

UNIVERSITY OF CAPE COAST

APPRAISAL OF EXERCISE PRESCRIPTION BY KEEP FIT INSTRUCTORS
IN THE KUMASI METROPOLIS OF GHANA

WILLIAM KWADWO OSEI

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IN THE KUMASI METROPOLIS OF GHANA

BY

WILLIAM KWADWO OSEI

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of the Faculty of Education, University of Cape Coast in partial fulfilment of the
requirements for award of Master of Philosophy Degree in Physical Education

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DECLARATION

Candidate's Declaration

I hereby declare that this thesis is the result of my own original research and that no part of it has been presented for another degree in this university and elsewhere.

Candidate's Signature..... Date.....

Name: William Kwadwo Osei

Supervisors' Declaration

We hereby declare that the preparation and presentation of the thesis were supervised in accordance with the guidelines on supervision of thesis laid down by the University of Cape Coast.

Principal Supervisor's Signature..... Date

Name: Dr. S. L. Lamptey

Supervisor's Signature Date

Name: Mr. F. S. Bediako

ABSTRACT

The purpose of this study was to appraise exercise prescription procedures by the keep fit instructors in the Kumasi Metropolis of Ghana. The descriptive survey design was used. One hundred and thirty participants volunteered for the study. The instrument for data collection (questionnaire) yielded an internal consistency of 0.76. Percentages and frequencies were used to analyze the research questions postulated.

The results indicated that keep fit instructors in the Kumasi Metropolis are not familiar with fundamental principles of exercise and do not consider age and gender in exercise prescription. It was concluded that keep fit instructors in the Kumasi Metropolis lack the basic principles of physical training with specific reference to type, duration and frequency of activity, and the effect of age, gender, fitness levels and health conditions on exercise. It was recommended that certificate courses should be organized for keep fit instructors by universities or other relevant bodies that conduct programmes in physical education.

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DEDICATION

To my wife, Vida Osei-Bonaldi, my mother, Pierina Bonaldi and my two sons
Alex Odoi Osei-Bonaldi and William Osei Kofi Bonaldi.

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CHAPTER ONE

INTRODUCTION

Background to the Study

There is no doubt that exercise helps in maintaining perfect health. Exercise focuses on exerting the body to burn off excess calories, build lean muscle mass and lose weight. In the olden days, exercise was not given any special attention since the daily routine itself involved much strain. Throughout history little emphasis was placed on exercise because the rigors of daily life were exercise in and of itself. Today, however, with fewer jobs, technological advancement and activities requiring physical involvement, exercise is a crucial part of life. American College of Sports Medicine (1988) reveals that unhealthy lifestyle habits of Americans regarding diet, exercise, smoking, obesity and other health behaviour have contributed significantly to spiral health care costs. Despite the health warnings by health and medical professionals negative health behaviours continue to be prominent. Today's adults were yesterday students taking physical education and learning to be fit. However, it is said that one in two American adults does not participate in regular vigorous physical activity while one in four pursue no vigorous leisure activity.

Virtually everyone can get health benefits from physical activity. But, surveys confirm that most people are not active enough. Consequently we pay for it (Rost, 1987). The American Heart Association attributes about 250,000 deaths a

year in the United States (about 12 percent) of total deaths to lack of regular exercise. About 66 percent of Americans above forty years of age are overweight, with more males than females.

People's motivation to exercise may vary from health reasons, to reasons of improving self-esteem, body image and attractiveness. Psychological reasons and health benefits may be offset by factors that drive those who are motivated to exercise for appearance related reasons. Indeed, people who exercise for weight loss, body tone, and attractiveness reasons may be experiencing body dissatisfaction (Frederickson & Roberts, 1997), reduced body esteem, self-esteem and lowered psychological well-being (Strelan, Hargreaves, 2005). Research indicates that acceptable levels of aerobic capacity are associated with a reduced risk of high blood pressure, coronary heart disease, obesity, diabetes, some forms of cancer and other health-related problems (Blair, Kohl, Paffenbarger, Clarke, Cooper & Gibbens, 1982).

Physical fitness has greatly been cherished by different ethnic groups, communities, states and nations because of their struggle for food, land, supremacy and wars in the olden days. These days, due to advancement in technology and modernization of society which is dynamic, most jobs are sedentary, implying that most people seldom obtained the opportunity to exercise when on the job. Fitness is the state or condition of being fit, suitable and appropriate, accompanied by good health or physical condition especially as a result of exercise and proper nutrition. In previous years, fitness was commonly defined as the capacity to carry out the day's activities without undue fatigue. However, with automation without undue leisure time, changes in lifestyles

following the industrial revolution rendered this definition insufficient. These days, physical fitness is considered a measure of body's ability to function efficiently and effectively in work and leisure activities, to be healthy to resist hyperkinetic diseases, and to meet emergency situations.

Physical fitness comprises two related concepts-general fitness (a state of health and well-being) and specific fitness (a task-oriented definition based on the ability to perform specific aspects of sports or occupations). A general purpose physical fitness programme must address cardiovascular fitness, flexibility training, strength training, muscular endurance, body composition and general skill training. A comprehensive fitness programme that is tailored to an individual will probably focus on one or more specific skills, and on age or health-related needs such as bone health. Specific or task-oriented fitness is a person's ability to perform a specific activity with reasonable efficiency; for example sports or military service. Specific training prepares athletes to perform well in their sports.

Regular activity has a number of proven, positive health effects, especially on heart health. Vigorous exercise strengthens the heart as a pump, making it a larger, more efficient muscle. Moderate activity can boost High Density lipoproteins (HDL-"good" cholesterol), aid the circulatory system, and lower blood pressure and blood fats. All these effects translate into reduced risk for heart disease, heart attack and stroke. Exercise can also offer other benefits, including strengthened muscles, increased flexibility and stronger bones, which can help ward off the bone thinning condition called Osteoporosis.

According to American Heart Association [AHA] and National Heart, Lung and Blood Institute (2005), most citizens have jobs where they sit most of the

time, so chances are limited to be physically active at work. They also rely heavily on modern labour-saving devices, cars, appliances and power tools to spare themselves manual effort. This according to the AHA is due to the firm, supple bodies shown exercising on television or on magazine covers which gives the impression that exercise is sweaty and strenuous best reserved for the young, super-fit and athletic.

Exercise also has other body-slimming effects. It builds muscle and displaces fats. Because exercise builds muscles, it may also help counter a problem caused by dieting because when one reduce calories, the body metabolism may slack off and burn calories more slowly. This makes further weight loss more difficult. Regular activity helps correct this, slow down and makes it easier to keep shedding pounds. Exercise or activity affects calorie needs. The more active you are, the more calories you will burn, which can help weight loss. Exercise also promotes fat loss and builds muscle. This in turn, increases your body's metabolic rate, the rate at which you burn calories, even after you have finished exercising. The amount of energy needed for any activity depends on three factors; these are your muscles mass, your body weight and the activity itself. The larger the muscle mass and heavier the body part being moved, the more calories you use. The duration, frequency and intensity of exercise also count.

With regards to physical activity, exercise and cardiovascular fitness, regular activity and exercise make for a healthier heart. Furthermore, a healthy heart is a strong heart that works efficiently and is able to easily supply the body with blood. The heart pumps blood which carries oxygen to muscles and carries

away waste. How well the heart performs is a good indication of how healthy a person's cardiovascular (the heart and the associated blood vessels) system is. Endurance refers to a person's ability to continue doing a stressful activity for an extended period of time (Bouchard, 1993). This sometimes is referred to as stamina. A person with good endurance or stamina can bike, jog, play or run for a long time without getting tired. Having a healthy endurance level means that a person has a healthy level of cardiovascular fitness. Technically speaking, cardiovascular fitness refers to how efficient the heart and lungs can pump blood (which holds oxygen) to muscles that are being worked. The more efficiently the heart works, the more energy the body has to continue working without a great deal of effort.

