawso RC, Adawso Presby, Adukrom Presby, Abiriw Presby, Nkyenoa D/A, Mampong Anglican and Mampong N A T. A mean score of 1.3m was recorded by Akropong Presby, Amanokrom Presby, Obosomase Presby, PCE Demonstration'B', Mamfe Methodist and Okorase Methodist 'B'.

Comparing the mean performance scores of the strength levels of class one pupils and class two pupils, the study concluded that class two girls performed slightly better than class one pupils. The above result is similar to a study conducted by Seils (1951) when he analyzed data in terms of each grade level in a study and found out that the mean

performance of boys and girls becomes higher at each grade level. Analysis of means of running performance and standing long jump of boys and girls classified into three months showed a rather constant increase of mean performance from the youngest age interval to the oldest age interval.

In another study by Dinucci and Shows(1978) where they determined possible age and race differences between black and Caucasian girls ages 6, 7 and 8 years. Ninety female subjects were administered 28 test items measuring speed, muscular power, agility, flexibility, balance, muscular endurance and cardiorespiratory endurance. They concluded that significant differences were observed between adjacent ages but 8 years old females were significantly superior to the six-year-old subject on most motor performance.

Table 4: Schools Mean score for Boys in the Standing Broad Jump Test

SCHOOLS	Primary 1		Primary 2		Primary 3	
	Mean(m)	s.d	Mean(m)	s.d	Mean(m)	s.d
Adawso Roman Catholic	1.1	0.10	1.2	0.15	1.4	0.10
Adawso Presby	1.2	0.12	1.3	0.13	1.6	0.11
Adukrom Presby	1.1	0.12	1.3	0.14	1.3	0.10
PCE Demonstration 'A'	1.1	0.12	1.2	0.12	1.3	0.15
Akropong Presby	1.0	0.10	1.1	0.15	1.3	0.17
Amanokrom Presby	1.1	0.14	1.3	0.15	1.5	0.14
Obosomase Presby	1.2	0.10	1.3	0.13	1.4	0.12
Abiriw Presby	1.2	0.15	1.4	0.10	1.4	0.16
PCE Demonstration'B'	1.1	011	1.2	0.13	1.3	0.13
Larteh Presby	1.2	0.14	1.4	0.24	1.5	0.10
Dawu Methodist	1.2	0.14	1.4	0.20	1.5	0.11
Mampong N A T	1.0	0.12	1.2	0.13	1.3	0.10
Okorase Presby	1.3	0.14	1.4	0.12	1.6	0.15
New Mangoase Methodist	1.2	0.10	1.4	0.14	1.5	0.16
Tinkong Methodist	1.2	0.15	1.4	0.16	1.6	0.15
Nkyenoa D/A	1.1	0.11	1.3	0.10	1.5	0.18
Mampong Anglican	1.1	0.10	1.3	0.13	1.4	0.10
Tinkong Presby	1.2	0.14	1.3	0.15	1.5	0.15
Mamfe Methodist	1.1	0.12	1.3	0.15	1.4	0.14
Okorase Methodist 'B'	1.2	0.12	1.3	0.13	1.4	0.15

Table 4 summarizes the data collected for boys during the standing broad jump. The data was to find out the strength levels in lower primary schools. Table 4 showed the various results from the schools used during the standing broad jump test. For instance, in Adukrom Presby school, the average mean score recorded for boys in primary one was 1.1m and the standard deviation was 0.12. The boys in primary two in the same school had an average score of 1.3 m with 0.14 as the standard deviation. Primary three boys in Okorase Methodist B had a mean score of 1.3m in the standing broad jump and a standard deviation of 0.10.

During the study it was realized that the primary two boys in Adukrom Presby and Abiriw Presby Schools recorded an average scores same as that of boys in primary three. Primary two boys recorded the same strength levels as that of primary three boys. They both had a mean score of 1.3m and 1.4m respectively.

