PHYSICAL FITNESS STATUS OF PUBLIC AND PRIVATE SECONDARY SCHOOL STUDENTS IN ZARIA, KADUNA STATE

BY

NYUYSE AUGUSTINE MAINSA, B. Sc. (ABU, 1998)
M. SC./EDUC/20072/99-2000
M.SC./EDUC/47512/2004-05

A THESIS SUBMITTED TO THE POST GRADUATE SCHOOL, AHMEDU BELLO UNIVERSITY, ZARIA NIGERIA.

IN PARTIAL FULFILMENT FOR THE AWARD OF DEGREE OF MASTER OF SCIENCE IN EXERCISE AND SPORTS SCIENCE

DEPARTMENT OF PHYSICAL AND HEALTH EDUCATION, AHMADU BELLO UNIVERSITY, ZARIA NIGERIA.

APRIL 2009

DECLARATION

I declare that this thesis entitled ‘Physical Fitness status of Public and Private Secondary School Students in Zaria, Kaduna State, has been written by me in the Department of Physical and Health Education under the supervision of Prof. C. E. Dikki.

The information derived from the literature has been duly acknowledged in the text and a list of references provided. No part of this thesis was previously presented for another degree or diploma at any University.

Nyuyse Augustine Mainsa Signature: _____ Date: _____

CERTIFICATION

This thesis entitled “Physical Fitness Status of Public and Private Secondary School Students in Zaria, Kaduna State” by Nyuyse Augustine Mainsa meets the regulations governing the award of the degree of Master of Science (M.Sc) in Exercise and Sports Science of Ahmadu Bello University, Zaria and is approved for its contribution to knowledge and literary presentation.

_____ _____

Prof. C.E. Dikki Date
Chairman, Supervisory Committee

_____ _____

Prof. M.A. Chado Date
Member, Supervisory Committee

_____ _____

Dr. A. I. Kabido Date
Head of Department

_____ _____

Prof. S. A. Nkom Date
Dean, Postgraduate School

DEDICATION

This thesis is dedicated to my wife Madame Lucy Ihotu Nyuyse whose love, support and perseverance have inspired me to complete this work, to all the family members of late Mr. Patrick Nyuyse and to the family members of Chief Patrick Oyinu, to whom I am forever indebted.

ACKNOWLEDGEMENTS

The researcher gives honour and glory to God Almighty for granting me the ability completes the course.

The researcher is highly indebted to his supervisors Professor C. E. Dikki and Professor M. A. Chado for their useful comments, constructive criticisms, suggestions and the dedicated guidance they gave me throughout the duration of the work despite their tight schedule.

The investigator is especially grateful to his late father Mr. Shey Patrick Nyuyse whose financial support saw him through the course. In the same vein, all members of the Nyuyse's family and everyone in my natal land of Ndzeen are highly appreciated for their endless support during the course.

The researcher's profound gratitude is expressed to late Dr. I. I. Gamba who made the researcher to know what it meant to read Exercise and Sports Science. This same gratitude is also extended to Prof. J. A. Gwani, Dr. Haruna Faruk, Professor K. Ventakeswarlu, Professor (Mrs.) Adeyanju, Prof. JA. Ayo and Dr. Mamman Musa whose professional tutelage enabled him to go through the course. In the same vein is Dr. (Mrs.) T. N. Ogwu whose motherly support, encouragement and enlightenment enabled me to read Exercise and Sports Science. Similarly of paramount importance are Dr. I. S. Ndams and Dr. J. S. Oniye of the Department Biological Sciences whose encouragement and support

during the course cannot be quantified.

The researcher is also grateful to Mrs. Eze Patience and Mrs. Ogebwunam, all former head mistresses of Zaria Children's School, Dr. (Mrs.) Onyemelukwe of the French Unit, Institute of Education, Ahmadu Bello University, Zaria, Mr. Rick Williams, the former principal, the Capital Science Academy, Kuje – Abuja and Mr. David Easton, the Principal, The Capital Science Academy, Kuje – Abuja for their support and Understanding during the trying moments of the course.

The researcher's sincere gratitude goes to the computer operators of the institute of Agriculture, Computer Centre for their technical advice, which made this study a success. In line with this are Mr. Celinus Kiyea and Madame Bernadette Vershiyi whose technical input and criticisms cannot be quantified.

Lastly the researcher's sincere gratitude and thanks go to late Mr. Chin Celestine Sevidzen who stood by the researcher all the way through the difficult moments and the duration of the whole course. May the Almighty Father bless all of you.

ABSTRACT

The study was conducted to assess the physical fitness status of public and private secondary school students in Zaria, Kaduna State. Four hundred and eighty (480) male and female students were selected using stratified sampling techniques as the subject's in this study. The subjects were selected from both public and private secondary schools. Two hundred and forty (240) were females and two (240) were males. Two hundred and forty subjects were selected from each type of school. Individuals in the group were administered physical fitness tests. The test items included the twelve minutes distance run, sit up test, push up test, sit and reach, skin fold measurements, standing broad jump, 50 meter sprint test, shuttle run and the balance test. These were used to measure muscular endurance, muscular strength, flexibility, percent body fat, speed, power, agility and balance respectively. Student t-test was used to determine if significant difference existed between the groups in these variables at alpha level of 0.05. The findings indicated significant differences between public and private secondary school students in all the performance indices. Public secondary school students had better performance values in all the test items than their counterparts in private secondary schools. Public Secondary School male students were better performers, followed by private male students, then public female students and private female students were the least performers in the test

batteries used. [tdf (478) = 1.960 < 0.05; tdf (238) = 1.960 < 0.05]. This shows significant differences in their cardio respiratory endurance, speed, trunk flexibility, coordination, agility and balance. It is recommended among others that secondary schools should organize routine physical fitness tests for students so as to help them gauge students' progress in physical fitness components such as muscular strength, muscular endurance, muscular power, cardio respiratory endurance, flexibility, coordination, speed, agility and balance

Table of Contents

Title Page - - - - - - - - - i

Declaration - - - - - - - - - ii

Certification - - - - - - - - - iii

Dedication - - - - - - - - - iv

Acknowledgement - - - - - - - - v

Abstract - - - - - - - - - vii

Table of Contents - - - - - - - - ix

List of Tables - - - - - - - - xiii

List of Appendices - - - - - - - xv

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study 1

1.2 Statement of the Problem 5

1.3 Significance of the Study 7

1.4 Purpose of the Study 8

1.5 Basic Assumption 8

1.6 Research Hypothesis 9

1.7 Delimitations of the Study. 10

1.8 Limitation of the Study. 11

1.9 Definition of Terms and Acronyms. 12

CHAPTER TWO: REVIEW OF LITERATION

2.1 Introduction. 15

2.2 Definition of Physical Fitness 15

2.3 Components of Physical Fitness. 18

2.4 Need for Physical Fitness Programme and its Development …. 19

2.5 Evaluation of Physical Fitness. 22

2.6 Importance of Physical Fitness. 24

2.7 Physical Fitness of Public and Private Secondary School Students

37

2.8 Low Level of Physical Fitness. 38

2.9 Measurement of Physical Fitness Components. 39

CHAPTER THREE: METHODOLOGY

3.1 Introduction. 68

3.2 Research Design 68

3.3 Population of the study. 69

3.4 Sample and Sampling Procedure 69

3.5 Test items Selection and Justification 70

3.6 Instrumentation. 71

3.7 Study Conditions 72

3.8 Testing Procedures. 72

3.9 Research Assistants. 79

3.10 Statistical Techniques. 80

CHAPTER FOUR: DATA ANALYSIS AND DISCUSSION

4.1 Introduction. 81

4.2 Results. 82

4.3 Discussion. 103

4.3.1 Cardio – Respiratory Fitness. 104

4.3.2 Muscular Strength.. 105

4.3.3 Muscular Endurance 106

4.3.4 Flexibility 107

4.3.5 Body Composition (Percent body fat B.F %) . .108

4.3.6 Speed. 109

4.3.7 Muscular Power 110

4.3.8 Agility 111

4.3.9 Static Balance 111

CHAPTER FIVE: SUMMARY CONCLUSIONS AND RECOMMENDATION

5.1 Summary. 113

5.2 Conclusion 115

5.3 Recommendations 116

5.4 Suggestions for Further Research . . .118

REFERENCES 119

APPENDIX A 130

APPENDIX B 131

APPENDIX C 132

LIST OF TABLES

Table 4.1: Physical Characteristics of public and private secondary school students - - - - - - - - - 84

Table 4.2: Performance of public and private secondary school students in different physical fitness test items (batteries) - - - - - - - 86

Table 4.3: Summary of t-test for difference between public and private secondary school students in the cardio-respiratory endurance. - -88

Table 4.4: Summary of t-test for difference between public and private secondary school students in the muscular arm strength - - - -90

Table 4.5: Summary of t-test for difference public and private secondary school students in the muscular endurance ability. -92

Table 4.6: Summary of t-test for difference between public and private secondary school students in trunk flexibility. - - - -94

Table 4.7: Summary of t-test for difference between public and private secondary school students in their body fat percent (B.F %) - -96

Table 4.8: Summary of t-test for difference between public and private secondary school students in their speed ability. - - - -98

Table 4.9: Summary of t-test for difference between public and private secondary school students in the leg power capacity. - -100

Table 4.10:Summary of t-test for difference between public and private secondary school students in agility - - - - -102

Table 4.11: Summary of t-test for difference between public and private secondary school students in the static balance ability - -104

LIST OF APPENDIXES

APPENDIX A: Informed Consent form. - - - -133

APPENDIX B: Introductory letter - - - - -134

APPENDIX C: Physical Fitness Status Raw Data - - -136

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Man's endless efforts to improve himself and his environment have transformed the labour oriented society to automated one. Though this man is paying enormously in terms of health as a consequence of this development. This arises mainly due to the abuse of the aforementioned privileges. Advances in modern technology, for instance, in nations such as United State of America, Great Britain, Germany, Japan and France, have made present day society to exist in situations where the concept of hard or moderate physical work is obsolete and unfashionable. Elevators have replaced staircases in modern buildings and a walk to nearby destinations (market, school, church, mosque, neighbor's house and so on) has been replaced by a short drive or ride. The result of this is the incidence of several disorders known as "diseases of civilization." These include hypertension, diabetes and obesity, which cause myocardial infarction, arteriosclerosis and many others. There exists a popular opinion that physical activities may be used not only to control but to cure these disorders. It is in realization of the benefits of regular exercise that much emphasis and importance have been attached to the area of physical fitness in recent years.

Physical fitness is the condition of the body in which an individual is able to carry out efficiently all his/her expected daily tasks without easily getting tired and without suffering much pain in or being hindered by any part of his/her body. When a person is fit, it also means that he/she is healthy and that the body systems such as the cardiovascular system, the respiratory system and the muscular system are functioning properly. A person that is physically fit has no form of physical disability. Physical fitness can be acquired through exercise. Participation in regular, well selected and planned exercises can make a person physically fit (Uti and Ojeme, 2003; Akinseye, 2005).

The American Association for Health Physical Education Recreation and Dance (AAPHERD, 1990), defined physical fitness as "the individual's ability to endure exertion and stressful physical activities beyond that required by his or her normal day to day means of livelihood or occupation. The association also dichotomized physical and performance related physical fitness components.

The basic components of health related fitness include: -

1. Cadiorespiratory endurance
2. Muscular endurance
3. Muscular Strength
4. Flexibility
5. Body composition

6. Muscular power

These relate to the development of health and functional capacity of the body. It is well documented that these factors offer the individual some protection against degenerative disease such as the coronary heart disease (CHD), obesity, low back pain, hypertension and various muscular skeletal disorders.

The performance related fitness components include those factors that are critical to skilful performance in various physical activities.

These include:

1. Speed
2. Agility
3. Coordination
4. Balance

In the past this area has been referred to as motor ability

Physical exercise is generally recommended as a good thing for both healthy and also in many cases for patients with a variety of diseases. The ability to move in numerous situations is one of the important objectives of physical education. Considerable time and efforts are spent in attempting to help person especially children and youths learn how to successfully engage in work, play in specific skills. Maladies such as obesity, coronary heart diseases and low back

pain have become significant problems with the adult population (AAHPERD, 1980).

The teaching of physical and health education (PHE) in secondary schools nowadays is a far cry from what used to be in those glorious days when PHE used to be a subject of high value.

The subject faces competition from other subjects such as mathematics, sciences, introductory technology and commercial subjects due to the shift in technological advancements and change in habits from the sweating (manual) activities to the present day automations.

Similarly, there is lack of teaching personnel in secondary school for the subject, coupled with the misconception that there is not much to be done in PHE. Some secondary school administrators tend to give PHE responsibilities to teachers who are not PHE graduates but are interested in football, forgetting that the subject is not just secondary school staff saying “What is there in PHE” or giving the subject nickname such as “Jumpology”.

Another threatening factor is the limitation of teaching the subject to only junior secondary classes (Js1 – Js3) in most secondary schools in Nigeria. This is testified by the limited amount of papers in the subject corrected in the senior secondary school examinations of WAEC and NECO.

After the junior level students entering SS1 have the notion that there are no careers in PHE, that is why it is only limited to the junior section.

All the afore mentioned issues have detrimental effects on physical fitness which is one of the vital scope of PHE. Thus morning jogging hiking, mountain or rock climbing, inter-class and inter - school competitions and martial arts clubs are not just declining in secondary schools today but are almost disappearing. This raised a lot of concern about PHE existence and physical fitness status of secondary school students nowadays.

1.2 Statement of the Problem

One of the main purposes of teaching physical education in secondary schools is the development of physical fitness of the students. However collapse of education in Nigeria suggests the possibility of decline in the physical fitness of secondary school students. Apart of a dearth of qualified teachers, teaching of physical education does not appear to be a priority. Playgrounds and sport facilities in schools are either non-existent or are in a state of decay.

The private secondary schools that have taken up the challenges of education do not seem to be doing better. Most of them do not employ qualified physical and health education teachers. Some private school

authorities give additional responsibilities to physical and health education teachers which tend to divert them from practicing the profession. Many of these private schools hardly acquire enough land for buildings, not to talk of open fields for physical/sporting activities (extra curricular activities). This has increased their inactivity of secondary school students who are already pruned to sedentry6 lifestyles.

As a result, this study tried to compare the physical fitness status of public and private secondary students in Zaria by answering the following research questions.

1. Do students in public schools differ from those in private secondary schools in their cardio-respiratory endurance?

2. Is there any difference between the public and private secondary school students in their muscular endurance?

3. Do public and private secondary school students differ in their muscular strength?

4. Is there any difference between the public and private secondary school students in their flexibility?

5. What is the difference between the public and private secondary school students in their body composition?

6. Do public and private secondary school students differ in their speed?

7. What is the difference between public and private secondary school students in their agility?

8. Do public and private secondary school students differ in their balance?

1.3 Significance of the Study

It is hoped that the finding of this study would contribute to the body of knowledge in the area of physical fitness in particular and physical education in general. It would determine the strength and weakness of the Nigerian youths in areas of physical fitness. This study would serve as a useful source of information on physical fitness to students, to help them achieve higher level of physical fitness. It would also help students develop skills and knowledge required to become intelligent physical fitness consumers.

It is hoped that the findings of this investigation will give a clue to the physical fitness level of secondary school students of similar age level. The study will provide the bases for classifying public and private secondary school students in terms of their physical fitness.

This study would help students gauge progress in physical fitness components of strength, cardio-respiratory endurance, flexibility, power, speed, body composition, agility and balance. It would also bring out issues relating to physical fitness level, which could be investigated in future, and as a topic for discussing academic and professional matters. The findings of this study would help the authorities of public and private

secondary schools in Zaria, to understand the current physical fitness status of their students.

1.4 Purpose of the Study

The objectives of the study are

1. To assess the physical fitness status of public and private secondary school students in Zaria.
2. To compare the physical fitness status of selected groups of students from public and private secondary schools.

1.5 Basic Assumption

Based on the research evidence available and professional opinions, the following assumptions are made for the purpose of this study: -

1. The selected groups of students (Public and private) vary in their physical fitness status.
2. The various field gests can effectively measure and quantify the physical fitness status of students
3. Individuals prone to higher physical activities(active groups) are expected to have higher levels of fitness status than those who are prone to physical inactivity(sedentary groups)

1.6 Research Hypotheses

Based on the available research data and professional opinion, the following hypotheses are made for the purpose of this study

Major Hypothesis

There is no significant difference in the physical fitness status of public and private secondary school students in Zaria.

Sub-Hypothesis

1. There is no significant difference between the public and private secondary school students in their cardio-respiratory endurance.
2. There is no significant difference between the public and private secondary school students in their muscular endurance.
3. There is no significant difference between the public and private secondary school students in their muscular strength.
4. There is no significant difference between the public and private secondary school students in their flexibility.
5. There is no significant difference between the public and private secondary students in their body composition.
6. There is no significant difference between the public and private secondary students in their speed.
7. There is no significant difference between the public and private secondary school students in their muscular power.

8. There is no significant difference between the public and private secondary school students in their agility.
9. There is no significant difference the public and private secondary school students in their balance.

1.7 Delimitations of the Study

The study is delimited to evaluation of:

1. The physical fitness status of public and private secondary school students in Zaria, Kaduna State.
2. The study is centred on both the health and performance related physical fitness components.

1.8 Limitation of Study

The study is limited by the following aspects, which must be taken into consideration while collecting data, analyzing and interpreting the results.

1. Variation in the daily activities of the subjects could affect their capacity to perform though no attempt was made to control the daily activities. It was assumed that these activities were same for all the subjects as they are students of the same locality.
2. Behaviour in terms of their cooperation, lack of interest, due to poor knowledge on research work, could limit their performance.

However, the subjects were enlightened and highly motivated for the purpose of this study. This was done by giving the subjects the basics benefits of fitness and creating a competition atmosphere.

3. It would be better of use the various laboratory tests to measure the physical fitness components. Unfortunately, the non-availability of equipment and facilities and the large number of subjects involved in the investigation made in impossible to conduct laboratory tests.

4. It would be better to use the various laboratory tests to measure the physical fitness components. Unfortunately, the non-availability of equipment and facilities and the large number of subjects involved in the investigation made it impossible to conduct laboratory tests. This would however be taken care of by using various acceptable field tests to assess the physical fitness status of the subjects.

   This was however taken care of by using various acceptable tests to assess the physical fitness status of the subjects. Field tests were used because of the large number of the subjects.

1.9 Definition of Terms and Acronyms

Physical fitness status: The condition (state) or level of physical fitness of an individual.

Public secondary school students: These are individuals attending secondary education in government owned secondary schools.

Private secondary students: Individuals attending secondary schools owned by private individuals.

Arteriosclerosis: the slow, progressive disease where the inside lines of the arteries becomes thickened by deposits of facts fibrin, cellular debris and calcium.

Angina Pectoris: Chest pain due to insufficient blood flow to parts the heart.

Myocardial Infarction: Heart attach or death of heart muscle (Myocardium) due to lack of oxygen.

Cardio Respiratory Fitness: This is the capacity of the heart, blood vessels and lungs to function efficiently during vigorous sustained physical activity.

Physical Activity: Bodily movement produced by skeletal muscles that required energy expenditure (transformation) and produces health benefits.

Coronary Heart Disease: The impairment of the arteries of the heart from the building up of cholesterol and associated fatty substances on the inner part of the arterial wall.

Obesity: An excessive amount of body fat that increase the risk of morbidity and mortality. Generally defined as more than 25% in men and 35% in woman (Being very fat and over weight).

Sedentary Life Styles: Living a life full of physical inactivity, which have very various implications for the health and well being of the average individual.

Skin fold caliper: an instrument used for assessing the thickness of the skin to determine percent body fat.

Cardio-respiratory endurance: The ability to do moderately strenuous activity over a period of time. It reflects how well your heart and lungs work together to supply oxygen to your body during exertion and exercise. Also known as aerobic fitness.

Hypertension: Abnormally high blood pressure above 140mmHg and systolic pressure, diastolic pressure above 90mmHg.

Body Composition: the portion of at in your body compared to your bone and muscles. It does not refer to your weight in pounds or your figure.

ACRONMYS

AAHPERD: American Alliance for Health Physical Education, Recreation and Dance.

C.H.D: Coronary Health diseases, this is the results of all arterioscleroses.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Introduction

The main purpose of this investigation is to assess the physical fitness status of public and private secondary school students in Zaria. Literature related to physical fitness status were reviewed under the following subheadings.

1. Definition of physical fitness
2. Components of physical fitness
3. Need for physical fitness programme and its development
4. Evaluation of physical fitness
5. Importance of physical fitness
6. Achievement and maintenance of physical fitness
7. Lower level of physical fitness.
8. Factors contribution to poor fitness
9. Role of schools in physical fitness of children
10. Description and measurement of physical fitness components

2.2 Definition of Physical Fitness

Physical fitness is one of the primary objectives of physical education programmes. It signifies attribute of possessing characteristics which allow for productive living a condition required to perform daily

activities satisfactorily. The term is “all encompassing”. It is a state that characterizes the degrees to which the individual is able to live most and serve best. The ability to function depends on the physical, mental, emotional, social and spiritual components of fitness, all of which are related to each other and mutually interdependent (AAPHERD, 1989; Uti and Ojeme, 2003; Ajala et al, 2003, and Akinseye, 2005).

The aforementioned definition of fitness is a reference to “total fitness”. Physical fitness is hence seen as just a phase of total fitness. However, physical fitness is basic to other forms of fitness. It is a very significant aspect of, and a highly fitness is an aspect of total fitness. Akinseye (2005) opined that physical fitness is an aspect of total fitness that is concerned with the physical well-being of an individual. It is the ability of an individual to have sufficient energy to perform his work (daily task) efficiently without unnecessary fatigue, and still have extra as reserve to enjoy social activities and cope with unforeseen emergences after work. It also embodies the absence of disease and body deformities (infirmity).

Medically, it refers to good health, which concerns a sound body with reference to good heart, good lungs, good muscles etc. otherwise known as organic vigour. In terms of functional or dynamic fitness, it denotes the ability to sustain strenuous exercise and to recover rapidly. This implies that there is a sound respiratory mechanism and a good

muscular forms of specific muscular co-ordination, skills (motor) and strength such as running, jumping, climbing and throwing (Peter, 1987) and Akinseye, 2005).

The aforementationed definition of fitness is a reference to “total fitness”. Physical fitness is hence seen as just a phase of total fitness. However, physical fitness is basic to other forms of fitness. It is a very significant aspect of, and a highly desired means to total fitness. Akinseye (2005) opined that physical fitness is an aspect of total fitness that is concerned with the physical well-being of an individual. It is the ability of an individual to have sufficient energy to perform his work (daily task) efficiently without unnecessary fatigue, and still have extra as reserve to enjoy social activities and cope with unforeseen emergences after work. It also embodies the absence of disease and boy deformities (infirmity).

Emiola (1982) was of the opinion that the confusion regarding the definition of physical fitness stems from an understandable desire by most authors to make a definition apply to everything under the sun. however, he defined physical fitness as “the individual’s ability to endure exertion and stressful physical activity beyond that required by his/her normal day-to-day occupation.” The definition is in accordance with the views of Barrow and McGee (1979), Karporich and Sinning (1977), and Getchell (1976), who regarded physical fitness as a person’s ability to

meet certain physical requirements, which may be anatomical (structural), physiological (functions) or both.