Cardiovascular fitness is improved by aerobic exercise. The word aerobic refers to something that occurs in the presence of oxygen. Aerobic exercise improves cardiovascular health as it typically uses the body's largest groups of muscles (for example the legs) continually which makes a person need more oxygen. The more oxygen a person needs the more efficiently his or her cardiovascular system must be functioning. Examples of aerobic exercises include running, walking fast, biking and dancing. Incorporating cardiovascular or aerobic activity strengthens the heart and lungs. This makes it easier to do all sorts of everyday activities such as hurrying to class, work, chasing a bus for work, climbing stairs or mowing the lawn.

Regular physical activity and exercise helps the body as a whole gain strength. Strength is the ability to resist force. Muscles constantly resist force. The more strength a person has, the easier it is for his or her muscles to resist greater

force. For instance, someone who can lift one hundred pounds of weight once (that is one repetition maximum – 1RM) is stronger than someone who can lift fifty pounds of weight twice. Just as regular physical activity builds strength, it also builds muscle endurance. Similar to cardiovascular endurance, muscle endurance means that muscles are able to work for long periods of time making it easier to swim another lap or carry a heavy knapsack while walking.

Stronger muscles go hand in hand with stronger bones and healthy joints. As the body builds muscles, it tends to lose fat, which results in a leaner, healthier body. This explains why several weight-bearing activities build better bones. These activities seem to actually stimulate the formation of bone. This makes the doing of a variety of muscle-strengthening activities on a regular basis important. With improved strength, balance and coordination, the risk of falls and bone injuries is greatly reduced. Having thicker, healthier bones helps combat arthritis, a disease that involves the chronic inflammation of the joints and osteoporosis later in life. Osteoporosis is a disease that gradually weakens the bones, making them so fragile that they can fracture easily doing everyday activities. This takes time to develop and many people are unaware that they have the disease until they fracture bone which result in a painful crippling condition that is irreversible (Ajala, 2006). While it is true that Osteoporosis mainly strikes older people, it is during childhood and adolescence that the bones are forming. Therefore building stronger bones during adolescence will help combat this disease later in life.

As people grow older, their lung capacity (how much air the lungs hold) grow smaller. Cardiovascular activity and exercise can combat this because aerobic activities actually increase lung capacity. So while lung capacity will

continue to diminish because of age, with regular activity, especially aerobic activity, it will do so at a slower rate. Physical activity and exercise require energy, as does everything. In addition to spending energy, however, physical activity also gives people increased energy throughout the entire day.

The immune system, too, gets a big boost from regular physical activity. A healthy immune system helps fight colds, cancer, and other diseases and speeds recovery from all kinds of injuries. The less time a person is ill, the more energy he or she has to spend on living well. To have energy to function, the human body needs sleep. Sleep as does food, gives us energy. Regular physical activity and exercise helps people sleep more soundly. The more soundly one sleeps, the more energy one saves up during that time, and the more energy a person has to work, play, study and do all sorts of things. Young people are usually quite flexible. But as with lung capacity, flexibility diminishes as people grow older. Activities and exercises that increase flexibility, such as gymnastics, martial arts, and yoga are helpful in preventing injuries. The more flexible a person is, the less likely he or she is to suffer a sprain or strain a muscle while doing everyday things or while being active.

Physical activity and exercise are beneficial to the mind as well as the body. They help improve a person's health and overall outlook on life. In order to feel the best, have more energy and stay healthy, a person should do something active at least three times a week. This means that a person can bike, run, swim or in-line skate and each will help benefit the mind. Specifically a person will experience a natural high and develop the ability to better handle emotions and changes in life. When a person is physically active or exercises for a certain

period of time (about twenty minutes or longer), the body releases endorphins, proteins in the brain that act as the body's natural pain reliever. When endorphins are released, a person may experience a feeling of euphoria. Many people enjoy this feeling and look forward to the natural high they get from keeping physically fit (Prentice, 1977).

At no point in time in the brief history of mankind has physical activity, conditioning and exercise voluntarily emerged to the forefront as it has in today's society. In Ghana wherever everyone goes, there are people jogging, walking, dancing, cycling, playing football, tennis or just doing simple exercises unguided by any professional. The simple reason is that, people have come to the realization that regular stimulation of the body through vigorous exercises produces increased strength and endurance characterized by good health which makes people feel good and active. This awareness has sprung up so many keep fit groups formed by certain individuals or groups. Notable among them are the Late Mr. A. O. Lawson in Kumasi and a maiden one at Dansoman, Accra in the early 1980's. Since then more keep fit clubs have sprang up in the country including the Kumasi Metropolis in the Ashanti Region (the Research Area). This perhaps may be due to the fact that factors such as industrialization, urbanism and sub urbanism have enveloped us into a world of 'future shock' as Krotee and Hatfield (1979) put it. They further asserted that a world of fantastic technological accomplishment, involving complex scientific advances in automation, transportation and communication has brought about this dramatic acceleration in technology and has trusted the people of the United States of America and mankind in general into a lifestyle of apparent prosperity and leisure. Indeed,

according to them, people spend less time at work and have more time for leisure pursuit than any time in history.

According to the Daily Graphic (1996) the Kumasi Metropolis has more than hundred (100) keep fit clubs registered and unregistered. To mention but a few, among the registered ones are the Colgate / Palm Olive Club, Roots, Ridge, Matyres, Prempeh, Wesley College, Ultimate, KNUST, Professionals Nana Tuffour and Stadium keep fit clubs.

Exercise, apart from keeping the total body fat content low, reduces the rate of adipose cell accumulation (Fox, Matheus, 1981). This realization might have contributed to the emergence of numerous keep fit clubs and regular weekly runs within societies today. The importance of regular exercise in weight control and management has led to much research devoted to establishing the energy costs of various sports and exercises to determine their relative effects in enhancing normal body composition (Getchell, 1983).

According to Ankude (2002), because of current national attention on issues of health, it is essential that the practice and acquisition of health-related fitness in our youth be encouraged to prevent them from becoming victims of the same or similar chronic diseases that plague society. It is in this light that the researchers wants to find out whether in prescribing exercises for their clients in these keep fit groups, exercise leaders or the keep fit instructors consider the age and gender before introducing them into the programmes or work outs.

Statement of the Problem

The goal of exercise and physical fitness is to stimulate the body's functions in order to produce increased strength and endurance characterized by

good health to make people feel good and active. People join keep fit clubs to exercise in order to be fit and improve upon their health conditions. People of different sexes, and ages attend these keep fit clubs to seek advice from exercise leaders or instructors for programmes that would modify their health status. Ageing is characterized by decreased ability to adapt to and to recover from physiologic displacing stimuli. Certain exercises diminish with age. It is an accepted fact that age is a risk factor to some health conditions like obesity, coronary heart diseases, diabetes, pregnancy related issues, hypertension, osteoporosis and dyspnea (laboured respiration). For this reason, if appropriate exercises are not prescribed for these individuals, their conditions could worsen or may even lead to death. It is therefore imperative to look into the activities of these keep fit instructors and understand the situation as it exists.

Purpose of the Study

The purpose of this study was to investigate whether the numerous keep fit instructors of the various keep fit clubs in the Kumasi Metropolis consider the age, gender, risk factors associated with exercise and health implications of exercise before prescribing exercises for their clients.

Research Questions

1. To what extent are keep fit instructors in the Kumasi Metropolis familiar with fundamental exercise principles?
2. To what extent do keep fit instructors in the Kumasi Metropolises consider age differences in their exercise prescription?
3. To what extent do keep fit instructors in the Kumasi Metropolises consider gender differences in their exercise prescription?

4. To what extent are keep fit instructors in the Kumasi Metropolis familiar with the health implications of exercise?

Significance of the Study

This research would offer keep fit instructors as well as the general public the opportunity to appreciate the importance of exercise for all ages and gender so as to meet each individual's physical need from their association with numerous keep fit clubs. It will also be beneficial to physical exercise practitioners in the various sporting clubs as well as the Ministry of Youth and Sports.

Delimitation of the Study

The study was delimited to:

1. Keep fit instructors in the Kumasi Metropolis.
2. Selected members of keep fit clubs in the Kumasi Metropolis.
3. The use of questionnaire as a data collecting instrument.
4. Frequencies and percentages.

Limitations of the Study

The close-ended nature of the questions provided some sort of constraints to the respondents who could not express divergent views.