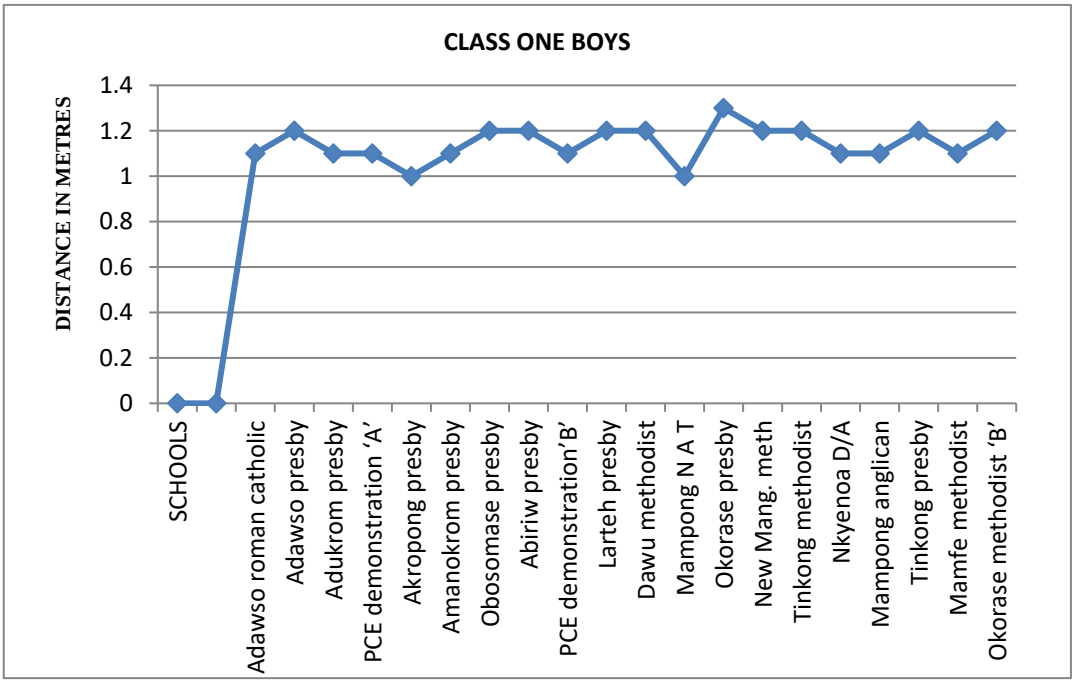

Figure 10. Graphical Representation of Boys Mean Performance for Broad Jump in Class One.

The class one pupils from Okorase Presby obtained the best mean score during the standing broad jump test. The school recorded a mean score of 1,3m. Two schools in class one recorded the lowest mean score of 1.0m. the school were Akropong Presby and Mampong N.A.T. the following eight schools, Adawso roman catholic, Adukrom Presby, PCE Demonstration 'A', Amanokrom Presby, PCE Demonstration'B', Nkyenoa D/A, Mampong Anglican, and Mamfe Methodist recorded a mean score of 1.1m each.

Eight other schools also recorded a mean performance score of 1.2m. The schools were Adawso Presby, Obosomase Presby, Abiriw Presby, Larteh Presby, Dawu Methodist, New Mangoase Methodist, Tinkong Methodist, Tinkong Presby, and Okorase Methodist 'B'. The twenty schools in class one recorded a strength level means performance score of 1.2m and a standard deviation of 0.10.

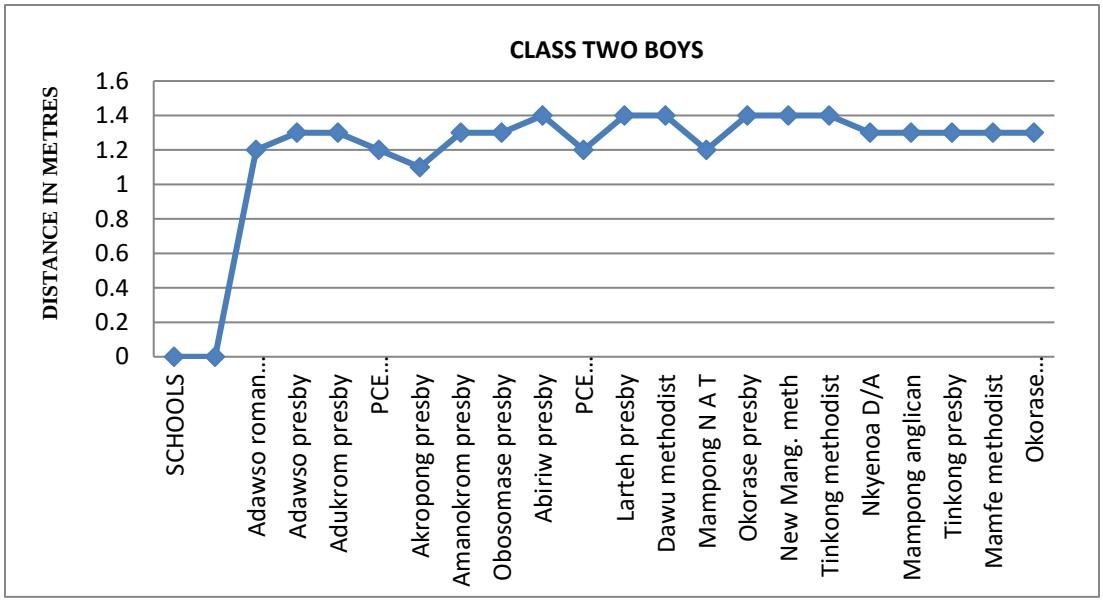

Figure 11.Graphical Representation of Boys Mean Performance for Broad Jump in Class Two Pupils.