In the field of exercise physiology, physical fitness is defined in terms of aerobic and muscular fitness, which are very important for productive life styles. This types of fitness is desirable for every individual irrespective of occupation because it promotes general good health (Chado, 1991). Although all the above criteria are essential for fitness, what is important to physical fitness is the working condition of the heart, lungs muscles and blood vessels. Morehouse and Miller (1976) called it cardiovascular or cardio-respiratory health. Emiola (1982) and Venkateswarlu, 1975) also reaffirmed that excellent cardio-respiratory fitness is truly the most desirable aspect of physical fitness.

2.3 Components of Physical Fitness

Larson and Yocom (1978) enumerated ten components of physical fitness as follows: muscular endurance and strength, cardio-respiratory endurance, muscular power, flexibility, speed, agility, coordination, balance and accuracy. Cureton (1978) also categorized physical fitness in terms of physique and organic efficiency which he says, imply calls “motor fitness.” He explained that motor fitness refers to specific physical aspects of fitness, such as the ability to perform certain physical

actions. Inclusive are the capacities to jump, run, fall, dodge, lift, climb, swim and carry heavy loads and to endure long time of continuous work.

The classification of physical fitness by the American Association for Health Physical Education, recreation and Dance (AAPHEDRD, 1980) and Akinseye, 2005) became the most widely accepted. It states that physical fitness is an expression of physical development in a number of discrete areas that can be divided into two major categories, namely, the health related physical fitness whose components are: cardio-respiratory endurance, muscular strength, muscular endurance, flexibility and body composition as well as the performance related physical fitness whose components constitute: agility, balance, power, speed, neuro-muscular co-ordination and recreation time.

2.4 Need for Physical Fitness Programme and its Development

Physical fitness programme has become an important phenomenon in the world over, because of its role in the development and importance in sports performance and health.

Nations such as Egypt, India, Australia, Norway and several others are becoming more involved in the programme of physical fitness, though some countries continue to be faced with financial limitations. The extent of physical fitness level is specific to the needs of the individual and is affected by the types of fitness programmes engaged in (Chado, 1991).

The high interest on the subject of physical fitness has been associated with the growing incidence of coronary heart disease (CHD) and other degenerative disease among youth and working population. In advance countries these problems are believed to be the direct consequence of automation in modern living, which eliminates sufficient bodily exercise to maintain the minimum state of fitness required for healthy living.

Recently some distinguished Nigerians and scholars, including Nwegbu (1992), Onekata (1995) and Chado (1992) have expressed fears that many Nigerians have become physically unfit, especially the contemporary Nigerian elite, who prefer to be spectators rather than participants, since the beginning of “the oil boom” in the early 1970s. They content that the numerous and continuous publications in the dailies and the announcement on television and radio, have shown that many young Nigerians die in their forties and fifties after what is usually described a “brief illness”.

The number of deaths due to stroke, heart failure or thrombosis, are enough evidences that the incidence of degenerative disease is very high in Nigeria.

Irrespective of these observations, the physical fitness status of students in schools in Nigeria today is yet to be given proper attention. Although physical fitness has long been regarded as one of the

fundamental goals and basic foundations of school based physical education programmes, there has been a drastic shift of emphasis from this area in schools.

Bucher (1979) was of the view that “the school in particular has an important role to play in developing physical fitness in school children. Schools have the responsibility for providing facilities and equipment for understanding and developing physical fitness”. Amuse and Udoh (1982) stated that “students should be motivated first to get into the physical fitness programmes. The essence is to increase the individual’s aerobic power”.

Before participating in regular exercise programme there exists certain principles, which must be well known and carefully followed as they serve as basic guidelines. These include:

1. Initial level of physical status
2. Sex of participant
3. Age of the participant
4. Body fat percentage and desirable weight
5. Medical fitness levels
6. Previous physical activity level (Chdo, 1991 and Bucher, 1979).

2.5 Evaluation of Physical Fitness

David and Jean (1989) stressed that the full evaluation of the child's physical and motor fitness requires a comprehensive assessment of ability areas. One does not measure strength as a single entity. One measure the strength of specific muscle groups such as the knee extensors, elbow flexors or abdominal muscles to determine range of motion at specific joints in the body.

AAHPERD (1980) and Chado (1991) recommended that physical fitness evaluation should measure fitness components such as cardio respiratory fitness (aerobic fitness) and muscular fitness (muscular strength, local endurance, flexibility, appropriate body fat percentage and agility). Thus a full evaluation of physical education needs would involve assessing the strength of major muscle, groups, range of motion of many joints and factors that affect cardio-vascular efficiency (David and Jean, 1989). A severe loss of strength in any muscle group or limited range of motion in any joint could seriously affect the attainment of specific daily living or sports skills.

According to Chado (1991) and AAHPERD (1980), the criteria for selecting the best items for physical fitness evaluation are:

1. The must be reasonable familiar to the participant and easy to administer.

2. The must require little or no equipment to reduce cost especially when the equipment budget can result to the rejection of the activity.
3. They should be administrable to both male and female to save time
4. They should measure a range, which extends from severely limiting dysfunction to levels of functional capacity.
5. They should measure the capacities that can be improved with appropriate physical activity.
6. They should accurately reflect on individual's physical fitness status as well as changes in functional capacity by corresponding test scores and changes in these changes.

Chado (1991), AAHPERD (1980) and Duhu (1978) recommended the following physical fitness test items with emphasis on health related fitness than performance related fitness.

i. 12minute run test
ii. One mile run test
iii. Nine minute run test
iv. Optional distance run for older students
v. Sit and reach test
vi. Standing broad jump test
vii. Bent knees sit-ups test.

viii. Push up test

ix. Pull up test

x. Body composition test

2.6 Importance of Physical Fitness

Physical fitness is considered to be healthful and recreational living, not an end to itself. Physical fitness can be health-related in as much as it preserves healthful functions of the body over extended periods of time into adult life. Physical conditioning can keep the cardiovascular and muscular system from deterioration as well as assists in maintaining both mechanical posture and good alignment of the body. It enhances appearance, which aids in social development (David and Jean, 1989).

Heywood (1989) and Allen et al, (1999) stressed that health benefits of physical activity include reducing dying prematurely from heart diseases and development of diabetes, high blood pressure and colon cancer. Physical activity reduces blood pressure in those having blood pressure and alleviates feelings of anxiety and depression. It helps build and maintain healthy bones, muscles and joints. It develops strength and agility as well as control weight and create a sense of psychological well-being (Allen et al, 1999).

The health of children is more likely to improve rather than adversely be affected by participation in physical fitness programmes. Regular participation in appropriately designed physical fitness activities positively influences children's bones mineral density (BMD), body composition, cardio respiratory fitness, blood lipids and psychological well-being (Avery, 2001).

Hypocrites who live 2,400 years ago stated, "Eating alone will not keep a man well, he must also exercise" (Allen et al, 1999). Nowadays, the relationship between physical activity and health can be traced from Jeremy Morri's study of London Transport Authority Employees in which the drivers significantly had greater number of cases of coronary hearth disease than bus conductors (the active group). Other related research evidence has illustrated the relationship between physical activity and the number of causes of disease and death (Avery, 2001).

The benefits of physical activity constitute wanting to have fun, feel and look good, feel healthy, control body weight, interact recreational skills relieve stress, increase energy level and reduces risk of dying prematurely (Allen et al, 1999).

The importance of fitness in achieving personal ambitions and desires in living well and contributing to a strong nation, cannot be over emphasized. No one will deny that a good figure and attractive complexion are desirable. They are important not because they contribute

to an attractive appearance but because they reflect and internal well being that is far more important (Duhu, 1978).

A number of studies also support the claim that physical fitness is related to mental achievements. Duhu (1978), reported that “the results of studies indicated that a person’s general learning potential for a given level of intelligence is increased or decreased in accordance with his degree of physical fitness”.

According to Kraus and Raab (1961), the physically active person shows better adaptability to stress, less neuromuscular tension, and less fatigability, active individuals, ages later, do not tend to become absolute and relative over weight, have lower pressure, are stronger and more flexible, and have greater breathing capacity and lower pulse rate.

Bucher (1978), AAHPERD (1980), Uti and Ojeme (2003) and Akinseye (2005) also agreed on the following values of physical fitness.

1. It trains the nerve centres in coordination enabling muscle fibres to work together with less strain and more energy output (improves stamina).
2. It promotes circulation, which relieves tissues and organ congestion.
3. It increase the thickness and strength of the heart, which works more efficiently at lower loads and pumps more blood per minute possessing longer rest intervals between beats.

4. Physical fitness increase the alkaline reserve, the glycogen and phosphocreatine of the blood and tissue
5. It forces the lungs to work efficiently
6. It stimulates total body growth.
7. It increases spiritual and moral qualities that constitute personal maturity.
8. Physical fitness promotes attitudes and values, which help in achieving and maintaining fitness
9. It prevents major and minor illnesses.
10. It speeds the recovery from illness
11. It adds to aesthetic value of the body, the individual looks good, feels good and happy.
12. It reduces the risk of hypo kinetic diseases (diseases associated with inactivity).
13. It promotes a sense of well-being and enjoyment of life.

2.7 Physical Fitness of Public and Private Secondary School Students

There is a problem within the Nigerian society of knowing that physical education and physical fitness are two separate subjects. Thus it is essential for a reasonable effort to be made to draw a line of distinction between the two in order to appreciate the importance of physical

education in a physical fitness programme (Ademola, 2005). He was of the view that physical education contributions to physical fitness include increase in strength, speed and endurance three major aspects of school life. These include: school heath services, healthful school living and health aspects of physical education.

Of recent, some distinguished Nigerians and scholars including Chado (1992) and Shuaibu (2000) have expressed fears that many Nigerian students have become physically unfit because they prefer to be spectators than participants. They were of the opinion that the numerous and continuous publications in the dailies and the announcement on television and radio, indicate that young Nigerians die in their forties and fifties after what is often described as “brief illness.” The number of deaths due to heart failure and stroke are indicative that the incidence of degenerative disease is very high in Nigeria.

Despite these observations, the physical fitness status of students in schools in Nigeria is yet to be given proper attention although physical fitness has long been regarded as one of the fundamental goals and basic foundations of school based physical education programmes. There has been dramatic shift of emphasis from this area in schools (Shuaibu, 2000).

2.8 Low Level of Physical Fitness

Low physical fitness level indicates a state of poor well-being which hinders people from performing daily activities with vigour, increased risk of health problems and reduces participation in a variety of physical activities. Based on this belief, children and youths fitness should be related to a level, which provides protection against fitness major health problems through habitual physical activity, which is a single most important contribution to our society today (Iro, 1991).

Research evidence strongly suggests that much still need to be done to promote regular participation of children in physical activity and attainment of health and fitness standard (Bucher and Constance, 1979; Aaron et al 2001). Available research evidence shows that children with low level of participation in physical activity become inactive adults (Bucher 1979).

Research findings have indicated that children and youth end up in their childhood and adolescent habits, will determine what kind of people they become (Iro, 1991).

2.9 The role of School in Physical Fitness of Children

Education is the broadest means of preparation for life. School in particular has an important role to play in developing physical fitness in school children (Allen et al, 1999; Bucher and Constance, 1978). The best

way to do this according to them is by providing well-balanced physical education and health programme through which physical fitness of the children will be enhanced. Schools have the responsibility for providing facilities and equipment for understanding and developing physical fitness.

Bucher (1979) stated that physical education and the process of education are inexorable tied to physical fitness. As such a school should be fitness conscious and provide programmes that will stress good attributes and practices, physical activities, health, knowledge and total environment conductive to proper growth and development.

The school leadership should exemplify fitness. Other groups such as the home, church, youth organization and voluntary community units can make large contributions towards fitness. Duhu (1978) emphasized that all children and youths should have the opportunity to remain physically fit at all times.

Adolf Hitler emphasized in 1933 in his book “Mein kampf” that physical fitness is more important for the welfare of a nation as well as the development of intellectual capacities (Helison and Templin, 1991 and Nixon and Tewett, 1980). Much of this was placed in the hands of the school to achieve this objective.

In no exception, Nigerian schools should in one accord get towards achieving this by careful selection of exercises and provision of equipment and facilities to enhance physical fitness.

The United State of America, China, Germany, India, Great Britain, France etc have established physical fitness programme in school for their learners to attain maximum fitness (Chado, 1986; John, 1990 and Shuaibu, 2000). The essence of this is to promote physical fitness to all their citizens through existing fitness programmes and the launching of additional programme to ensure that more vibrant and productive citizens are produced for the continuity of their respective countries.

2.10 Measurement of Physical Fitness Components

Physical fitness assessment of elite sports men and women and the fitness conscious public is done through elaborate testing facilities in human performance laboratory test at major universities and colleges, hospitals and research institutions. Unfortunately, these laboratory facilities cannot meet the volume of tests required by coaches, athletes, and the general population. Thus field tests of various physical fitness components and athletic performance should be relied on. A field test denotes a simple test requiring minimum equipment and facilities but providing an accurate estimate of a particular component (Wilmore, 1977).

The following are field tests, for each of which the basic physical fitness components are listed for the investigation.

A. Health related physical fitness components.

Cardio-Respiratory Endurance

This is the ability to do moderate strenuous activity over a period of time. It reflects how well the heart and lungs work together to supply oxygen to the body during exertion and exercise also known as aerobic fitness.

It is the ability of the circulatory system to keep the muscles supplied with oxygen and nutrients and to keep the muscles free of waste products during heavy exercise. The individual, who has difficulty in climbing stairs, demonstrates a lack of cardiovascular endurance.

The concept of cardio respiratory endurance has been defined by many authors, according to their understanding. Winsley and Armstrong (2005) defined it as physiological variable that reflects the ability of the individual cardiopulmonary and muscular system to sue oxygen to produce energy for movement. Niemant (1998) stated that cardio respiratory endurance or aerobic fitness is enhanced when large muscle masses of the body involved in continuous and rhythmic activity for at least twenty to sixty minutes on regular basis. He further stressed that typical physical activities include jogging, swimming, cycling, brisk walking and vigorous sports.

Machol and Ladaney (1981) defined cardio respiratory endurance in terms of the “ability of the circulatory and the respiratory systems to adjust to vigorous exercise and to recover from the effect of exercise” Cardio-respiratory endurance is the most vital means of determining a person’s maximal oxygen consumption (Vo_2 max) Mathews and Fox, 1981). Maximum oxygen uptake according to Verducci (1980) indicates how well various physiological functions can be adjusted to increasing metabolic demands of work.

For decades, various tests were developed to measure Vo_2 max but most of these tests require laboratory setting, such tests include treadmill running/walking, cycle erg meter pedaling and stepping tests. Again, most of these tests cannot be used on a large scale (Population) at the same time, because of the cost of equipment, time consumption, and their technical complexity.

In order to overcome these limiting factors, varied field test were developed as alternatives to the more complex laboratory tests. These tests are not only reliable but have been compared with the laboratory tests, and found to be more convenient when large samples are involved. Some of these field tests include the 6-minute, 9-minute and 12-minute run as well as the 1 ½ miles run tests. Cooper (1968) designed a 12 minute run/walk test, which was only considered suitable for large sample but also found reliable when compared with laboratory tests.

Burke (1976) reported that the 12 minute run test correlated as high as 0.91 with the laboratory tests.

McArdle et al (1981) stated that prediction of maximum aerobic capacity should be approached with caution when using running performance. Factors such as the pacing of inexperienced subjects, body weight and body fatness, running efficiency and the percentage of one's aerobic capacity that can be sustained without lactic acid build up, all contribute significantly to successful running.

Pollock et al (1978) stressed that the widely used field-tests for measuring Vo2 max are the 12 minutes and 1 ½ mile run tests. According to them, this is because both tests have very high Interco relation. Both tests have a moderate to high relationship with the laboratory maximum oxygen uptake. Gwani (1986) reported that the 6 minute run and Cooper's 12 minute run tests correlated as high as 0.778. This indicates that the two tests are reliable measures of cardio-respiratory fitness. Chado (1986) in the study of "the function of physical fitness performance as a prerequisite for admission in the Department of Physical and Health Education, Ahamu Bello University Zaria" acknowledge Cooper's 12minutes run test as one of most reliable field test of cardio respiratory fitness than the 6 minute run test. He was of the opinion that it is in all respects inexpensive, easy to administer and that many subjects can be tested within a short period of time.

Devries (1974) revealed that an equally high relationship exists between the two-mile run and laboratory tests. This is in accordance with Burke's requirement of minimum duration of 10 minutes walk out. He found 15 minutes to be optimum duration for estimating cardio-respiratory fitness. Devries (1974) and Krahenbuhl et al (1985) concluded that better results are obtained when time rather than distance is given to subjects because psychologically, subjects will tend to put in more efforts as all start and stop at the same time.

Muscular Strength

Strength is the ability of the body to apply force. It refers to the amount of force a muscle or a group of muscles can exert. Akinseye (2005) and Uti and Ojeme (2003) defined muscular strength as the maximal one- effort exertion a group of muscles can make. It means the power and work ability of the muscle and also includes the speed demonstrated by the muscles under such work conditions as exercises, pulling, pushing and digging.

Johnson and Nelson (1979) defined it as the muscular force exerted against movable and immovable objects. Muscular strength can quickly be built up through static (isometric) exercises and dynamic (isotonic) exercises. The static exercises are carried out by exercising against unyielding resistance. Static strength training is the preferred method of the so-called body builders. It can be measured by different kinds of

dynamometers, while the dynamic strength exercises are carried out against movable resistance Dynamic training is much more advantageous in physical conditioning (Nelson and Jensen, 1972).

Chado 1987, in his study of the difference between pull-ups and push-ups as a measure of dynamic strength and endurance of upper limb muscle groups, showed that pull-ups are a good exercise for developing strength of the upper limb muscle groups.

Skinner et al, (1990) stated that “regardless of how strength is assessed, several factors are important; both isometric and isotonic strength increase from 10 and 14 yrs to 20 to 29 years, remain unchanged until 40 to 49 years, and then declines. They further stated that lower strength in children is explained more by smaller muscle fibres. Reduced strength in old age is due to muscle atrophy (especially fast twisting reduced number of muscle fibre and decreased ability to recruit fast twist fibres. Although strength training in older men had increased their fibre size similar to that of younger men, strength is still less suggesting that some loss with age is neurological.

Muscular Endurance

This is the ability of a group of muscles to contract for a period of time without fatigue. It refers to the ability of the muscle to sustain itself in a work condition for a long period of time. Muscular endurance

includes circulatory strength and respiratory endurance (Uti and Ojeime, 2003; Ajala eta al, 2003 and Akinseye 2005).

Endurance is defined as resistance to fatigue and quick recovery after fatigue. This may apply to the body as a whole or to particular body system such as the respiratory and circulatory systems or to a local group of muscles, the extensiveness of their capillary beds and the nerve mechanisms supplying them. Compared to muscular strength, which is one maximum contraction, muscular endurance is the ability of a muscle to contract many times. It signifies the ability of a muscle to repeat identical movement of a certain degree of tension over a period of time (Johnson and Nelson, 1979). According to Sharkey (1984), muscle endurance is the ability to persist. He further stressed that it is the repetition of sub maximal contractions or sub maximal holding time.

Nelson and Jenson (1972), were of the opinion that “a person with high level of muscular endurance can persist in vigorous performance”. When endurance gives way to fatigue as a result of muscular work, several elements diminish such as strength, timing, alertness etc. increased endurance postpones the out set of fatigue; thus, endurance contribute to improved performances in activities where fatigue is a limiting factor.

It is an established fact that strength contribute to muscular endurance. What differentiates them lies in the level of tension or applied

resistance and consequently the number of repetitions. Muscular endurance is primarily developed by resistance exercises (isotonic exercises as in weight additional blood.

According to Asmussen (1968) a very high correlation exists between strength and absolute muscular endurance. He stated that absolute muscles endurance is the amount of time person can work against a certain resistance irrespective of strength. He further stressed that this is demonstrated when different persons work against the same resistance; the stronger ones tend to continue the exercise than the weaker ones; relative muscular endurance. It is only when the resistance in adjusted to correspond to each person's strength, then the weaker individual displays much lower endurance than stronger one.

Muscular endurance tests are practically for majority for schools and have been widely used in physical fitness testing programme. Such tests however differ from strength test, in that the score is based on the number of repetition execute (or the length of a time a tension is maintained) and not on the maximum amount of weight lifted or force exerted.

Muscular endurance has been measured in a number of different ways, including the greatest number of sit ups that can be performed in a fixed period of time (usually 30 seconds to 1 minute) or the maximum

number of push ups or bar dips/bench press that can be performed continuously in an indefinite time period.

Wilmore (1977) stated that many of these tests penalize the participants that, in order to eliminate this bias, a concept has evolved that uses a fixed percentage of the individual lifts his/her weight as many times as possible, until he/she reaches the point of fatigue of exhaustion. However, he stated that since this is a relatively new concept, norms or standards have yet to be established.

Flexibility:

This is the ability to move easily at the joints. It is simply the ability of the joints to bend easily or undertake a wide range of movement freely without hindrance (Uti and Ojeme, 2003; Ajala et al, 2003 and Akinseye 2005). Johnson and Nelson (1979) defined flexibility as the ability of an individual to move the body and its parts through a wide range of motion as possible without undue strains of the articulations and muscle attachments. The range through which a joint can move is dependent on the following factors:

1. The extensibility of the muscles and the connective tissues, which cross over (overlap) at the joint.
2. Amount of bulk (muscle and other tissues) involved in the motion.
3. Bone structure o the joint.

The extensibility of muscles and connective tissues crossing over at the joint is of more concern in tying the range of motion (Robison et al., (1974).

Jensen and Fisher (1979) classified flexibility into passive flexibility; this involves the range of motion, which occurs in a joint when the muscles are relaxed and the body part is moved by another person. The second class is dynamic flexibility indicating the range of movement, which occurs in joints as a result of contracting muscles, which control the joint. A well-organized fitness programmed will develop this so as to help reduce injuries to a minimum and improve the recreation time of athletes as well as non-athletes.

Flexibility can be developed through participation in stretching exercises such as the hamstring stretch, the upper supine stretch and son on (Uti and Ojeme, 2003 and Ajala et al, 2003).

Injuries may result when joints are forced to move beyond their limit. Maintaining adequate flexibility seems to depend on the intensity and amount moving through a complete range of motions several times a day. The ability of any individual to move depends on his/her flexibility. Once developed, flexibility may not deteriorate as fast as other components of fitness during inactivity period. The importance of good flexibility cannot be under estimated. Research evidence indicates that balled dancers, swimmers, diver, hurdlers, high jumpers, triple jumpers,

pole vaulters and discuss throwers are among those who need more than normal flexibility in certain body parts and that different types of athletes possess different amounts of flexibility (Nelson and Jenson, 1972).

Flexibility is developed by stretching the muscles and connective tissues regularly (Robinson el al, 1974). They were of the view that even though flexibility can be developed by dynamic stretching (bobbing type movements), static stretching is a better method. Flexibility exercises produced the best result when they are done daily. Hard-jerky-type stretching causes mild injuries to the muscle tissue, so it should be avoided. There exist test batteries that have been developed for the evaluation of body flexibility. These texts measure specification, the flexion extension of the body or body parts. The most accurate tests of the flexibility availably are those the measure actual rage of the various joints. While this is easily accomplished by instrument such as the highton flexometere for measuring degree of bending, electrogoniometers for measuring angles and the radiogoniometers which are quite recent. These pieces of instruments (equipment) are not readily available because of the cost and complexity of operation. Simple field tests include the sit up and reach the back hyperextension test, the sit and reach tests, was developed to measure the flexion of the hip and back as well as the elasticity of the hamstring muscles. A reliability of 0.92 was reported by Fatile and venkateswarlu (1982). During the sit and reach test the subject

sits with the legs extended directly in front of back of his/her knees pressed the against a stool to which a yardstick is attached, with the 14 or 15inch mark place at the point where the foot contacts the stool. The person bend slowly, as far as possible. The knees must be kept in contact with the floor and bouncing is to be discouraged.

