UNIVERSITY OF EDUCATION, WINNEBA

AN ASSESSMENT OF HEALTH -RELATED PHYSICAL FITNESS LEVELS OF MALE RESIDENTIAL AND NON-RESIDENTIAL STUDENTS OF SENIOR HIGH SCHOOL IN SUNYANI MUNICIPALITY

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A DESSERTATION IN THE DEPARTMENT OF HEALTH PHYSICAL EDUCATION RECREATION AND SPORTS, FACULTY OF SCIENCE SUBMITTED TO THE SCHOOL OF GRADUATE STUDIES UNIVERSITY OF EDUCATION, WINNEBA, IN PARTIAL FULFILMENT FOR THE REQUIREMENTS FOR THE AWARD OF THE MASTERS OF EDUCATION (PHYSICAL EDUCATION) DEGREE.

DECEMBER, 2015

DECLARATION

STUDENTS DECLARATION

I, Alberta Gator-Sedegah declare that the dissertation, with 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……

SUPERVISORS DECLARATION

I hereby declare that the preparation 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: Dr. Philip Omoregie

SIGNATURE…….....

DATE…….....

ACKNOWLEDEGMENTS

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I am also thankful to my entire family for their support during my time of study.

DEDICATION

I dedicate this piece of work to my beloved children, Jeny, Judith, Francis, Stanley, Franklin and my entire family.

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ABSTRACT

This study assessed the health-related physical fitness level of male residential and non-residential students from Sunyani from Senior High School in Brong Ahafo Region, Ghana. The Quasi experimental design was used for the study. One hundred male participants (50 each) from residential and non-residential were selected using stratified random sampling technique. The prudential fitnessgram consists of health-related components (muscular endurance, muscular strength, cardiovascular endurance, body composition and flexibility as instrument for data collection. The instrument yielded a reliability coefficient of 0.76. Three research questions were answered. Data collected was analysed using descriptive statistics of frequency counts, percentage, mean and standard deviation. The result of findings showed that male non-residential students were poor in muscular endurance, muscular strength, body composition, than their male residential counterpart, while subsequently better in cardiovascular endurance and flexibility than the male residential. The findings indicated that, the male residential students have a better mean in four health-related physical fitness level with exception of flexibility than the male non-residential. The result also showed that male residential students were able to meet the health-related standard in three components than the male non-residential students, who were able to meet two components from the five components measured. it is advisable to formulate a regular physical training schedule, to achieve/meet the whole health-related standards. It was recommended that curricular planners in Ghana Education Service should include health-related fitness in the curriculum of pupils during physical education classes.

CHAPTER ONE

INTRODUCTION

Background to the Study

The concept of physical fitness is as old as mankind. Throughout the history of mankind physical fitness has been considered an essential element of everyday life. The ancient people mainly dependent upon their individual strength, vigour and vitality for survival. Physical fitness is crucial to health among all age brackets with benefits such as maintenance of liquid profile, regulation of blood pressure (BP) and control of cardiovascular ailments (Ariel Martial Marie-Claude & Jean-Claude, 2005).

The physical fitness is connected to the health conditions during childhood and adolescence (Myers, Prakash, Froclicher, Do, Patington & Atwood, 2002; Andersen, Harro, Sardinha, Froberg et al, 2006; Koryagina, Petrishchera, Vasilets & Tuer, 2013). Thus, fitness is merely associated with cardiovascular risk factors for chronic diseases such as high blood pressure, total fatness abdominal adiposity and clustering of metabolic risk factors (Brunct, Chaput & Tremblary, 2006; Ruiz, Ortega et al 2007) As the childhood obesity epidemic grows in the country, schools continue to incorporate fitness testing in their physical education curriculum. Physical fitness (PF) is considered an important health-related marker in youth (Ortega, Ruiz, Castillo & Sjostrom, 2008; Ruiz, Castro-Pmero, Artero, Ortega, Sjostrom, Suni & Castillo, 2009). Huge number of the environmental factors such as; socio-economic status, cultural influence, life style, health condition and many other factors have influence upon the level of physical activity among children and at the same time there is indirect influence upon the characteristics of the children. Hence both children and youngsters differ at the level of physical fitness regarding socio-economic

characteristics as well as the living environment and that's because they depend on the economic and cultural potential of the family.

Physical fitness can objectively and accurately be measured through laboratory methods and field based fitness tests. Yet due to the high cost involve in necessity of sophisticated instrument qualified techniques and time constraints, laboratory tests seem not feasible to be used at population level in some area. In contrast, field-based fitness tests are easy to administer which involve minimal engagement, low cost and larger number of participants that can be considered and evaluated in a relatively short period of time (Rodriguez, Moreno, Blay Blay, Fleta, Sarria Bueno, 2005; Prineau, Chiheb, Banu, valensi, Fontan, Gaugelus, Chapalain, Chumlea, Bornet & Boulier, 2008; Ruiz, Ramirez-Lecuga, Ortega, Castro-Pinero, Benitez, Aranru-Azafra, Sanchez, Sjostrom, Castillo, Gutierrez & Zabala, 2008).

In the school setting, field-based fitness tests have been a practical and feasible option to assess physical fitness. Ctro-Pinero et al (2010) states that more than fifteen (15) battery test exist for the assignment of the physical fitness of the children and adolescents with several key components of physical fitness currently in use worldwide. Unlike most European countries which are applying the Euro-fit test battery in schools and US where the Fitness Gram test battery is being used (Crejic, Pejoric & Ostojie, 2013). Ghana lacks a clearly specified and well defined strategy for testing the physical fitness of children and adolescents especially at the senior high schools level. Teachers are directed to existing tests published in the official gazette and the Euro-fit battery of test (Radogeric, 2011). Although testing is provided, there is no evidence of its implemented, and there are no centralised database of the results that can be processed and compare. Research clearly suggests that health-risk behaviours are consistently linked to academic failure and often affects school

student's attendance, test scores and ability to pay attention in class. According to Biddle, Fox and Boutcher (2001) and Biddle and Mutrie (2008) opined that growing interest in the benefits of physical activity to mental health shows increases psychological well-being.

The fact that childhood physical fitness has important health consequences during adulthood. Results from several European studies suggested that physical fitness is key indicator of the health of children and adolescence (Ruiz, Ortega mensel, Harro, Ojo & Sjostrom, 2006). According to World health Organisation (2010) asserted that regular monitoring of physical fitness and physical activity of the entire population should be considered a public health priority. Therefore, the study assesses health related physical fitness levels of residential and non-residential students of senior high school in Sunyani municipality.

1.2 Statement of the Problem

Determination of physical fitness is one of the important criteria to assess cardiopulmonary efficiency of an individual. Physical fitness is the prime criterion for survival to achieve any goal and to live a healthy life. Realising the fact that diseases are related to lack of fitness, a need to counteract the sedentary lifestyle with planned physical activity through sports and formal exercise is required. Thus, in our schools today, students are getting acquainted with the modern amenities at a very fast rate, neglecting the natural physical activities. The present attractive education system has helped to improve the educational standards, but the non-active sedentary stressful life has made the youth physically unfit. Hence, the need to consider the physical fitness of adolescent most especially in the senior high schools. Research has recommended minimal physical exercise in the curriculum (Sujit & Chouleri, 2000). Therefore, the

researcher tends to assess health related physical fitness levels of residential and non-residential students of senior high school in Sunyani municipality.

1.3 Purpose of the Study

The obligation of schools is the periodic monitoring of students characteristics under their care. Thus, the purpose of this study is to assess the health related physical fitness of residential and non-residential students in senior high schools.

1.4 Objectives of the Study

The objectives of this study were;

1. To assess the health-related physical fitness of residential and non-residential male students of SHS in Sunyani
2. To examine if there are differences in the health-related physical fitness of residential and non-residential male students of SHS in Sunyani.
3. To examine gender and age influence on the health-related physical fitness of residential and non-residential male students of SHS in Sunyani.