Organization of the Rest of the Study

Chapter two reviews related literature which includes the concept of physical fitness and exercise, the concept of fitness clubs, the components of physical fitness, the need for exercise, effects of incorrect exercise, benefits of physical fitness, fundamental exercise principles, physical fitness and gender and physical fitness and age.

Chapter three presents the methodology used in the study. It has been subdivided into the research design and instrument, the population and sample selected for the survey and the administration of the instrument and how the data analysis was found out.

In Chapter four is presented the study analysis and results and the discussion out of the data. Finally chapter five presents the summary, conclusion and for further research and recommendations or suggestions for improved role play.

CHAPTER TWO

REVIEW OF REALATED LITERATURE

The purpose of the study was to find the knowledge level of keep fit instructors on exercise in the Kumasi Metropolis and whether they consider the age, gender and the risk factors associated with exercise before prescribing exercises for their clients. These clubs are being attended by people of different ages, sexes who are handled by these exercise leaders. It is in this light that I want to find out whether the right principles of exercise are being followed in order not to cause any harm to these innocent clients.

The review of related literature was carried out under the following headings:

1. The Concept of Physical Fitness and Exercise.
2. The Concept of Fitness Clubs
3. Components of Physical Fitness
4. The Need for Exercise
5. Effects of Incorrect Exercise
6. Benefits of Physical Fitness
7. Fundamental Exercise Principles
8. Physical Fitness and Gender
9. Physical Fitness and Age

The Concept of Physical Fitness and Exercise

People have been concerned with physical fitness for thousands of years. These days, people are concerned with fitness and what benefits they think being fit will bring them. Different cultures at various periods believed that physical activity and exercise would provide individuals, or even the government as a whole, with different attributes. These attributes provide insight into the evolution of exercise and activity as well as a view of what was valued by certain ancient cultures.

According to Updyke, Schaefer, Stolber and Johnson (1975) the Chinese developed the martial art Kung Fu over 4,000 years ago. The Chinese saw that individuals who were physically active on a regular basis did not get sick as often as those who were inactive. Kung fu was therefore developed in order to help more people get exercise on a regular basis and avoid frequent illness. Physical activities such as exercise and sports were not seen as being beneficial to the mind in Ancient India. Matters of the mind were of the utmost importance as far as Hindu and Buddhist Priests were concerned. Yoga, a series of exercises that incorporate regulated breathing, concentration and flexibility became popular with disciplined Indians and Priests, who used it as a method for emptying their minds of thoughts before meditating. The ancient Egyptians used physical activity and exercise primarily as a way to strengthen soldiers' bodies for warfare. This is because they failed to establish a link between a healthy body and a healthy mind. Endurance exercises and the use of weapons were stressed. The Persians began training young males in warfare at very young ages ignoring education to protecting Persia. Physical fitness was recognized in ancient Greece just as important as knowledge and learning. The Ancient Greeks strove to be well-

rounded individuals and to them, that meant training the body and the mind. Physical fitness was seen as its own reward. In the Olympic Games, which originated in Ancient Greece, Winners were awarded only a wreath fashioned out of olive branches. The Ancient Romans valued physical fitness not just for its own merits but because it benefited the government. Physically fit men made better soldiers and workers, who helped protect and expand the empire.

Several people have conducted studies on physical fitness and have presented different meanings for physical fitness. Werner and Hoeger (1992) considers physical fitness as the capacity to carry out reasonably vigorous activities including qualities that are important to the individual's health and well-being as opposed to those that relate to performance of specific motor skills. According to Bouchard (1993), physical fitness is to improve one's quality of life. He thought that physically fit individuals should be capable of working more effectively, engaging in a variety of wider recreational pursuits, experiencing less subjective fatigue at the end of the day.

According to Bouchard (1993), an appropriate concept of physical fitness includes the following essential principles: (1) physical fitness is a very individual matter that is related to one's role in life, (2) sports skill is not synonymous with physical fitness (though a skilled performer might develop a high level of physical fitness), (3) physical fitness can be properly related to health and to performance of one's daily task more than sports skills, (4) anybody who is reasonably healthy can improve physical fitness levels, regardless of sports skill level by simply making effort on regular basis, (5) becoming physically fit, one does not have to push himself or herself until he or she "hurts" in order to improve fitness, (6)

physical fitness is not an end in itself; it is a part of good health which is in turn, a part of the “quality” of living, (7) physical fitness is not the answer to all life’s problems and does not guarantee a long life, nor does it make one immune to all diseases. However, physical fitness reduces the occurrence of degenerative diseases and one’s frequent visit to the hospital, (8) physical fitness is not a single, common quality because it differs depending upon one’s role in life. Furthermore, it consists of several components. The components include muscular endurance, flexibility, optimal body composition, and cardio-respiratory endurance which includes maximal aerobic power, heart-lung function, blood pressure and sub-maximal exercise.

An individual is deemed fit when he/she carries out his/her daily chores with ease. The term “fitness” is generally used to mean a state of well – being good health normal vitality and optimal fitness for life (Powell, 1971). This means that there is a balance between the physical, mental, social and emotional components of the individual. Research has shown that those who are engaged in a planned programme of physical fitness also tend to feel better mentally emotionally and socially. Pate (1983) and Hockey (1985) provided a widely accepted definition for physical fitness. According to them physical fitness is the ability to perform daily tasks with Vigor and alertness, without undue fatigue and with ample energy reserved to enjoy leisure time pursuits and to meet unforeseen emergencies. Generally, physical fitness is a reflection of one’s ability to work with vigour and pleasure without undue fatigue coupled with ample energy reserved for enjoying recreational activities, hobbies, and for satisfying unforeseen emergencies (Vannier & Gallahue, 1978).

The Concept of Fitness Clubs

Fitness club(s) may be defined as a group of people, firm, corporation, or an association engaged in the sale of instruction, training, or assistance in a programme of physical exercise or weight reduction, which may include the use of a sauna, whirlpool bath, weight lifting room, massage, steam room or other exercising or weight reduction machine or device (Siedentop, 2001). Exercise is a social activity for many people. Belonging to a group may fill a strong social need and is an excellent way to receive the positive reinforcement that is so critical in the initial stages of increased exercise. Qualified instructors can lead, educate, and motivate individuals to ensure that the appropriate exercises are done to improve the chances of progress. Another advantage of group programmes is that there is usually a fixed routine that may help some people make exercise a regular part of their lifestyle. Many people begin exercise because of other persons, for example, their appearance or to improve their health when others (physician, family or friends) think it is the best thing to do. There are so many reasons why people decide to start or to continue to exercise and that health professionals should not try to impose their own reasons. People should be allowed to decide what is important in their particular case. When individuals have exercised sufficiently and have achieved a high fitness level, they transfer these gains into sports and games which foster a great deal of social interaction with others.

According to Skinner (1987) people should train to play a sport and not use sports as the main way to train. Sports and games are better used during the maintenance phase when the fitness level is adequate and when enjoyment is more important to continued participation. Successful exercise programmes that

develop individual's physical fitness leads to socialization, communication and co-operation among team mates.

There are however, some disadvantages to group exercise. Individualized exercise prescriptions, flexibility within the programmes, and qualified leadership can avoid some of these problems. One compromise that has been found useful, easier to schedule, and more individualized is to exercise with one or two other persons. This approach works best when the members of the group have similar interests and fitness levels.

The Components of Physical Fitness

Physical fitness has been divided into Health-related and Performance-related fitness (President's Council on Physical Fitness and Sports, 2005). The major concern here is on the health-related physical fitness which is characterized by those aspects of physical fitness that affect an individual's functional health (that is the efficient working of all the systems of the body to keep the body healthy). It also refers to those aspects of physiological and psychological functioning which are believed to offer some protection against degenerative diseases such as coronary heart disease, obesity and various musculo-skeletal disorders, cardiovascular diseases, low back pain, ischemic heart diseases, renal failure and hypertension. These afflictions have been referred to as "hypokinetic diseases" by physicians because they are associated with low levels of energy expenditure common to a sedentary person. This type of fitness should be a primary concern to every individual. Unlike motor or performance related fitness, health-related fitness is observable, improvable, perishable and it is earned not

learned. Components of health-related fitness include muscular strength, muscular endurance, flexibility, bodily composition and cardiovascular efficiency.