In class two, Akropong Presby School had the lowest mean performance score of 1.1m. Four of the schools recorded a mean score of 1.2m.These schools were Adawso Roman Catholic, PCE Demonstration 'A', PCE Demonstration'B' and Mampong N.A.T. nine out of the twenty schools obtained a score of 1.3m. they are Adawso Presby, Adukrom Presby, Amanokrom Presby, Obosomase Presby, Nkyenoa D/A, Mampong Anglican, Tinkong Presby, Mamfe Methodist and Okorase Methodist 'B'. The schools that recorded the highest mean strength level scores were Abiriw Presby, Larteh Presby, Dawu Methodist, Okorase Presby, New Mangoase Methodist and Tinkong Methodist. They were six and recorded a mean performance score of 1.4m each.

The group means score for the twenty schools in class two was 1.3m and a standard deviation of 0.10. This indicates that class two pupils performed better than class

one pupils during the standing broad jump test. A lot of research confirms this kind of results. Geraldine (1968) conducted a study on the motor performance of primary grade Negro and White 6, 7 and 8 year old children and concluded that broad jump and jump measures improved significantly from 6 to 8 years

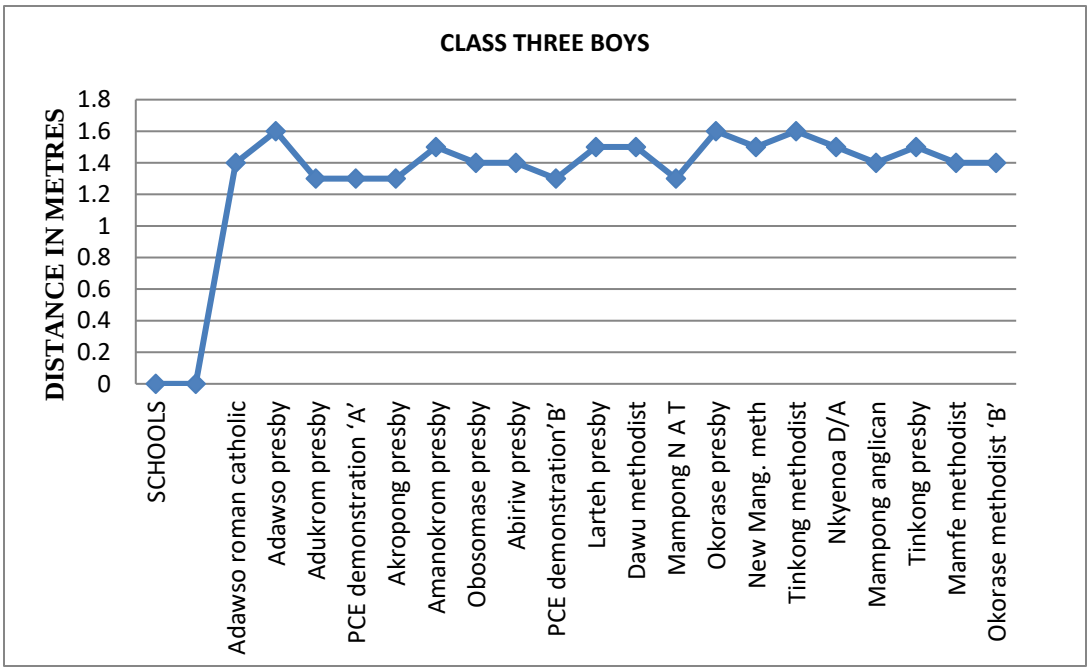

Figure 12.Graphical Representation of Boys Mean Performance for Broad Jump in Class Three Pupils.

Five class three schools during the study recorded a mean score performance of 1.3m. This was the lowest mean score for the twenty schools. The schools were Adukrom Presby, PCE Demonstration 'A', Akropong Presby, PCE Demonstration 'B' and Mampong N.A.T. six of the schools had a mean score of 1.4m. These schools were Adawso Roman Catholic, Obosomase Presby, Abiriw Presby, Mampong Anglican, Mamfe Methodist and Okorase Methodist 'B'. Another six schools involving Amanokrom Presby, Larteh Presby, Dawu Methodist, New Mangoase Methodist, Nkyenoa D/A and Tinkong Methodist. These schools recorded a mean score of 1.5m

each. The schools that recorded the highest mean performance score during standing broad jump test were Adawso Presby, Okorase Presby and Tinkong Presby. Their mean score was 1.6m each.

In primary three the standard deviation was 0.11 with a mean score of 1.4m. In this study, the results from table 4 indicates that the class three boys performed better than class one and class two boys during the standing broad jump test. The result from the study is similar to other research results.

Yadav (1982) conducted a study on 270 boy students with all age groups having an equal representation of 45 students each ranging in ages between six to eleven years. The subjects were tested within two months of their birthdays in flexed arm hang, push-ups, bent knee, sit-ups (one minute), standing broad jump, football throw, 50 m. dash, shuttle run, squat thrust, 600 m. walk/sit and reach test and shoulder rotation test. The performance of boys ranging in age 6 to 11 years in motor fitness components increased as the age advanced, except in the case of sit and reach test.