1.5 Research Questions

The following research questions were answered;

1. What is the health-related physical fitness level of residential and non-residential male students of senior high school in Sunyani?
2. Is there any significant difference in the health- related physical fitness of residential and non-residential male students of senior high school?
3. What is the health-related, physical fitness of non-residential and residential male students' standards for healthy fitness zone of senior high schools in Sunyani?

1.6 Significance of the Study

This study investigated whether there existed any differences in the health related physical fitness levels of residential and non-residential students of senior high school in Sunyani municipality. The study would contribute to existing body of knowledge and making known the importance of keeping fit always.

It would assist teachers to be enriched in planning their lessons, curriculum planners would also benefit in other to put measure in the syllabus for teaching and learning in class setting. The results of the various test items would be used to identify strengths and weaknesses in individual students. Thus, the outcome of this study would assist students to improve on their weaknesses for better and improved health.

The results of the test would also help teachers to identify potential student athletes who are likely to succeed in various types of athletic activities. It would enable teachers to evaluate programme on the fitness levels of their students.

1.7 Limitation of the Study

The absence of reliable literature on fitness testing in Ghana led to the reliance on fitnessgram battery test and norms as well as reviewed of related literature based on research work done in Europe, America and some African countries, also the Cooper Institute for Aerobic Research – Texas, USA. To this end the norms used for the Health-fitness zone (HFZ) levels will be used as a criterion referenced standards though, the weather condition might be a challenge during testing and data collection stage, but the researcher and assistant will make sure this does not affect the outcome of the results.

1.8 Delimitations of the Study

The study was restricted to students of Sunyani senior high school. The researcher was only interested in testing health-related fitness components of first year students only because they were less busy with lessons. The activities that were chosen for the various test items include the following;

1. Body composition – BMI test
2. Flexibility – sit and Reach on Acuflex box
3. Muscular endurance – Curl Up
4. Cardiovascular endurance- 1 mile or 1600m run/walk
5. Muscular Strength- Push Up

1.9 Definition of Terms

Residential students- students who live in the boarding house on campus.

Non- residential students- students who come from home to school every day for tuition.

Aerobics – A type of exercise intended to strengthen the heart and lungs e.g running and swimming.

Sedentary – Spending a lot of time sitting down, sand moving or exercising very much.

Dynameters – An instrument used to measure the strength of the muscle.

Body Mass Index – It is a process used to indicate how fat or lean one is. It is calculated by Weight/Height.

Physical fitness- ability to carry out tasks without undue fatigue

CHAPTER TWO

LITERATURE REVIEW

The issue of physical fitness programme in Secondary Schools in Ghana has not being given due attention as shown by the dearth of information in this area in our schools. Physical Education is conceptualized in our schools to mean sports to the neglect of health benefits for longevity and wellness. Information from articles, journals, books and other research study was therefore, found useful and used for reviewed under the following sub- headings.

1. Concept of Fitness and Health Related Fitness
2. Factors that Affect the Physical Fitness of Students
3. The Prudential Fitness Gram (2000)
4. Physical Activity and Health Benefits
5. Fitness Surveys and the Fitness Gram
6. Physical Fitness Components

2.1 Concept of Fitness and Health-Related Physical Fitness

Fitness means different things to different people. More so, it is relative because fitness levels are not the same for everybody. It is related to the work one does. Fitness is a blend of a number of physical qualities (Beashel & Taylor, 1996). We all need these qualities in order to perform our daily tasks. According to Pate (1983) and Hockey (1985), the widely accepted definition for physical fitness is the one given by Clarke. To him, physical fitness is "the ability to perform daily tasks with vigour and alertness, without undue fatigue, and with ample energy to enjoy leisure time pursuits and to meet unforeseen emergencies". According to Bucher and Prebtice (1985), fitness is a broad term denoting dynamic qualities that allow you to satisfy your

needs, regarding mental and emotional stability, social consciousness and adaptability, spiritual, moral and organic health, consistent with your heredity. Ross and Gilbert (1989) spoke of health as a mirage. You can reach for it, but never fully grasp it. Physical fitness is the same; it is not so much a possession as a procession, not so much something to have but a way to be. Being physically fit is defined as the "ability to carry out daily tasks with vigour and alertness without undue fatigue and with ample energy to enjoy leisure and to meet unforeseen emergencies" The most frequent cited components fall into two groups.

1. Health – related fitness.
2. Skill – related fitness.

The health – related components of fitness are:

a. Cardiovascular endurance
b. Muscular endurance
c. Muscular strength
d. Body composition
e. Flexibility

Just as the amount of physical activity ranges from low to high, so does the level of physical fitness. The choice of the type of fitness one needs or wants is dependent on one's personal philosophy of fitness. Health – related fitness components are all achievable, observable and measurable.

The body's ability to perform work efficiently and without undue is directly related to and dependent upon:

i. Cardiovascular endurance.

ii. Muscular strength

iii. Muscular endurance

iv. Flexibility

v. Body composition

In essence, where the physical task to be performed consist of running, walking, cycling or ordinary household chores, efficiency of performance will be dependent upon the efficiency of the circulatory respiratory process; the effectiveness of muscular action, overall flexibility of the body and body composition of the individual (Awuni, 1999). Physical fitness components relate to the development of an efficient heart, blood vessels, joints and body with a relatively high percentage of lean compared to a fat weight. Specific health – related components in this study covered the five main fitness components listed above.

2.1.1 Cardiovascular Endurance

Cardiovascular endurance is defined as the ability of the respiratory, cardiovascular and muscular systems to take up, transport and utilize oxygen during exercise and activity. This implies that a fit a person will adapt more efficiently than the stress imposed person. This indicates an increase in efficiency, because less stress is placed on the heart. In short, cardiovascular fitness is the maximal amount of work an individual is capable of doing when the task is continuous and involves large muscle groups. Aerobic capacity can be improved substantially in a person through regular and sustained physical activities. Pate, Pratt, Blair, Haskell, Macera, Bouchard, Ettringer, Health, & King (1995) state that health benefits can result by accumulating 30 minutes or more moderate intensity physical activity on all days of the week. Aerobic capacity is perhaps the most important area of any fitness programme. Research indicates that acceptance levels of aerobic capacity are associated with

reduced risk of high blood pressure, coronary heart disease, obesity, diabetes, some form of cancer and other health problems in adults (Blair et al, 1992). Aerobic capacity relative to body weight is considered to be the indicator of a person's over – all cardio – respiratory capacity, and a laboratory measure of maximal oxygen uptake is generally considered to be the best measure of aerobic capacity (Fitness Gram, 2000).

Boys and girls who are over – fat may expect an improvement in the aerobic capacity measures with a reduction in body fat. For boys, aerobic capacity relative to body weight stays relatively constant during growing years. For boys, aerobic relative to body weight stays relatively constant between ages 5 and 10 years, but decreases after age 10 years due to increase in specific essential fat (fitnessgram,2000). To estimate cardio – respiratory fitness, the fitness Gram requires students to run one mile in the shortest possible time. Their mile run times are compared to criterion – referenced, health – fitness standards for cardiorespiratory fitness based on maximal aerobic power (Sfrit et al 1992). For cardiovascular endurance assessment, each student must run his or her best time. The better the running the better the aerobic capacity (Cureton, Baumgartner and McManus, 1991). Experience in running skill, body fatness, subjects motivation and training can improve the mile run performance (Saltaerlli and Andreas, 1990; Watkinson and Kohl, 1998). Performance on distance running tests of one mile of longer have been shown to correlate significantly with maximal aerobic power. Correlation coefficients from most investigators have ranged from 54 all the way up to 90 (Jette 1984).