Cardiovascular Endurance

Hoeger and Hoeger (1992) clarifies the parameters of health-related fitness as cardiovascular, strength, body composition and flexibility. Updyke (1975) refers to cardiovascular endurance as the circulorespiratory capacity as he defines it as the quality that enables one to endure reasonably vigorous physical activity for extended periods.

Ted (2012) also defines cardiovascular endurance as the capacity of the body to transport and utilize large quantities of oxygen. Aerobic fitness depends on the ability of the blood to flow to the working muscles and the diffusion and utilization of oxygen within the muscle tissue. An individual possessing full cardiovascular efficiency can usually run long distance at a rapid rate; exhibit a slower heart rate while engaging in moderate work and his heart rate recovers sooner after participating in prolonged physical activity or exercise. The criterion for cardiovascular fitness is the relative level of functioning within the heart and the circulatory system. Falls and Dishman (1980) consider cardiovascular endurance as the most important health-related fitness component. It concerns the body's ability to possess oxygen for supplying energy for muscular work. It is determined by the amount of oxygen that the body can consume per minute. It involves the combination of the function of the heart, lungs and respiratory systems. According to Hoeger and Hoeger (1992), the most important tool recommended for the development of cardiovascular endurance is exercise. This means that, the overall physiological functioning of the body is enhanced if the

body is properly stimulated on regular basis with exercise. Sedentary living they said, results in drastic decline of vital functions of the human system which is needed for good health and wellbeing. Physical activity when done regularly increases muscle size, strength, power and develop endurance for sustaining work and taxes the circulatory and respiratory systems when performed in a vigorous manner. Armstrong (1990) stipulates that vigorous activity also develop cardiovascular fitness that produces the quality of physical reserves, power and stamina called endurance. For instance, three 20 minutes of exercises per week with intensity producing a heart rate of eighty percent (80%) of estimated maximum will improve cardiovascular fitness. Heart rate and oxygen consumption during exercise and recovery are good indicators of person's aerobic efficiency. In a highly trained individual, the heart becomes more efficient and the resting heart rate is often much lower than seventy-two (72) beats per minute. Exercise also improves the heart stroke volume, which is the amount of blood ejected at each heart beat. Cardiac improvement is another benefit of exercise. A critical factor in the development of cardiovascular endurance is the ability of the heart to pump increasing amounts of blood and thus get nutrients to the working muscles (Hockey, 1985). Exercises used should be carefully selected, taking into consideration age and health status of subjects (Updyke & Johson, 1970). They further stated that, even cardiac patients can make dynamic gains in cardiovascular capacity through appropriate exercise programmes. The need for appropriate exercises for the development of cardiovascular endurance was stressed by many research findings. A wealth of statistical evidence indicated that active people are less likely to have coronary heart disease than inactive people.

They also indicated that people who are physically active in their leisure time have a reduced risk of coronary heart disease if the exercise they choose is done above the cardiovascular threshold of training and in the cardiovascular fitness target zones. Regular exercise according to them is one effective means of rehabilitation for a person who has coronary heart disease or who has had a heart attack.

Muscular Strength

Strength in the muscle is necessary for the normal physical activities and enjoyment of a happier life. Hoeger and Hoeger (2002) have condemned the idea that strength is necessary only for highly trained athletes and other individuals who have jobs that require muscular work. To them, strength is undoubtedly a basic component of fitness and wellness, and is crucial for optimal performance in daily activities such as sitting, walking, running, lifting carrying objects and doing household work or even enjoying recreational activities. Strength is seen as an equally important aspect of health-related fitness and refers to the maximum tension or force muscles develop in a single contraction against a given resistance. Wuest and Lombardo (1994) also state that muscle strength is the ability of a muscle or muscle group to exert force in a single effort against resistance. It is also made clear, that there is some crossover effect between muscular strength and muscular endurance. Development of muscular strength also produces some increase in muscular endurance. However, muscular endurance does not enhance strength. Corbin, Welk, Lindsey and Corbin (2003) have defined strength as the amount of force produced with a single maximal effort of a muscle group. Apart from the above definitions Fall, Baylor and Dishman (1996) have also, stated that

strength is the relative ability of a muscle group to exert force against resistance. Muscle strength is said to be on the same continuum with endurance. This has brought about the name “strength endurance” used by some writers. “Pure” strength is reached as one nears one end of the continuum where only one maximum contraction is required. As the number of repetitions increases and the contractile force decreases, the other end of the continuum; “pure” endurance, would be reached (Lindsey, Welk, & Corbin, 2000).

Talking about the “strongest” human muscle, experts propounded that, since three factors affect muscle strength simultaneously, and muscles, never work individually, it is unrealistic to compare strength in individual muscles, and state that one is the “strongest”. If strength refers to the ability to exert a force on an external object, then, the strongest muscle should be the masseter or jaw muscle. The 1992 Guinness Book of Records, has been cited to record an achievement of a bite strength of 4337 Newton (N) for two seconds. To the experts, if strength refers to force exerted by the muscle itself, then the strongest muscles are those muscles with the largest cross-sectional area, since strength exerted by an individual skeletal muscle fibre does not vary very much. Each fibre can exert a force on the order of 0.3 micro-newton. By this definition, the strongest muscle will be the quadriceps femoris or the gluteus maximus. By weight, shorter muscles would be stronger than longer muscles. Going by this principle, then the uterus may be the strongest weight in the body, because at the time of delivery, the uterus weighs about 1.1 kilogram and exerts a downward force of 100 to 400 N with each contraction. The tongue, which consists of sixteen muscles, appears frequently in the list of surprising facts as the strongest muscle in the body, but

authorities are finding it difficult to come with a definition to make the statement true. Another school of thought also considers the heart which has the claim to being the muscle that performs the largest quantity of physical work in the course of a lifetime, to be the strongest muscle. Estimates of the power output of the human heart ranges from 1-5 watts, which is much lesser than the output of the quadriceps which can produce over 100watts, but only for a few minutes. The hearts low power output of one watt continuously for 70 years, yields a total work output of 2-3 gigajoules (Wikipedia, 2004).

Muscle strength is best developed with exercises done against resistance; also referred to as progressive resistance training (PRT) or progressive resistance exercise (PRE). This name is given because the frequency, intensity, and length of time of muscle overload are progressively increased as muscle strength increases. Hippocrates was the first to explain the principle behind strength training when he wrote “that which is used develops, and that which is not used wastes away”, referring to muscular hypertrophy and atrophy. PRT dates back, at least, to Ancient Greece, when legends have it that the wrestler Milo of Croton, trained by carrying a newborn calf on his back every day until it was fully grown. Isometric strength training was popularized by Charles Atlas from the 1930’s onwards. Strength training became popular in the 1980’s following the release of the body building movie, “Pumping Iron”, and the subsequent popularity of Arnold Schwarzeneger Hartfield et al. (1979).

A PRE is typically done in 3 sets of 8 to 15 repetitions (reps) (Corbin et al., 2003). PRT could be done in a variety of ways, and with different equipment. Isotonic, isometric and isokinetic exercises are the variety of ways in PRT.

Isotonic exercises involve muscle contraction in which the muscle changes length, either shortening (concentrically) or lengthening (eccentrically). In isotonic exercises, a resistance is raised and then lowered, as in weight training, and calisthenics to build dynamic strength in the muscle. Plyometrics is a form of isotonic exercise useful for athletes training for power. It involves jumping from boxes, hopping on a foot and similar types of activities. Isometric exercises are those in which no movement takes place while a force is exerted against an immovable object. Muscle contraction is said to be static and is effective for developing strength. In such exercises little or no equipment and only minimal space is required to build static strength in the muscle. Isokinetic are isotonic-concentric exercises done with a machine that regulates both movement velocity and resistance. The Apollo, Exer-Genie, Mini-Gym, Hydra-Fitness (hydraulic machine) and others. These machines keep the velocity of the movement constant, and by matching the resistance to the effort of the performer, permitting maximal tension to be exerted throughout the range of motion, thus attempting to overcome the basic weakness of isotonics. However, isokinetic exercises are not better for the development of pure strength (Corbin et al.). Strength training requires the use of “good form”, that is, performing the movements with the appropriate muscle groups and not transferring the weight to different body parts in order to move greater weight or resistance, called “cheating”. Failure to use “good form” leads to injury or inability to meet training goals, since the desired muscle group is not challenged sufficiently, the threshold of overload is never reached and the muscle does not gain in strength (Bouchard, 1993).