Body Composition

This signifies the portion of fat in the body compared to the bones and muscles. It does not refer to weight in pounds or figure, (Ajala et al, 2003 and Akinseye, 2005).

Body weight is the part of general physical condition that has received particular interest in research over the last few decades. Over the years, the amount of body fat, extend of muscular development and dimension of body structures are factors used in evaluating physique and body types. Body composition is often referred t as the lean muscle and the fat weight, which together equal the body weight.

According to Edgerton (1976), body composition is largely dependent on dietary and excise build, sex and genetic background. In the same line GetcheII (1976) stressed that sex and genetic background do determine the distribution of fat deposit the body. He was of the view that male and female humans do not deposit fat in the same place and at the same percentage. He further revealed that exercise is an important means for the control of body fat and the overall body builds. This indicates that

physical exercise could redistribute the body weight by making muscles firmer and aiding the loss of exercise body fact.

Excess fat is associated with increase risk of heart disease and diabetes (Bouchard and Malina, 1983). They further stressed that even though excess fat causes cardiovascular problems, in the same vein, when fat is too small in the body, it creates problems. Vitamins that are fat soluble for instance depend on the acquired amount of body fat for them to be absorbed. This then implies that body fat should be maintained within the acceptable level so as to avoid either cardiovascular problems or deficiencies of fat-soluble vitamins. In societies (nations) where sedentary life style and high calorie diets intake is prevalent, a large percentage of both adults and children tend to store too much of fat, and many are over fat to the extent that they can be classed as obese. Mathews and Fox (1981) revealed that active people posses considerably less total body fat and are less prone to cardiovascular diseases than their less active counterparts since the world is becoming more and more obese by body image, created by undesirable body weight, it becomes pertinent to provide scientific explanations relating to body composition. Obesity begins early in childhoods and if this happens, the chances for adult obesity will b three times greater than children of normal body weight. However, research evidence suggests that overfeeding early in life, particularly during infancy causes the generation of an abnormally large

number of adipose tissue cells, which persist through out life. Body fat is stored around the main organs of the body and within muscles, but half is stored in the layer first below the skin, making over fatness as visible phenomenon (Strauss, 1984).

Body composition measurement is of paramount importance because obesity is an established problem worldwide; obesity is highly associated to a higher incidence of numerous diseases, which embody coronary heart disease, hypertension, diabetes, liver cirrhosis and intestinal obstruction. Johnson and Nelson (1979) stressed that because of the medical risk factors associated with obesity, insurance companies above been concerned with "proper weight" for many years. Wilmore (1977) was of the view that life insurance statistics tells us that an individual who is 15 ½ under weight has best chance of surviving a heart attach.

McArdle et al (1981) state that the evaluation of body composition permits quantification of the major structural components of the body such as muscle, bone and fat. They came out with the general procedure for the evaluation of body composition.

a) **Direct method:** this entails the chemical analysis of the animal carcass and human cadaver.

b) **Indirect method:** Denoting hydrostatic weight, skinfolds and air circumference measurements.

Body Fat Estimate

The body fat content of an individual can be accurately measured by the under water weighing technique also known as the hydrostatic weighing technique. Unfortunately this method is too expensive and complex to be utilized widely (Wilmore, 1977). The hydrostatic method, which is laboratory tests is based on the principle that fat floats whereas lean body tissue sinks, and fat weight is determined by putting the subjects in water to see how well they can float. This is an induced method based on the application of Archimedes' principle, which says that "the loss of body weight in water equals the weight of the water displaced by the body". Due to the expensive and time consuming nature as well as the expertise needed in this method, a more simple one is required.

Anthropometric measurements can be used to estimate the respective components of body composition such as body density, relative or absolute fat content and lean body weight. Skinfold thickness, body diameters (breaths) and body circumference (girths) have been used in the part with appreciable accuracy to estimate body composition (Getche11 et al, 1987). Sharkey (1984) opined that skinfold measurement has a simpler and more beneficial method for determining percentage of body fat. Also Getche11 (1976) stressed that these skinfolds techniques correlated quite will with other more complicated technique of estimating

body composition Skinner et al (1990 indicated as well as that correlation coefficients of -0.7 to 0.84 had been reported between skinfolds method and hydrostatic weighing technique in different populations. Further more, they stated that although the skinfolds method is inexpensive and measurements are easy to obtain there exist methodological problems. Some of these include caliper pressure, inter observe error, difficulty in obtaining accurate measures on obese individual and considerable expertise required to obtain accurate measurement.

Skinfold measurement are obtained by taking a fold of flesh or puling the subcutaneous fat away from the body in various areas and measuring the thickness with spring loaded calipers which exerts a constant standard pressure. These measurements are then utilized to determine one's body fat percentage (Sharkey, 1984). Skinfolds are measured on four sites of triceps; biceps sub scapular and supra-iliacs (Watson, 1983).

Studies indicated that the Durnin and Rahaman formulated procedures were used on subjects of both sexes and all ages, with different equations used for computation of body density in the cases of men, women boys and girls. The Durnin and Rahaman method of estimating fact was developed for use with sedentary individuals and is not deal for use with sportsmen because of differences in the distribution of subcutaneous fact.

Skinfolds Measurement Procedure

The procedure for measuring skinfold was identified as follows:

(a) Locate the site of measurement and mark with a wash-felt tip pen.

(b) Grasp the skinfold between the thumb and forefinger. Ensure the fold is as large as possible, and it contains all the subcutaneous fat at the site.

(c) Hold the fold between the finger and thumb while the measurement is taken.

(d) Take the reading 2-5 seconds after the application of the caliper jaws (Watson, 1983). Measurements are taken in an upright position on the right side of the body.

Using the Durnin and Rahaman produre, there are two steps in the conversion for the skinfold thickness into an estimate of percentage fat, they include:

i) Skinfold thickness-estimate of body density.

ii) Body density-estimate of percentage fat.

The conversion of the skinfold thickness to an estimate of the body density is arrived at by adding together al the skinfolds and substituting in one of the equations.

(a) **Boy:** Body density = 1.1533 – 0.0643 log10 (total skinfold)

(b) **Girls:** body density = 1.1369 – 0.0598 log10 (total skinfolds)

(c) **Men:** body density = 1.161 – 0.0632 log10 (total skinfolds)

(d) **Women:** body density = 1.158 – 0.0720 log10 (total skinfolds)

The conversion of the body density is then converted to an estimate of percentage fat. The Sirri formula was used and is the same for all types of subjects.

$$\text{Percentage fat} = \frac{(4.95 - 4.5) \times 100}{\text{Body density}}$$

B. Performance related physical fitness components

Speed: This is an aspect of physical fitness that is concerned with the pace of one's movement. Different individuals are faster or slower than others in their movements. Speed of running is important to performance. Foot speed is the ability of a person to cover a given distance in unit time (Uti and Ojeme, 2003 and Ajala et al., 2003). They stated the formula for speed as follows:

$$\text{Speed} = \frac{\text{distance covered}}{\text{Time taken.}}$$

Nelson and Jenson (1972) defined speed as the velocity of a body, body part(s) or even an object, that is, the rate of motion. Speed is simply the result of rapid application of force to a mass. Akinseye, (2005) defined speed as "the rate at which force can be applied." This force results from muscle contraction. Movement occurs only when the force results from muscle contraction. Movement occurs only when the force

(applied) is greater than the resistance, the greater the force, the greater the speed in accordance with Newton's second law of motion. Watson (1983) was of the opinion that the speed of contraction is apparently inherent in muscle tissue. Since when muscles receive constant artificial stimuli, they contract at varying rates. The difference in the speed of muscle contraction is apparently due to difference in biochemical and physiochemical properties of the contractile materials within the muscles and has no relationship to factors outside the muscle tissue. Furthermore, the chemical environment of muscle tissue and its chemical make up can be altered by a limited mounts either by training or by nutrition, and this may result in faster boy movement (Devries, 1974).

Components of Speed

Speed, mostly in the form of acceleration, is an important factor in almost all games and sports. It becomes a determining factor in scoring, passing and defending or preventing a goal. Therefore speed makes the difference where on is able to gain an advantage over an opponent. Speed can be estimated by simply measuring the time it takes to cover a particular distance. This can be accompanied for the individual body parts such as the arm or leg, by the usage of an elaborate system of micro switches and an electronic timer. The total body speed can be measured

by timing the individual over a given distance from 50-100 meters (Wilmore, 1977).

Muscular Power . . . Component of Explosive Strength

Power is a dynamic form of strength per unit time. Power and flexibility are essential for health and very important for skills performance (Akinseye, 2005).

Muscular power is defined as the ability of an individual to use maximum energy in one explosive act to project the body through space. Physical educators generally refer to jumping tests as measures of power. As such, the vertical jump (Sergeant Jump) and the standing broad jump are the most frequently used tests of explosive strength (power). Muscular power is related to muscular strength. Individuals who can jump high have strength to muscular strength. Individuals who can jump high have strong legs. A heavier individual needs more force or greater muscular strength to proper the body through space (Ajala et al., 2003). Jumping is also dependent on individual differences in leg strength and body weight.

Muscular power often known as explosive strength is a combination of strength and speed. It indicates the ability to realize maximum force in the fastest possible time. Also it is referred to as the ability to exert a maximum contraction in one explosive act.

Muscular power is the ability to apply force rapidly (Nelson and Jensen, 1972). Power is typically demonstrated in projecting the body (as in jumping) or an object (as in throwing). The muscles must supply great force at a rapid rate in order to give the body or object the required momentum to carry it in the desired distance.

An individual may be very strong and yet not very powerful. Also he/she may be capable of moving with great speed against a light resistance but lacks the strength to move rapidly against heavier resistance and thus he/she is not powerful.

Explosive strength is very important to vigorous performance because it determines how hard and individual can hit, how far he can throw, how high he can jump as well as how fast he can run. Running comprises a series of body projections. Thus leg power is of prime importance to fast running (Nelson and Jensen, 1972). Explosive strength can be increased by increasing strength without sacrificing speed, or by increasing both speed and strength. Increasing strength affords the greatest potential for improving power because strength can usually be increased by a significant amount, while speed can be improved by a very limited amount (Jensen and Fisher, 1979).

Explosive strength can be assessed very accurately within the laboratory using expensive force transducers and recorders (Wilmore, 1977). Several field tests have been in use but lack objective validation.

The sitting short put and medicine ball throw have been used to estimate upper body power while the standing broad jump and vertical jump have been utilized to estimate lower body power.

The Margaria-Kalamen leg-power tests (Mathews and Fox, 1981) represent a more objective measure of lower-body power. The subject begins by standing six meters in front of a series of steps. On the command go, he runs as quickly as possible up the stairs stepping on every third step. A microswitch embedded in a rubber mat is placed on the third step. A second microswitch is placed on the ninth step, which stops the timer when hit. The elapsed time represents the time required to move the body weight through the vertical distance between the third and ninth steps.

Power is calculate by the formula:

$$\text{Power (Kg x meters/sec)} = \frac{\textbf{(Body weight (Kg) vertical distance (m)}}{\text{Elapsed time (sec)}}$$

(Mathews and Fox, 1971).

McArdle et al. (1981) were of the opinion that the power score in Margaria-Kalamen test is influenced significantly by the person's body weight. That is, the heavier person will definitely have a higher power score if many individuals achieve the same speed.

Mathowsaud Fox (1981) revealed some classification guiders for male and female subjects between 20 and 50 years based on data from studies conducted by Margaria and Kalamen.

These guidelines seem to suggest that age and sex are other variables that are likely to affect power.

The sergeant jump is another test for power. For many years the jump tests such as the sergeant jump have been a common element in many physical fitness test batteries. The sergeant jump is noted as the difference between an individual's standing reach and the maximum jump and touch height. A lot of studies have reported a fairly high reliability of the sergeant jump tests as a measure of explosive power (McArdle et al., 1981).

A series of studies indicating the validity and reliability coefficient of sergeant jump test summarized by Duhu (1978), showed that Clarke (1976) reported reliability coefficient of 0.85 and 0.96 after the subjects practiced its execution. Similarly, Wilmore (1977) revealed a reliability coefficient of 0.90 on test and retest.

Agility: This is the ability to move in different directions from different positions. This results from a combination of strength, speed and general good health. Experts are of the opinion that the most important elements of agility are change of direction and change of height of movement. As such, the shuttle run serves as one of the better tests for

agility, provided that the distance of the run is not such that the factor of speed becomes a determinant (Uti and Ojeme, 2003; Ajala et al. 2003 and Akinseye, 2005).

Wilmore (1977) defined agility as the ability to move and change position or direction rapidly without losing balance or sacrificing speed.

Duhu (1978) described agility as “the ability to react quickly with controlled and precise movement.” He stressed that an individual who can control his body quickly and efficiently will have the opportunity of saving himself or others in times of emergencies. Jensen and Fisher (1979) were of the opinion that agility signifies the ability to change direction basic skills demonstrated in movements such as dodging, stopping, running, starting and changing body positions quickly.

Wilmore (1977) stressed that there are no universally accepted tests of agility, although many test batteries exit which use various shuttle run tests to estimate the agility component. The “shuttle run” test has been utilized to measure the agility of students in running and changing direction and the reliability coefficients of 0.94 for boys and 0.082 for girls, were reported.

Agility is very important in most of the games and sports. This is shown by he shift in half back or a broken run in football, the supple gymnast performing a complex, free exercise routine, etc. it has been

revealed that performance of any physical activity is greatly enhanced with increased agility.

Balance: This is the ability to maintain a certain posture in one position for a long time. It embodies also the maintenance of stability at rest after the performance of a series of movement. It is generally recognized that this ability is important in the execution of some skills such as those in gymnastics, ballet, tennis and so on (Uti and Ojeme, 2003, Ajala et al., 2003 and Akinseye, 2005).

The human body rests on a base of support defined as area of contact between the body and the supporting surface. If the base of support and other factors remain constant, then stability is said to be achieved; when an even adjustment exists between opposing forces of a body, that body experiences a condition known as balance (Ecker, 1971). Technically, a body is said to be in a state of equilibrium when it does not take a new position with the slightest application of force.

Balance occurs when the muscles and the nerves work collectively (Duhu, 1978). He stated that “balance is the result of neuromuscular control which takes place when people engage in activities such as riding, dancing, running, carrying load, playing games and other similar every day activities.” A good sense of balance can be developed by a variety of balancing exercises. Balance can simply be described as the ability to maintain equilibrium. There are generally two types of balance.

(i) **Static balance:** This is the ability to maintain body equilibrium with the base of support in a fixed position (standing in one position) e.g. handstand, headstand etc.

(ii) **Dynamic balance:** This refers to the ability of the body to maintain equilibrium (stability) while the base of support is moving or while the whole body is moving in performing some motor skills such as walking on a balance beam. To test is to estimate the student's ability to maintain a balance log is used. This is to estimate the student's ability to maintain a balance position on unbalance log while walking. Reliability coefficient of 0.82 is reported (Duhu, 1978).

Coordination: This signifies the effective orderly working of the skeletal, nervous, muscular systems and the sense of touch, sight and hearing (Akinseye, 2005).

Uti and Ojeme (2003), coordination is the ability to integrate the separate abilities in a complex task. They further stated that coordination in a particular sport could be improved by developing a training programme. This works on specific components of coordination that are unique to that sport. For instance, the soccer player must work on eye-foot coordination in addition to other components f fitness. The tennis player is concerned about developing hand-eye coordination.

A well-coordinated movement involves perfect timing between the muscular and nervous systems. Different forms of coordination are present in sporting activities such as dance, athletics, bowling, badminton, gymnastics, golf and archery.

2.11 The place for Physical Fitness

Physical fitness maintenance should generally be an aspiration of all due to its enormous contribution to healthy and meaningful life. It is the ability to carryout daily tasks with vigour and alertness without undue fatigue and with ample reserved energy to enjoy leisure time, pursuits and meet unforeseen circumstances and emergencies (Gwani and Chado, 1995). Fitness is not based on physical appearance but on functional capacity of the individual to perform work and to supply the needed energy. It is related to the task a person must perform, his potential for physical effort and relationship of physical fitness and his total self. It should be sufficient to meet the requirements of job as well as a little extra reserve for emergencies. It denotes the relationship for personal resources. Physical fitness affects the mental, the emotional, the physical and social factors of human beings (Nwakwo and Salawu, 1995; Akinseye, 2005). Health and fitness are birthrights of every man, woman and child. As such regular exercise should be a must if one wisher to retain fitness beyond the flush of youth.

Physical fitness connotes the capacity to carryout reasonably vigorous physical activities and includes qualities important to the individual's health and well-being as opposed to those related to performance of a specific motor skill. It is the opposite of being fatigued for ordinary efforts, and the ability to bear up, to withstand pressure and sustain under difficult conditions where an unfit person would give up (Duhu, 1978).

Man being a muscular creature possesses an organism designated for movement with neuromuscular mechanism, which will produce individuals possess some degree of physical fitness, which however varies considerably from one person to another and in the same person from time to time. The individual effectiveness of adjusting to physical activities is facilitated majority by his fitness in motor abilities. One's degree of physical fitness desired is determined by one's psychological, physiological and morphological characteristics. This should at least be the minimum needed to the condition of "wholesome and complete living" (Duhu, 1978).

Many youths and adults do not fully understand and appreciate he importance of health and fitness; and heavy responsibility rests on the shoulders of educators. It a nation is to remain strong physically, mentally, spiritually and socially, there must be education for fitness (Bucher, 1979). Children need to participate regularly in physical

activities that enhance and maintain cardiovascular and muscular skeletal health (Avery, 2001).

Physical fitness means considerably more than being free from disease or merely well. It signifies a positive trait that ranges on a scale from death to full and abundant life. It is an essential human quality and each person should try to attain the highest of physical fitness he or she if capable of (Richard, 1978).

Onekata (1995) opined that research in physical fitness has demonstrated that physical fitness status of individuals in significantly related to performance an one of the importance's of this is reduction in muscular injuries such as "musco-tendinous stiffness." Physical fitness status can be achieved through physical training for cardio-respiratory endurance, muscular strength, flexibility, speed, agility, coordination and balance. These are significantly obtained through concentric motion of the major body musculature in the sit-up, push-up, 12-minute urn, 50-meter dash, standing broad jump, sit and reach, shuttle run and static balance.

It has been established that people who collapse onto the ground after small exhaustive work are either as a result of disease or poor fitness. This is why maintaining a high level of physical fitness should generally be an aspiration for everyone (Masironi and Denolin, 1985 and Akinseye, 2005).

Tasks of daily life no longer provide sufficient regular vigorous exercise to develop and maintain adequate levels of physical fitness. Mechanization of work and many domestic chores has, for the most part eliminated obligatory physical act unity from modern life. Lack of this regular physical activity has been associated with certain degenerative diseases such as high incidence of heart related diseases, high blood pressure (hypertension), obesity, increased anxiety and different types of depression (Chado, 1992). On the other hand, research evidences induced risk of coronary heart diseases, hypertension, colorectal cancer, obesity and osteoporosis (Blair et al, 1996, Bouchard et al 1994). Other benefits are reduced stress and depression as well as increased emotional well being, energy level, self-confidence and satisfaction with social activity Gauvin and Spence, 1996). Thus the need for regular exercise in maintaining an organically sound body from birth through old age is of paramount importance.

With the above observation in mind, it is believed that the best way to achieve the desired goal of health and leading of productive live today is to participate in regular physical fitness programme. Physical fitness had been described by Clarke (1976), quoted by Umar (2005) as the ability to last, to bear up and to persevere under difficult circumstances where an unfit person would give up. It reduces being fatigued from ordinary efforts to lacking the energy to enter zestfully into life's

activities and to become exhausted from unexpected, demanding physical exertion. He concludes that the maintenance of an adequate level of physical fitness is essential for any one wishing to be useful to himself and his life.

Research to date in the field of preventive medicine forms the nucleus of a social humane movement that articulates a vision in the field providing a framework for children's benefit as the present available evidence has shown a strong relationship between habitual physical activity and physical fitness (Iro, 1991).

Fitness has no staying power of its own. One can be fit for a number of years, but of he stops being active he will lose a good portion of fitness very quickly. Also if one is relatively inactive for a number of years and not very fit, the fitness rapidly escalates when one becomes active on regular basis. Being fit has many benefits and one is in control of how fit he is (Allen et al, 1999).

One does not need to build muscles to be physically fit. Physical fitness is much more than muscle building and involves everything from cardio respiratory, fitness to being more flexible. Physical fitness is exercise. However, it is more than exercise. They go hand-in-hand to help you feel and look younger, work more efficiently and relaxed (walk, jog, swim, lift weights, dance, cycle), just exercise, whether exercise is aerobic. Exercise and fitness go together for life, if one starts or fitness

programme (Winsley and Armstrong, 2005; Malina, 2002; Web M.D. Health, 1999).

Physical fitness is often regarded as the major objective of physical education. This is because the foundation areas of exercise physiology, biomechanics and motor learning comprise major components of the concept of physical fitness. The physical fitness of the American Public of all ages continues to be a major concern not only of the physical educators but also of the family physicians, other medical and educational specialists as well as state and national governments. The various communication media keep the country informed of recent developments through professional and popular books, magazine articles, research reports, television programmes and advertising (Nixon and Jewett, 1980).

Physical fitness is one of the most misunderstood aspects of physical education and has never been easy to define. Most of the times, it is believed to b synonymous with strength. A strong individual may not necessarily be totally physically fit, since strength is but one attribute of fitness.

In the same way, broad shoulder, narrow hip and lack of external fat may not necessarily be an indication of fitness. This is why Hockey (1977) and Masironi and Denolin (1985), chose to describe the state of fitness “as characterized by man’s ability to function effectively within his potentialities”

Emiola (1982) opined that a physically fit person is “one who can efficiently handle his or her daily task whithout undue fatigue so as to have energy for family, hobbies and leisure times activities and a reserve in case of emergences.” Physical fitness is not just a general term, like good health, but a specific one. “Physical fitness is an individual matter and as such little meaning unless viewed in relation to the specific needs of such an individual” (Clarke, 1976).

In an effort to clarify confusion surrounding the proper definition of physical fitness, the American Association for Health Physical Education, Recreation and Dance (AAPHERD, 1990) defined physical fitness as “the individual’s ability to endure exertion and stressful physical activities beyond that required by his or her normal day to day means of livelihood or occupation.” The association also dichotomized physical fitness with two components: health related physical fitness components.

The basic components of health related physical fitness involve muscular strength, muscular endurance, cardio respiratory endurance, body composition and flexibility. They are directly related and affect the health of an individual. They develop the health and increase the functional capacity of the body. They are essential for survival regardless of a person’s age, religion or occupation. In the same line, speed, agility, power, balance and neuromuscular coordination and balance are

performance related physical fitness components. They are essential for skilful performance in various physical activities. Formerly, this area has been referred to as motor ability (Ajala et al., 2003 and Akinseye, 2005). Activities with vigour and to demonstrate capacities that the associated with a lower risk of premature development of hypokinetic diseases (Philippaerts et al., 1999).