2.1.2 Heart Rate

Heart rate and oxygen consumption during exercise and recovery are good indicators of a person's aerobic efficiency (Hockey, 1985). For an average untrained person in a

resting position, the heart beats approximately 72 times per minute. This is the heart rate. The heart pulse is caused by the contraction of the ventricular muscle and closure of the atria – ventricular valves. Resting heart rate is best detected by placing a finger on the redial artery or carotid artery, best used just after exercise. In the highly – trained individual, the heart becomes more efficient and the resting heart rate is often much lower than 72 beats per minute. When possible, the pulse should be counted for a full minute.

2.1.3 Maximal Oxygen Consumption (VO2max)

The ability of the total body to use oxygen for energy supply is called oxygen consumption. It is expressed as a volume of gas per unit time and is abbreviated VO2. During exercise and recovery, oxygen consumption is the amount of oxygen taken up and used by the body. It reflects the total amount of work being done by the body. During strenuous exercise, there can be a twenty – fold increase in VO2, which increase linearly with increase in the intensity of exercise. As a person approaches exhaustion, his or her VO2 will reach a maximum above that is the largest amount of oxygen that a person can utilize within given time (for example, 50 litres per minute). If you are doing sub – maximal exercise (below your limit) you can perform in an aerobic steady state. During maximal aerobic exercise (which usually lasts for five to ten minutes), you reach maximum oxygen consumption values. This is called the VO2 maximum. An individual's oxygen consumption may be decided by body weight (in kilograms and standard this value so that comparison may be made between individuals of different body weight (Hockey, 1985).

For example

Subject's body weight = 65kg

VO2= 3.21/minute

=30ml/minute

VO2=3200/65

= 49.1ml 02/kg body weight/minute

The final 49.1 is the millilitres of oxygen this person has available for use by each kilogram of body weight per minute. It is maximum amount of oxygen able to be taken in, transported to and consumed by the working muscle to produce energy. VO2 maximum is used as the most accurate measure of person's aerobic power of fitness. A higher VO2 maximum reflects an increased ability of:

1. The heart to pump blood
2. The lungs to ventilate large volumes air, and
3. The muscles to take up oxygen and remove carbon dioxide.

Therefore, the range of VO2 maximal is expressed in millilitres per kilogram minutes. However, this decline is greater in inactive or overweight people and can be developed by aerobic exercising. The maximum VO2 an individual can attain measures the effectiveness of the heart, lungs and vascular system in the delivery of 02 during work. Males generally range from 42 to 45 ml/kg/min of work. Trained athletes have been able to achieve values as high as 65 to 80.

2.1.4 Work Heart Rate

Subjects walk very fast for at least, 2 minutes. Within 3 – 5 minutes after walking, subjects located the carotid or radial artery and count their heartbeat for one minute. The same procedure can be repeated at a faster pace (jogging or running). This provides an excellent opportunity to demonstrate the difference between the non –

exercising state of the cardiorespiratory system (Best and Steinhardt, 1991). As speed increases, the heart beats faster and pulse rate increase. Remember to stop quickly, find your pulse and count accurately, elapses between stopping and counting, you will be recording recovery rather than exercising pulse rates (Saltarelli and Andreas, 1990). Exercise heart rate of young boys is relatively high beyond age 20. Maximum heart rate during exercise decreases with age and that young boys have higher HR in response to sub – maximal exercise than older boys (Miller, 1994). The decreasing HR in growing children is closely related to increasing body dimensions.

2.1.5 Target Pulse Rates

Recently, research has shown that boys and girls can sustain a running intensity within 85 to 95% ranges of maximum pulse rate for one mile run (Salterelli and Andres, 1990). Maximal Heart Rate (MHR) is dependent on the individual's age and can be estimated according to the following formula (the karvonen Formula);

- MRH=220 -age that is 220 -20 yrs = 200
- Check resting heart rate (RHR)
- Determine the heart rate reserve (HRR). This is done by subtraction the resting heart rate from the maximal heart rate (HRR=MHR-RHR). The heart rate reserve indicates the amount of beats available to go from resting conditions to all – out maximal effort.
- To calculate the target heart rate for a 20 years – old student with a Resting Heart Rate of 60 beats per minutes as follows:

1. 220-20 years =200 maximal heart rate
2. Calculate HRR=200-60bpm=140
3. Maximal HRR x 60 + Resting HR = Lower level Target Heart rate (140 x 60 =84+=144).

4. Upper level of Target maximal HR

   MHRR x .90+Resting HR = Upper level of target

   HR range = 140 x 90=126+60=186.

5. Target Heart Rate range = Lower level of Target HR range and Upper level of target HR range (144 to 186 bpm).

2.1.6 Muscular Strength

Muscular strength is defined as the ability to exert maximum force against resistance. It is measured with a dynamometer. Muscular strength is often approximated by finding the maximum resistance that can be lifted one time. It is an important component of health – related fitness because it can:

1. Improve the quality of life by making daily chores less fatiguing
2. Decrease recovery time injury.
3. Maintain and improve posture.
4. Improve athletics performance.
5. Increase or develop muscle size (hypertrophy)
6. Improve self – esteem.
7. Prepare a person for emergency situations

There are two types of strength tests:

i. Isotonic (dynamic)

ii. Isometric(static)

Isometric exercises involve a resistance being moved through a muscle's full range of (ROM) motion. The greatest resistance that can be filled equals the maximum weight that can be moved at the weakest angle of a joint. Isotonic (no movement) exercise

involves a muscular contraction being applied only to one segment of a movement (pulling or pushing) against immovable objects. Strength training is basically built around the overload principle and the specificity of training. Individually differences in strength is due to differences in body weight moderately correlated (r = 45) to 1-ROM is the weight of the last successful lift (Baumgartner and Jackson, 1991). Muscular strength and endurance are closely related; though weight training methods for them are typically different. Generally, strength is best developed through a high resistance, low repetition programmes, whereas endurance is improved through a low resistance, high repetition programme (Delorme, 1945). It is also necessary to have strength to develop endurance for example, to develop abdominal muscular through curl – ups or modified sit – ups, you must have the strength to perform at least one sit – up. The inability to perform one sit – up is due to lack of strength not endurance (miller, 1994). Strength is essential for good health. Strong muscles help protect the joints, making them less susceptible to sprains, strains and other injuries. Strength is necessary for good posture. Such postural problems as sagging abdominal organs, round shoulders and lower back pain may be prevented if adequate strength is maintained. In addition, strength will enable you to perform routine tasks more efficiency and to experience more satisfaction from leisure sport participation.

Baumgartner et al (1991), measured acquisition of leg extensions against resistance allowing only 12 repetitions, maximal effort isometric leg extensions, and running up and down stadium bleachers. He found out that the smallest gains in strength were made by those subjects trained by running up and down bleachers. The results revealed that those who were trained for strength gained as much endurance as those who were trained for endurance and vice versa. Dynamic strength is measured with one repetition maximum (1- ROM) since a direct relationship exists between body

weight lifted (heavier individuals generally can lift more), the maximum weight that can be lifted should be interpreted in relation to the individual's weight (Miller, 1994). The 1 – ROM is determined through trial and error. Although 1- ROM may be administered to measure most muscle groups, the body's major muscle groups may be tested with the bench press, standing press, pull – ups and leg press. Individual seeking health – fitness should be able to able to perform 12 to 15 repetitions of each of the lifts.

2.1.7 Muscular Endurance

Muscular endurance is the ability of a muscle or group to resist fatigue and to make repeated contractions against a defined sub – maximal resistance – dynamic endurance. It also may be the ability to maintain a certain degree of force over time – static endurance abdominal strength (McGill, 1998) Isometric abdominal endurance has been hypothesized to be a motor skill related to lumbar or pelvic control and potential back programmes. It is also necessary to have some strength to develop endurance. For example, to develop abdominal muscular endurance through curl – ups or modified sit – ups, you must have the strength to perform at least one sit – up. The inability to perform one curl up is due to lack of strength, not endurance (Miller, 1994). Robertson and Magnusdotir (1987), using curl – up test (CUT) found that performers showed greater demand on the abdominal muscles and no demand on the hip flexors, compared to performing the sit – up test with supported feet. Good abdominal endurance helps your appearance and sports performance and it may affect your ability to resist back injury. Young adults in good shape can usually do 70 to 80 curl – up (McGill, 1998).