Strength training is governed by principles including the principles of specificity, diminishing returns, rest, and recovery. The principle of specificity indicates that different types of resistance training programmes are used depending on the muscles you want to develop. To develop strength in the arms to enable you easily lift and push heavy loads onto shelves, isotonic contractions at a relatively slow speed, with a relatively high resistance are to be used. But, to develop strength in muscle of the fingers to enable you hold and throw heavy objects, the training should be done isometrically, using the fingers the same way as you would hold the objects.

Strength training develops strength, but it should be noted that anaerobic athletes need endurance training just as aerobic athletes need some strength training. The negative aspect of endurance training is that, athletes whose event rely too much on strength and power run the risk of losing their strength and power, when they train much on endurance, due to the modification that will take place in the different muscle fibres (Fahey, Insel & Roth, 2003). Properly performed, strength training can provide significant functional benefits and improvements in overall health and well-being including increase in bone, muscle, tendon and ligament strength and toughness, improved joint function, reduced potential for injury, improved cardiac function and elevated good cholesterol.

Weight training for strength, can stimulate the cardiovascular system, but exercise physiologists, based on their observations on maximal oxygen intake, argue that aerobic training is a better cardiovascular stimulus (Johnson, 2006). Though aerobic training is an effective therapy for heart failure patients,

combined aerobic, and strength training is ineffective. A noted side effect of any intense exercise is increased levels of dopamine, serotonin, and norepinephrine, which can help to improve mood and counter feelings of depression. Strength training is primarily an anaerobic activity, although some proponents have adapted it to provide the benefit of aerobic exercise through circuit training. Strength training differs from bodybuilding, weightlifting, and others, which are sports rather than forms of exercise. However, strength training forms part of their training regimen (Hartfield et al., 1979). According to Corbin et al. (2003), about 80 – 90% of the fitness and health benefits are gained in the first set. The benefit reduces down and down with any additional set ; thus the principle of diminishing returns. To prevent boredom, the American College of Sports Medicine [ACSM] (1993) has recently recommended single-set programmes for adults. The principle of rest and recovery also indicates that progressive resistance training for strength done every day of the week, does not allow enough rest and time for the muscles to recover and, therefore, gain nothing from the programme.

The greatest portion of strength is said to be gained in two days of training per week. The amount of gain in the third day of training is relatively small compared to earlier gains. It is interesting to know that, the amount of exercise needed to maintain strength is less than that needed to develop it. There is also a threshold of training and a target zone for strength development. The threshold for any strength programme should involve the interplay of the frequency, intensity and time for training (Wuest & Lombardo, 1994).

The effect of some growth hormones on strength development has been highlighted by some experts. Insulin-like Growth Factor 1 (IGF-1) is a potent

anabolic factor stored in the liver and peripheral tissues which plays a significant role in the development of muscle hypertrophy and strength in women. Hence strength programs for women should focus on maximizing growth hormones. The use of contraceptives which are not of the triphasic variety by women, affects the production of growth hormones. Authorities in strength training have recommended that, strength training for women should be tailored to each athlete's menstrual cycle because, there is slight greater exercise response towards strength development, when a woman is in both the follicular (first half) and the luteal phases of the menstrual cycle. It is, however, recommended that, during the luteal phase, strength training should consist of moderate intensity loading, using 3-4 sets of 8-10 repetitions at 65-75% of 1-RM, done three times a week, involving the large muscle groups. The rest period should not be more than two days (Brown, 1996).

Some misconceptions and myths about strength training are as follows. The idea that progressive resistance training (PRT) is only for young people is not true, because according to experts people within the ages of 80 and 90 can benefit from regular PRT. The popular belief that complete weight training workout requires two hours is for competition lifters and body builders, but not for athletic training which requires about 45– 90 minutes and 30 -45 minutes for recreation fitness. The expression “no pain, no gain” is also a misconception. If your training hurts your muscle fibres, you may probably be harming yourself, but it may be helpful to strive for a burning sensation in the muscle. Increased strength does not also make you move more slowly or make you uncoordinated. Up to a point, increased strength leads to increased speed (Lindsey et al., 2000). Insel and Roth

(2001) say that muscular strength helps keep the muscles in proper alignment, preventing back and leg pain and providing the support necessary for good posture. Muscle mass also increases during strength training, therefore, making it possible for higher rate of metabolism and fast energy use which helps to maintain a healthy body weight. To them strength training is good for healthy ageing, prevents life-threatening injuries, and also has some benefits to cardiovascular health.

On the other hand, muscle weakness can result in abnormal movement or gait and can impair normal functional movement. It can also produce poor posture, lower back pain and unappreciated appearance (Prentice, 1997). Strength training in the form of progressive resistance exercises are ideal for strength building. Some experts have indicated that strength-training exercises tend to selectively develop fast-twitch muscle fibres, and muscle endurance training, selectively develops slow-twitch fibres (Corbin et al., 2003). The effect of strength training on children depends on what type of strength training is utilized, however, orthopaedic specialists used to recommend that children avoid strength training, because the growth plates on their bones might be at risk. Recent studies by The National Strength and Conditioning Association have shown that a properly designed and supervised resistance training programme is safe for children (Wikipedia, 2004). Muscle strength is measured in various ways depending on the muscle group involved. Weight lifting exercises like the bench press, overhead (military press) and push-ups could be used to measure upper-body strength. Sit-ups, crunch (curl-up) and trunk-lift could be used to develop and to measure abdominal strength. Leg press and squats with weights could also

be used to measure lower-body strength, while the hand dynamometer is used to measure grip strength (Wuest & Lomdardo, 1994).

Muscular Endurance

Muscular Endurance is the ability to perform repeated contractions against a sub-maximal resistance (Anderson, Broom, Pooley, Schrodt & Brown, 1995). The ability of the muscle to exert a sub-maximal force against resistance repeatedly or to sustain muscular contraction continuously overtime, is characterized by activities of long duration but low intensity (Robbins, Powers & Burgess, 1997). Corbin et al. (2003) defined muscular endurance as the maximum number of repetitions or muscle contractions one can perform against a given resistance. For example, the number of times you can bench press 60 kilogramme weight.

Muscular endurance could be classified as static and dynamic endurance which are all called isotonic endurance. Muscular endurance is developed through endurance training which leads to adaptations in the slow-twitch fibres that allow them to produce energy more efficiently and better resist fatigue. The PRT is used in a number of ways to develop muscular endurance in slow-twitch muscles fibers. Isotonic, isometric and isokinetic exercises could be mentioned here. Unlike strength development which requires high resistance, muscular endurance requires low resistance and repeated contractions with short rests. Muscular endurance exercises are performed with a relatively high number of repetitions and lower resistance (Siedentop, 2001). Just like muscle strength, muscle endurance is also necessary for optimal health and maximum performance. The fireman without this mentioned component of health-related fitness would not be

able to fight bushfire for hours continuously. The marathon and other long distance athletes also need muscular endurance for them to perform creditably. It has been proved by Corbin et al. (2003) that athletes and people interested in jobs requiring high-level performance such as the law enforcement and fire safety are, especially, likely to benefit from good muscular endurance fitness. A person with appreciable muscle endurance will be able to perform for long periods of time without undue fatigue. In this state, the person will have enough energy to perform daily work efficiently and effectively and has reserve energy to enjoy leisure time. Authorities, including Welk and Blair (2000) share the view that an individual who is strong would be less fatigued, because relatively less effort would be required to repeat muscular contraction. An assertion made by Clement and Hartman (1996) indicates that, a person who is strength trained would fatigue as much as four times faster than a person who is endurance trained.