Modern technology has lessened the physical demands of everyday activities like cleaning the house, washing clothes and dishes, mowing the lawn and traveling to work. What would require an hour of physical work now takes just a few seconds by pressing a button or setting a dial (Heywood, 1998). Low level physical activity similarly increased in Nigeria because of the technological advancement in using imported physical demands of daily activity has been associated with a drop in adaptability of functional systems of the body.

Regular physical activity affects the human body in a variety o ways. The total result being an increase kin physical performance capacity (Masironi and Enolin, 1985; Ibraheem, 1999), and reduces the risk of cardiovascular related diseases. Regular participation in physical activity has been associated with reduced blood pressure, maintenance of ideal weight and improved lipid profiles (Ginsburg et al., 1996). It also protects and guards the individual from the incidence of obesity, coronary

heart disease and other degenerative disorders (Sharkey, 1984; Chado, 1992).

Physical activity regularly plays a significant role in the envelopment of health and fitness, particularly when involves large muscles of the body. Physical activity may be classified according to the physiological characteristics of the movements that are performed. A large part of the human motor activity is cyclic being based on the repetition of a given movement pattern such as walking, running, cycling and swimming (Ibraheem, 1999).

The physical fitness of an individual is generally linked to one's cardio respiratory endurance capacity and maximum oxygen uptake (VO_2 max). A field test had become a common practice in health promotion centres to classify individuals into an aerobic fitness performance level and thus helps to prescribed aerobic exercise. This is population because of the expense, inconvenience and discomfort associated with direct assessment of maximum oxygen uptake (VO_2max). Therefore many investigations have developed field tests, which have been found to provide accurate results and administered to a large number of individuals within short time and less cost (John, 1990). In addition to the aforementioned advantages for field test, it is easy to administer and does not require much special skill (Cooper, 1968; Lamb, 1978). They were of the opinion that such field test performance requires the use o large

muscles. This places stress on the heart, blood vessels and lungs, which are important physiological variables for health and physical fitness.

Physical fitness status of students tends a complaint that public school students would tend to be more efficient at utilizing body functions during physical activities. Similarly public school students who go to school on foot and go on errands as well as involve in more energy demanding (vigorous physical) activities due to their economic than private school students who go to school in cars and are more prone to sedentary life styles. As such this study will examine the differences in the physical fitness status of public and private school students in Zaria, based on the variable of cardio respiratory endurances, muscular endurance, muscular strength, flexibility, body composition, speed, leg power (explosive strength), agility and balance.

SUMMARY

This chapter dealth with extensive review of research work on related issues conserning stuies that have been done . it went in two theories professional and expert opinion and research findings related to physical fitness and fitness status

It commenced with the definition of physical fitness then followed component of physical fitness, needs for physical fitness programme, importance of physical fitness and the role of school authorities in

physical fitness of students and ended with measurement of physical fitness components.

The literature review indicates that these field test batteries are accepted as valid and reliable test for physical fitness.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

The purpose of this study was to assess the physical fitness status of public and private secondary school students in Zaria. To assess the physical fitness of these students, two areas of physical fitness: - health related and performance related fitness components were assessed.

This chapter explains the research design, population, sample and sampling procedure, test item selection and justification, testing procedures instrumentation, study condition and control, test assistant and statistical techniques used in this study.

3.2 Research Design

The research design adopted for this study was one-shot case (ex-post facto) research design. This was adopted because the characteristics evaluated are already there and no variables were manipulated. It was chosen in accordance with studies of Peter J. M and Carl F (1995)

3.3 Population of the study

The population consisted of secondary school students in public and private schools in Zaria. The population was specifically students in JS1 – SS3 classes.

There are about twenty (20) public secondary schools and about eighty (80) private secondary schools in Zaria. It is estimated that there are about eighty five thousand nine hundred and thirty four (85,934) students in both public and private secondary schools in Zaria. But of this population about eighteen thousand (18,000) students are in public secondary schools and about sixty seven thousand nine hundred and thirty four (67,934) students are in private secondary schools in Zaria.

3.4 Sample and Sampling Procedure

A sample of four hundred and eighty (480) apparent healthy male and female students was selected from eighty chosen secondary schools in Zaria: 240 subjects were males and 240 subjects were females. This was done using stratified sampling method. Four were public secondary schools and four private secondary schools. In the selected schools male and female students were selected based on age and sex from JS1 – SS3. This was done using systematic sampling method.

The secondary schools were first systematically stratified into public and private schools. Then those schools that are coeducational were chosen as the target population because of the sex factor.

The names of public schools were written on pieces of paper and wrapped and four of them were randomly picked from the public school lots. This was done same for private secondary schools. From the

sampled secondary schools ten students were chosen from each class thirty of the subjects were females and thirty males per sampled school.

3.5 Test item Selection and Justification

Nine different tests items altogether were administered on each subject throughout the duration of the study. These tests were:

a) The cooper's 12-minute run test to determine cardio-respiratory endurance.

b) The sit-up test, to test muscular endurance of the abdominal area.

c) The push-up test for strength of the upper limb muscles.

d) The sit and reach test for flexibility.

e) Skinfold caliper measurement for body fat percent.

f) 50-meter sprint test for speed.

g) Standing broad jump test for leg power.

h) The shuttle run test for agility.

i) Balance log test for static balance

3.6 Instrumentation

The essence of this investigation was to determine the physical fitness status of public and private secondary school students in Zaria. To achieve this objective, the following instruments were used in conducting the tests.

i. Electronic stopwatches (World Time WR 5 Bar Model); for timing.

ii. The 5 Hop on Hanson Model Weighing scale for weight of the subjects.

iii. Whistles: To control exercise and test proceedings especially for starting and stopping.

iv. Mats: for floor activities.

v. A measuring tape was used to measure distance covered in the broad jump.

vi. Skinfold caliper (Lange Model) for skinfold measurements.

vii. A measuring tape was used to measure distance covered in the broad jump.

viii. The 400 meter track fields of Government Girls' Day Secondary School, Samaru-Zaria; Government Secondary School, Muchia; ABU, Zaria etc. for the 12-minutes run.

ix An unbalanced log for static balance test.

3.7 Study Conditions

(a) The researcher and research assistants conducted all tests same measurement to ensure similar study conditions for all the subjects.

(b) The meaning and purpose of each test item was explained to the subjects before the commencement of the tests.

(c) The time for the commencement of tests ranged from 4pm-6pm each test day. This was the time f the day when the temperature was suitable for vigorous physical activities.

(d) The subjects were encouraged to be at test venue at least 30 minute before the commencement of test.

(e) The subjects were advised to have their meals at least two hours before the commencement of tests.

(f) All the subjects wore sports outfit that were appropriate for the test conditions.

A consent form was given to the parents of the subjects through the students in their respective schools after the researcher had done the feasibility studies and given pep talks to the selected subjects.

3.8 Testing Procedures

Before the tests were administrated inform concepts form were given to the subject, which were completed and returned (See Appendix).

A). It was also made clear to the subjects that an individual is free to quit the test whenever he or she becomes uncomfortable.

Detailed explanation and demonstration of every test preceded actual performance of tests, standing broad jump jest, 50-m dash test, shuttle run test and balance test, the researcher allowed

three test items for each individual per day, and three days in a week (Monday, Wednesday and Friday). The tests were administered over three weeks. Each subject was allowed rest of two minutes relaxation session; after which a particular test followed again. A 10-minute general and specific warm up exercise were undertaken before engagement in the tests.

Each of the nine items was administered as described below.

1. Cooper's 12-Minute run Test

This test measures cardio-respiratory endurance (aerobic capacity). Subjects were told to run on the running track of the schools from the starting line until they hear the sound of the final whistle signifying to them to stop at the end of 12 minutes. In schools where the facility was not available, the subjects were transported to the nearest institution. The race was done by year group and sex. This was to induce competition as well as to avoid confusion. They were told to run as fast as possible but made sure to pace themselves during the run to prevent premature fatigue. When getting tired, they can slow down to walking speed or even stop. The number of times the subjects ran round the track (lapse) was counted at end of the twelve minutes. The distance covered at the end of the twelve minute was determined by multiplying the number of lapses by 400m. The distances were converted to

kilometers and recorded against the subject's number. Some physical and Health Education final year students of Ahmadu Bello University, Zaria and Physical and Health and Education students of Ahmadu Bello University, Zaria were used as research assistants due to their experiences in physical activities of this nature. They were assigned particular subjects and counted the number of lapses covered by the subjects.

2. Sit-up Test

The sit up test is used to measure muscular endurance of abdominal area. The subjects were told to lie on their backs with fingers clasped behind the neck and elbows touching the floor, knees were bent flat and feet on the floor, pulled in close to the body. The subjects' feet were held securely by a research assistant who also counted the number of sit-up turning trunk to the left touching the right knee. The exercise was repeated as many times as possible in one minute. The total number of repetitions in one minute was recorded for the score. Instructions were given to the subjects in relation to the position of the fingers, which must remain in contact behind the neck through out the test. There was no rest between sit-up and the knee must be touched with the opposite elbow.

3. Push-ups Tests

This measures muscular strengthen. Subjects were told to lie flat on the floor facing down, toes are curled under and hands placed directly under shoulders. Very slowly, body is pushed up to fill extension and then lower body to the floor. The body remains straight during the entire movement. At this point, shoulder blades are squeezed together. Subjects were told that it is a failure if the back arches during the rest. A push-up is scored each time the body is lowered to the floor and pushed up. The score is the greatest number of correct push-up performed in one minute.

4. Sit and Reach Test

The sit and reach test is utilized to measure flexibility level of subjects. The subjects sit with their legs extended directly confront of them and the back of their knees pressed against the floor. The feet of the subjects are placed against a stool to which a yardstick is attached, with the 14 inch mark placed at the point where the foot contacts the stool. They were told to place the index fingers of both hands together and reach forward slowly, as far as possible without pain and hold this position for the count of three. This distance reached is noted on the yardstick and recorded by the research assistant. The subjects were told not to bounce to reach and that the knees must be kept in contact with the floor. Do not

bend your knees. Do not bounce forward or backward because this can injure muscle and the tendons. Do not wear shoes. A sore of 15 means the subject has reached the yardstick fifteen times. The subject took three trails and the of the three was the score measured to the nearest centimeter

5. Skin fold Measurement

This measurement estimates the various components of body fat composition. The thickness on the subject's skin fold was measured with a skin fold caliper. The sites of the measurement consisted of the thigh, skin folds and scapular skin folds. These sites were chosen in accordance with studies by Shuaibu M.U (2001)The skin folds in these sites were held with the thumb and index finger and also held with the jaws of the caliper about 1 cm from the thumb and finger. The values obtained from the readings of the caliper were recorded in millimeters (mm). the right side of the body was for the measurement.

The body density was calculated using the Sloan equation reported by Johnson and Nelson (1979). This equation predicts body density for young men using the following formula. Body density = 1.1043 – 0.00132 x (thigh skinfolds) – 0.00131 x scapula skinfolds. These formulae were used because they have been found to access the body density of youths simlar to the subjects of this

investigation. The body density values were then converted to percentage body fat by the Siri formula (Johnson and Nelson, 1979).

6. 50 – meter Dash Test

This test is used to measure the subject's speed ability; that is, the minimum time required for a subject to run 50 metres. The test was administered to two at a time. Both subjects took a crouch position behind the starting line. The starting command was "on your mark, get set, Go".

When the "Go" command was given, the starter made a downward sweep of the arm to give a visual signal to the timer who stood at the finish line. On the command "Go" the subjects ran the entire 50 meters as fast as possible, passing through the plane o the finish line. The score is the amount of time between the starter's signal and the instance the subject crossed the finish line. Time was recorded in seconds to the nearest tenth of a second.

7. Standing Broad Jump Test

This test measures power and body coordination. The subjects were asked to stand behind a drawn take-off line or a jump off board with the feet severed inches apart an the subject bent the knees both hands were swung backward and jumped as far as possible using the arms to propel the body forward to help them go

further. The ester emphasized that the take off feet with the knees were extended.

Three trails were allowed per subject, measuring each jump from the take-off line to the heel or part of the body that touched the ground nearest the take-off line. The score was the best distance registered of the three trials.

8. Shuttle Run Test

This test is used to measure the agility of the subject in running and changing direction. Two parallel lines were marked on the ground 20 meters apart. Two bocks of wood, 2 inches x inches x 4inches were placed behind one of the line. The subjects started from behind the other line. When the signal was given, the subjects ran as fast as they could to the blocks, picked one up, ran back to the starting line and placed the blocks behind the line. They then ran back and picked up the second blocks, which were carried in hand backward across the starting line two subjects ran the same time. To eliminate the necessity of returning the blocks after each race, the races were started alternately, first from behind one line and then from behind the other.

Two trails were allowed with rest period between trails. The score is the recorded time of the best trial to the nearest tenth of a second.

9. Balance Test

This test estimates the subject's ability to maintain static balance on an unbalanced log. The subjects were told to walk on an unbalanced log tied in between two poles. The subjects started in standing position on as long axis of the log. The hands were raised off the hip spread and the eyes opened. Each subject was further instructed to walk on the log while trying to maintain balance. The stopwatch was started immediately the subject started to walk on the log and watch was stopped when one or both legs contacted the floor or at the maximum time of 20 seconds. When 20 seconds elapsed, the test was recorded to the nearest tenth of a second against subject's number.

3.9 Research Assistants

Test team approach was used. A total of twenty (20) test assistants comprising of physical and health education teachers of the selected schools and some of final year students of the Department of Physical and Health Education Department, Ahmadu Bello University Zaria were used. They were given explanations on the study, how to keep the time of subjects and

other tests protocols; this was to guide them in the evaluation of the subject.

The testers were in position where they could see both the subjects and their performances. The team completed the testing in one time block and uniform testing procedure was used.

3.10 Statistical Techniques

The data collected for this investigation were analyzed using:-

1. Description statistical of mean, and standard deviation.
2. Student t –test to see if there was any significant difference between public and private secondary school students' physical fitness status.
3. Decisions to reject or not to reject the null hypotheses were made at an alpha value of 0.05.

CHAPTER FOUR

DATA ANALYSIS AND DISCUSSION

4.1 Introduction

The research was undertaken to assess the physical fitness status of public and private secondary schools students in Zaria, Kaduna State.

The nine different tests items, for both the health related and performance related physical fitness components were used to collect data for the investigation. The test items comprised the cooper's 12 minute run test, the sit up test, the push up test, the skin fold measurement, the sit and reach test, the 50-meters measured cardio-respiratory endurance, muscular endurance of the abdominal region, muscular strength of the upper limbs, flexibility, speed, leg power and balance respectively.

The data collected during this investigation were subjected to statistical analysis. The performances for the four hundred and eighty (480) subjects were computed for the mean, standard deviation, standard error of the mean and range. The inferential statistics used was the t-test analysis (one tailed t-test). An alpha level of 0.05 was used to test the null hypothesis.

4.2 Results

The results of the statistical analysis were shown in tables with decisions and discussions based on the calculated alpha values. The tables contain summarized details and serve to provide immediate information regarding the performance of the students in the test items.

Table 41: Physical characteristics of Public and Private Secondary School Students

Category of subjects	Variable	Mean	Standard deviation	SEM	Min.	Max	Range
Public Secondary School student N = 240	Age (Yrs)	14.30	2.06	0.133	11.00	18.00	7.0
	Height (m)	1.49	0.07	0.004	1.37	1.69	0.32
	Weight (kg)	41.17	7.47	0.482	32.00	63.00	31.0
Private Secondary School Students N =240	Age (Yrs)	14.13	2.09	0.135	10.00	18.00	8.0
	Height (m)	1.47	0.83	0.005	1.30	1.69	0.39
	Weight (kg)	41.85	8.45	0.55	25.00	63.00	38.0
Public male Sec. School Students N = 120	Age (Yrs)	14.5	1.58	0.051	11	18	7.0
	Height (m)	1.48	1.61	0.133	1.37	1.66	0.29
	Weight (kg)	40.4	4.38	0.213	32.0	63.0	31
Public female Sec. School Students N = 120	Age (Yrs)	14.1	1.57	0.051	11	18	7.0
	Height (m)	1.5	1.64	0.301	1.39	1.69	0.3
	Weight (kg)	42.2	4.79	0.220	33.0	62.0	29
Private male Sec. School Students N = 120	Age (Yrs)	14.2	1.56	0.107	10	18	8
	Height (m)	1.5	1.59	0.302	1.35	1.69	0.34
	Weight (kg)	40.2	4.49	0.512	25	60	32
Private female Sec. School Students N = 120	Age (Yrs)	14.0	1.54	0.213	10	18	8.0
	Height (m)	1.5	1.63	0.003	1.30	1.68	0.38
	Weight (kg)	43.3	4.84	0.001	35.0	63.0	28
N Total = 480							

Table 4.1above shows the mean, standard deviation, standard error of the mean and the range of the selected groups of subject's physical characteristic of age, height and weight. The data indicates that they are adolescents and are of average height and weight. However, public

secondary school students are generally older within the age group with the mean age of 14.30 years against 14.13 years for their private school counterparts. Same for height. They are generally taller with the mean height of 1.49m as against 1.47m in private schools. But private secondary school students seem to generally have higher body weight values within the age group than their public school counterparts, with the mean weight of 41.85kg as against 41.71kg for public schools.

Observation to Table 4.1 above reveals that all the subjects are of average height, with their mean heights ranging from 1.48m for public school male students to 1.5m for public school female students; private school male students and private school female students have the same mean heights of 15cm however, there is a gradual variation in their mean weights from 40.4kg for public school male students to 42.2kg for public school female students, 40.4kg for private school male students and 43.3kg for private female students. Private female students are generally heavier than any other group in the selected group of students.

Table 4.2: Performance of public and private secondary school students in different physical fitness test items (batteries)

Category of subjects	Stat	12-minute run(km)	Push up	Sit up	Sit and reach (cm)	Body fat %	50-metre dash (Sec.)	Shuttle run (Sec.)	Standing broad jump (m)	Static balance (Sec.)
Public secondary school students N = 240	$\bar{x}$	2.24	19.56	18.13	16.66	10.92	6.64	10.36	1.90	11.93
	S.D	0.42	3.42	3.30	1.33	1.05	0.48	0.78	0.28	1.33
	R	4.08	14.00	15.00	6.46	5.62	2.20	4.10	1.32	12.50
Private Secondary School Students N = 240	$\bar{x}$	2.17	17.93	16.31	15.54	12.10	6.90	11.14	1.70	11.47
	S.D	0.34	3.70	2.93	1.95	1.75	0.64	1.05	0.32	6.67
	R	1.42	19.00	16.00	18.66	11.02	3.30	5.80	1.78	104.00
Public Male Sec. Sch. Students N = 120	$\bar{x}$	2.45	22.1	20.78	17.54	10.41	6.35	10.0	2.10	12.43
	S.D	1.70	4.68	2.31	1.93	1.13	1.3	1.09	1.32	1.4
	R	1.08	13.0	14.0	5.92	5.4	1.7	3.10	1.14	1.37
Public Female Sec. Sch. Students N = 120	$\bar{x}$	1.98	16.78	15.18	15.72	11.47	6.95	10.79	1.67	11.32
	S.D	1.22	4.1	6.8	1.93	1.26	6.2	1.18	1.14	1.24
	R	1.10	9.00	8.0	3.70	4.60	1.22	3.60	0.62	5.6
Private Male Sec. Students N = 120.	$\bar{x}$	2.36	20.85	18.61	16.90	11.11	6.43	10.62	1.84	11.84
	S.D	1.11	3.07	2.04	1.82	1.22	1.04	1.16	1.05	1.30
	R	1.32	16.0	14.0	7.63	7.38	1.61	4.20	2.20	13.40
Private Sec. Female Sec. Sch. Students N = 240	$\bar{x}$	1.88	15.6	13.94	14.68	13.04	7.36	11.64	1.56	10.18
	S.D	1.12	6.80	1.53	1.61	1.43	2.08	1.27	1.16	1.12
	R	1.52	14.00	10.0	9.29	6.88	2.40	4.40	1.72	5.20

N_{total} = 480

Key

x = Mean

S.D. = Standard deviation

R = Range

Table 4.2 above indicates the performance mean, standard deviation and the range of the subjects in both health related and performance related physical fitness test items. Examination of the table reveals that public secondary school students generally had better performance on the nine test items than their counterparts in private secondary schools. Public schools have higher mean values in the 12-minute run of 2.24km; push up 19.56, sit up and 18.13 and so on. As against 2.17km in 12-minute run; 17.93 in push up and 16.31 in sit up of their counterparts in private secondary schools respectively.

On the contrary, private secondary school students had higher body fat percentages on the average than those in public schools with a mean body fat percentage of 12.10% as against 10.92% of public secondary schools. These denote significant differences in their respective physical fitness status.

The table also indicates that the two selected groups of subjects, on the average, were found to be within the acceptable boy percent fat.

Cursory look at Table 4.2 indicates that public male secondary students generally means of 2.4km in 12minute run, 22.1push ups, 20.78 sit ups, 17.54cm for sit and reach, 10.41% body fat, 6.35sec for 50m dash, 10.0sec for shuttle run, 2.10m for explosive power and 12.43 sec for static balance.

They are followed by private male secondary school students with general mean performance of 2.36km of 12 minute run, 20.85 push up and so on.

On the other hand, the public female secondary school students had mean performance of 1.98km for 12 minute run 16.78push ups, 15.18 sit ups etc. However, the least performances are from private female secondary school students.. who had 1.88km for 12 minute run, 15.6 push ups, 13.94 sit ups, 14.68cm for sit and reach, 13.04% body fat, 7.36secs

for 50m dash, 11.64sec for shuttle run, 1.56cm for explosive power and 10.18sec for static balance.

Hypothesis One: There is no significant different between the public and private secondary school students in their cardio-respiratory endurance.

To test this hypothesis, the subjects performed the Cooper's 12-minutes and t-test analysis was computed thus:

Table 4.3: Summary of t-test for differences between public secondary school students in the cardio-respiratory endurance

Category of Subjects	$\bar{x}$	**Standard deviation**	**n**	**df**	**Standard error**	**t-cal**	**t-crit**
Public Secondary School Students	2.24km	0.42	240	478	0.017	2.66	1.960
Private Secondary School Students	2.17km	0.34	240				
Public male Secondary School Students	2.45km	1.70	120	238	0.182	4.14	1.960
Private male Secondary School Students	2.36km	1.11	120				
Public female Secondary School Students	1.97km	1.22	120	238	0.02	8.12	1.960
Private female Secondary School Students	1.88km	1.21	120				
t (478) = 1.960< 0.05		t (238) = 1.960< 0.05 * significant.					

$N_{total} = 480$

Observation of Table 4.3 above shows a significant difference in performance between the public and private secondary school students in their cardio-respiratory endurance. Since t_{cal} is greater than t_{crits} the null hypothesis, which states that “there is no significant difference between the public and private secondary school students in cardio-respiratory endurance”, was thus rejected. Public secondary school students in general had higher mean cardio-respiratory endurance of 2.24km than their private secondary school colleagues with the mean of 2.17km. This could be attributed to the fact that public secondary school students trek long distances to their respective schools as well as run errands on foot for long distances. It was also discovered during the research that most which is a great deal of exercise. On the other hand, private secondary school students go to school in cars, commercial motorcycles and buses. This may have significant influence on their respiratory endurance.