Recent electromyogram graphic (MG) and biomechanical modelling studies have attempted to identify the safest and most effective abdominal exercise based on maximizing abdominal activation and maximizing spinal loads (Axler & McGill,1997,Juker, McGill, Kropf & Steffen,1998). Muscular endurance tests may be relative or absolute. In a relative endurance test, the performance works with a weight that is proportionate to the maximum strength of a particular muscle group or to body weight. In an absolute endurance test, all performers work with the same amount of weight irrespective of body weight and strength. The need for muscular endurance is demonstrated in many daily activities. For example, while working, your arms, legs, or entire body feel too tired to continue the work. When pushing a stalled car, carrying a heavy suitcase, performing any task that involves sustained muscular contraction or moving the body throughout the day tires the body down. To avoid end of day fatigue, you need muscular endurance. Possessing muscular endurance helps to maintain good posture and reduce backaches and muscle injury while performing routine tasks. The best possible muscular endurance test uses a fixed percentage of the individual's body weight as the resistance. In curl up, the resistance is the head and trunk (Willmore, 1983).

2.1.8 Flexibility

Flexibility is the ability to move the body joints through a maximum range of motion without undue strain. It is not a general factor but it is specific to given joints and to particular sports or physical activities (Miller, 1994). Flexibility is classified as static and dynamic. It depends on the soft tissues – (ligaments, tendons and muscles) of a joint than on the body structures of the joint itself. Flexibility is also related to body size, sex, age and physical activity. Any increase in body fat usually decreases flexibility. During early school years, flexibility increases but a leveling – off or

decrease begins in early adolescence. The dramatic loss of flexibility in the aging process is probably due to failure to maintain an active programme of movement (Ibid, 1994).

Generally, active individuals are more flexible than inactive individuals. The soft tissues and joints tend to shrink, losing extensibility when the muscles are maintained in a shortened position. Habitual posture and chronic heavy work through restricted ranges of motion (ROM) can lead to adaptive shortening of muscles (Miller, 1994). Physical activity with wide ranges of movements helps prevent this loss of extensibility. Medical records indicate that lower back pain is one of the most prevalent health complains in America and many lower back pains are caused by poor muscle tone, poor flexibility of the lower back and inadequate muscle tone. Anyone with stiff spinal column is at a disadvantage in many physical activities. Furthermore, short muscle limit work efficiency benefit of stretching is decreased in muscle stiffness (greater dynamic flexibility). Stiffness is a measure of dynamic flexibility. The higher the stiffness of a muscle, the greater is lack of elasticity (resistance to stretch) while less stiffness means compliance or extensibility (Knudson, 1995; Magnuson, Simonsen, Aaggard, 1996). Stiffness is the measure of the rate of increase of passive tension as the muscle is stretched (Knudson, 1999).

Flexibility, like cardiovascular fitness, is rapidly lost without training (Wilmore and Costil, 1994). A recent study by Magusson et al (1996), found that passive tension and stiffness significantly decreased with stretching, but returned to baseline levels in one hour. Short – term increase in ROM from stretching has shown to persist for up to 90 minutes (Moller, Ekstrand, Obeng & Gillquist, 1995). According to Bandy and Ivion (1997), stretches lasting between 10 – 30 second results in flexibility and ROM gains. There is equally enough evidence that stretching once a week is frequent

enough to maintain ROM (Wallin, Ekblom, Grahn and Nordenborg, 1995). The long – term benefit from stretching is singled out because it has been noted in clinical settings that people with lower back problems often have a restricted range of motion (ROM) in the hamstring muscles and the lower back. The sit and reach test has the subject reach forward indicates tightness in these muscles (AAHPERD, 1986).

The major limitation to joint flexibility is tightness of soft tissues structures (joint capsule, muscles, tendons, ligaments). Flexibility is related to age and physical activity (Nieman, 1986). As a person ages, flexibility decreases, although this is due more to inactivity than the aging process itself. Musculoskeletal testing centre's on the flexibility of the lower back and the muscular strength/endurance of the abdominals, because of the widespread prevalence of lower back pain in the youths and adults. The purpose of the sit and reach in this study was to evaluate the flexibility of the lower back and posterior leg muscles (hamstrings) of subjects for individual exercise counseling. The four most common types of stretching exercise are passive, static, ballistic and proprioceptive neuromuscular facilitation (PNF) (Knudson, 1999). The type of stretching that is most effective is controversial (Alter, 1996).

2.1.9 Body Composition

Body composition refers to the component parts of the body. For measurement purposes, body composition is interpreted as referring to the body fat weight and lean body weight. Research clearly shows that over – fat people are at greater risk of cardiovascular disease, diabetes cancer and early death (Lohman, 1987). Having too little body fat can result in significant health risks. The body needs some fat to provide protection against shock, insulation against thermal streets or transfer and store vitamins to maintain proper nervous system function, proper reproductive health

and to store surplus energy. Eating disorders (anorexia nervosa and bulimia nervosa) affect body fat levels.

Fitnessgram (2000), provides optimal range of body fatness for males and females of age five to twenty – five as 10 to 25 % and 17 to 32% respectively. Fitnessgram considers males with less than 8% and females with less than 13% fat to be very lean. Lohman (1992), reports that a 10 to 22% fat content in men and 20 to 32% in women seems satisfactory.

Many students in high schools in Ghana have inaccurate perception of what healthful levels of body fatness are. This is one factor that may contribute to the high rate of eating disorders exhibited in this age group (Slavin, 1988). The generally accepted standard body composition assessment method is hydrostatic (underwater) weighting. However, the most accurate measure available to schools is skinfold assessment. Hydrostatic weighing if performed has an error factor of plus or minus 2 percent (_+ 2) body fat (Safrit, 1990). Skinfold assessment if performed properly has an error factor of plus or minus three percent (-+ 3) body fat (Lohman, 1987). The standards of classification set by Fitnessgram (2000), and Lohman, (1987), are not absolute guideline for what is healthy and what is not healthy.

Fitnessgram (2000) uses the following equations to calculate body fat. Boys % fat= (0.735x sum of skinfolds) + 1.0. Use Triceps and calf skinfolds. Fitnessgram Healthy Fitness Zones (HFZ) to percent fat ranges 10 to 25 is the lower end of HFZ and 10 is the upper end of HFZ. Above 25% is over – fat and less than 10% is very lean.

2.2 Factors that Affect the Physical Fitness of Students

Physical fitness is a multi – dimensional attribute. Genetic inheritance, age, morphology, nutrition, habitual physical activity, gender and general well – being are

commonly cited factors influencing physical fitness status (Goslin and Burden, 1986). These factors are intricately associated with the physical fitness characteristics, such as strength, endurance, flexibility, speed, agility, co – ordination and balance, which are basic components of competitive sports performance. Environmental factors such as adequate rest, proper diet, proper room ventilation, sanitation, family support and influences, facilities for training, time and physiological factors greatly affect one's physical fitness status in life and affect lifestyle behaviours. Malina (1996) and Gooding and Shepherd (1990) also concluded that experience in physical activity early in childhood is important because it positively influence attitude and current habits.

Research has shown that factors associated with exercise drop – out can be grounded into two.

a. Those relating to the situation
b. Those relating to the participant (Mutrie, 1987)

2.2.1 Situation Factors

Situation factors include proximity of the sports centre to the subject with an inverse relationship between distance and adherence. They also include intensity and duration of workout session, poor schedule of programmes and ineffective communications. Dropout rate increases as all of these variables increase (Pollock & Gateman 1990).