Fahey et al. (2003) also confirms a slight correlation between endurance and strength, since the development of one component influences the development of the other to some extent. Training for muscular endurance follows the same variables just like training for muscular strength. The difference comes in as follows. While strength training requires higher resistance or heavier weights, endurance training requires lighter weights or lower resistances. The number of repetitions per set is lower for strength training, but the number of sets, usually 3 sets, per workout is the same for both strength and endurance training. It is important to note that both strength and endurance training need a day or two within a week for resting to prevent any health problem (Siedentop, 2001). Trunk Curl-Up (dynamic), Push-Ups, Flexed Arm support (static) and Side Leg Raises

performed for a number of repetitions without a weight are exercises that could be used to develop muscular endurance in the abdominals, the triceps of the arms and the outer thigh muscles respectively. The above mentioned activities are also used to evaluate muscular endurance. A rating scale which is age based is used for the classification. To be in the high performance zone, a man of 17-26 years should be able to perform Curl-Up 35+ as a score. For the same age group, a score of 29+ for Press-Ups will be in the high performance zone. A man of the same age group falls to the low zone when he scores less than 15 and 16 respectively for Curl-Ups and Press-Ups.

Flexibility

Flexibility is the measurement of the achievable distance between the flexed position and the extended position of a particular joint or muscle group. This measurement depends on the length and looseness of the muscles and ligaments due to normal human variation and the shape of the bones and cartilage that make up the joint (Chek, 2002).

Wuest and Lombardo (1994) have defined flexibility as the ability of the various joints of the body to move through their full range of motion. Insel and Roth (2001) refer to flexibility as the ability to move the joints through their full range of motion. To them flexibility is not a significant factor in the everyday activity of most people, but inactivity causes the joints to become stiffer with age, causing poor posture, back, shoulder and neck pains. Prentice (1997), has defined flexibility as the ability to move freely throughout a full, non-restricted, pain-free range of motion about a joint or series of joints. According to Lindsey et al. (2000), flexibility is the measure of the range of motion available at a joint or

group of joints. It is determined by the shape of the bones, cartilage in the joint, length and extensibility of muscles, tendons, ligaments and fascia that cross the joint. The President's Council on Physical Fitness and Sports [PCPFS] (2005) has defined flexibility as the ability to move joints and use muscles through their full range of motion.

Sit-and-reach test is a good measure of flexibility of the lower back and the back of the upper leg muscles. As well as the potential for muscle wasting, inactivity brings with it a tendency for our muscles to become less flexible, thus decreasing the 'range of motion' of our joints as we age (i.e. the joints stiffen). Regular stretching exercises and full 'range of motion' activities (such as gently swinging the arms and 'high kicking') will reduce or delay this onset of inflexibility. Stretching for flexibility is best done after you have completed your endurance or resistance training, because the muscles are warm; as a result they will be able to be fully stretched. Long, slow stretches are recommended (hold for 20-30 seconds), with each stretch being taken to the point where a slight discomfort is experienced. Each stretch should be followed by a short rest, and then repeated several times. All the major muscle/tendon groups (legs, abdomen, arms, shoulders, wrists and so on) should be stretched. Stretching should be conducted several times per week, preferably after conducting aerobic and/or resistance training (American Heart Association and the National Heart, Lung and Blood Institute, 2005).

It is interesting to know that there is no ideal standard for flexibility. There is little scientific evidence to show that a person who can reach 2 inches past his or her toes on a sit-and-reach test is less fit than the person who is able to reach 6

inches past his or her toe. Too much flexibility as well as too little flexibility could be detrimental (Corbin et al., 2003). To develop flexibility, it is recommended that muscles are stretched past normal length until resistance is felt. For duration, the stretch should be held from 5 to 10 seconds initially, building to 30 to 45 seconds (Wuest & Lomdardo, 1994).

The importance of flexibility to health, good posture and physical performance is even appreciated by animals like the cat and the dog who stretch after sleeping to maintain good joint mobility. Every person needs some flexibility to perform efficiently and effectively in daily life. Body builders who have developed bulged muscles through improper weight-training, usually sacrifice flexibility in order to develop muscle strength. In strength training, it is important to ensure that all movements are carried through their full range of motion to satisfy the good thumb rule; stretch what you strengthen and strengthen what you stretch (Scott, 2002).

Improvement in flexibility can reduce muscle strain from trying to do things which your current flexibility prohibits without effort. It can improve back movement and muscle pain and will sometime help with problems such as migraines (Crump, 2000). Proper stretching is one of the more helpful ways to reduce chronic pain. If you don't stretch, your muscles get tight and weak, which leads to pain. One of the main causes of back pain is tight hamstrings (Calabrese, 2001).

While stretching may make you feel better, it does not remove a potential case of injury. This is why stretching, especially static stretching, before working out does not prevent injuries (Kurz, 2000). Fox (1998) and other authorities like

Fahey, Insel and Roth (2001), have recommended flexibility and stretching exercises to help maintain good joint mobility, increase resistance to muscle injury and soreness, maintain good postural alignment and help to improve personal appearance and image. According to Lindsey et al. (2000), adequate flexibility provide the following health benefits. Backache and the risk of muscle strain is reduced when a person is flexible.

Flexibility is also associated with effective daily functioning, including driving ability among older adults and brings about improved athletic performance. Lack of flexibility causes stiffness or contractures. Too much flexibility also leads to problems like loose jointedness, hyper mobility or erroneously as double jointedness. Some experts believe that hyper mobility may lead to athletic and dance injury at the knee and ankle. It may also develop premature osteoarthritis.

Stretching has been the physical activity used to improve flexibility. The three basic types of flexibility exercises are ballistic or dynamic stretching, static stretching and proprioceptive neuromuscular facilitation (PNF) stretching. Static stretching, by its name, is done by stretching the muscles slowly and held for a period of several seconds with no movement in the group of muscles stretched. If performed correctly the probability of tearing a soft tissue is very low and is recommended for beginners, for people with a history of muscle injury and for people who do not need exceptional levels of flexibility for athletic performances. This type of stretching could be done with active or passive assistance. With the active assistance, the opposing muscle group is contracted to produce a reflex relaxation (reciprocal inhibition), making it easier to stretch the muscles you are

stretching. A typical example is by contracting the shin muscles to stretch the calf muscles. Passive assistance comes in when a partner or the hands are used to pull the toes backward to stretch the calf muscles. The problem noted about static stretching of any type is its negative effect on performance. For several seconds of rest period after static stretching, subjects could not display their maximal speed and top agility because their muscles were less responsive to stimulation and coordination was also affected. Static stretching reduces the force production of the stretched muscles (Rosenbaum & Hennig, 1995). It was revealed that, after performing 3-15 seconds stretches of the hamstrings, quadriceps and the calf muscles, the vertical velocity of majority of vertical jumpers reduced (Knuds, 2000). A fast dynamic movement immediately after a static stretch may injure the stretched muscles (Kokkomen, 1995). The PNF stretching is also static in nature, but most commonly characterized by a precontraction of the muscles to be stretched and a contraction of the antagonist muscle during the stretch against a passive assistance. This type of stretching has been popular for rehabilitation since the 1960s (Corbin et al.,2003). Ballistic stretch comes in when muscles are stretched by the force of momentum of a body part that is either bounced, swung, jerked or rocked. It is the momentum created by the movement of the body part that stretches the muscle.

As with static stretching, ballistic stretching could be done actively, passively with the assistance of a partner or by gravity. This method of stretching has the advantage of stretching the muscles further than the other methods, but there is always the high risk of injury. However, because many athletic activities are ballistic in nature, sport-specific ballistic stretches are appropriate for most

athletes. This brings in the principle of specificity in sports training. It is important to appreciate the fact that each method of stretching has its advantages and disadvantages, and the best method for anyone will depend on the persons physical condition and the aim for stretching, whether to increase range of motion or just to maintain it. (Corbin et al., 2003; Fahey et al., 2003).