Examination of Table 4.3 further shows that public male secondary school students had higher cardio respiratory endurance mean with the mean value of 2.36km, followed by public female secondary school students with the mean value of 1.97km. The least performers are the private female secondary school students with the means value of 1.88km for 12minute run. This is the lowest value within the four groups.

The t-cal values of public secondary school students and private secondary school students of (2.66) is greater than t-critical of (1.96)

same for public male students and private male students as well as for public female students and private female students. This indicates significant difference in t heir cardio respiratory endurance.

Hypothesis Two: There is no significant difference between the public and private secondary school students in their muscular strength.

In this case, the push up test performance values of the subjects were used to compute t-test analysis as follows:

Table 4.4: Summary of t-test for differences between public and private secondary school students in the muscular arm strength.

Category of Subjects	$\bar{x}$	**Standard deviation**	**n**	**df**	**Standard error**	**t-cal**	**t-crit**
Public Secondary School Students	19.56 push up	3.42	240	478	0.17	2.47	1.960
Private Secondary School Students	17.93 push up	3.70	240				
Public male Secondary School Students	22.11 push up	4.68	120	238	0.008	2.40	1.960
Private male secondary School Students	20.85 push up	3.07	120				
Public Female Secondary School Students	1.78 push up	4.1	120	238	0.162	2.29	1.960
Private Female Secondary School Students	15.6 push up	6.80	120				

$N_{total} = 480$

t (478) = 1.960 < 0.05 x significant t (238) = 1.960 < 0.05

Examination of Table 4.4 above indicates a significant difference in performance between the public and private secondary school students. The table shows that there is a significant difference between the performance of public and private secondary schools students in the arm strength using the push-up test. As such the null hypothesis, which holds that “there is no significant difference between public and private secondary school students in their muscular arm strength” is therefore rejected. Public secondary school students on the average had higher arm muscular strength than their counterparts in private secondary schools.

Table 4.4 shows public male secondary school students with the highest mean value of 22.11 push ups, followed by private male secondary school students with the mean value of 20.85 push ups, then public female secondary school students with the mean value of 16.78push ups. The lowest performing group is the private female students with the mean value of 15.6 push ups.

The t-cal values for the selected groups (public students and private students, public male students and private male students public female private male students, public female students and private female students) of 2.47, 4.40 and 2.29 are greater than the t-critical of 1.960 of all the selected groups. Thus there is significant difference in their muscular arm strength.

Hypothesis Three: There is no significant difference between public and private secondary school students in their muscular endurance.

Table 4.5 Summary of t-test or differences public and private secondary school students in the muscular endurance ability. (sit up performance)

Category of Subjects	**$\bar{x}$**	**Standard deviation**	**n**	**df**	**Standard error**	**t-cal**	**t-crit**
Public Secondary School Students	18.13 sit up	3.30	240	478	0.15	2.1	1.960
Private Secondary School Students	16.31 sit up	2.93	240				
Public male Secondary School Students	20.78 sit up	2.3	120	238	0.105	2.12	1.96
Private male secondary School Students	18.16 sit up	3.04	120				
Public Female Secondary School Students	15.18 sit up	6.8	120	238	0.006	2.01	1.960
Private Female Secondary School Students	13.94 sit up	1.53	120				

$N_{total} = 480$

t (478) = 1.960 < 0.05 t (238) = 1.960 < 0.05 * significant

Table 4.5 above indicates a significant difference in performance between public and private secondary school students in their abdominal muscular endurance test. In this case, the null hypothesis depicting that

“there is no significant difference between the public and private secondary school students in their muscular endurance” is thus rejected. Public secondary school students averagely had higher muscular endurance test abilities than their colleagues in private schools. This suggests that public secondary school students usually involve themselves in endurance enhancing physical activities than their private school counterparts.

Table 4.5 indicates that public male secondary school students have mean value of 20.87 sit ups. In the second place are private male secondary school students with the means value of 18.16 sit ups. They are followed by public female secondary school students with the mean value of 15.18 sit ups. However, private female secondary school students have the least mean value of 13.94 sit ups in muscular endurance.

The t-cal values of the selected groups (public school students and private school students, public male students and private male students, public female students and private female students) of 2.1, 2.12 and 2.01 are greater than t-critical of 1.960. Indicating a significant difference in their muscular endurance.

Hypothesis Four: There is no significant difference between the public and private secondary school students in their flexibility.

To test this hypothesis, the sit and reach test battery was utilized. The computed t-test analysis of the performance values of the subjects is shown in table 4.6.

Table 4.6: Summary of t-test for differences between public and private secondary school students in trunk flexibility.

Category of Subjects	$\bar{x}$	**Standard deviation**	**n**	**df**	**Standard error**	**t-cal**	**t-crit**
Public Secondary School Students	16.66cm	1.33	240	478	0.08	2.26	1.960
Private Secondary School Students	15.54cm	1.95	240				
Public male Secondary School Students	17.54cm	1.93	120	238	0.03	2.17	1.960
Private male secondary School Students	16.60cm	1.82	120				
Public Female Secondary School Students	15.72cm	1.93	120	238	0.14	2.23	1.960
Private Female Secondary School Students	14.68cm	1.61	120				

$N_{total} = 480$

$t(478) = 1.960 < 0.05$ $t(238) = 1.960 < 0.05$ * Significant

Observation of Table 4.6 above reveals that there is a significant difference in performance between public and private secondary school

students in their body flexibility using the sit and reach performance test. Here the null hypothesis which states that “there is no significant difference between public and private students in their body flexibility is not accepted.

On the average, public secondary school students have higher values for trunk flexibility than their fellow students in private schools.

Observation of Table 4.6 indicates that public male secondary school students are high performers in trunk flexibility with mean value of 16.60cm. Then follows public female secondary school students with the means values of 15.72cm. The least mean value is registered by private female secondary school students.

The t-cal values of the selected groups of 2.26 for public and private school students, 2.17 for public male private male students, 2.23 for public female and private female students are greater than t-critical values of 1.960 at 0.05 alpha level. This indicates significant difference in their trunk flexibility.

Hypothesis Five: There is no significance difference between public and private secondary school students in their body composition fat percent (BF%).

Table 4.7: Summary of t-test for differences between public and private secondary school students in their body fat percent (B.F %)

Category of Subjects	$\bar{x}$	Standard deviation	n	df	Standard error	t-cal	t-crit
Public Secondary School Students	10.92%	1.05	240	478	0.07	2.04	1.960
Private Secondary School Students	12.10%	1.75	240				
Public male Secondary School Students	11.11%	1.13	120	238	0.30	2.31	1.960
Private male secondary School Students	11.47%	1.22	120				
Public Female Secondary School Students	13.04%	1.26	120	238	0.34	2.15	1.960
Private Female Secondary School Students	13.04%	1.43	120				

$N_{total} = 480$

t (478) = 1.960 < 0.05 t (238) = 1.960 < 0.05 * significant

Examination of Table 4.7 above shows that there is a significant difference in performance between public and private secondary school students arising from their varied body fat percentage values of 10.92% for public schools and 12.10% for private schools. Thus the null

hypothesis which says, “there is no significant difference in their body fat percentage” is hereby refuted.

Private secondary school students averagely have higher values of body fat percentage than their counterparts in the public school.

Examination of Table 4.7 reveals that public male secondary school students have lower body fat percent with the mean value of 10.41%. They are followed by their private male counterparts with the means value of 11.11% Next to them are the public female secondary school students with the mean value of 11.47%. The highest mean value of 13.04% is for respective mean weights of 43.3kg for private female secondary school students 42.2kg for public female secondary school students and 40.4kg for public male and private male secondary school students.

The t-cal values of the selected groups of 2.04, 2.31 and 2.15 are greater than the t-critical value of 1.960 at 0.05 alpha level. This shows significant difference in their body fat percent.

Hypothesis Six: There is no significance difference between the public and private secondary school students in their speed”.

In order to test this hypothesis, the subjects performed the 50metre dash test and the t-test values of their performance were computed as shown below.

Table 4.8: Summary of t-test for differences between public and private secondary school students in their speed ability.

Category of Subjects	$\bar{x}$	Standard deviation	n	df	Standard error	t-cal	t-crit
Public Secondary School Students	6.64sec	0.48	240	478	0.03	2.07	1.960
Private Secondary School Students	6.90sec	0.64	240				
Public male Secondary School Students	6.35sec	1.3	120	238	0.102	2.82	1.96
Private male secondary School Students	6.43sec	7.04	120				
Public Female Secondary School Students	6.95sec	1.22	120	238	0.41	2.97	1.960
Private Female Secondary School Students	7.36sec	2.08	120				
$N_{total} = 480$							
t (478) = 1.960 < 0.05		t (238) = 1.960 < 0.05		* significant			

Table 4.8 above reveals a significant difference in performance between public and private secondary school students in their speed ability. Thus the null hypothesis depicting no significant, difference in their speed ability, does not hold. Public secondary school students have

on the average higher speed ability than private secondary school students.

Table 4.8 also indicates that public male secondary school students are high performers in speed with the mean value of 6.35 sec followed by private male secondary school students with the mean value of 6.43sec. Next are public female secondary school student with the mean value of 6.95 sec. The least performaners are private female secondary school students with the mean value of 7.36sec.

The t-cal values of the selected groups of students of 2.67, 2.23 and 2.25 are greater than the t-critical values of 1.960 at 0.05 alpha levels. This shows that there is significant difference in their speed ability.

Hypothesis Seven: There is no significance difference between the public and private school students in their power.

In this case, the subjects performed the standing broad jump (the sergeant jump) test and the t-test of the performance values was computed thus:

Table 4.9:Summary of t-test for differences between public and private secondary school students in the leg power capacity.

Category of Subjects	$\bar{x}$	Standard deviation	n	df	Standard error	t-cal	t-crit
Public Secondary School Students	1.90m	0285	240	478	0.01	2.67	1.960
Private Secondary School Students	1.70m	0.32	240				
Public male Secondary School Students	2.10m	1.32	120	238	0.12	2.23	1.96
Private male secondary School Students	1.84m	1.05	120				
Public Female Secondary School Students	1.67m	1.14	120	238	0.27	2.25	1.960
Private Female Secondary School Students	1.56m	1.16	120				
$N_{total} = 480$							
t (478) = 1.960 < 0.05		t (238) = 1.960 < 0.05			* significant		

Observation of Table 4.9 above reveals that there is a significance difference in performance between public and private secondary school students in their leg power capacity. Public schools have a mean of 1.90m as against 1.70m for private schools. Also t_{cal} is greater than t_{crit}. Therefore the null hypothesis of no significant difference is rejected.

Public secondary school students on the average have higher leg power capacity than their colleagues in private secondary schools.

Examination of Table 4.9 also shows public male secondary school students with a superior mean value of 2.10m in explosive school followed by private male secondary school students with the mean value of 1.84m. The next group is public female secondary school students with a mean value of 1.67m and the least performing group is the private female secondary school students with a mean value of 1.56m for explosive power.

Hypothesis Eight. There is no significant difference between the public and private secondary school students in their agility.

Here, the subjects were given the shuttle run (dodge run) test and the t-test of he performance values was calculated as follows:

Table 4.10: Summary of t-test for differences between public and private secondary school students in agility.

Category of Subjects	$\bar{x}$	Standard deviation	n	df	Standard error	t-cal	t-crit
Public Secondary School Students	10.36sec	0.78	240	478	0.05	2.81	1.960
Private Secondary School Students	11.14sec	1.05	240				
Public male Secondary School Students	10.0sec	109	120	238	0.04	2.95	1.960
Private male secondary School Students	10.62sec	1.16	120				
Public Female Secondary School Students	10.79sec	1.18	120	238	0.05	2.03	1.960
Private Female Secondary School Students	11.6sec	1.27	120				
$N_{total} = 480$							
t (478) = 1.960 < 0.05		t (238) = 1.960 < 0.05t		*significant			

Examination of Table 4.10 above shows as significant difference in performance between public and private secondary school students in their agility level using the shuttle run performance tests. The null hypothesis stipulating no significant difference in their agility level is

thus not accepted. Public secondary school students averagely have higher agility capacity than private secondary school students.

Table 4.10 also reveals that public male secondary school students have superior mean value of 10.0sec in shuttle run (agility) followed by private male secondary school students with a mean value of 10.62sec. the next group is public female secondary school students with the mean value of 10.79 and the least group is female secondary school with the main value of 11.60sec in shuttle run.

The t-cal values of the selected groups of students of 2.81, 2.95 and 2.05 are greater than their –critical values of 1.960 at 0.05 alpha level. This shows a significant difference in their agility.

Hypothesis Nine: There is no significant difference between public and private secondary school students in their balance ability.

In order to test this hypothesis, the subjects performed the static log balance test and the t-test of the performance values was computed as indicated in the tab le below:

Table 4.11: Summary of t-test for differences between public and private secondary school students in the static balance ability

Category of Subjects	$\bar{x}$	Standard deviation	n	df	Standard error	t-cal	t-crit
Public Secondary School Students	11.93sec	1.33	240	478	0.22	2.30	1.960
Private Secondary School Students	11.47sec	6.67	240				
Public male Secondary School Students	12.43sec	1.40	120	238	0.12	2.78	1.96
Private male secondary School Students	11.84sec	1.30	120				
Public Female Secondary School Students	11.32sec	1.24	120	238	0.27	2.89	1.960
Private Female Secondary School Students	10.12sec	1.12	120				
$N_{total} = 480$							
t (478) = 1.960 < 0.05		t (238) = 1.960 < 0.05t		* significant			

Observation of Table 4.11: above depicts a significant difference in the performance between public and private secondary school students in their balance ability using the balance log test. The null hypothesis stating, “There is no significant difference between the public and private public secondary school students in their balance ability,” is rejected.

Averagely public secondary school students have higher balance ability than their fellow students in private schools.

Observation of Table 4.11 also indicates that public male secondary school students have higher means values of 12.43sec in static balance. They are closely followed by private male secondary school students with the mean value of 11.84sec. However, public female secondary school students have higher mean value of 11.32sec in static balance than their private secondary school counterparts with the mean value of 10:18sec who are the least performers in static balance within the group of selected students.

The t-cal values o the selected groups of students of 2.30, 2.78 and 2.89 are greater than the t-critical values of 1.960 at 0.05 alpha level. Indicating a significant difference in their static balance ability.

4.3 Discussion

The investigation was conducted to assess and compare the physical fitness status of public and private secondary school students in Zaria, Kaduna State, Nigeria. To achieve this, both health related and performance related physical fitness test items were selected for test as suggested by the AHPERD guide to physical fitness and physical education and assessment (1989), (Duhu, 1978, Akinsee, 2005 and Ajala et al 2003).

4.3.1 Cardio-Respiratory Fitness

The result of this study shows significant difference in the cardio-respiratory endurance between public and private secondary school students. The followings revealed that public secondary school students averagely had superior cardio-respiratory endurance (aerobic fitness) than their fellow colleagues in private secondary schools. The null hypothesis of no significance was then rejected.

This significant difference stems from the fact that:

(i) Most public secondary school students in Zaria trek long distance to and from their respective schools.

(ii) Most of the public school students especially boys go to school on bicycles which is a great deal of exercise. While most private school students go to school in cars, commercial buses or commercial motorcycles (Okada). These means of transportation render private secondary schools students more sedentary.

However, this result suggests that all the categories of subjects were averagely fit in cardio-respiratory endurance. This may stem from the fact that they were of the young age ($\bar{x}$ = 14.30 years public and $\bar{x}$ = 14.13 years private). Also closely related is that since they are adolescents, most of them of them are involved in childhood physical activities.

Onekata in Shuiabu (2000), supported these findings which he stated that “physical fitness status of individuals is significantly related to performance” Chado (1986) and Gwani (1986) all supported this finding when they were of then opinion that younger subjects had better cardio respiratory fitness that the older ones in the cooper’s 12 minutes distance run test.

The cardiorespiratory fitness values reported in this study are comparable to those reported in previous studies Peter (1987), John (1990) and Shuaibu (2000). These studies also used 12-minutes distance run test as a measure of cardiorepiratory fitness in youngsters.

4.2.3 Muscular Strength

The finding of this research work with performance in the push-up test depicted a significant difference between public and private secondary school students. The null hypothesis was therefore not accepted.

Based on the outcome of the result, public secondary school students exhibited stronger muscular strength than their private school counterparts. Thus significant difference recorded may stem from the fact that most public secondary school students go on errands carrying objects for long distance, help in farm work or even involve in life sustaining and

stressful activities than their fellow students in private schools who are mainly sedimentary watching television or playing computer games.

Shuaibu (2000) reported that McArdle et al. (1981) revealed 30% improvement in muscular strength of both male and female subjects involved in some designed physical activities, while Podlock et al. (1978) showed that “a muscle or group of muscle looses its power of maximal contraction as a response to discuss or immobilization. These previous studies tally this result.

4.3.3 Muscular Endurance

The result of this study on muscular endurance test indicated that there was significant difference between the public and private secondary school students. The null hypothesis was therefore rejected. The public secondary school students exhibited superior muscular endurance that the students in private secondary schools. This suggest that public secondary school students involve themselves in muscular endurance enhancing physical activities like farming, carrying form produce, hunting and so on than private secondary school students.

Shuaibu (2000) and Peter (1987) stated that the strength of individual influence performance in endurance tests since the result of this study revealed that public secondary school students exhibited better strength than the private secondary counterparts; the strength factor might

party have influenced the public school student's superiority in the endurance test over private secondary school students.

4.3.4 Flexibility

In the case of flexibility the performance test of sit and research result reveals a significant difference between the public and private secondary students. The null hypothesis of no significant difference was therefore not accepted. Public secondary school students exhibited superior ability in flexibility than the fellow colleagues in the private schools. This suggested that the superiority in flexibility performance of public school students result from the fact that they involve themselves in flexibility enhancing,, farming activities like hunting, fishing which demands swimming, farming, street games and other cultural activities after closing hours. Bucher (1979) stated that "flexibility denotes the capability of the body of an individual to make a wide range of movements, such as those required for swimming, diving and tumbling". The more flexible an individual, the less energy sopent in accompanying a skill.

Sadiq (2001) opined that exercises have direct effects on the subtleness of the connective tissues as well as tissues surrounding the joint in the trunk region.

Pollock cited by Shuaibu (2008) indicated that the more active an individual, generally the more flexible he or she should be, but that activity must be performed through a full range of motion of each specific joint.

4.3.5 Body Composition (Body Fat Percent. B.F%)

The result of this investigation on the percent body fat indicated a significant difference between the public and private secondary school students. The null hypothesis is thus rejected. Public secondary school students showed inferior body fat percent values than their private sector counterparts. These tallies with the result of their respective physical characteristic of weight in this very investigation in which public school students exhibited inferior values than private secondary schools. The important contributing factor to the increase in the body fat percent of private school students.

The evaluation of body composition permits qualification of the major structural components of the body muscle, bone and fat. Body fat percentage is base on the proportion of body fat to the lean body mass which has been on the found to affect one's performance. As such the more the fat deposit, the lower the capacity for oxygen consumption (Shuaibu, 2000). He was of the opinion that the sedentary lifestyle of the non active group of students could be a contributing factor to their higher percent body fat. Further more he stated that sedentary lifestyle increases

the risk of excessive body fat accumulation which is a major factor affecting physical fitness.

The results of this study on body fat percent is similar to those of Sadiq (2001) he also cited similar research evidence of Haralds et al, Amusa and Adewumi which suggested a decrease in body fat in the physical activities subjects than their sedentary lifestyle counterparts.

4.3.6 Speed

The result of this research work revealed a significant difference in the performance difference in the performance of the 50 – metre dash, which was used to test the speed ability of the subjects. As such the null hypothesis is rejected. Public secondary school students were found to exhibit better speed ability than the private secondary school students.

Public secondary school students showed that they usually involve themselves more in movement physical activities such as trekking to school, which may involve running or jogging when late, hunting as well as rushing to and from the farms. These activities are not usually obtainable with the majority of private secondary students who might be sitting for hours watching television, playing computer games or attending to one or more home lesson teachers.

Peter (1987) and Shuaibu (2000) found that constant involvement in speed related physical activities greatly increase the speed of individuals. They stated that the differences in speed of contraction of

muscles is apparently due to the differences in biochemical and physiological properties of the contractile materials within the muscles and has be relationship to factors out side the muscle tissue. They further opined that the environment of muscle tissue and its chemical make up of this is faster body movements (speed). all these findings agree with that of this study in relation to increase sped through constant involvement in speed related physical activities.

4.3.7 Muscular Power

The result of this study in the standing board jump (sergeant jump or chalk jump) performance used to test muscular leg power (lower limb power) indicated a significant difference between the performance of public secondary students and those of the private secondary schools. The null hypothesis was therefore rejected. Public secondary school students exhibited superior leg power (lower limb power) ability than subjects in private schools. This suggests that subjects in public secondary schools usually involve themselves in muscular power generating physical activities like throwing, jumping sprinting (running) etc which are obtainable in the afore mentioned activities of hunting fishing, farming and carrying of heavy loads which are lacking in the case of subjects from private secondary schools.

4.3.8 Agility

In the shuttle run test (dodge run test) use to test agility, the result showed a significant difference between public and private secondary school students. The null hypothesis was therefore not accepted. Subjects from public schools are more agile than those themselves in more agility enhancing physical activities than their fellow colleagues from private schools.

Most sports are agility based, thus becoming an advantage. The superior performance o public school students in agility test suggests that cultural activities such as dance and acrobatic display which they take part in, might have played a role in enhancing such performance in agility test. Shuaibu (2000) stated that performance of any physical activity is greatly enhanced in increased agility. This is demonstrated in movements such as dodging, running, stopping, starting and changing body positions quickly. This finding is in agreement with that if the study concerning the agility of public secondary school students. The subjects that are more involved in physical activities would definitely be more agile than the subjects with lower physical activities.

4.3.9 Static Balance

Finally, the result of this investigation on the static balance test reveals that there was a significant difference between public and private secondary school students. The null hypothesis was therefore rejected. In

this case, public secondary school students exhibited better and superior balance ability than their secondary school students do involve themselves in balancing activities and physical activities in general as those already mentioned in the course of the discussion of this investigation, than their colleagues from the sector, who are generally sedentary.

Balance is the maintenance of total body equilibrium through neuromuscular control. Coordination is a factor in balance and for some skills agility also plays part (Bucher, 1979) and Ajala et al, 2003).

The human body rests on a base of support defined as area of contact between the body and supporting surface. Duhu (1978), observed that balance is a result of neuro-muscular control which takes place when people engage in activities such as riding, dancing, carrying loads, playing games and other similar everybody activities.

The findings of this study in relation to static balance, agreed with the observation of Shuaibu (2000) that static balance improves significantly with constant involvement in balancing related physical activities. A good sense of balance can be developed by a variety of balancing exercises.

CHAPTER FIVE

SUMMARY CONCLUSION AND RECOMMENDATION

5.1 Summary

This investigation was to assess the physical fitness status of public and private secondary school students in Zaria, Kaduna state, Nigeria. The essence was to ascertain their physical fitness status and find out whether there exist differences between the public and private secondary school students. The subjects of the investigation were four hundred and eighty (N = 480) students. Two hundred and forty (240) students were drawn from public secondary schools and same from the private sector. The subjects were drawn from JS1 – SS3. The subjects mean age was (14.30 years for public and 14.13 years for private), height mean age was (1.49m for public and 1.47m for private) and weight was (41.17kg for public and 41.85kg for private).