2.2.2 Participation Factors

The most consistent factors associated with exercise drop – out, include work status, self – motivation and social reinforcement. The most common reason for dropping out or not starting an exercise programme is lack of time due to academic work. Others include childhood socialization, social attitudes towards exercise, fear of violence,

gender role expectations and discrimination issues (Hedges, 1999). Another common barrier for the sedentary life is that students perceive themselves as getting exercise already. Inconvenience associated with exercise programmes (disrupting of normal routines, interference with family and friends) consistently explains much of the lack of exercise compliance.

2.3 The Prudential Fitness Gram (2000)

The Prudential Fitness gram (2000) is a comprehensive fitness programme for school – aged children and youth. It consists of a health- related fitness assessment tests and standards to determine who is fit according to the Healthy Fitness Zones. The fitness gram measures the components of physical fitness which have been identified as being important because of their relationship to overall health and optimal function. The components are aerobic capacity, body composition, muscular endurance, strength and flexibility. Several test options are provided for each area with one test item being recommended. The fitness gram is a more effective fitness test for the youth. First, it compares scores to carefully researched and developed health standards, rather than to state averages. By using these standards called Healthy Fitness Zones, the test administrator knows without a doubt whether a child meets the minimum recommendation for being fit on each test item. Second, it emphasizes measures of physical fitness instead of performance of physical or sports – related skills. Third, it goes beyond measuring fitness to recommend physical activity programme option that will help students make it into the Healthy Fitness Zones for those areas where they need improvement.

The fitness gram was developed by the Copper Institute for Aerobics Research, Texas – Dallas. It has been in use for more than ten years. The fitness gram provides everything you need to accurately assess a student's fitness levels and identify

individualized approach to improve physical fitness. Underlying the fitness and standards and fitness zones is the premise that there is an association between good health and fitness, flexibility, muscular endurance and strength and body fat (may decrease the risk of some disease).

2.4 Physical Activity and Health Benefits

Physical fitness is a related construct and it is also often assumed that the more habitual and active one is the more fit is likely to bet and that the relationship is casual (Corbin & Pangrazi 1996, Livingstone, (1994). Physical activity and physical fitness occur within the context of lifespan transactions and cannot be viewed in isolation. Physical activity refers to any body movement produced by the skeletal muscle and resulting in a substantial increase over the resting energy expenditure (Bouchard Shephered & Stephen, 1994). Physical fitness in a contrast is an adaptive state that is a response to a variety of environments. The concept of physical fitness evolved from a primary motor and strength focus (Performance – related) to a health – related focus. The increased energy expenditure that accompanies regular physical activity contributes to more efficient function of the various systems, weight maintenance, reduced risk of several degenerative diseases, reduced risk of mortality and overall improvement of quality of life (Bouchard, Shepherd & Stephen, 199 4). Habits, lifestyle behaviour and attitudes towards physical activity developed during childhood are assumed to continue through adolescence into adulthood (Livingstone, 1994).

A recent physical activity and health report of the Surgeon General (1996) emphatically states that regular physical activity preferably performed daily will reduce one's risk of developing or dying from heart – related disease. Regular and vigorous daily activity increase muscle size, strength and power and develop endurance for sustaining work, and tasks the cardiovascular fitness the produces the

quality of physical reserve, power and stamina – endurance. For example, three 20 minute sessions of physical activity per week with intensity producing a heart rate of 80% of estimated maximum will improve cardiovascular fitness (Armstrong, 1990). Evidence also demonstrates that regular exercises combat anxiety and depression (Miller 1994). It promotes psychological well – being and helps build healthy bones flexible muscles and joints (Casperson, 1998). Physical activity also influences mental health. Besides organic vigour fitness, physical activity contributes to improvements in ability, speed co – ordination and skill. The incorporation of regular physical exercises into our school curriculum and our lifestyle has the potential not only to reduce the cost and suffering caused by inactivity but also to improve the quality and enjoyment of life of the participants. Hundreds of research studies give us the latest standards for the ideal amounts of physical activity that is, 30 minutes of moderate intensity physical activity on most if not all days. Activities such as walking at a pace of three miles per hour for 30 minutes, riding a bike for 45 minutes, running for 20 minutes, etc, can all be interwoven throughout the week in order to achieve health benefits from physical activity (Surgeon General's Report on health, 2000).

Sports medicine has established that three to five 15 – 30 minutes exercise session per week of hard intensity aerobic activity like jogging, swimming or brisk walking is necessary to develop the heart – lung – blood vessel system and that has as the heart is strengthened so is the brain. In addition, one is now confident that in exercise one has a strong weapon to help counter the never – ending onslaught of streets, anxiety and depression, associates our present day economic and social problems in the country. Exercise does act as buffer, decreasing the strain of stressful events. Exercise does fortify the brain, helping to alleviate anxiety and depression while elevating mood. Exercise helps the brain function better intellectually. What this means to busy

students is that time spent in exercising is not lost. Instead, the half – hour exercise session could mean enhanced mental functioning and greater time efficiency so the allocation of curricular time to physical education does not hamper academic achievement as some people think. Exercise is good for both the body and the brain. Through regular, active use of the body, one can discover a greater sense of well – being, far greater vitality and a calmer, more relaxed attitude towards daily pressures. David Nieman (1986), sums it up thus a healthy body lives in silence, you cannot hear it, you cannot feel it, from deep within comes harmony and peace.

2.5 Fitness Surveys and the Fitness Gram

A fitness survey designed by the Institute for School Research at the University of Michigan and conducted by the US President's Council on Physical Fitness and Sports (PCPFS) (1993) involving 18,857 boys and girls revealed that the physical fitness of public school children had shown virtually no improvement in the last 10 years and only 36% of American youth had daily physical education.

Other findings include the following.

i. Forty percent (40%) of boys 6 – 17 years could not do more than one pull up. One out of four could not do any at all.
ii. Forty – five percent (45%) of 10 – 17 years of age could not hold their chin over a raised bar for than ten seconds.
iii. In the 50 – meter dash girls 10, 14 and 16 years were significantly slower than the boys.
iv. In a simple flexibility, curl – up test 40% of boys 6 - `18 years could not reach beyond their toes or beyond 7 inches on the scuffle.

v. Approximately 50% of girls age 6 – 17 years and 30% of boys' age 6 – 17 years could not run a mile in less than ten minutes.

In was concluded that many children were not getting the vigorous exercise they needed to develop strong and healthy bodies (George Allen, Chair of the PCPFS, 1993). Knudson (1998) also reports that the resistance during a simple curl – up test for muscular endurance is essentially the weight of the upper body. This resistance is quite low, usually between 10 to 40% of maximum resistance needed. He further suggested that 15 to 30 repetitions with small weights (5 to 10 pounds) held on the chest are likely to be more than multiple sets of 50 or more repetitions.

2.6 Summary of Related Literature Reviewed

The purpose of the study was to use the Prudential Fitnessgram (2000) battery of test to determine the health – related fitness status of Senior High Secondary Schools. The assessment measures five components of physical fitness which have been identified as being important because of their relationship to overall health and optimal function. These components are aerobic capacity, body composition, muscular strength, muscular endurance and flexibility. Several test options were provided for each area with one test item being Fitnessgram (2000), the following test items were selected.

Aerobic capacity – 1 mile run/walk.

Flexibility – sit and reach.

Muscular strength – pull up for upper body strength.

Aerobic capacity is perhaps the most important area of any fitness programme. Research clearly indicates that acceptable levels of aerobic capacity are associated with reduced risk of high blood pressure, coronary heart disease, obesity, diabetes,

some forms of cancer and other health problems in adults (Blair et al 1992). Aerobic capacity relative to body weight is considered to be the best indicator of a person's overall cardiorespiratory conditioning activities serve to:

i. Increase physical working capacity of all ages
ii. Decrease the risk of developing obesity and problems associated with obesity.
iii. Decrease the risk of coronary heart disease
iv. Aid in the management of both stress and depression.
v. Enable most people to feel better, physically and mentally (Blair et al, 1992).
vi. Vi A laboratory measure of a maximal 02 uptake (VO2 max) and the resting heart rate are generally considered to be the best measure of aerobic capacity.