Many people do not realize the impact that periodic stretching has on the fitness level of their body, or its ability to perform. Stretching before weight training can actually improve your overall lift strength, as well as your endurance. Stretching before a workout is paramount to realizing maximum strength gains and necessary to experience the greatest benefit during a workout. Gains in strength are not the only benefit from routinely stretching during a workout. After the cardiovascular or weight training activity one should always stretch to allow the muscles to extend to their fullest range of motion. This provides two significant benefits;- the first of which is that it prevents your range of motion from becoming limited. This prevents you from becoming muscle bound, and from having to work too hard in your daily activities. The second benefit is that stretching after a workout helps to remove the waste that has built up in your muscles during the workout. This speed up muscle recovery, and lessens the muscle soreness that is typical of any fitness program (Johnson, 2006). The appropriate time for stretching is still a problem among experts, but until scientists reach a consensus, it seems wise to stretch when the muscles are warm. This means that stretching could be done in the middle or near the end of the workout (Fahey et al., 2003).

It is impractical to test the flexibility of all joints. The tests for flexibility are, therefore, specific to joints. Prentice (1997) has outlined a series of tests which include the sit-and-reach test, total body rotation and shoulder rotation test to measure flexibility in the hamstrings and low-back, the trunk and hip and the shoulders, respectively. The sit-and-reach test, for example, is done by sitting on the floor, legs straight and feet 12 inches apart, the student places the hands together and reaches forward as far as possible. The reach is measured on a graduated scale along which the forward stretch is made. The greater the distance reached, the greater is the flexibility (Wuest & Lombardo, 1994).

Some common and natural limitation factors to flexibility are as follows: (1) lack of use of a body part or joint, injury or disease can decrease joint mobility, (2) the lack of use of a body part or joint or static positions held for long periods leads to shortened muscles, ligaments and other soft tissues and loss of mobility, (3) the inability to stretch far enough forward indicates tightness in the lower back and hamstrings which comes by due to ageing and inactivity (Lidell, 1997). Body builders who fail to move the weights through a joint's full range of movement lose flexibility in that joint. Diseases such as arthritis and calcium deposits can damage a joint, and inflammation at joints can cause pain that prevents movement. Injuries and accident of various kinds which damage muscles and tendons also lead to loss of flexibility in the affected joints (Scott, 2002).

Body Composition

Body composition, the fifth composition of health-related fitness and wellness has been defined by Corbin et al. (2003) as the relative percentage of muscle, fat, bone and other tissues of the body. Wuest and Lombardo (1994) have

also defined body composition as the attainment of the appropriate proportion of lean body tissues to fat body tissue. Another definition given by Anderson et al. (1995) is that body composition refers to the relative percentage or amount of fat tissue in the body. Apart from the above, the President's Council on Physical Fitness and Sports (2005) has also come out that, body composition is the make-up of the body in terms of lean mass (muscle, bone, vital tissue, and organs) and fat mass.

Fat is found in all of the body's cells. However, a special type, the adipose cell, stores fat. Body fat serves to cushion organs and stores energy for future needs. In general, women who tend to have large stores of fat in the abdominal area; tend to store more fat in their hips and thighs than men. About half of the body's fat is located under the skin (subcutaneous fat). Two factors determine the amount of fat found in the body; the number of adipose cells and the size of the adipose cell. The number of adipose cells increases before birth and continues to rise until puberty. Children who become obese at an early age are believed to have too many fat cells. Also, adolescents who become overweight seem to develop a greater number of fat cells than those of normal weight. It is thought that by early adulthood, the number of cells becomes fixed.

In addition to cell number, cell size is a factor in obesity. The size of the adipose cell depends upon the amount of fat stored within it. Fat cells increase until early adulthood but may increase under certain conditions. In the mature adult, fat cells size fluctuates as a function of caloric balance. If more calories are consumed than needed, the excess is converted to fat and stored in the adipose cells. Under this condition, adipose cells swell fat. When the energy from fat is

needed to fuel activities, the fat cells lose stored fat and shrink in size. (Prentice, 1997).

Fat content of the body is significantly associated with physical activity. Athletes and other active people are less obese than sedentary individuals. Lack of exercise is the prime cause of obesity of all age groups. Obesity refers to the above average amount of fat contained in the body (Buskirk, 1974). This in his view is dependent upon the lipid (fat) content of each adipocyte fat cell) and on the total number of fat cells. The prevention of obesity through regular exercise and proper diet is more successful than a treatment for it.

Energy balance means consuming the same amount of energy through food intake as is being expended by activity. Wilmore et al. (1977). Person is said to be in a positive energy balance when body weight is gained and negative energy balance when body weight is lost. The weight gained may be in the form of fat or fat-free (lean or muscle) weight. The latter is possible when a person is in a positive energy balance while participating in an exercise programme at the same time.

Apart from the above factors, Corbin et al. (2003) glandular disorders and basal metabolic rates (BMR) are contributing fattening agents. Experts have mentioned that, about one or two percent of over-fatness is directly caused by glandular disorders. Thyroid problems can cause low metabolic rates that result in fat gains. In the view of Wyne (2000), this “old myth” that obesity occurs as a result of a low metabolic rate is unfounded. To him, obesity can only occur when energy intake remains higher than energy expenditure for an extended period of time. BMR is the indicator of a person’s energy expenditure when totally inactive.

Younger and active people have a higher BMR which prevents fats accumulation, and older and inactive people have a lower BMR which leads to fats accumulation. Kearney (2000) has made it clear that, physical inactivity is an important contributor to the ever increasing levels of overweight and obesity. Lindsey et al. (2000) have pointed out that, it is the essential fat tissues which are used in the body for insulation around nerves, fat pads in joints, temperature regulation, shock absorption, regulation of essential body nutrients including vitamins A, D, E and K and forming cell membranes are the amount of fats most needed for good health than storage fat located beneath the skin as well as inside the abdominal cavity are necessary. Experts have agreed that males and females should possess not less than 5% and not more than 10% of essential fats. It is the non essential fat levels in excess of the essential fat that poses health risks. (Anderson et al., 1995) Higher percentages (over 25% in men and over 35% in women) of storage fat in the body promote obesity, heart disease, diabetes, stroke, cancer, liver disease, depression, low self-esteem and others (Corbin et al., 2003).

Although some scientists and dieticians reject the "eat less at night to burn more fat" theory and believe that 24 hour calorie balance is the only thing that matters, there are some logical and scientific reasons why fat loss is accelerated if you eat less at night and keep the last meal at least two hours from bedtime:-

1. You are less active at night and are burning fewer calories
2. Your metabolism is slowest while you are sleeping
3. You will release more insulin at night compared to in the morning

4. Your glycogen stores are fuller after a day of eating so you are more likely to store excess carbohydrate as fat instead of storing it as muscle glycogen (Johnson, 2006).

Obesity can lead to severe health problems. Willett (2004) warns of the danger of Type II diabetes for even young people who are obese. Weight-related conditions lead to some 300,000 premature deaths a year in the United States of America. According to Velcu, Adolphine and Angus (2005), obesity can have a tremendous impact on the psycho-social, physical and economic health of those afflicted by it. In the view of Haughton (2000), obesity raises the risk of diabetes, and fatness is linked to early menstruation, a risk for hormone influenced cancer. People who are obese are more likely to suffer from coronary diseases, adult onset diabetes, gallstone, arthritis, high blood pressure and some types of cancer. People with extra weight around their middle; 'apple shape' are at more risk of some disease than those who have most of the extra weight around their hips and thighs; 'pear shaped'. People who are over-weight find it more difficult to be physically active and this may add to their health problems. Most of the health problems are removed once the extra weight is lost. Although cigarette smokers weigh less than people who do not smoke the risk from smoking are more than those of being obese (British Nutritional Foundation, 1998). Being over-weight, can have the effect of hastening sickness and death. The fatter people are, the more likely they are to die earlier than they should (Hope, 2000). International Obesity Task Force (2004) has found out that, the health risk of obesity takes time to develop and can be avoided by losing weight. A study conducted by Weinstein, Sesso and Lee (2004) revealed that BMI and physical activity were both significant independent

predictors of incident diabetes with increased BMI having a greater effect than low activity. Obese, low activity women were at highest risk of developing diabetes.