The two areas of physical fitness namely health related and performance related components were assessed. These subjects performed all the physical fitness test items (batteries) such as the 12 – minutes run, sit up, sit and reach, standing broad jump, skin fold measurement, 50 met-re dash, shuttle run, push and the static balance.

These batteries were to evaluate cardio-respiratory endurance, muscular endurance, flexibility, muscular strength, body fat percent, speed, power agility and balance respectively.

From this study and within its limitations the research compares favourable with previous studies involving active and non active (sedentary) groups from Jeremy Morri's study of London Transport Authority Employees in the 1950s where the bus drivers (the sedentary group) were found wanting than the bus conductors (the active group) (Avery, 2001). These results also talk with those of Shuaibu, 2000. Where he fond out that the sedentary of students (non-athlete students) were least performers in fitness test batteries, followed by the physical and health education and the athlete group of students of college of education Kontagora were superior performers.

These results also compare favourably with the eighteen tests of fitness outlined by Bucher (1979) and those by Allen et al (1999).

The data collected from field investigations were analyzed at the data processing unit of the Institute of Agricultural Research (I.A.R) Ahamadu Bello University Zaria. The descriptive and student t-test method was used to analyze the data.

The study revealed that:

1. The selected groups of public and private secondary school students differ in their physical fitness status.

2. The public school subjects were more physically fit than their counterparts from the private schools. They showed superior performance in all the test items.
3. Subjects from the private secondary schools generally had higher weights than those from the public schools. This reflects their poor performance in most test items especially those requiring short or long distant races.
4. Subjects from the private schools were averagely shorter within the age group than their public schools colleagues. This is shown in the superior performance of public school subjects in the jumps and distance races.
5. The subjects from the private schools generally had higher body fat percent (B.F%) than those from the public schools.
6. Public male secondary school students are the fittest group and private female secondary schools students are the least fit group in the selected group of students.

5.2 Conclusion

From the result obtained and in view of the limitation of this study, the following conclusions were made that:

Public secondary school students(active group) showed higher physical status in both health and performance related fitness components

than their counterparts in private secondary schools in Zaria (sedentary group)

5.3 Recommendations

On the basis of the findings and within the limitations of this study the following recommendations were made:

1. The secondary schools authorities in collaboration with the ministry of education should provide adequate facilities and equipment for encourage students to engage themselves in physical fitness activities. This will enable students to develop skills and knowledge required to become intelligent fitness consumers. This is because physical fitness is one of the vital components of physical and health education.
2. The present system of education in secondary schools should make physical and health education a compulsory subject for all students and the subject should be examinable at the end of the sixth form. This will make the subject logical primary target for intervention to increase participation in appreciable physical activity. Also, this will enable students to adapt to a health life style through regular physical activity which will improve their physical fitness and health standards.
3. Secondary school authorities in conjunction with the government through their physical and health education

department should enable students to achieve and maintain high levels of physical fitness by establishing physical fitness standards through designing and administering judiciously followed physical fitness programmes and exercises.

4. Each ministry of education within the federation and local government secondary board should have significant numbers of exercise and sports scientists who are competent in various physiological needs of the students. Also secondary authorities through their physical and health education departments should organize a routine physical fitness test for students.

5. The government knowing the prime importance of physical fitness of her citizens in nation building should bring the issue into legislation where it can be made compulsory after passing into law. In the same manner the Nigerian Government should assist indigenous research to produce Nigerian based physical fitness norms to service as a means of comparison within the Nigerian population.

6. Seminars and workshops (awareness campaigns) on physical fitness should be organized frequently at secondary school level to serve as useful source of information and encouragement to students about physical fitness and living a fruitful life.

7. Propagation of values of continued participation in various and appropriate physical activities throughout life by the mass media and the government programmes should been encouraged. Similarly workshops and seminars on physical fitness should been organized frequently to save as useful sources of information and awareness to students to students concerning physical fitness.

5.4 Further Research

1. There is need for more studies of this nature in different parts of the country. This will not only add to the existing body of knowledge in the existing boy of knowledge in the area of youth fitness and health promotion but which will as well provide the much needed data for future comparison.
2. Another research that would involve University (higher institution) students would also help for a better understanding of the trend of physical fitness status of Nigerian students.
3. Further research is required on different Nigerian population groups to collect more physical fitness information for generalization.

REFERENCES

Ademola A. J. (2005. *The dynamics of Physical Education and Sports.* First Edition. University Press Plc Ibadan.

Aaron, B. Rebert, P Pangrazi and Susan, D. V. (2001) Pedometers. Physical Activity and Accountability *Journal of Physical Education, Recreation and Dance.* JOPPERD. Vol.27 No. 7.

Ajala, J.A Amusa L.O. and Solui, A. (2003) *Macmillan JSS Physical Education.* 4th Edition, Macmillan Nigeria, Ibadan.

Akinseye, S.E. (2005) *Essentials of Physical and Health Education for Junior Secondary School.* Eraz Publisher, Ketu-Lagos.

Allen. W. Y. James A. Marrow JNR, David W.H. and Rod A.D (1999) *Physical Activity for Health and Fitness. An Individualized Lifetime Approach.* Human Kineetics, Hong Kong.

American Alliance for Health Physical Education, Research and Dance (1980) *Health Related Fitness.* 1900 Association Prive Roston Virginia.

American Alliance for Health Physical Education, Research and Dance (AAPHERD) *Institutor's Guide to Physical Fitness Education and Assessment:* 1989 Publication.

A Musa, L.O. and Udoh C.O. (1982) Fitness *Dynamics of Physical* Oshogbo. Adebara Publishers LTD pp 38.43.

Asmussen, E. (1965) *The Neuro Muscular System and Exercise* New York.

Avery, D.F. (2001) Strength Training and Children's Health *Journal of Physical Education, Recreation and Dance.* JOPERD, Vol. 72, No. 9.

Barrow, H. M. and McGee .R. (1972) *A Practical Approach to Measurement in Physical Education.* Philadephia lea and Febiger Pub. Co. pp 45-69.

Blair, S. N. Kampert J.B. Kohl H. W. Barlow C.E. and Marcera C. A. (1996) "Influence of cardio respiratory fitness and other precursors on cardiovascular disease and all curse Mortality in men and women" *Journal of American Medical Association 276 (3): 205-210.*

Bouchard, C. and Manila R. M. (1983) "Genetics of Physical Fitness and motor performance" *Exercise and Sports Review.* Vol. 11 No. 39 pp 42 – 48.

Bucher, C. A. and Constance. R.K. (1998) *Methods and Materials for Secondary Schools Physical Education.* The C.V. Mosby Company, Saint Louis.

Bucke, E. (1976) "Validity of selected laboratory and field tests of Physical Working Capacity" *Research Quarterly.*

Chado M.A. (1992) *Physical Fitness for Productive Health*. Zaria Ahmadu Bello University Press.

Chado M. A. (1991) *Physiological bases of physical fitness and conditioning programmes*. Ahmadu Bello University Printing Press Zaria.

Chado M.A. (1988) the implication of Health Related Fitness America Established Fitness Organizations Nigerian as determined by the United State of America Established Fitness Norm Unpublished Research Paper.

Chado M.A. (1987) the different between pull-ups and push-ups tests as a maeasurement of dynamic strength and Endurance of Limb Muscle groups. *Journal of Nigeria Association of Sports Scienec and Medicine.* Vol. 1 pp. 126-130.

Chado M.A. (1986) *The function of Physical Fitness Performance as a Pre-requisite for Admission in to Physical and Health Education Programme at Ahmadu Bello University Zaria Nigeria*. An Unpublished Ph. D. dissertation Ohio State University U.S.A.

Clarke, E.J. (1976) *Application of Measurement of Health and Physical Education.* Englewood cliffs. Prentice Hall Pub. Co- pp 61-89.

Cooper, T. K. (1968) "means of Vo2 Max" *Journal of American Medical Association.* Vol. 203 pp 135 – 138.

Cureton, T.K. (1978) *Physical Fitness Appraisal and Guidance.* St Louis C.V. Mosby Co. pp 21 – 35.

Danladi and Balhat (2000) *Cardio respiratory Fitness and Risk Factors for Coronary Health Disease in Pre Adolescent School Girls.* A School Association Kano. NNSH 2000.

David , A. and Jean P. (1989) *Principles and Methods of Adapted Physical Education And Recreation.* 6th edition Times Mirror Mosby Collage Publishing Saint Louis Toronto.

Devises, H.A. (1974) *Physiology of Exercise* Dubuque: Mc Brown Publishing Co. pp 102-110.

Duhu, R. (1978) *Test and Evaluation in Physical fitness programme (for youth and Adults)* 1st edition, fourth dimension publishers, Enugu.

Eeker, T. (1971) *Track and Field Dynamics* California: Tafnews press Pp 86-106

Edgerton, E. (1976) *The biology of physical Activity* Boston: Houghton Miffin Publishing Ltd pp 6-12 and 84-120.

Emiola, A.O. and Venkateswarlu .K. (1982) *Test measurement Dynamics for physical Fitness.* Ibadan Adebara Publishers Ltd pp 5-9

Fatile, A.O. and Venkateswarlu .K. (1982) *Test measurement in Physical Education for Collages and University.* Unpublished Monograph Ahmadu Bello University Zaria.

Gauvin, L. and Spence .J.C. (1996) "Physical Activity and Caveats" *Nutrition Review.* 54 (4) pp. 553-655.

Geetchell, .B. (1976) *Physical fitness:* A way of lice: New York: John Wiley and sons Inc.

Getchell, .B. Pipin .R. vernes .J. (1987) *Health:* Boston: Houghton Miffin Co pp. 257-261.

Ginsburg, G.S. and Anderson, W. (1982) *Being fit: A Personal Guide* London: John Wiley and Sons Inc.

Ginshurg, G.S. Agil A.O. Toole .M. Rimm .E. diyghass. P.S. and Rifai N. (1996) Effect of single bout of ultra endurance exercise on Lipids to Peroxidadtion in Trianthletes. *Journals of American Medical Association* Vol. 276 (3) 221-225.

Gwani J.A. (1986) *A relationship between Modified Six Minutes Run and Fitness* Unpublished M. Ed thesis. Ahmadu Bello University Zaria.

Gwani J.A. and Cado M.A. (1995) Determination of the Ahmadu Bello University Security Cardio-Respiratory Fitness Norms. *Kinesiologist: An International Journal of Physical Education and Sports Science and Medicine.* JOPESSM, Vol. vii, 1995.

Hellison, D. R. and Tremplin T. J. (1991) A Reflective Approach to Teaching Physical Education Campaign. J. L. Human Kinetics.

Hettinger, T. and Muller E. (1961) *Total fitness, physiology of strength training* Illinois. The Mosby Co.

Heywood, V. H (1998) *Advanced fitness assessment and exercise prescription* 3rd edition Human kinetic

Hockey, R.V. (1977) *Physical fitness: the pathway of Healthful living* 3rd edition St. Louis the V. C. Mosby.

Ibraheem, T.T. (1999) *Effects of Regular Exercise, Duration Frequency nd intensity8 and some selected Physiological variables.* Unpublished Ph.D. Thesis Ahmadu Bello University Zaria.

Iro, M.D. (1991) *Relationship between Habitual Physical Activity Level: Cardio-respiratory Fitness and Selected Disease Risk Factors Among Nine To Eleven year old male Children.* Unpublished M.s.c. thesis Ahmadu Bello University Zaria.

Jensen, C.R. and Fisher A. G. (1979) *Scientific Bases of Athletic Conditioning.* Philadelphia Lea and Febiger pp 69-76.

John, O.U. (1990) *A comparison of 12 minute rum and Harvard step tests as measures of cardio-respiratory fitness.* An unpublished M. Sc. Thesis. Ahnmadu Bello University Zaria.

Johnson, B.L. and Nelson J. K. (1979) *Practical Measurement for Evaluation in physical Education.*_.3rd edition Toronto Burges Publishing pp 15-67

Karpovich P.V. and Sinning W. (1977). *Physiology of muscular activity.* Philadelphia: W.B. Saunders CO. pp 121-136.

Krahenbuhl, G.S. Skinner J. S. and Koht W. M. (1985) "Developmental Aspects Maximal Aerobic power in children Inc. R.L. Terjuing (Ed) *Exercise Science and Sports.* New York. Mac Million Pub. Co. pp 503-538

Kraus, H. and Raab. R. (1961) "Physical fitness of children" *Research Quarterly.* 32 pp 190-196

Lamb, R.D. (1978) *Physiology of exercise Responses nd adaptations.* Macmillan publishing Co. Inc. New York pp 227-235, 252-253.

Larson, L.A. and Yocom. R. (1978) *Measurement and Evaluation in Physical Health and Recreation:* St. Louis. The C.V. Mosby Co. pp 162-168.

Machol, R.E. Ladaney S.P. Morrison D. P. (1981) "Management science in Sport" *Journal on operational Research* North Holland publications, Netherlands.

Malina R. M. (2002) Physical activity and fitness pathway from childhood to Adulthood" *American journal of human biology.* 13 pp 162-172

Masironi, R. and Dendin H. (1985) *The Physical Activity in disease prevention and Treatment.* London Butterworth's publishing Co pp 61-97.

Mathews, D. K. and Fox E.L. (1981) *The physiological Basis of physical education and Athletics.* New York, Saunders Co publishers pp 1-6 and 112-118

McArdle W. D. Katch F.I. and Katch V. L. (1981) *Energy Nutrition and Human Performance.* Philadelphia Lea and Febiger pp 215-258

More House; L. E. and Miller A.T. (1976) *Physiology of Exercise.* 7th Edition. St. Louis. The C. V. Moshy Co. pp 244-226

Nelson N.P. and Jensen C.R. (1972) *Measurement and Statistics in physical education.*_ California: Wades Worth publishing Co. Inc. pp 141-190

Neiman D.C. (1995) *The exercise health connection. How to reduce your risk of disease and other illness by making exercise your medicine.* Human Kinetics Champaign USA.

Nixon J. E. and Jewett A. E. (1980) *Introduction to Physical Education* Saundra College Publishers, Philadelphia

Nwakwo E. I. and Salawu, O.T. (1995)"Physical fitness status of female Physical and Health Education Students." *Journal of Nigerian Association of Sports Science and Medicine.* JONASSM, Vol. VII

Nwegbu, C.O.E. (1978*) Physical Education Handbook* Onitsha Africana Educational Publishers (Nig) Ltd pp 30-43

Onekata S.S. (1995) "A Comparative Study of the Cardio-vascular fitness of Physical Education Students and non-Physical Education

Students of the Federal College of Education Kano." *Tambari Kano. Journal of Education.* Vol. 2, No 2. pp 82-90

Peter A. J. (1987) *Physical fitness Level of Boys and Girls of 14-16 years old in Niger State Nigeria* An unpublished M.Sc. Thesis Ahmadu Bello University, zaria.

Philappears, H. M. Lefeure J. Thomis M. Vanreusel B. Evynde R. V. Claessens A. L. Lysens R. and Beunen G. (1999) "Associations between daily physical activity and physical fitness in Flemish males: A cross-sectional analysis" *American Journal of Human Biology* pp 587-597

Pollock, M.L. Wilmore, J. H. and Fox S. M. (1978) *Health and Fitness through physical activities.* New York. John Wiley and sons.

Richard S. R. (1978) *Foundations of Physical Education.*_ A Scientific approach. Houghton Miffin Company Boston.

Robinson C.F. Jensen C.r. James W. S. Hirschi. W. M. (1974) *Modern Techniques of Track and Field.*_ Philadelphia Lea Ferbiger, pp 4-23

Sadiq A. (2001) *Comparative effects of continuous and circuit training programmes on health related fitness of female Undergraduate.* An unpublished M. Sc Thesis, Ahmadu Bello University, Zaria.

Sharkey, B. J. (1984) *Physiology of Fitness.* 2nd Edition Illinois. Human kinetic publishers Inc. 52-60, 65-70

Shuaibu M. U. (2000) *Physical status of male athletes, non Athletes and Physical Education Students.* An unpublished M. Sc. Thesis, Ahmadu Bello University, Zaria.

Skinner J. S. Baldini F.D. Gardner A.W. Shepherd R.j. McPherson. B.D. Stevens T. and Suition J. r. (1990) *Exercise Fitness and Health.* Illinois Human kinetics Books Inc. pp 100-136.

Strauss, R. A. (1984) *Sports Medicine.* Philadelphia. W. B. Saunders Co. pp 40-46

Umar M. (2005) *Effects of Regulation Jogging on Cardio respiratory fitness among the students of Jigawa State College of Education Gumel.* An unpublished M.Sc. Thesis, Ahmadu Bello Universit, Zaria.

Uti, I. O. and Ojeme E. O. (2003) *Comprehensive Physical Education for Junior Secondary School.* Africana Feb. Publishers Limited Onitsha, Nigeria.

Watson, A. W.S. (1993) *Physical Fitness Athletic Performance:* A guide to student Athletes and coaches: London Longman Publishers pp 2-10 and 168-286.

Web MD Health (1999) *"Exercise"* Wysiwyg://Zoffste bottom 64/htp.

Wilmore J.H. (1977) *Athletic Training and Physical Fitness:* Boston: Allyn and Bacon Inc.

Winsley, R. and Amstrong N (2005) *"Physical activity, physical fitness, health and young people."* In Greek, K and Hardman K. (Eds) physical Education Essential Issues SAGE Publication Inc. London.

APPENDIX A

Informed Consent Form

In order to participate in this research test I ----------

voluntary agreed to take part in the study.

As part of this study, I understand and agree that during participation, complications may arise, if the person exercising is not tolerating work, it usually becomes necessary that exercise can be stopped by my decision or that the investigator or his representatives. Other risks, in addition to dizziness, nausea, vomiting or even fainting may occur during participation but rarely.

Student Signature----------

Address ----------

Date ----------

Parent's Name----------

Signature: ----------

Address ----------

Date ----------

APPENDIX B

Physical and Health Education Department
Faculty of Education,
Ahmadu Bello University Zaria
July 17th 2006.

The Principal

Sir,

COLLECTION OF DATA FOR RESEARCH THESIS

I hereby apply for both your administrative approval and support to use your college Athletic Track ground and students to collect data towards an M .Sc research thesis “Physical fitness status of public and private secondary school students in Zaria, Kaduna State”.

I am a full time postgraduate student in physical and health education department, Ahmadu Bello University Zaria. I am required to carry out an investigation on the physical fitness status of public and private secondary school students in Zaria, Kaduna state for my M. Sc Exercise and sports science thesis.

I shall be very grateful for necessary assistance in carrying out this investigation.

Yours sincerely

Sign

Nyuyse A. M

APPENDIX C

PHYSICAL FITNESS STATUS RAW DATA FOR PRIVATE SCHOOLS

GOD'S TIME COMPREHENSIVE SECONDARY SCHOOL, SAMARU – ZARI												
Subject	**Class**	**Sex**	**Age (Yrs)**	**Height (m)**	**Weight (Kg)**	**12Min run (Km)**	**Push up**	**Sit up**	**Sit and read (cm)**	**Body fat %**	**50m Dash (Sec)**	**Shuttle run (Sec)**
1	JS1	F	10	1.40	30	1.60	14	08	09.78	09.88	08.90	14.0
2	JS1	F	11	1.40	34	1.60	13	12	11.57	10.41	07.50	12.8
3	JS1	F	11	1.38	31	1.62	10	11	17.21	09.93	08.40	13.2
4	JS1	F	12	1.42	35	1.80	12	13	13.29	11.14	07.70	12.0
5	JS1	F	11	1.50	37	1.67	13	14	10.82	12.10	07.00	13.0
6	JS1	M	12	1.48	39	2.00	17	15	16.38	07.34	06.80	12.0
7	JS1	M	11	1.49	36	1.75	18	16	15.27	09.97	06.50	11.2
8	JS1	M	11	1.38	34	2.00	19	17	14.74	10.13	07.00	11.0
9	JS1	M	12	1.42	37	1.95	16	15	14.40	08.11	07.20	11.6
10	JS1	M	10	1.32	25	2.00	21	14	11.78	10.21	06.00	10.5
11	JS2	F	12	1.43	36	1.85	12	13	13.97	11.41	08.60	12.3
12	JS2	F	13	1.43	39	1.52	12	12	16.29	12.21	07.80	12.1
13	JS2	F	12	1.37	34	2.02	15	14	14.64	12.94	07.20	12.8
14	JS2	F	12	1.38	38	2.04	14	13	15.77	12.57	08.00	13.2
15	JS2	F	12	1.35	36	1.85	16	15	13.56	12.12	07.60	11.0
16	JS2	M	12	1.42	35	2.00	20	21	14.68	10.44	06.80	11.3
17	JS2	M	12	1.40	36	1.92	18	19	16.89	10.82	07.00	11.2
18	JS2	M	12	1.30	37	2.10	19	18	17.35	10.62	06.90	11.0
19	JS2	M	12	1.39	39	1.95	20	20	18.70	12.11	06.60	12.4
20	JS2	M	12	1.41	36	2.20	21	18	17.64	11.14	07.20	10.6
21	JS3	F	13	1.43	38	1.57	18	13	16.45	12.50	07.20	11.0
22	JS3	F	13	1.44	37	1.81	21	13	16.21	11.82	07.50	11.3
23	JS3	F	14	1.41	41	1.84	20	14	15.98	13.69	07.40	12.6
24	JS3	F	13	1.47	35	1.89	19	15	17.00	12.33	08.00	10.8
25	JS3	F	13	1.42	33	2.00	22	14	15.23	12.23	07.00	11.0
26	JS3	M	14	1.48	32	2.45	24	18	18.26	08.90	06.30	09.8
27	JS3	M	14	1.43	38	2.03	23	19	17.64	10.56	06.80	10.4
28	JS3	M	13	1.34	33	1.95	19	18	16.76	10.45	06.40	10.1
29	JS3	M	13	1.37	32	2.05	24	19	17.33	10.45	06.60	10.2
30	JS3	M	13	1.40	30	2.18	20	17	16.84	09.44	06.70	09.7