Poulouse (1979) also compared the performance of elementary school children in selected fundamental skill and found that the level of every subsequent class was higher than the proceeding class. All performance was found significant at .01 level of confidence.

4.2 Discussions

Berk (1997) showed that boys are generally slightly more advanced than girls in regard to force and power; however, according to Malina et al. (2004) "in early childhood there are minimum gender differences in motor development and, consequently, in motor tests. These differences become significant later, from the age of 10 years on when sexual maturation starts" (Davies & Rose, 2000; Haywood & Getchell, 2001).

Our findings support the view that in the 6-12 years period motor performance improves with age and is higher in males. The capacity of performing physical activity is named physical fitness or motor fitness, albeit these terms are difficult to define (Gallahue, 1987).

Physical fitness may be conceived as the capacity to perform one's daily tasks without fatigue; motor fitness, also termed motor ability, refers to a person's performance abilities as affected by the factors of speed, agility, balance, coordination, and power (Gallahue, 2006).

Motor abilities represent an integrated outcome of most bodily functions involved in physical activity and can be used to assess the effectiveness of physical education as well as measure the health-related fitness of schoolchildren, provided they are reliably measured by standardized tests such as the EUROFIT test battery (Adam et al., 1988), which has been widely used with children and adolescent (Tomkinson et al., 2007); the Körperkoordinationstest für Kinder (KTK, (Kiphart & Schilling, 1974)), which has been applied for testing coordination skills in children; the MOPER fitness test, adopted in Dutch school children (Leyten, 1982; Kemper & Verschuur, 1995); the FITNESSGRAM® battery test, developed at the Cooper Institute for Aerobics Research to assess health and fitness in children and adolescents; the General Sports-Motor Test

(Allgemeiner Sportimotorischer Test (AST), Bös, 2000), specifically designed for obese children.

On the other hand, measurement of anthropometric parameters allows monitoring of children's growth in terms of physical dimensions, body composition, and sex dimorphism (Kautiainen et al., 2002; Argyle, 2003; Wells, 2007; Krebs et al., 2008), also in relation to physical fitness (Westerstahl et al., 2003). Simultaneous assessment of anthropometric parameters and motor abilities provide more accurate information on the developmental process of children; however, it is not well known whether a relationship actually exists between motor abilities and anthropometric parameters in children or between different motor ability evaluation tests.

According to Berg et al., 1986; Farrar et al., 1987, in the developing child, linear growth, weight, and muscle size are important contribute to strength. The strength increases fairly linearly until puberty, to increase thereafter at different rates for males and females. We found significant correlations between standing long jump and 30m dash in both sexes and at all ages suggesting that explosive strength and velocity are related to the 6-12 years age span. Accordingly, it has been shown that muscle strength is an important component of running speed (moreover, the relationship between standing long jump and 30m dash may be due to the fact both are power events which involve horizontal movement of the centre of mass).

This finding confirms and extends the findings of a meta-analysis based on sixty-seven studies on the EUROFIT tests performance of healthy European children (Tomkinson et al., 2007): considering the correlation matrix for mean z-scores for nine EUROFIT test, standing long jump was strongly correlated with many others and showed the best consistency between males' and females' performances within a country (+0.96).

However, the Italian studies considered in the meta-analysis were all performed in the age range 12-19 years; results presented herein were obtained in children aged 6-12 years, thereby integrating previous information for that country.

Available data on age and running speed suggests a fairly consistent positive relationship between a child's developmental stage and her/his running velocity (Fountain, Ulrich, Haubenstricker, & Seefeldt, 1981). Girls' running speed peaks approximately at the age of 14 to 15, while boys' running speed continues to improve well over 17 years of age. When boys' and girls' running speed is examined in relation to developmental stage, a somewhat weaker relationship is observed.

The Physical Education Standards of Learning for Virginia Public Schools (2008) identifies the concepts, processes, and skills for physical education in kindergarten through grade twelve. This framework provides school divisions and teachers with a guide for creating aligned curricula and learning experiences in physical education. The intent of physical education is to help students learn the skills necessary for performing a variety of physical activities and understand the benefits of achieving and maintaining a physically active lifestyle.

The physical education standards are grouped into five strands: Skilled Movement, Movement Principles and Concepts, Personal Fitness, Responsible Behaviours, and Physically Active Lifestyle. The standards in each strand are sequenced to progress in complexity from grade level to grade level. The standards are intended to provide students with the necessary knowledge, processes, and skills to become physically educated, physically fit, and responsible in their physical activity choices and behaviors for a lifetime. Each school division's school board is responsible for incorporating the Virginia Standards of Learning into its curriculum. The Board of Education recognizes that school

divisions will adopt an instructional sequence and programme that best serves their own students.

When it comes to physical education, what should students know and be able to do? The National Association for Sport and Physical Education (NASPE) has assisted in the work toward answering that question by developing National Standards for Physical Education (2004). These standards define what students will be expected to learn from a high-quality physical education programme.