The body composition test results provide estimation of the percent of a student's weight that is fat in contrast to fat free body mass (muscles, bones, organs). Maintaining appropriate body composition is vital in preventing the onset of obesity, which is associated with increased risk of coronary heart diseases, stroke and diabetes. Children and youth with levels of fat greater than 25 and 30% fat for boys and girls, respectively, have greater risks of developing primary risks factors of heart diseases including high blood pressure and elevated cholesterol (Williams et al, 1992). Fitnessgram (2000) recommended 10% to 25% fat for boys 5 – 18 years. A number of methods for estimating body composition in children and youth have been developed including underwater weighting, anthropometry, bio – electrical impedance and height and weight ratios. Each approach has some limitations leading to measurement errors of +_3% in the estimates based on height and weight results in measurement errors, the recommended test option is the measurement of triceps and calf skin – folds thickness for calculation of the present body fatness.

Test of muscular strength, muscular endurance and flexibility have been combined into one broad category, because the primary consideration is determining the health status of the muscular – skeletal system. It is equally important to have strong muscle that can work forcefully and or over a period of time and also be adequately flexible to allow range of motion at the joint, for example, in performing sit – ups or curl – ups. Flexibility is an important component of health – related fitness and the lack of it can create functional problems or disorders for many individuals, such as low back disorders and muscles stiffness. Strength is essential for good health. Strong muscles protect the joints, making them less susceptible to sprain, strain and other injuries. Muscular endurance is very important in our daily activities such as walking, carrying files from one office to another and climbing up the stairs to our offices that involve sustained muscular contraction. It is important to remember that the specificity of training is applicable to the development of muscular – skeletal strength, endurance and flexible. The movements included in these test items are only a sampling of the many ways that the abdominal trunk region has been selected as areas for testing because of their perceived relationship to maintaining functional health and correct posture, thereby reducing possibilities of future low back, pain and restrictions in independent living. Although most students will not have weakness sufficient to cause current problems it is important to educate them regarding the importance of muscle strength, endurance and flexibility in preventing problems as adults it is essentially important to make students aware of correct postural alignments and body mechanics in the event that they are developing scoliosis, which is the problem for teenage youth. Some of the ROM, strength, endurance, flexibility and cardiovascular endurance gains are lost, however, after a week of inactivity (Starring et al, 1998). The Surgeon General's report (2000) also indicates that many of the beneficial effects

of exercise training from both endurance and resistance activities diminish within 2 weeks if physical activity is substantially reduced, and effects disappear within 2 – 8 months if physical activity is not resumed.

CHAPTER THREE

METHODOLOGY

This chapter contains all the various aspects of method and procedures used in this study. The organization of the methods and procedure covered includes the following sub-headings;

1. Research Design
2. Population
3. Sample and Sampling Technique
4. Instruments
5. Validity and Reliability of the Instruments
6. Data Collection Procedure
7. Data Analysis Procedure

3.1 Research Design

The research design used in this study was a Quasi experimental design. This examine one variable in different groups that are similar in all other characteristics. This allows the researcher to examine the association between the exposure and outcome, without experimental and effects. This allows the research to simple record the information that is observed in the groups examined.

3.2 Population

The population for this study was made up of residential and non-residential male students of Sunyani Senior High school in the Brong Ahafo Region.

3.3 Sample and Sampling Technique

One hundred (100) participants were sampled for the study. The Stratified Random Sampling technique was used to select fifty (50) male students from residential and

non-residential. They were made up of fifty (50) residential and fifty (50) non-residential students. The basis of selection was to ensure that each respondent had an equal chance of being selected. The students were placed in each class from SS 1 – SS 3. The researcher used the lottery method whereby "yes" and "no" were written on pieces of papers and put into a box (fish bowl). Each student that pick 'yes' was selected for the study which are as follows: twenty (20) from SS 1, fifteen (15) from SS 2 and fifteen (15) from SS 3 for both residential and non-residential male students, total one hundred (100) male students in all.

Table 3.1: Selection of Participants

Class	Residential	Non-Residential
SS 1	20	20
SS 2	15	15
SS 3	15	15
Total	50	50

3.4 Instrument

The main instrument for data collection was an adopted Prudential Fitness Gram (2002) which was designed by the cooper Institute for amniotic Research in Dallas in the United States of America (U.S.A). The instrument has widely been used in the U.S.A and Europe and has proved to be a reliable instrument in the evaluation of student's status relative to the difficult health related fitness component.

Flexibility: Sit and Reach

To measure subjects' flexibility status at the lower back and posterior leg muscles.

Equipment: Acuflex ruler and mat

Procedure: Subjects sat on the mat; stretched one leg forward and placed the soles of both feet flat against the Acuflex and flexed the other leg fully. Subjects placed one

hand on top of the other and bent forward with fully extended arms sliding down the meter rule to see how far forward they can reach. Subjects alternate the legs and repeat the same exercise.

Scoring: Distances covered by the subjects were recorded against their names.

Body Composition (% Body Fat)

Purpose: To measure the percentage body fat of subjects.

Equipment: Pre-calibrated Lange skinfold calipers.

Procedure: The fat on subjects' calf medialis, vastus lateralis and medialis were located and held between the thumb and the forefinger and measured with the Lange Skinfold Calipers.

Scoring: The thickness of the fat as shown on the caliper were recorded.

The sum of the medial calf medialis vastus lateralis gave each subject the fat level.

Body Weight

Purpose: To determine subjects' weight.

Equipment: Bathroom weighting scale.

Procedure: Subjects removed their sandals and wore their physical education uniforms before standing on the scale for their weights to be determined.

Scoring: Subjects stood still for their weight readings to be taken and recorded.

Subjects' Height Measurement

Purpose: To measure subjects' height

Equipment: Tailor's measuring tape

Procedure: The tape measure was used to record heights on the wall of the classroom, starting from 0 to 2 meters. All centimeters also marked. Subjects removed their shoes or sandals and stood with their back very close to the wall with feet flat on the ground. A ruler was placed on the top of student's head touching the wall. Subjects walked away from the wall for the reading to be taken.

Scoring: The height of each subject was recorded against her name in meters and centimeters.

Curl-Up: Muscular Endurance

Purpose: To measure abdominal muscular strength and endurance.

Facilities and Equipment: Mats and Curl-Up measurement strip, taped to the mat.

Procedure: Subject laid flat on the back with knees bent and feet on the floor. The hands by the side of the body. The subject then curled up sliding her fingers on the measurement strip. When the fingers traverse the strip, the student lowered her head and chest back to the starting position. The exercise was repeated as many times as possible until the students could no longer curl-up. There was no time limit.

Scoring: One point was scored for each correct curl-up.

Modified Push-up: For Muscular Strength

Purpose: To measure arm and shoulder strength.

Facilities and Equipment: A metal or wooden bar was placed horizontally on two wooden posts at a convenient height.

Procedure: The subjects used the overhand grasp technique to hang free off the ground. The subject then raised her body up until her chin went over the bar and then

lowered her body down to the starting position with her arms fully extended. The subjects performed as many push-ups as possible. There was no time limit.

Scoring: One point was scored each time the student completed a push-up. Only one trial was permitted.

1-Mile Run/Walk for Cardiovascular Endurance

Purpose: To see how fast a subject covered a distance of 1-mile (1600m) in the shortest possible time to measure cardiovascular fitness.

Facilities and Equipment: A 400-meter athletic oval and stopwatches.

Procedure: Subjects were divided into 2 groups for testing purposes. Each partner worked with a partner. While one partner was running, the other was checking the number of laps and the time at the finish of the race over 4 laps.