Subject	Class	Sex	Age (Yrs)	Height (m)	Weight (Kg)	12Min run (Km)	Push up	Sit up	Sit and read (cm)	Body fat %	50m Dash (Sec)	Shuttle run (Sec)
31	SS1	F	14	1.47	38	1.84	18	16	16.42	11.82	07.0	10.2
32	SS1	F	15	1.55	45	1.90	16	14	17.10	13.36	06.8	10.8
33	SS1	F	15	1.52	50	1.92	19	15	14.54	12.60	07.0	11.1
34	SS1	F	15	1.49	49	1.94	17	16	15.19	12.22	07.3	11.4
35	SS1	F	14	1.51	48	1.95	21	14	15.67	12.30	08.0	11.3
36	SS1	M	15	1.48	37	2.19	20	19	19.41	10.12	06.2	10.4
37	SS1	M	15	1.42	41	2.20	25	19	17.55	11.53	07.0	10.0
38	SS1	M	15	1.43	40	2.29	21	20	16.39	11.11	06.60	10.0
39	SS1	M	15	1.44	38	2.32	20	21	17.12	10.55	06.6	09.7
40	SS1	M	14	1.38	38	2.00	19	20	17.46	10.38	06.8	09.9
41	SS2	F	16	1.60	55	2.20	17	14	15.92	13.52	08.4	10.8
42	SS2	F	16	1.63	50	2.22	19	13	16.30	12.92	07.8	10.4
43	SS2	F	15	1.56	47	2.08	15	17	15.25	12.74	08.0	10.0
44	SS2	F	16	1.61	49	2.29	18	16	14.98	12.83	07.6	10.2
45	SS2	F	15	1.57	40	2.08	17	15	16.56	11.90	07.4	10.0
46	SS2	M	16	1.39	33	2.16	23	18	17.45	09.83	05.8	08.6
47	SS2	M	16	1.40	44	2.70	19	19	18.86	10.16	06.8	09.8
48	SS2	M	16	1.50	45	2.69	26	21	17.22	10.24	06.0	10.2
49	SS2	M	15	1.45	38	2.18	22	20	17.16	10.13	06.5	09.5
50	SS2	M	16	1.54	52	2.52	21	23	16.20	11.47	06.4	10.4
51	SS3	F	17	1.621	58	2.08	15	16	15.68	14.38	07.3	11.0
52	SS3	F	17	1.57	60	2.14	14	13	14.29	13.83	07.5	11.4
53	SS3	F	17	1.63	50	2.32	17	14	14.20	12.90	07.2	10.8
54	SS3	F	17	1.55	59	2.10	18	16	15.47	15.34	07.6	11.6
55	SS3	F	18	1.53	60	2.12	16	17	15.74	14.62	06.8	11.2
56	SS3	M	17	1.57	49	2.77	20	24	14.21	11.53	06.7	09.7
57	SS3	M	18	1.61	54	2.90	19	20	16.84	11.41	05.9	10.6
58	SS3	M	18	1.68	56	2.82	23	21	16.67	12.73	05.8	10.8
59	SS3	M	17	1.55	44	2.66	26	20	17.63	10.21	06.4	09.6
60	SS3	M	17	1.58	50	2.65	21	19	17.52	11.80	0.56	10.4

BUKS INTERNATIONAL SECONDARY SCHOOL, ZARIA

Subject	Class	Sex	Age (Yrs)	Height (m)	Weight (Kg)	12Min run (Km)	Push up	Sit up	Sit and read (cm)	Body fat %	50m Dash (Sec)	Shuttle run (Sec)
61	JS1	F	10	1.42	32	1.70	13	09	09.55	10.66	07.6	14.2
62	JS1	F	11	1.41	35	1.60	11	12	11.67	11.19	06.8	13.0
63	JS1	F	11	1.39	32	1.64	10	12	18.84	11.57	08.0	13.4
64	JS1	F	10	1.35	28	1.95	14	14	10.12	10.18	08.6	14.4

65	JS1	F	12	1.45	36	1.75	15	13	13.21	12.14	07.2	12.4
66	JS1	M	11	1.49	39	2.00	16	15	14.29	12.25	06.8	12.5
67	JS1	M	11	1.50	38	1.90	21	16	15.56	10.68	06.5	11.4
68	JS1	M	11	1.43	37	1.62	32	17	14.48	10.40	06.4	11.3
69	JS1	M	12	1.48	39	1.82	19	15	14.62	11.36	06.0	12.1
70	JS1	M	11	1.40	34	1.80	22	16	15.65	10.38	07.0	11.2
71	JS2	F	12	1.45	38	1.60	13	12	13.72	12.35	07.7	13.2
72	JS2	F	13	1.38	39	1.95	14	14	14.35	13.19	08.8	13.4
73	JS2	F	12	1.38	35	2.02	10	13	15.24	11.76	07.4	12.6
74	JS2	F	12	1.37	38	2.10	15	14	13.30	12.40	06.8	13.0
75	JS2	F	13	1.43	37	2.15	16	15	14.41	12.31	07.2	12.0
76	JS2	M	13	1.39	36	1.88	23	17	16.76	10.52	06.5	10.7
77	JS2	M	12	1.40	39	1.94	21	18	16.68	11.29	06.4	11.3
78	JS2	M	12	1.42	37	2.55	24	16	15.39	10.82	07.0	10.4
79	JS2	M	13	1.41	38	1.55	22	19	14.45	11.41	06.8	11.2
80	JS2	M	12	1.43	36	1.85	20	18	17.18	09.61	06.4	10.4
81	JS3	F	14	1.44	40	1.88	15	14	15.19	12.40	07.5	12.3
82	JS3	F	14	1.48	38	1.89	14	13	16.28	11.58	07.2	11.0
83	JS3	F	13	1.47	39	1.95	13	12	15.62	11.98	07.2	11.0
84	JS3	F	14	1.46	42	2.10	15	15	14.88	12.32	07.0	11.2
85	JS3	F	13	1.48	45	2.12	17	16	14.40	13.30	08.0	12.4
86	JS3	M	14	1.45	37	2.77	19	18	16.74	11.34	06.6	10.2
87	JS3	M	14	1.43	38	2.90	18	17	15.55	12.42	07.0	11.4
88	JS3	M	13	1.40	35	2.82	20	18	16.42	10.56	06.8	10.3
89	JS3	M	13	1.39	34	2.66	23	20	17.63	09.74	06.3	10.4
90	JS3	M	14	1.42	36	2.65	22	19	17.75	09.96	06.3	10.2

Subject	**Class**	**Sex**	**Age (Yrs)**	**Height (m)**	**Weight (Kg)**	**12Min run (Km)**	**Push up**	**Sit up**	**Sit and read (cm)**	**Body fat %**	**50m Dash (Sec)**	**Shuttle run (Sec)**
91	SS1	F	15	1.62	40	1.90	17	15	16.18	13.49	07.0	11.0
92	SS1	F	15	1.58	44	1.85	14	14	16.35	14.75	07.0	11.5
93	SS1	F	14	1.51	52	1.92	13	13	15.46	14.86	07.4	12.2
94	SS1	F	14	1.60	54	2.00	15	14	14.24	15.36	06.8	12.4
95	SS1	F	14	1.49	48	1.95	12	13	14.40	12.30	07.6	10.6
96	SS1	M	15	1.45	42	2.24	19	20	17.38	12.18	06.6	09.3
97	SS1	M	14	1.59	41	2.28	19	19	16.81	12.24	06.3	11.4
98	SS1	M	15	1.47	39	2.25	21	18	17.32	11.46	06.8	10.2
99	SS1	M	15	1.62	40	2.20	20	19	16.65	10.31	06.2	11.6
100	SS1	M	14	1.48	41	2.15	25	19	15.86	11.29	06.4	10.4
101	SS2	F	16	1.58	56	2.15	16	16	14.36	16.25	07.4	11.4
102	SS2	F	16	1.63	49	2.00	14	14	16.14	14.34	07.0	10.6
103	SS2	F	15	1.64	48	2.80	15	15	16.72	13.82	06.8	10.8
104	SS2	F	15	1.40	50	2.55	14	14	15.64	14.47	07.8	10.6
105	SS2	F	15	1.55	53	2.70	12	16	14.84	15.38	08.4	11.2
106	SS2	M	16	1.64	55	2.30	18	19	16.45	13.25	06.7	10.8

107	SS2	M	16	1.59	47	2.52	19	17	17.24	12.19	05.8	09.6
108	SS2	M	15	1.45	45	2.20	17	18	18.10	12.10	06.4	09.6
109	SS2	M	15	1.50	50	2.35	21	20	17.38	11.44	06.2	10.7
110	SS2	M	16	1.48	51	2.40	23	19	17.68	11.28	06.0	10.4
111	SS3	F	17	1.58	60	1.95	12	13	14.85	15.31	07.6	11.5
112	SS3	F	17	1.56	60	2.10	13	14	14.72	16.40	07.0	11.0
113	SS3	F	17	1.63	57	2.14	17	15	16.43	15.45	06.8	10.3
114	SS3	F	18	1.56	59	2.00	16	14	15.48	16.58	06.8	10.4
115	SS3	F	18	1.57	50	2.20	18	16	16.32	16.46	06.6	10.6
116	SS3	M	17	1.60	55	2.75	19	20	17.10	12.88	06.2	10.4
117	SS3	M	18	1.68	60	2.80	22	19	15.49	13.65	06.4	11.0
118	SS3	M	17	1.55	56	2.65	21	18	16.430	12.96	06.3	10.0
119	SS3	M	17	1.62	58	2.75	20	19	15.68	12.46	06.6	10.2
120	SS3	M	18	1.60	50	2.25	21	21	17.10	11.62	05.8	09.7

TOTAL CHILD BIBLE SECONDARY SCHOOL, SAMARU - ZARIA

Subject	Class	Sex	Age (Yrs)	Height (m)	Weight (Kg)	12Min run (Km)	Push up	Sit up	Sit and read (cm)	Body fat %	50m Dash (Sec)	Shuttle run (Sec)
121	JS1	F	12	1.40	35	1.89	18	11	15.46	12.82	07.7	13.6
122	JS1	F	12	1.44	36	1.84	16	13	14.29	13.36	07.0	12.4
123	JS1	F	11	1.37	39	1.60	17	11	14.66	11.56	07.2	13.1
124	JS1	F	12	1.41	38	1.86	15	12	13.34	13.47	07.4	13.0
125	JS1	F	11	1.42	37	1.82	18	13	11.52	13.79	07.2	12.4
126	JS1	M	12	1.38	35	2.03	22	19	14.66	11.62	06.8	11.0
127	JS1	M	12	1.39	36	2.06	21	18	16.23	11.40	07.0	11.2
128	JS1	M	12	1.39	34	2.24	24	19	15.77	11.84	06.0	11.0
129	JS1	M	12	1.37	37	2.05	20	18	15.89	10.77	06.4	11.4
130	JS1	M	11	1.40	38	2.16	21	20	15.54	11.41	06.2	11.8
131	JS2	F	12	1.44	37	1.85	15	12	14.62	13.05	07.2	11.8
132	JS2	F	13	1.45	35	1.98	16	13	14.23	12.10	07.0	11.9
133	JS2	F	13	1.46	34	2.00	14	13	15.10	12.22	07.2	11.6
134	JS2	F	13	1.48	33	1.97	16	14	14.89	11.20	07.0	11.7
135	JS2	F	12	1.46	34	2.00	17	12	14.66	11.68	07.2	11.5
136	JS2	M	13	1.39	34	2.50	19	20	16.12	11.51	06.3	10.2
137	JS2	M	12	1.36	33	2.40	23	19	16.70	10.46	06.8	10.5
138	JS2	M	12	1.37	37	2.37	21	18	15.78	10.15	06.4	10.6
139	JS2	M	13	1.43	35	2.50	26	21	16.45	11.21	06.2	10.4
140	JS2	M	12	1.35	34	2.48	22	19	16.93	10.85	06.2	10.8
141	JS3	F	14	1.48	38	2.00	16	14	14.09	13.19	07.2	11.2
142	JS3	F	14	1.48	37	1.98	14	13	14.32	13.21	07.3	11.5
143	JS3	F	13	1.49	36	12.03	17	15	15.23	12.88	07.6	10.6
144	JS3	F	14	1.50	36	2.08	15	13	15.10	12.52	07.4	10.4
145	JS3	F	13	1.52	37	2.10	18	15	14.42	12.48	07.0	11.3
146	JS3	M	14	1.46	34	2.56	19	18	16.22	11.61	06.2	10.7
147	JS3	M	14	1.36	33	2.48	20	17	16.86	10.17	06.4	09.2

148	JS3	M	13	1.40	34	2.50	19	18	16.14	11.16	06.4	10.6
149	JS3	M	13	1.40	35	2.45	21	19	15.62	10.42	06.6	10.3
150	JS3	M	14	1.47	30	2.58	23	21	17.00	09.84	06.2	09.4

Subject	**Class**	**Sex**	**Age (Yrs)**	**Height (m)**	**Weight (Kg)**	**12Min run (Km)**	**Push up**	**Sit up**	**Sit and read (cm)**	**Body fat %**	**50m Dash (Sec)**	**Shuttle run (Sec)**
151	SS1	F	15	1.57	40	2.20	16	15	14.22	14.41	07.0	11.6
152	SS1	F	14	1.47	38	2.40	14	16	14.40	13.66	07.2	11.5
153	SS1	F	15	1.56	40	2.34	17	14	14.15	14.53	07.0	11.4
154	SS1	F	14	1.50	38	2.10	12	17	14.36	12.76	07.0	10.2
155	SS1	F	14	1.52	37	2.25	15	18	15.36	12.76	07.0	10.2
156	SS1	M	15	1.53	36	2.40	20	20	16.47	11.68	06.3	09.6
157	SS1	M	15	1.48	37	2.58	19	19	17.20	12.16	06.0	10.4
158	SS1	M	15	1.50	36	2.64	18	21	17.08	10.35	06.0	09.8
159	SS1	M	15	1.45	37	2.48	21	20	15.35	11.19	06.2	10.0
160	SS1	M	14	1.47	35	2.58	20	22	16.82	10.28	06.4	09.7
161	SS2	F	16	1.57	50	2.26	14	14	13.13	15.20	07.2	10.2
162	SS2	F	16	1.53	56	2.20	13	13	14.53	16.44	07.4	11.4
163	SS2	F	16	1.54	58	2.18	15	17	12.86	16.24	07.8	11.6
164	SS2	F	15	1.52	50	2.15	12	15	13.48	14.63	07.0	10.8
165	SS2	F	15	1.48	45	2.22	16	12	16.22	13.24	07.2	10.4
166	SS2	M	16	1.45	53	2.60	23	17	16.10	14.45	06.6	10.5
167	SS2	M	16	1.48	50	2.70	19	19	16.30	12.66	06.4	10.7
168	SS2	M	15	1.53	48	2.68	22	18	17.50	11.49	06.5	09.6
169	SS2	M	16	1.49	49	2.70	18	21	16.98	11.34	06.2	10.4
170	SS2	M	16	1.48	48	2.69	21	19	17.43	11.72	06.2	09.6
171	SS3	F	18	1.66	56	2.10	13	16	14.44	16.41	07.0	11.7
172	SS3	F	18	1.69	60	2.11	15	13	14.18	16.72	07.0	11.8
173	SS3	F	17	1.59	60	2.24	14	14	14.33	16.46	06.8	11.7
174	SS3	F	17	1.60	56	2.26	17	15	14.58	15.28	06.8	10.3
175	SS3	F	17	1.65	50	2.37	12	14	15.78	16.35	06.6	10.2
176	SS3	M	18	1.60	24	2.94	22	18	16.54	14.45	06.4	10.0
177	SS3	M	18	1.56	55	2.88	24	17	16.62	14.31	06.2	10.2
178	SS3	M	17	1.50	50	2.82	23	19	17.13	13.56	06.2	09.4
179	SS3	M	18	1.58	55	2.90	26	20	16.14	14.72	06.0	10.6
180	SS3	M	17	1.49	49	2.80	24	18	17.78	11.46	10.4	10.4

PRIME VISION ACADEMY, MUCHIA VILLAGE

Subject	**Class**	**Sex**	**Age (Yrs)**	**Height (m)**	**Weight (Kg)**	**12Min run (Km)**	**Push up**	**Sit up**	**Sit and read (cm)**	**Body fat %**	**50m Dash (Sec)**	**Shuttle run (Sec)**
181	JS1	F	10	1.41	33	1.72	08	12	09.77	09.84	07.6	14.2
182	JS1	F	11	1.40	34	1.62	11	13	11.46	11.53	07.4	13.0

183	JS1	F	11	1.38	34	1.64	13	11	11.57	11.47	07.4	12.4
184	JS1	F	11	1.45	36	1.76	12	14	11.29	10.86	07.8	12.8
185	JS1	F	11	1.36	32	1.82	16	13	14.66	11.14	07.2	13.0
186	JS1	M	11	1.44	37	1.90	17	17	13.68	11.30	07.0	12.8
187	JS1	M	11	1.38	35	2.00	19	17	15.53	10.38	07.2	11.7
188	JS1	M	12	1.35	36	1.95	20	18	16.34	11.42	06.4	12.4
189	JS1	M	11	1.33	34	2.05	19	19	14.52	10.26	06.6	11.6
190	JS1	M	11	1.37	33	2.32	21	19	15.10	10.28	06.0	10.2
191	JS2	F	12	1.37	40	1.52	16	13	14.98	13.74	08.2	13.1
192	JS2	F	13	1.40	40	1.57	31	12	14.78	13.68	08.0	13.0
193	JS2	F	12	1.43	38	1.82	15	11	13.66	12.98	07.4	12.2
194	JS2	F	13	1.38	35	1.92	14	14	14.53	11.49	07.2	12.0
195	JS2	F	13	1.50	38	1.89	17	16	14.36	12.14	07.0	11.6
196	JS2	M	13	1.38	34	2.40	16	19	15.77	10.34	06.2	12.3
197	JS2	M	12	1.36	34	2.35	19	18	16.44	10.48	06.4	10.4
198	JS2	M	13	1.37	33	2.39	18	19	15.55	09.82	06.4	10.2
199	JS2	M	14	1.35	36	2.00	21	22	16.62	10.27	06.8	11.4
200	JS2	M	13	1.34	35	2.24	20	21	16.39	10.38	06.3	11.8
201	JS3	F	14	1.45	42	1.90	12	15	15.42	13.47	07.0	12.0
202	JS3	F	13	1.40	36	1.84	16	13	16.24	11.76	08.2	11.6
203	JS3	F	13	1.43	38	1.89	14	14	15.63	12.41	08.0	11.2
204	JS3	F	14	1.49	43	1.92	19	15	14.89	13.58	07.8	12.4
205	JS3	F	13	1.42	35	1.90	17	16	15.22	11.29	07.8	11.9
206	JS3	M	14	1.39	38	2.14	21	18	16.48	11.25	06.8	10.2
207	JS3	M	13	1.40	33	2.48	20	20	16.69	10.36	06.3	10.4
208	JS3	M	14	1.40	35	2.46	19	21	16.39	11.27	06.4	11.9
209	JS3	M	13	1.42	34	2.50	18	20	17.35	10.84	06.2	10.8
210	JS3	M	14	1.43	35	2.58	23	22	16.77	10.48	06.2	10.7

Subject	**Class**	**Sex**	**Age (Yrs)**	**Height (m)**	**Weight (Kg)**	**12Min run (Km)**	**Push up**	**Sit up**	**Sit and read (cm)**	**Body fat %**	**50m Dash (Sec)**	**Shuttle run (Sec)**
211	SS1	F	14	1.48	40	1.98	16	14	15.68	12.45	07.0	11.5
213	SS1	F	15	1.55	47	1.94	15	14	14.58	13.29	07.1	12.2
213	SS1	F	15	1.55	48	1.92	17	15	14.43	13.20	06.8	12.2
214	SS1	F	15	1.56	40	2.14	16	13	15.18	12.25	07.2	11.6
215	SS1	F	14	1.45	36	2.00	18	16	16.22	11.41	06.5	10.7
216	SS1	M	14	1.47	35	2.58	17	17	17.35	10.28	06.8	10.8
217	SS1	M	15	1.44	35	2.46	19	12	18.44	10.40	06.6	11.2
218	SS1	M	15	1.47	37	2.50	20	18	17.36	10.45	06.7	11.1
219	SS1	M	15	1.43	40	2.48	21	19	16.54	11.96	06.5	11.4
220	SS1	M	14	1.38	34	2.45	24	20	19.22	09.88	06.9	10.6
221	SS2	F	15	1.47	40	1.90	15	15	14.98	11.53	06.8	10.2
222	SS2	F	16	1.60	55	2.21	14	16	14.52	12.18	07.3	11.3
223	SS2	F	16	1.55	56	2.26	17	14	14.19	13.32	07.1	11.1

224	SS2	F	15	1.52	44	1.95	18	13	16.45	11.92	07.2	10.4
225	SS2	F	15	1.54	45	2.00	20	16	15.38	12.25	97.6	11.6
226	SS2	M	15	1.48	37	2.54	24	17	17.63	11.50	06.3	11.6
227	SS2	M	15	1.50	38	2.60	19	18	17.68	11.38	06.7	10.4
228	SS2	M	16	1.46	51	2.62	20	17	16.75	12.42	06.4	11.4
229	SS2	M	15	1.45	39	2.48	22	18	17.49	10.48	06.2	10.8
230	SS2	M	16	1.47	45	2.70	21	19	16.52	11.12	06.0	11.2
231	SS3	F	17	1.59	58	2.24	14	14	15.36	13.68	07.0	10.2
232	SS3	F	17	1.59	56	2.27	16	16	15.34	13.32	06.8	11.4
233	SS3	F	18	1.59	63	1.98	13	13	14.82	14.27	07.8	11.7
234	SS3	F	17	1.53	60	2.08	14	15	14.74	12.48	06.9	10.5
235	SS3	F	18	1.66	58	2.10	15	16	15.14	12.19	06.7	10.6
236	SS3	M	17	1.49	50	2.80	19	19	16.25	11.20	05.9	10.0
237	SS3	M	17	1.52	48	2.85	19	17	17.47	10.29	05.7	10.1
238	SS3	M	18	1.54	58	2.78	26	18	16.42	13.18	06.3	11.2
239	SS3	M	17	1.56	45	2.86	27	19	17.24	09.62	06.2	09.8
240	SS3	M	18	1.58	55	2.90	21	20	16.32	11.76	05.8	11.4

APPENDIX D
PHYSICAL FITNESS RAW DATA FOR PUBLIC SCHOOLS

ARMY DAY SECONDARY SCHOOL, BASAWA												
Subject	**Class**	**Sex**	**Age (Yrs)**	**Height (m)**	**Weight (Kg)**	**12Min run (Km)**	**Push up**	**Sit up**	**Sit and read (cm)**	**Body fat %**	**50m Dash (Sec)**	**Shuttle run (Sec)**
241	JS1	F	11	1.41	36	1.90	19	13	16.51	10.25	07.4	11.8
242	JS1	F	11	1.45	37	1.86	16	14	15.49	09.38	07.2	11.6
243	JS1	F	11	1.39	39	1.62	17	15	14.62	09.10	07.0	12.4
244	JS1	F	12	1.42	40	1.90	18	17	16.40	10.22	06.8	12.3
245	JS1	F	12	1.40	39	1.86	17	16	17.13	11.37	07.0	12.8
246	JS1	M	12	1.41	37	2.06	21	19	18.98	10.14	06.8	10.6
247	JS1	M	11	1.39	33	2.08	23	20	17.57	08.17	06.3	11.3
248	JS1	M	12	1.38	35	2.26	25	21	17.28	09.48	06.2	10.4
249	JS1	M	11	1.37	36	2.08	20	20	17.12	09.15	06.4	11.6
250	JS1	M	12	1.42	38	2.18	22	21	19.43	10.20	06.3	10.5
251	JS2	F	13	1.44	36	1.92	18	14	15.47	11.75	7.3	10.6
252	JS2	F	12	1.46	35	1.98	17	16	15.38	10.94	07.0	10.4
253	JS2	F	13	1.47	34	2.02	18	15	15.52	10.52	06.6	10.1
254	JS2	F	13	1.46	33	2.00	19	16	17.88	10.23	06.4	10.2
255	JS2	F	12	1.45	34	2.10	20	15	17.55	09.92	06.4	10.3
256	JS2	M	13	1.40	33	2.55	23	20	17.12	08.54	06.2	10.2
257	JS2	M	13	1.41	34	2.50	26	19	18.36	08.13	06.3	10.0
258	JS2	M	13	1.39	35	2.40	24	22	18.28	09.86	06.6	10.6
259	JS2	M	13	1.42	38	2.56	21	20	16.90	10.44	06.0	10.8
260	JS2	M	12	1.37	35	2.50	22	21	18.34	10.54	06.4	10.4
261	JS3	F	14	1.49	38	2.10	14	15	15.55	10.48	06.8	10.1
262	JS3	F	14	1.48	39	2.00	19	16	15.29	11.66	07.0	11.5