Included with these standards is the identification of various assessments linked to them. Fitness measurement, for example, is just one of the assessments that have been used to connect to Standard 4 and help students identify their personal levels of health-related fitness and provide them with a baseline for developing personal fitness plans. Through the process of developing personal fitness plans, students connect with the knowledge and skills found in Standard 3 as they discover the importance of regular physical activity and how that activity can help improve general health and wellness. In its "Position Statement on Quality Physical Education Programmes (2003)," NASPE says that a high-quality physical education programme offers students an opportunity to learn, meaningful content and appropriate instruction, which includes:

• Fitness education and assessment to help students understand, improve and/or maintain their physical well-being.

• Development of cognitive concepts about motor skill and fitness.

• Promotion of regular amounts of appropriate physical activity now and throughout life.

• Regular assessment to monitor and reinforce student learning.

Skill-related fitness is an important component of instruction, because students who are more proficient in a specific sport's skills will be more inclined to pursue that

type of physical activity outside the school setting. Specific skill-related fitness assessments can allow students to measure these skills. Improved skill-related fitness enables students to perform at a higher level, resulting in their being more physically active and leading to a corresponding improvement in health-related fitness. The skill-related components of fitness are agility, balance, coordination, power, speed and reaction time.

Purposeful measurement is an appropriate component of quality physical education. Combining fitness measurement and instruction is an appropriate instruction strategy and should be the main reason for measuring fitness. Measurement without a plan for using the data does little to serve students' needs and is not an educationally sound practice.

Fitness measurement can be divided into two types: norm-referenced and criterion-referenced. Norm-referenced measurement compares a large sampling of student performances to determine fitness standards relative to each other. Criterion-referenced measurement compares student scores to a set standard of health-related fitness that will indicate the level of fitness necessary for good health regardless of other students' scores. Criterion-referenced measurements are based on a large sample of individuals' scores, which are analyzed with those individuals' risk factors for chronic diseases that affect long-term wellness. Scoring in this fashion places more focus on achieving health-related fitness. (NASPE 2004)

This study intended to establish speed and strength standards for lower primary schools in Ghana. By obtaining the means and averages of the pupils in Akuapem North District, the researcher used it to establish a range of benchmarks for pupils in 30m dash and standing broad jump activities. This will serve as a rating scale for pupils' assessment when it comes practical physical education lessons. The mean scores of speed and broad

jump performance indicates the levels of boys and girls of lower primary schools in the Akuapem North District in the Eastern Region of Ghana.

4.2.1 Benchmark for 30m Dash.

Myer et al, (2007) postulates that running speed is the product of stride length and stride frequency. Attempts to improve speed must induce neuromuscular adaptations that increase either stride length or stride frequency without significant detriment to the other.

Morehouse and Miller (1968) have studied that ability of boys to perform athletic activities requiring strength, speed endurance and skill increased steadily between the age of five and twenty with adolescence but without interrupting the process. He continued to say that athletic ability in girls reached a maximum at the age of 13 to 14 years then tended to decline so that a six-year-old girl usually had a better performance than a girl of 18 years of age.

From the results, the average mean for class one girls and boys in the 30m dash were 6.70sec and 6.50sec respectively. The benchmark for lower primary class one when it comes to 30 metre dash ranges as follows:

Table 5: Class One Benchmark for 30m Dash in Seconds

RATING	GIRLS	BOYS
Excellent	< 6.40sec	<6.20sec
Above average	6.40-6.50sec	6.20-6.30sec
Average	6.60-6.70sec	6.40-6.50sec
Below average	6.80-6.90sec	6.60-6.70sec
Poor	>6.90sec	>6.70sec

The results of descriptive statistics for class two pupils in the 30m dash were as follows: Girls had an average mean of 6.50sec and Boys got 6.20sec. This was used to establish the benchmarks below for lower primary two pupils.

Table 6: Class Two Benchmark for 30m Dash in Seconds.

RATING	GIRLS	BOYS
Excellent	< 6.20sec	<5.90sec
Above Average	6.20-6.30sec	5.90-6.00sec
Average	6.40-6.50sec	6.10-6.20sec
Below Average	6.60-6.70sec	6.30-6.40sec
Poor	>6.70sec	>6.40sec

During the study, the average mean score recorded for boys in class three was 6.00sec. The girls obtained a mean score of 6.20sec. The results obtained were used to establish the benchmarks above for boys and girls in lower primary class three.

Table 7: Class Three Benchmark for 30m Dash in Seconds.

RATING	GIRLS	BOYS
Excellent	< 5.90sec	<5.70sec
Above Average	5.90-6.00sec	5.70-5.80sec
Average	6.10-6.20sec	5.90-6.00sec
Below Average	6.30-6.40sec	6.10-6.20sec
Poor	>6.40sec	>6.20sec

4.2.2 Benchmark for Standing Broad Jump.

In numerous researches the motor test standing long jump is an integral part of the analysis of human motor space. The simple analysis of the motion structure of standing long jump indicate that there are the two most important motor abilities, arranged in three movement momentum whose synergy determines the efficiency during performance of this test: a) explosive strength, b) coordination during takeoff, c) coordination during landing. The process of motor learning should be based on improving these components. Especially, it should take into account the development of coordination. Namely, coordination is an essential component of standing long jump and its development should be preferred at the beginning of exercise. (Lorger, M. et al, 2012).