Instructions: Subjects began to run on the signal "go" and stopped on completing the 4th lap.

Scoring: The time each subject used to complete the 4 laps was recorded against her name.

For accurate measurements of health-related physical fitness levels, the following tools were used;

1. Ten stopwatches (electronic) for timing the 1-mile run/walk.
2. Twenty pencils.
3. One hundred score sheets for recording.
4. Five tape measures for measuring distances.
5. Two whistles for starting and ending events.
6. Graduated wall for measuring heights.

7. Ten mattresses for performing floor activities.
8. One skinfold caliper for measuring body fat.
9. One bathroom scale for measuring weight.
10. One acuflex box for measuring flexibility.

3.5 Validity and Reliability of the Instrument

Validity is an attempt to ensure that the research instruments the researcher uses are not questionable or disputable (Seidu, 2007). The prudential fitness gram (2002) is a standardized instrument. It is a comprehensive fitness programme for school-aged children and the youth. It consists of a health- related fitness assessment tests and standards to determine who fit according to the healthy zones is. Fitness programme measures the components of health related physical fitness which has been identified as being important because of their relationship to overall health and optimal function. The components measured were aerobic capacity, body composition, muscular endurance, strength and flexibility. Reliability on other hand is the consistency of the instrument producing the same results given the same conditions on different occasions. A coefficient of 0.76 was obtained as a reliability index of the instrument using a split-half method.

3.6 Data Collection Procedure

The researcher took an introductory letter from the Department of Heath Physical Education Recreation and Sports to the school in which the research was being done. The researcher then sought permission from the headmistress of the school involved in the study. Both Residential and non-residential subjects were tested without distinction to avoid a competitive situation.

The various tests were done on the schools fields and the assembly hall closer to the fields. Eight Physical Education tutors who have knowledge in the collection of data assisted the researcher in the collection of the data. The subjects were given the knowledge about the procedure, purpose and duration of what they were going to do. The three days for the collection of the data was ideal because it did not bring fatigue, pressure or boredom to both teachers and subjects.

The recording of the results of the various data was compiled by the researcher to ensure accuracy, consistency and to make sure that the data was correct on each subject. Three days schedule was utilized to administer the fitness tests; this was how the tests were conducted each day.

Day 1

Sit and reach for flexibility, height, weight and skinfold measurement of calf muscles, abdominal, hamstring, and triceps were taken.

Day 2

Curl-up and modified push-up tests were administered after warm-up for muscular endurance and strength.

Day 3

One-Mile or 1600m run/walk was used to test the subjects for cardiovascular endurance. Resting heart rate was taken and recorded before the start and immediately after the race. P. E. tutors who already have knowledge of testing assisted in taking the measurements.

Day and Boarding subjects were tested together without distinction to avoid a competitive situation. The following were the purpose, facilities, equipment and procedures for the various tests:

3.7 Data Analysis Procedure

The data collected were analysed using descriptive statistics of frequency counts and percentage for both demographic information and research questions, while inferential statistics of t-test was used for the hypotheses set at 0.05 significant level.

CHAPTER FOUR

ANALYSIS, RESULT AND DISCUSSIONS

This chapter deals with the findings and analysis of data for the study. The results are discussed accordingly below.

Demographic Information

Table 4.1: Showing the Selection of Participants according to class

	Residential	Non-Residential
SS 1	20	20
SS 2	15	15
SS 3	15	15
Total	50	50

The table 4.1 above showed the selection of participants with SS 1 having the highest member with 20 participants and SS 2 and SS 3 with 15 participants respectively for both residential and non-residential.

Table 4.2: Sex of Participants

Categories	Male
Residential	50
Non-Residential	50
Total	100

Table 4.2 indicated the sex of participants which were solely 50 male participants for both.

4.3 Age

Table 4.3: Distribution by Age of Participants

Age	Residential	Non-Residential
17+	50	50

Table 4.3 above showed the distribution by age of participants which were solely made up of those from 17years and above (age bracket of 20years).

Research Question 1: What is the health-related physical fitness level of male residential and non-residential students of Senior High School in Sunyani?

Table 4.4: Descriptive analysis of health-related physical fitness levels of male residential and non-residential students of senior high school in Sunyani.

Components Measure	Non-Residential		Residential	
	(F)	%	(F)	%
Muscular Endurance				
1 – 10 poor	12	24.0	2	4.0
11 – 12 below average	26	52.0	38	76.0
21 – 30 Average	10	20.0	10	20.0
31 – 40 Good	2	4.0		
Muscular Strength				
1 – 10 poor	33	66.0	7	14.0
11 – 20 below average	17	34.0	21	42.0
21 – 30 average			10	20.0
31 – 40 above average			12	24.0
41 – 50 good				
Cardio vascular Endurance				
≥ 8.30	16	32.0	37	74.0
8.30 – 7.00	23	46.0	5	10.0
> 7.00	11	22.0	8	16.0
Body Composition (BMI)				
➢ 18.9 underweight	13	26.0	10	20.0
19 – 24.9 normal weight	32	64.0	15	30.0
25 – 29.9 overweight	3	6.0	10	20.0
30 – 34.9 obesity grade I	-	-	10	20.0
35 – 39.9 obesity grade II	2	4.0	5	10.0
Flexibility				
6 – 7.99	11	22.0	30	60.0
8 – 9.99	26	52.0	20	40.0
10 – 11.99	13	26.0		

The result from table 4.4 above showed that only 24% of non-residential made students have a good muscular endurance, whiles 20% of both non-residential and residential male students were average. 52% of non-residential and 76% of residential

were below average, and 24% of non-residential and 4% residential were poor. This indicated that there is need to help male student build their muscular endurance.

Table 4.4 above showed muscular strength of male participants with 24% residential above average and 20% average, while 42% residential and 34% non-residential were below respectively, and 14% residential and 66% non-residential were poor. This indicated that on the muscular strength the residential male participants were better than non-residential though there is still needs to work on their muscular strength due to majority been below average and poor.

Table 4.4 showed that 22% non-residential male participants had better were in <7.00 in the one mile run (cardiovascular endurance) residential with 16%, while 46% of non-residential male participants were in the range of 8.30 – 7.00 and 32% non-residential and were in the range ≥ 8. 30. This indicates that non-residential male participants had better performance in cardiovascular endurance than their counterpart of residential male participants.

Table 4.4 revealed that non-residential and 30% residential male participants have normal weight respectively, 26% non-residential and 20% residential were underweight respectively. Also 6% non-residential was 20% residential were overweight, while 20% residential were obesity grade I, and 4% non-residential and 10% residential were obesity grade II. The results showed that majority of non-residential than residential were in the normal weight category, while more were underweight than residential and more overweight and obesity among residential male participants.

Table 4.4 indicated that 52% of non-residential and 40% residential male participants had flexibility range between 8 – 9.99cm, while 22% non-residential and 60%

residential were between 6 – 7.99cm flexibility (sit and reach), and 26% non-residential were between 10 – 11.99cm flexibility measure.

Research Question 2: Is there any difference in the health related physical fitness components of male residential and non-residential students of SHS?

Table 4.5: Descriptive Statistics of male residential and non-residential students' health-related physical fitness components.

Components	**Non-Residential**			**Residential**	
	N	**Mean**	**Std.**	**Mean**	**Std.**
Muscular Endurance	50	2.04	.7814	3.12	4.424
Muscular Strength	50	1.34	.4785	2.16	.468
Cardiovascular Endurance	50	1.90	.7354	4.42	.758
Body Composition	50	1.92	.8291	2.70	1.281
Flexibility	50	2.04	.6984	1.40	.495

Table 4.5 above showed that the residential male participants had a higher mean value in muscular endurance (3.12); muscular strength (2.16); cardiovascular endurance (4.42) and body composition (2.70) respectively than the non-residential male participants. On the other hand the non-residential male participant had a higher mean value of 2.04 in the flexibility than residential male participants. The result indicated show that residential made participants are better in four health-related physical fitness components than their counterpart but lack flexibility.