263	JS3	F	13	1.49	37	2.08	18	15	15.14	10.46	06.8	10.2
264	JS3	F	13	1.50	36	2.10	17	17	16.37	10.82	06.8	10.3
265	JS3	F	14	1.53	36	2.58	19	16	16.76	10.58	06.6	10.1
266	JS3	M	13	1.47	34	2.50	24	21	17.44	09.26	06.4	10.0
267	JS3	M	14	1.40	33	2.50	22	22	17.70	09.54	06.4	09.5
268	JS3	M	14	1.40	35	2.45	19	21	15.69	10.19	06.6	09.3
269	JS3	M	14	1.47	36	2.60	21	23	15.78	10.20	06.2	09.8
270	JS3	M	13	1.47	32	2.58	23	22	18.10	09.72	06.2	09.4

Subject	**Class**	**Sex**	**Age (Yrs)**	**Height (m)**	**Weight (Kg)**	**12Min run (Km)**	**Push up**	**Sit up**	**Sit and read (cm)**	**Body fat %**	**50m Dash (Sec)**	**Shuttle run (Sec)**
271	JS1	F	11	1.41	36	1.56	15	15	14.90	10.75	07.5	11.6
272	JS1	F	11	1.40	35	1.58	17	15	15.56	10.82	07.0	11.8
273	JS1	F	12	1.43	38	1.54	16	16	17.10	11.21	07.0	12.0
274	JS1	F	12	1.42	36	1.50	15	16	17.23	10.31	07.0	12.0
275	JS1	F	11	1.40	37	1.52	22	14	14.85	11.76	07.2	12.2
276	JS1	M	12	1.44	37	1.95	25	16	15.98	10.13	07.2	11.8
277	JS1	M	11	1.42	35	1.98	24	19	16.47	10.24	07.0	10.6
278	JS1	M	12	1.43	35	2.06	24	21	18.72	09.25	07.0	10.8
279	JS1	M	11	1.38	34	2.00	21	19	17.29	09.20	07.2	10.4
280	JS1	M	12	1.40	37	2.08	20	21	17.30	10.27	07.0	10.6
281	JS2	F	12	1.43	35	1.60	17	14	16.44	10.23	06.8	10.0
282	JS2	F	13	1.44	38	1.58	16	16	15.48	11.72	07.0	10.6
283	JS2	F	13	1.45	38	1.62	15	15	15.47	11.20	07.0	10.8
284	JS2	F	12	1.39	38	2.10	18	16	15.40	11.33	06.8	10.4
285	JS2	F	13	1.46	36	1.89	16	17	16.42	10.67	07.2	10.2
286	JS2	M	13	1.40	34	2.20	19	22	17.55	09.90	06.6	10.0
287	JS2	M	13	1.41	36	2.34	22	21	16.68	09.86	06.4	10.2
288	JS2	M	13	1.40	38	2.66	23	21	17.34	08.88	06.2	10.4
289	JS2	M	12	1.39	35	2.14	21	23	17.25	10.15	06.8	10.3
290	JS2	M	13	1.43	38	2.42	24	20	16.70	10.24	06.3	10.2
291	JS3	F	14	1.45	39	2.12	15	15	15.18	11.79	06.8	10.8
292	JS3	F	14	1.50	37	1.98	17	14	15.20	11.44	07.0	10.4
293	JS3	F	13	1.52	40	1.88	17	15	14.45	11.14	07.2	11.4
294	JS3	F	14	1.50	38	1.94	18	15	15.55	10.59	07.0	10.6
295	JS3	F	13	1.49	35	2.10	18	15	16.36	11.68	06.6	10.2
296	JS3	M	14	1.47	36	2.36	19	21	17.38	10.65	06.6	09.8
297	JS3	M	13	1.45	37	2.44	21	20	15.45	10.40	06.4	10.2
298	JS3	M	14	1.48	35	2.30	20	22	17.33	10.86	06.4	10.4
299	JS3	M	14	1.50	36	2.15	22	23	18.24	09.44	06.6	10.6
300	JS3	M	14	1.49	35	2.50	21	22	17.84	10.86	06.0	09.4

GOVERNMENT SECONDARY SCHOOL, KWANGILA - ZARIA												
Subject	**Class**	**Sex**	**Age**	**Height**	**Weight**	**12Min**	**Push**	**Sit**	**Sit**	**Body**	**50m**	**Shuttle**

			(Yrs)	(m)	(Kg)	run (Km)	up	up	and read (cm)	fat %	Dash (Sec)	run (Sec)
301	SS1	F	15	1.45	45	1.88	16	14	16.62	11.22	07.0	12.0
302	SS1	F	15	1.50	46	1.90	17	15	15.54	11.61	06.8	12.2
303	SS1	F	14	1.48	44	2.02	18	14	16.40	10.22	06.8	11.4
304	SS1	F	15	1.49	48	2.06	16	16	15.21	12.48	07.0	12.2
305	SS1	F	15	1.50	49	2.08	18	15	14.88	12.24	06.8	12.4
306	SS1	M	15	1.52	38	2.60	20	19	17.53	10.26	06.8	09.6
307	SS1	M	14	1.51	36	2.24	21	20	19.21	09.85	06.6	09.8
308	SS1	M	15	1.54	39	2.56	22	19	16.66	11.56	06.3	10.4
309	SS1	M	15	1.44	37	2.58	21	21	18.42	10.27	06.2	09.5
310	SS1	M	15	1.47	38	2.66	25	20	16.86	10.28	06.4	09.7
311	SS2	F	16	1.52	46	2.04	18	15	16.37	11.10	07.2	09.8
312	SS2	F	16	1.54	47	1.98	16	15	15.28	11.31	07.2	09.6
313	SS2	F	15	1.60	48	2.10	17	14	14.78	11.28	06.8	10.4
314	SS2	F	16	1.56	46	2.36	16	16	16.31	11.46	06.6	09.6
315	SS2	F	15	1.54	45	2.20	16	14	16.35	10.21	07.0	09.2
316	SS2	M	16	1.49	44	2.70	19	21	19.50	10.44	06.0	08.7
317	SS2	M	16	1.50	47	2.74	24	23	17.75	10.15	05.8	09.5
318	SS2	M	15	1.55	48	2.50	23	22	18.60	11.36	06.0	09.4
319	SS2	M	16	1.48	46	2.48	21	20	17.74	10.78	06.0	09.2
320	SS2	M	18	1.54	43	2.82	22	19	20.64	10.20	05.8	08.9
321	SS3	F	18	1.58	58	2.10	14	14	16.25	12.38	07.2	10.2
322	SS3	F	18	1.56	62	2.12	17	13	14.64	13.22	07.0	10.8
323	SS3	F	17	1.65	59	2.00	16	17	15.18	12.62	07.0	10.6
324	SS3	F	17	1.60	56	2.30	18	18	16.45	12.84	06.8	10.4
325	SS3	F	18	1.61	60	2.14	17	17	15.16	11.48	05.8	10.8
326	SS3	M	18	1.65	53	3.00	26	27	20.40	10.55	05.8	09.7
327	SS3	M	17	1.66	45	2.75	24	22	19.14	11.26	05.8	10.0
328	SS3	M	18	1.59	52	2.96	26	21	17.86	10.54	05.8	10.1
329	SS3	M	18	1.62	53	2.80	25	22	17.81	11.31	06.0	10.1
330	SS3	M	18	1.49	54	2.76	24	20	18.14	10.55	05.8	10.2

Subject	Class	Sex	Age (Yrs)	Height (m)	Weight (Kg)	12Min run (Km)	Push up	Sit up	Sit and read (cm)	Body fat %	50m Dash (Sec)	Shuttle run (Sec)
331	SS1	F	15	1.56	39	2.16	17	16	15.46	12.55	06.8	11.0
332	SS1	F	15	1.48	37	2.32	18	17	17.28	11.96	06.6	10.4
333	SS1	F	14	1.55	39	2.34	17	16	15.37	12.50	06.4	11.2
334	SS1	F	15	1.50	39	2.16	15	17	15.41	11.67	06.9	11.1
335	SS1	F	15	1.53	38	2.30	19	15	15.60	11.76	06.4	10.3
336	SS1	M	15	1.54	35	2.54	25	22	17.94	10.96	06.9	09.1
337	SS1	M	15	1.49	36	2.56	26	22	16.86	10.96	06.4	09.3
338	SS1	M	15	1.49	37	2.62	24	23	16.29	10.85	06.3	10.4
339	SS1	M	14	1.48	36	2.58	23	21	17.34	10.44	06.2	09.2

340	SS1	M	15	1.52	34	2.66	24	24	18.50	09.77	05.8	09.4
341	SS2	F	16	1.56	48	2.22	16	17	16.55	10.44	06.0	09.4
342	SS2	F	16	1.55	54	2.18	19	15	15.53	10.70	05.8	10.0
343	SS2	F	15	1.55	56	2.20	17	16	14.18	11.46	07.0	10.4
344	SS2	F	16	1.54	49	2.26	18	17	16.43	10.51	06.7	09.2
345	SS2	F	15	1.49	43	2.43	20	16	17.13	11.67	06.4	10.0
346	SS2	M	16	1.46	48	2.68	26	20	17.34	10.83	06.4	09.6
347	SS2	M	15	1.49	48	2.16	22	21	17.68	10.14	06.3	09.8
348	SS2	M	16	1.53	49	2.69	25	24	16.62	11.86	06.0	09.7
349	SS2	M	16	1.49	47	2.35	21	25	19.21	09.51	06.4	09.6
350	SS2	M	15	1.47	47	2.00	19	23	18.10	09.96	05.8	09.5
351	SS3	F	18	1.67	55	2.08	15	14	16.78	13.32	06.4	10.2
352	SS3	F	18	1.69	58	2.10	17	16	15.87	12.20	06.8	10.4
353	SS3	F	17	1.60	59	2.16	16	17	15.30	13.75	07.0	10.8
354	SS3	F	17	1.60	55	2.26	14	16	16.28	12.68	07.2	10.0
355	SS3	F	18	1.65	48	2.30	18	15	17.34	12.74	06.8	10.0
356	SS3	M	17	1.62	53	2.70	23	20	16.38	11.11	06.8	11.0
357	SS3	M	18	1.58	49	2.90	22	20	17.14	10.12	06.6	09.6
358	SS3	M	18	1.52	50	2.78	25	22	17.56	10.21	05.8	09.8
359	SS3	M	18	1.57	52	2.96	23	21	17.18	10.34	05.8	09.8
360	SS3	M	17	1.50	48	2.83	27	24	18.17	09.82	06.0	09.4

GOVERNMENT SECONDARY SCHOOL, MUCHIA - ZARIA

Subject	Class	Sex	Age (Yrs)	Height (m)	Weight (Kg)	12Min run (Km)	Push up	Sit up	Sit and read (cm)	Body fat %	50m Dash (Sec)	Shuttle run (Sec)
361	JS1	F	12	1.42	36	1.57	17	12	15.17	12.21	09.0	12.4
362	JS1	F	12	1.41	38	1.58	16	13	15.16	12.10	07.6	11.2
363	JS1	F	11	1.39	39	1.58	18	15	16.18	11.62	07.2	12.5
364	JS1	F	11	1.40	40	1.82	15	14	14.61	10.34	07.0	10.0
365	JS1	F	11	1.39	38	1.82	18	13	15.52	11.58	07.0	10.4
366	JS1	M	12	1.43	38	1.92	23	19	17.19	10.98	07.2	10.4
367	JS1	M	11	1.40	34	1.96	20	20	16.25	10.69	06.8	10.0
368	JS1	M	12	1.39	35	1.98	21	18	17.34	10.56	07.0	10.0
369	JS1	M	12	1.42	37	2.08	22	19	17.44	10.44	06.8	10.1
370	JS1	M	11	1.38	38	2.20	24	21	15.68	11.63	06.8	10.2
371	JS2	F	13	1.45	37	1.90	16	14	14.46	11.32	07.6	11.0
372	JS2	F	12	1.44	36	1.59	19	16	15.28	11.51	07.8	10.2
373	JS2	F	13	1.46	35	1.92	18	14	15.39	11.64	07.4	10.4
374	JS2	F	13	1.47	34	1.95	17	15	15.45	10.48	07.0	10.2
375	JS2	F	13	1.48	34	1.90	19	20	15.56	11.34	07.2	09.8
376	JS2	M	13	1.42	35	2.00	21	20	17.68	09.88	07.0	10.0
377	JS2	M	13	1.40	35	2.45	21	21	17.52	10.53	06.8	10.0
378	JS2	M	12	1.42	38	2.42	26	20	16.72	09.75	06.8	10.3
379	JS2	M	13	1.40	35	2.08	24	23	17.19	11.25	07.0	09.6
380	JS2	M	13	1.39	34	2.06	25	24	18.21	10.38	07.0	10.2

381	JS3	F	13	1.48	37	1.86	19	13	16.48	12.51	07.0	10.8
382	JS3	F	13	1.47	38	1.94	17	15	15.54	12.63	06.6	11.0
383	JS3	F	14	1.43	37	1.98	18	13	16.37	10.44	06.4	10.6
384	JS3	F	14	1.50	38	2.00	17	14	15.66	11.20	06.4	10.8
385	JS3	F	14	1.49	36	2.08	19	15	16.30	11.32	06.8	10.6
386	JS3	M	13	1.48	35	2.10	22	20	16.44	10.96	06.4	10.2
387	JS3	M	14	1.45	34	2.37	21	19	17.18	09.87	06.3	10.0
388	JS3	M	13	1.42	36	2.32	25	21	16.54	10.67	06.3	09.7
389	JS3	M	14	1.51	35	2.43	24	18	18.63	09.84	06.2	10.0
390	JS3	M	14	1.49	33	2.46	26	22	20.19	09.92	06.2	09.8

Subject	**Class**	**Sex**	**Age (Yrs)**	**Height (m)**	**Weight (Kg)**	**12Min run (Km)**	**Push up**	**Sit up**	**Sit and read (cm)**	**Body fat %**	**50m Dash (Sec)**	**Shuttle run (Sec)**
391	SS1	F	14	1.50	38	1.94	16	14	15.38	15.32	07.0	10.0
392	SS1	F	15	1.48	37	1.98	18	15	16.40	11.82	07.2	10.2
393	SS1	F	15	1.52	39	1.96	16	14	15.50	10.52	06.8	11.0
394	SS1	F	15	1.49	38	2.24	15	16	15.49	11.80	06.6	10.4
395	SS1	F	14	1.47	40	2.08	17	15	15.19	12.21	06.8	11.8
396	SS1	M	14	1.40	34	2.56	24	20	17.52	09.40	06.3	09.7
397	SS1	M	15	1.49	36	2.52	20	22	16.88	09.92	06.4	10.2
398	SS1	M	15	1.48	35	2.54	22	19	17.30	10.68	06.4	09.6
399	SS1	M	15	1.53	37	2.50	25	23	18.42	10.47	06.3	10.4
400	SS1	M	15	1.47	36	2.48	23	22	17.75	10.35	06.6	09.8
401	SS2	F	15	1.55	55	2.00	17	15	14.45	10.54	07.2	11.5
402	SS2	F	16	1.62	48	2.42	19	16	15.25	11.64	06.8	10.3
403	SS2	F	16	1.62	50	2.40	18	15	15.22	12.36	07.0	11.4
404	SS2	F	15	1.57	42	2.16	17	14	16.68	11.68	06.6	09.8
405	SS2	F	16	1.63	48	2.48	16	15	15.36	10.45	06.4	10.2
406	SS2	M	16	1.54	43	2.78	19	20	1922	08.69	06.8	09.4
407	SS2	M	16	1.53	45	2.80	26	22	17.48	10.34	06.0	10.1
408	SS2	M	15	1.49	40	2.54	23	21	17.63	09.34	06.3	09.8
409	SS2	M	16	1.55	48	2.74	21	22	17.53	09.48	06.4	10.0
410	SS2	M	15	1.50	42	2.62	26	23	20.18	10.28	06.4	09.4
411	SS3	F	17	1.60	57	2.24	15	14	15.35	08.88	06.8	10.2
412	SS3	F	17	1.58	58	2.26	16	15	15.64	13.61	07.0	10.4
413	SS3	F	18	1.68	59	2.16	14	14	15.46	11.32	07.0	10.3
414	SS3	F	18	1.65	62	2.05	17	16	15.19	12.18	06.8	11.4
415	SS3	F	18	1.64	60	2.08	18	15	15.24	11.64	06.6	10.2
416	SS3	M	17	1.55	43	2.78	25	23	19.45	11.70	06.4	09.2
417	SS3	M	18	1.58	44	2.88	26	21	20.18	09.92	05.8	09.4
418	SS3	M	18	1.53	48	2.80	21	20	17.43	11.54	06.0	10.2
419	SS3	M	18	1.49	50	2.82	22	21	17.58	09.84	05.8	10.6
420	SS3	M	17	1.56	45	2.80	24	24	16.70	10.76	05.8	09.8

YUSUF ABOKI SECONDARY SCHOOL, GIWA - ZARIA												
Subject	**Class**	**Sex**	**Age (Yrs)**	**Height (m)**	**Weight (Kg)**	**12Min run (Km)**	**Push up**	**Sit up**	**Sit and read (cm)**	**Body fat %**	**50m Dash (Sec)**	**Shuttle run (Sec)**
421	JS1	F	12	1.43	38	1.50	14	14	14.84	12.23	09.6	12.2
422	JS1	F	12	1.42	36	1.51	16	13	15.63	12.42	07.4	12.0
423	JS1	F	11	1.40	37	1.50	17	15	14.54	10.62	07.4	11.4
424	JS1	F	11	1.39	36	1.57	15	16	14.24	11.26	07.2	11.2
425	JS1	F	11	1.40	37	1.48	14	16	15.44	11.31	07.0	11.4
426	JS1	M	12	1.44	37	1.95	19	18	16.61	10.68	07.0	10.6
427	JS1	M	11	1.41	35	1.92	17	21	16.55	11.41	07.0	10.4
428	JS1	M	12	1.43	34	2.00	18	23	17.65	10.22	06.8	10.2
429	JS1	M	11	1.39	35	2.05	20	21	17.62	10.28	07.0	10.8
430	JS1	M	12	1.40	36	2.08	22	20	17.48	10.22	06.8	10.4
431	JS2	F	13	1.44	38	1.52	15	15	15.46	12.52	07.4	10.4
432	JS2	F	12	1.43	34	1.57	17	16	16.63	11.48	07.2	10.2
433	JS2	F	12	1.45	35	1.56	16	14	16.45	11.23	07.2	10.4
434	JS2	F	13	1.44	36	1.58	17	16	16.24	11.63	07.0	10.5
435	JS2	F	13	1.46	34	1.89	18	15	16.38	10.76	06.8	10.2
436	JS2	M	13	1.41	35	2.18	21	20	17.62	10.61	06.6	10.2
437	JS2	M	13	1.40	36	2.34	24	21	16.48	10.35	06.3	10.4
438	JS2	M	12	1.39	37	2.32	22	19	16.68	10.29	06.2	10.6
439	JS2	M	13	1.42	35	2.22	20	22	17.75	09.24	06.4	10.2
440	JS2	M	13	1.43	36	2.18	20	20	17.44	09.84	06.4	10.4
441	JS3	F	14	1.49	38	2.00	16	14	14.48	11.31	06.8	10.4
442	JS3	F	13	1.46	37	1.94	14	14	15.19	12.65	07.0	10.6
443	JS3	F	14	1.50	38	1.92	13	17	15.15	11.64	07.0	10.3
444	JS3	F	13	1.51	37	1.86	14	16	15.85	11.38	07.0	10.2
445	JS3	F	13	1.47	36	2.24	17	15	16.61	11.41	06.8	10.3
446	JS3	M	14	1.45	35	2.32	20	23	16.68	10.38	06.8	10.4
447	JS3	M	14	1.48	36	2.43	21	22	16.32	10.72	06.4	09.8
448	JS3	M	14	1.45	34	2.28	20	21	17.44	09.88	06.0	10.2
449	JS3	M	13	1.49	35	2.35	21	19	17.65	10.41	06.2	10.4
440	JS3	M	13	1.51	34	2.48	23	22	18.19	09.68	06.0	09.6

Subject	**Class**	**Sex**	**Age (Yrs)**	**Height (m)**	**Weight (Kg)**	**12Min run (Km)**	**Push up**	**Sit up**	**Sit and read (cm)**	**Body fat %**	**50m Dash (Sec)**	**Shuttle run (Sec)**
441	SS1	F	14	1.56	43	1.86	17	15	16.10	13.40	07.2	11.6
442	SS1	F	15	1.45	48	1.92	14	16	14.85	13.20	07.0	12.4
443	SS1	F	15	1.44	42	2.04	15	15	16.48	11.96	07.0	11.2
444	SS1	F	15	1.50	49	1.90	16	16	14.54	12.76	07.2	12.4
445	SS1	F	14	1.46	40	1.98	18	17	16.38	10.45	07.0	11.3
446	SS1	M	15	1.50	37	2.64	21	20	17.48	10.13	06.8	09.7

447	SS1	M	15	1.49	38	2.56	20	21	17.62	11.55	06.8	10.6
448	SS1	M	15	1.53	35	2.66	22	23	17.19	10.98	05.8	09.3
449	SS1	M	15	1.40	42	2.20	20	21	16.88	12.85	06.0	10.8
450	SS1	M	14	1.47	35	2.58	23	20	20.19	10.76	05.8	09.44
451	SS2	F	16	1.50	45	2.16	16	16	15.58	11.70	07.0	10.2
452	SS2	F	15	1.55	48	1.94	15	15	14.88	11.42	07.4	10.4
453	SS2	F	15	1.48	45	2.04	17	16	15.68	10.54	07.2	10.2
454	SS2	F	16	1.62	44	2.43	16	15	16.54	10.44	06.8	10.0
455	SS2	F	16	1.54	46	2.22	18	17	15.63	11.42	07.0	10.1
456	SS2	M	16	1.48	48	2.72	19	20	16.65	10.56	06.0	09.7
457	SS2	M	16	1.49	43	2.78	23	21	17.25	10.67	05.8	09.8
458	SS2	M	16	1.54	43	2.73	21	22	17.35	11.70	06.0	09.4
459	SS2	M	15	1.48	42	2.50	20	23	18.12	10.45	06.2	09.9
460	SS2	M	16	1.53	40	2.80	25	21	19.44	09.75	05.5	09.8
461	SS3	F	17	1.58	57	2.16	14	16	15.38	12.54	07.0	10.2
462	SS3	F	18	1.58	63	2.00	14	15	14.72	13.62	07.0	10.6
463	SS3	F	18	1.65	60	2.14	17	14	15.46	13.28	06.8	10.4
464	SS3	F	17	1.61	55	2.28	16	13	15.51	12.64	07.0	10.2
465	SS3	F	18	1.66	61	2.08	16	16	15.19	12.56	07.2	10.3
466	SS3	M	18	1.63	52	2.99	24	21	17.42	11.84	05.8	09.6
467	SS3	M	17	1.58	42	2.88	22	22	19.56	10.48	06.0	09.4
468	SS3	M	18	1.60	53	2.94	23	23	17.61	12.27	05.8	09.6
469	SS3	M	18	1.61	51	2.96	25	21	17.48	11.29	05.5	08.9
470	SS3	M	17	1.47	42	2.78	24	23	18.35	11.42	06.0	08.8