The purpose of motor test standing long jump is to evaluate the lower body strength and power. That is the ability to activate the maximum number of motor units in a piece of time (Findak, et al., 1996), or the ability to handle the resistance with high-speed contractions (Marković, 2008).

The performance from class one pupils during the standing broad jump indicated that there was not a significant difference between the boys and girls. For the purpose of the study however these were the benchmarks created for class one pupils.

Table 8: Class One Benchmark for Standing Broad Jump in Metres.

RATING	GIRLS	BOYS
Excellent	> 1.3m	> 1.4m
Above Average	1.2-1.3m	1.3-1.4m
Average	1.1-1.2m	1.2-1.3m
Below Average	1.0-1.1m	1.1-1.2m
Poor	<1.0 m	< 1.1m

This was the benchmark that was established for pupils in class two during the study. The mean performance score for boys was 1.3m and that for girls was 1.2m.

Table 9: Class Two Benchmark for Standing Broad Jump in Metres.

RATING	GIRLS	BOYS
Excellent	> 1.4m	> 1.5m
Above Average	1.3-1.4m	1.4-1.5m
Average	1.2-1.3m	1.3-1.4m
Below Average	1.1-1.2m	1.2-1.3m
Poor	< 1.1m	< 1.2m

In class three there was no difference between the boys and girls during the standing broad jump. The results from the various performances show the same mean scores.

Table10: Class Three Benchmark for Standing Broad Jump in Metres.

RATING	GIRLS	BOYS
Excellent	> 1.5m	> 1.6m
Above Average	1.4-1.5m	1.5-1.6m
Average	1.3-1.4m	1.4-1.5m
Below Average	1.2-1.3m	1.3-1.4m
Poor	< 1.2m	< 1.3m

Current concerns about the health and wellness of our youths have generated widespread interest in fitness measurement. Many states have begun the process of instituting statewide or district wide fitness measurement. It's important to remember that fitness measurement alone will not make students more fit. Instead, helping them value physical education and physical activity will serve as the foundation for improving personal health. Students' health-related fitness will improve only by using sound instruction practices and providing students with the knowledge and skills they need to be physically active for a lifetime.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

The purpose of this study was to evaluate speed and strength standards for lower primary schools in Ghana. This chapter looked at the summary of findings, conclusion of the study, and recommendations for further research.

5.1 Findings

The main results of the present study, conducted with 1,200 children aged 6-9 years from twenty primary schools in the Akuapem North District area, are the following:

1. The boys in class one performed better than the girls in the 30m dash. The girls and boys recorded an average score of 6.70sec and 6.50sec respectively.
2. In class two the boys performed better than the girls. The boys recorded a mean score of 6.20sec whilst the girls got 6.50sec.
3. The boys in class three had an average score 6.00sec and girls got 6.30sec during the 30m dash.
4. During the standing broad jump, the girls in class one had an average score of 1.1m and boys got 1.2m.
5. There was a slight difference between the class two pupils. Whilst the boys got a score of 1.3m the girls had 1.2m
6. There was no difference between the primary three pupils. They both recorded an average score of 1.4m in the standing broad jump test.

Table 11: Proposed Standards of Speed for Lower Primary Schools.

a. 30m Dash for Girls

	Primary 1	Primary 2	Primary 3
Time (seconds)	6.70sec	6.50sec	6.30sec

b. 30m Dash for Boys

	Primary 1	Primary 2	Primary 3
Time (seconds)	6.50sec	6.20sec	6.00sec

Table 12: Proposed Standards for Standing Broad Jump for Lower Primary Schools.

a. Standing Broad Jump for Girls

	Primary 1	Primary 2	Primary 3
Distance (Metres)	1.1m	1.2m	1.4m

b. Standing Broad Jump for Boys

	Primary 1	Primary 2	Primary 3
Distance (Metres)	1.2m	1.3m	1.4m

These findings, therefore, have implications for school administrators, pre and in-service education of early childhood and lower primary teachers. Teachers need to develop skills in movement observation (Gallahue, 1996) as well as a repertoire of

appropriate movement based learning experiences for their pupils especially at the early years of schooling.

5.1.2 Implications for Early Childhood Programmes and School Administrators

1. School administrators should track down and monitor their pupils' motor development on a regular basis. This can be done by assessing the fundamental motor skills right from day one that the child will enroll in the school in order to identify any developmental delays that may exist in their motor skills development.

2. Early childhood programmes should provide developmentally appropriate and structured motor skill programmes for children.