Research Question 3: What is the health-related physical fitness of male non-residential and residential students' base on standards for healthy fitness zone?

Table 4.6: Showing descriptive statistics of male non-residential and residential students healthy fitness zone.

Curl Up (Muscular Endurance)

	I	**F**	**H**
NR	76%	24%	-
R	80%	20%	-

I – *Needs Improvement Zone*

F – *Healthy Fitness Zone*

H – *High Fitness Performance Zone*

Push Up (Muscular Strength)

	I	**F**	**H**
NR	76%	14%	-
R	56%	25%	20%

Body Mass Index (Body Composition)

	Very Lean	**HIZ**	**NI**	**NI – (health risk)**
NR	26%	64%	6%	4%
R	20%	30%	20%	30%

HIZ – *Health Fitness Zone*

NI – *Needs Improvement Zone*

NI (health risk) – *Needs Improvement (health risk)*

Kilometre Run (Cardiovascular Endurance)

	I	F	H
NR	32%	46%	22%
R	74%	10%	16%

Sit and Reach (Flexibility)

	I	F	H
NR	22%	52%	26%
R	60%	40	-

NR – *Non-Residential*

R – *Residential*

Table 4.6 above showed participants' results base on healthy fitness zone of fitness gram. The result indicated that about 24% male non-residential and 20% residential muscular endurance meets health-related standards (Health Fitness Zone), while 76% male non-residential and 80% residential does not meet health-related standards (needs improvement zone. The findings show that the male non-residential muscular ensurance that meets health-related is more than the residential participants.

On the muscular strength 20% of male residential exceeds health-related standard (high fitness performance zone) while 14% male non-residential and 24% residential meets health-related standard [(F[HFZ)], with 76% male non-residential and 56% residential does not meet health-related standard (I). this indicated that majority of male residential participants are better in muscular strength than their counterpart.

The result on body composition revealed that 64% male non-residential and 30% residential meets health-related standard, while 26% male non-residential and 20%

residential were very lean. Also 6% male non-residential and 20% residential does not meet health-related standard (needs improvement zone), and 4% male non-residential and 30% residential on needs improvements but are of health risk. Base on the result outcomes, it shows that majority of male non-residential participants meet health-related standard than residential counterpart.

On the cardiovascular endurance, the results indicated that 46% male non-residential and 16% residential exceeds health-related standard (H), while 46% male non-residential and 10% residential meets health-related standard (I), and 32% male non-residential and 74% residential does not meet health-related standard. This show that non-residential is better in cardiovascular endurance than their residential counterpart.

The result on flexibility indicated that 26% male non-residential participants exceed health-related standard (H), while 52% male non-residential and 40% residential meets health-related standard (F), and 22% male non-residential and 60% residential does not meet health-related standard (I). This shows that more male non-residential participants have better flexibility than the residential counterpart.

Discussion

The study assesses health-related physical of male residential and non-residential students in senior high school in Sunyani. Several studies have established that physical fitness is necessary to carry out daily task. The findings revealed that majority of male non-residential were poor in muscular endurance and strength than their residential counterpart. This agrees with Pista, Marguis and Maia (1997), that this may be attributed to less physical activity and sedentary life style. It also support Das and Dahundasi (2001) who opined that they may be due to poor physical composition, improper nutritional status and lack of physical activity in them. Thus,

regular physical exercise is necessary for proper growth of an individual as it increase plasma somatotropin level (Gordon, Kraemer, Vos, Lynch & Kunttgen, 1994).

The findings on the standards healthy fitness zone revealed that male non-residential needs improvement because of not able to meet the health related standard in body composition, muscular endurance, and muscular strength but better in cardiovascular endurance and flexibility compare to the male residential counterpart. This supported Anderson and Rutenfranz (1997) assertion that physical fitness acquired in youth provides health impact. It is advisable to formulate a regular physical training schedule, so that they can achieve better strength and endurance.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

The main purpose of the study was to investigate the health-related physical fitness level of residential and non-residential male students of SHS in Sunyani municipality in the Brong Ahafo Region.

5.1 Summary

The focus of the study was to determine the health-related physical fitness levels of residential and non-residential male students of Senior High School in the Sunyani Municipality through the utilization of a fitnessgram test. The males' population of residential and non-residential was also considered in the study. They study went further to establish health-related physical fitness parameters for the students.

The study attracted interest for the following reasons:

1. The lifestyles exhibited by the participants.
2. Physical activity performed as a means of recreation and health practice had declined considerably among male students in the Senior High School.
3. The area of physical fitness assessment all these years had not been give any serious attention in our schools, hence the dearth of information on fitness norms in our schools.

The purpose of physical fitness testing is to determine status. All doing, teachers assumed that their student's players were fit because they participated in intramural and extramural games. The study involved residential and non-residential male students of Senior High School in Sunyani between the ages of 17years and above. The total population of the study was hundred (100) made up of fifty (50) residential

and fifty (50) non-residential make students. The stratified random technique was used to select the population.

The researcher collected data with the help of her assistant using the fitnessgram test battery.

5.2 Conclusion

In all, five health-related fitness components. Namely, muscular endurance, muscular strength, body composition, cardiovascular endurance and flexibility were tested using the fitnessgram test battery. A total population of hundred (100) subjects were tested. The means and standard deviations for the residential and non-residential male students were calculated to ascertain their health-related physical fitness levels.

In establishment the health-related physical fitness zones or the residential and non-residential male students, the researcher took into consideration the means of the various components of health-related physical fitness. The researcher went on to establish a health-related physical fitnessgram that will be guided to all physical education teacher who are interested in the health-related issues of their students. The researcher went ahead to compare the standard of the students physical fitness level in various components and activities that was carried out with the prudential fitnessgram.

5.3 Recommendations

The following recommendations were given:

1. The need to draw a well physical training schedule for all students with consideration of others who stay outside the school premises.
2. Allowing maximum physical exercise in the curriculum.

3. The need to counteract sedentary lifestyle with physical activity through sports and formal exercise during school hours.

4. Health-Related Fitness components should also be evaluated at the end of the lesson just like the skill-related components so that students can benefit from both in a practical lesson.

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APPENDIX A

INSTRUMENTS

Curl –Up (Muscular Endurance) for Male Non Residential students

Curl –Up (Muscular Endurance) for Male Residential students

Push –Up (Muscular Strength) for Male Non Residential students

Push –Up (Muscular Strength) for Male Residential students

1 Kilometer Run (Cardiovascular Endurance) for Male Non Residential students

1 Kilometer Run (Cardiovascular Endurance) for Male Residential students

Body Composition for Male Non Residential Students

Body Composition for Male Residential Students

Sit and Reach for Male Non Residential Students

Sit and Reach for Male Residential Students

APPENDIX B

Criterion – Referenced Standards

Interpreting Fitnessgram Results

Standards for Healthy Fitness Zone

Body Mass Index

Very Lean	HFZ (Health Fitness Zone)	NI (Need Improvement Zone)	NI (Health Risk)
≤ 18.5	18.6 – 24.9	25.0	≥ 29.3

Curl Up (Muscular Endurance)

I	F	H
NIZ	HFZ	HFPZ
0 – 23	24 – 47	> 47

Push-Up (Muscular Strength)

I	F	H
NIZ	HFZ	HFPZ
0-17	18-35	> 35

Kilometre Run (Cardiovascular Endurance)

I	F	H
NIZ	HFZ	HFPZ
> 8.30	8.30-7.00	< 7.00

Sit and Reach (Flexibility)

I	F	H
NIZ	HFZ	HFPZ
0 – 7	8	_

I – Needs Improvement Zone (does not meet health-related)

F- Health Fitness Zone (meets health-related standard)

H – High Fitness Performance Zone (exceeds health-related)