3. Though Ghana does not have a specific standards for assessing fundamental motor skills, it is suggested that Policy makers in early childhood education should arrange their curriculum to include both structured and unstructured physical and motor skill activities to meet the objectives stipulated in the Primary Physical Education Curriculum or to adopt the NASPE physical activity guidelines for children ages 5 to 9 (NASPE, 2009).

5.1.3 Implications for Physical Education Teacher Preparation Programmes

1. Physical Education Teacher Preparation Programmes in the Ghanaian Tertiary Institutions should increase the number of courses related to child development, motor development and motor learning. This is because the researcher believes that if student-teachers who at the colleges of education who are potential basic and early childhood teachers are well equipped with adequate knowledge about motor behaviour of children, it will go a long way to enable them to design an effective curriculum and also be able to

use developmentally appropriate instructional approaches in their everyday teaching of fundamental motor skills when they get to the field as teachers.

2. There is the need for the Physical Education Department of University of Education, Winneba and other Universities in Ghana who offer Physical Education to cooperate with the departments of Early Childhood to educate their students in the motor development area especially at the early childhood level. Also, the student- teachers should be equipped with the necessary teacher preparation tools that will help them to better understand the motor behaviour of the pupils that they will be teaching in the near future.

3. Physical Education Teacher Preparation Programmes should be geared towards exposing potential physical education teachers to a variety of instructional approaches in teaching of fundamental motor skills.

4. Physical education teachers should begin to assess pupils during physical education lessons.

5.2 Conclusion

According to Meredith and Welk (2007), "The ultimate long-term objective of a physical education programme is to teach students the physical and behavioral skills they need to be active for life."

Learning physical skills is essential and provides students with the opportunity to experience and enjoy a variety of physical activities. Developing a health-enhancing level of fitness and competence in a variety of skills will make it easier for students to learn sports and activities that they can perform to be physically active throughout their lives. Students also need behavioral skills to help them understand the intrinsic rewards

associated with daily physical activity. Students need to learn to self-assess their personal fitness levels, analyze the data, develop personal fitness plans and, ultimately, motivate themselves to remain physically active for a lifetime. No matter what students aspire to become, they will live happier, more productive lives if they are healthy. Maintaining appropriate levels of physical fitness is vital to overall health, so the connection between maintaining personal fitness and overall health is a strong one.

Testing and measurement are the means of collecting information upon which subsequent performance evaluations and decisions are made. Performance is an assessment of how well a task is executed and the success of a training program is largely dependent upon satisfying the performance aims associated with it.

Mackenzie (1997) believes that performance measurement in a 'game situation' based on a series of jumping activities familiar to the players can be used as a daily tool. Key parameters for basketball players are identified as ground contact time between landing and take-off - an indicator of explosive motivity - and time of suspension - a specific measure of proportionately developed strength correlating to the height achieved of the centre of gravity of the subject. Testing can be a very useful tool for all sports - this study identified meaningful tests that were fun, familiar, easily performed and unobtrusive.

The technique of sprinting must be rehearsed at slow speeds and then transferred to runs at maximum speed. The stimulation, excitation and correct firing order of the motor units, composed of a motor nerve (Neuron) and the group of muscles that it supplies, makes it possible for high frequency movements to occur. The whole process is not very clear but the complex coordination and timing of the motor units and muscles

most certainly must be rehearsed at high speeds to implant the correct patterns. (Murray, 2005)

Speed is the quickness of movement of a limb, whether this is the legs of a runner or the arm of the shot putter. Speed is an integral part of every sport and can be expressed as any one of, or combination of, the following: maximum speed, elastic strength (power) and speed endurance. For a number of sports acceleration and speed over a short distance (10 to 50 metres) is very important e.g. American Football, Basket Ball, Baseball, Cricket, Field Hockey, Rugby, Soccer etc. Mackenzie (1997)

5.3 Recommendations

From the findings of this study, it is recommended that

1. Initial teacher preparation programmes should focus on preparing teacher candidates who understand the technicalities of using different instructional strategies in teaching speed and strength activities.
2. Physical education teachers should encourage children, specifically girls, to take part in and out of school activities. Both genders should have equal opportunities during school time to practice fundamental skill.
3 The researcher recommends that the course Lifespan Motor Development should be made compulsory in all Ghanaian Colleges of Education in other to keep the trainees abreast of the difficulties and challenges that the children they will be teaching in the real world faces in terms of motor skill acquisition and development.

4 It is recommended that teachers specify exactly what will be assessed in order to return more useful information about student achievement.

5 The following norms are recommended for adoption by the Akuapem North District education office for all schools.

Speed:

Girls:	Primary 1	Primary 2	Primary 3
	6.70sec	6.50sec	6.30sec
Boys:	Primary 1	Primary 2	Primary 3
	6.50sec	6.20sec	6.00sec

Standing Broad Jump:

Girls:	Primary 1	Primary 2	Primary 3
	1.1m	1.2m	1.4m
Boys:	Primary 1	Primary 2	Primary 3
	1.2m	1.3m	1.4m

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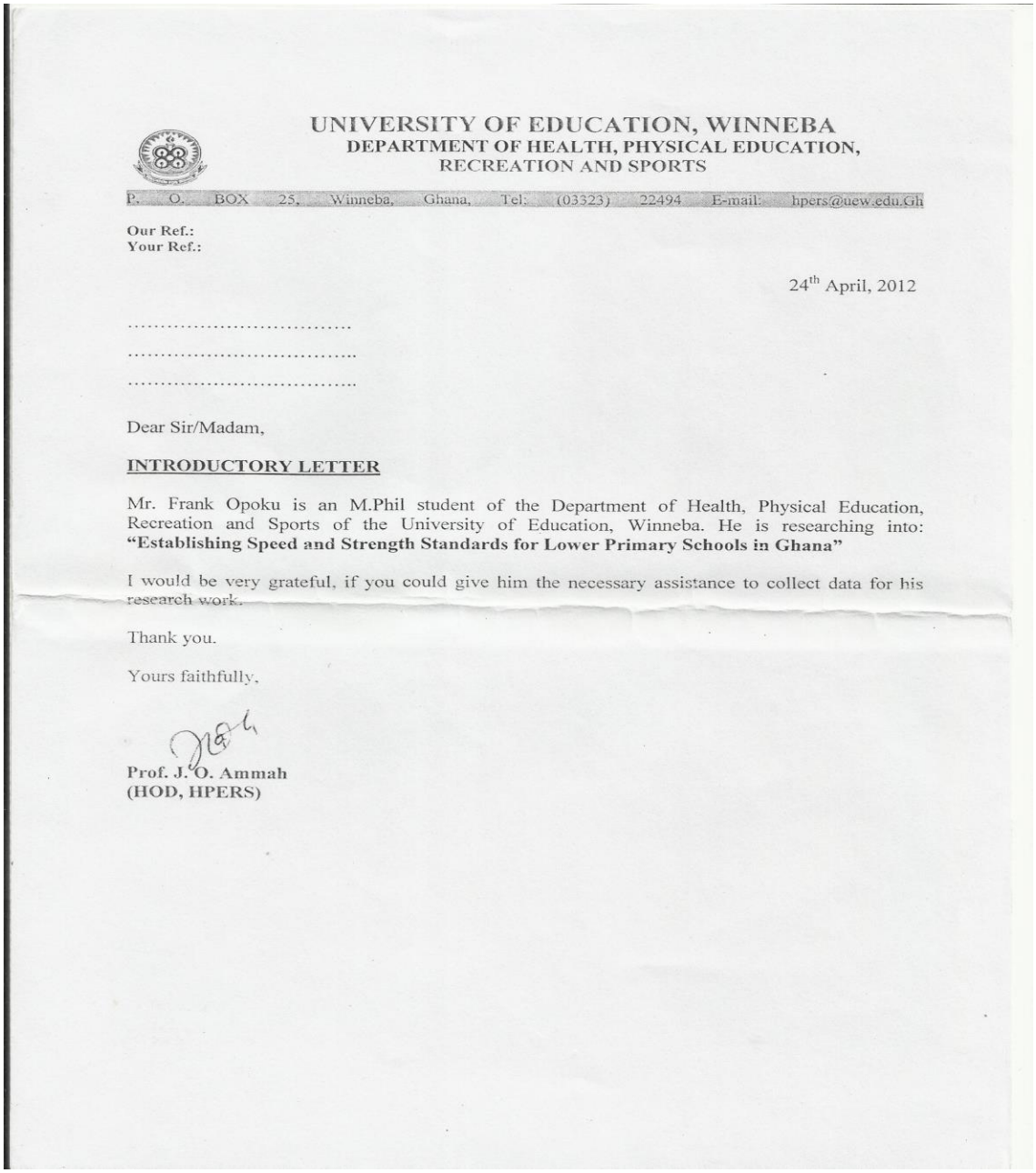
APPENDIX A

PERMISSION LETTER FROM THE DEPARTMENT OF HEALTH, PHYSICAL EDUCATION RECREATION AND SPORTS



UNIVERSITY OF EDUCATION, WINNEBA
DEPARTMENT OF HEALTH, PHYSICAL EDUCATION,
RECREATION AND SPORTS

P. O. BOX 25, Winneba, Ghana, Tel: (03323) 22494 E-mail: hpers@uew.edu.Gh

Our Ref.:
Your Ref.:

24th April, 2012

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Dear Sir/Madam,

INTRODUCTORY LETTER

Mr. Frank Opoku is an M.Phil student of the Department of Health, Physical Education, Recreation and Sports of the University of Education, Winneba. He is researching into: **"Establishing Speed and Strength Standards for Lower Primary Schools in Ghana"**

I would be very grateful, if you could give him the necessary assistance to collect data for his research work.

Thank you.

Yours faithfully,

Prof. J. O. Ammah
(HOD, HPERS)