The fight against obesity has also become a problem. Most people use dietary restrictions to control obesity, but experts in this field of study recommend the combination of regular exercise for only 30 minutes, can be beneficial, because exercise burns calories. Jones (2004) has emphasized that, increased physical activity and healthful dietary behaviours are necessary for the reduction of obesity. Kearney (2000), shares the same view by pointing out that, weight loss is best achieved by combining changes in eating habits with increased amounts of physical activities. According to the British Nutrition Foundation (1998) being plump (BMI 25-30) but not obese, is not a risk to health, but people in this range are encouraged not to put on any more weight and to ensure that they are exercising regularly and making sensible dietary choice.

It may come as a surprise to some people, but it's now clear that resistance training with weights leads to increased fat loss. Its crucial to understand that in addition to cardiovascular or aerobic exercise, resistance training is an important element in any effective fat loss program. Muscle tissue is metabolically active in your body. In other words, muscle burns calories even at rest. The higher your percentage of muscle mass, the higher your resting metabolism. Strength training will increase your lean muscle mass, which results in an accelerated metabolism. Fat, on the other hand, burns very little calories at rest, and is less dense than muscle. A pound of fat takes up more room than a pound of muscle. This means that as you lose muscle (when you cut calories drastically, or if you are sedentary)

and gain fat, your scale may tell you that your weight is the same. But your clothes will fit differently. The basic premise behind weight training is the promotion of fat loss by increasing lactic acid levels in the body, which in turn produces higher growth hormone levels. This puts the body in an optimal state to burn fat and build lean tissue (Johnson, 2006).

Excessive dieting may increase the prevalence of eating disorders such as anorexia, nervosa, bulimia and even obesity. Being underweight or having low body fat levels of between 11-16% is also a risk to health, as it can increase the risk of conditions such as osteoporosis and amenorrhea; absence or infrequent menstruation and frequent injuries in women (British Nutrition Foundation, 1998).

Walking can be a very effective component of a weight-loss program. It is beneficial and ranks high compared to other popular exercise activities. For example, walking at 4 miles per hour, matches bicycling at 10 miles per hour. Striding at a more leisurely rate at 3 miles per hour requires the same energy as cycling at 5 miles per hour (Prentice, 1997). According to Willett (2004), a well known writer on nutrition and health, for many people, walking is an excellent alternative to other types of physical activity because it does not require any special equipment, can be done anytime and anyplace, and is generally quite safe. His advice, refers to brisk walking, not just taking a stroll, for 30 minutes daily. Bird (2005) has also postulated that, walking drops weight, makes you faster and brings diabetes under better control. Current research on obesity is focusing on endocrinological effects, body metabolism and on genetic influences, once

thought unlikely causes. It is no longer thought that the reduction of the number of calories in a person's diet will automatically lead to a reduction in weight.

How much exercise is needed to make a difference in your weight depends on the amount and type of activity, and on how much you eat. Aerobic exercise burns body fat. A medium-sized adult would have to walk more than 30 miles to burn up 3,500 calories, the equivalent of one pound of fat. Although that may seem like a lot, you don't have to walk the 30 miles all at once. Walking a mile a day for 30 days will achieve the same result, providing you don't increase your food intake to negate the effects of walking (American Heart Association and the National Heart Lung and Blood Institute, 2005). A study by Krall and Dawson-Hughes (1994) also revealed that, a walk of only about 1 mile per day may improve bone health. They measured bone mineral density and habitual walking in a group of 239 post menopausal women. Women who walked more than 7.5 miles per week had higher mean bone density of the whole body and of the leg and trunk regions, than women who walked less than 1 mile per week. They also had fewer declines in bone density during a year's follow-up. A recent report by a team of Japanese and Danish researchers indicated that, breaking up an exercise session, by adding a rest period in between, may boost a workout's fat-burning efficiency. In their research, seven men were made to exercise for two 30 minute stretches, taking 20 minute rest break in between, they burned more fat than when they exercised for a single 60 minute session, and then rested afterward (Exciting Ebony, 2007).

Continuous cardiovascular exercise, such as walking, jogging, stair climbing, or cycling, sustained for at least 30 minutes, will burn body fat no

matter when you do it. However, to get the maximum benefits possible from every minute you invest in your workouts, experts advise that aerobic exercises should be done before you eat your first meal. It has been revealed that early morning aerobic exercise on an empty stomach has three major advantages over exercising later in the day. Early in the morning before breakfast, the levels of muscle and liver glycogen, as well as blood sugar are low since they breakdown to provide glucose for various bodily functions that go on during sleeping. Working-out before break- fast, when glycogen, the body's primary and preferred energy source is in short supply, forces the body to tap into its secondary or reserve energy source; body fat. To the experts, exercises done immediately after eating a meal, also burns fat, but the amount burnt will be less, because the carbohydrates eaten will be burnt first. The body always burns a combination of fat and carbohydrate for fuel, but depending on when exercise is performed, one can burn a greater proportion of fat relative to carbohydrate. The second benefit derived from early morning exercise sessions, according to experts, is what is called the "afterburn" effect. When an exercise is performed in the morning, fat is not only burnt during the session, but the body also continues to burn fat at an accelerated rate after the workout. This happens because, an intense session of cardiovascular exercise can keep your metabolism elevated for hours after the session is over. The third benefit of early morning workouts, though is not fat reduction, but a feeling of accomplishment that stays with you all day long after an invigorating workout (Venuto, 2005).

Obesity is a reversible condition, and with careful attention to both prevention and treatment, it should be possible to tackle this problem in the

future. Where dietary intervention, behavioral therapy and promotion of physical activity have failed to manage clinical obesity, anti-obesity drugs like orlistat, which is a pancreatic lipase inhibitor could be used (Wyne, 2000). Comparing a person's weight to his or her age and height is a poor way of checking whether that person is obese or of a healthy weight. Care should be taken when using the body weight of a person to determine his or her health or wellness status, because people who do a lot of exercise and possess a large muscle mass can be high in body weight without being too fat. Also the state of hydration or dehydration of a person affects his weight. You can lose weight just by losing body water, or gain weight by increasing body water. You can also be overweight, yet not be over-fat. Over-weight means having excessive weight relative to physical size and stature, while over-fat or obese refers to excessive fat. The age-height-weight method often gives broad ranges for acceptable weight and fail to take into account different body types (Wuest & Lombardo, 1994). A person having large muscle mass due to regular physical activity could appear to be over-weight, but not too fat (Fahey et al., 2003). This is to emphasize the point that using only one technique to measure body composition may result in misinformation. The use of the Body Mass Index (BMI) is better than the use of the height – weight charts. Having a BMI of 25 is a standard for over-weight, 30 is a standard for obesity and can be damaging to health, while BMI of 40 is for severe obesity. BMI is calculated by dividing total body weight in kilogrammes by the square of height in meters (Key, 2004).

BMI increases with age in both men and women up to the age 64 years, then decreases slightly in older age groups. In women, BMI tends to be higher in

the manual social class than in the non-manual social classes. It is not clear in men (Wyne, 2000). When used with other techniques, the BMI can provide useful information, but the risk of misclassification is high among active people with a high amount of muscle if the BMI is used alone. The problem with weight measurement is that body weight varies from day to day and even hour to hour based on the level of hydration at the time of measurement. Short-term weight changes are mostly due to changes in quantity of water than real body composition changes. Weighing at the same time of the day, preferably early in the morning, is the best to prevent variations in weight (Lindsey et al., 2000).

The underwater weighing also known as “hydrostatic weighing” has proved to be the best method for assessing body fatness. This method involves the weighing of the body on land and under water to estimate body density. Corrections are made for the amount of air in the lungs when the underwater weight is measured. Calculation is based on Archimede’s principles on floatation or buoyancy, which says that “a body immersed in a fluid is buoyed up by a force equal to the weight of the displaced fluid” (Adrian & Cooper, 1995), and the fact that fat is lighter per unit volume than is water and, therefore, floats. People with higher percentage of body fat have lower density and are good floaters. The problem with the hydrostatic weighing is that it takes considerable time, specialized training and needs a well equipped laboratory (Siedentop, 2001).

The skinfold measurements is a preferred practical method for assessing body fatness, because it is relatively cheaper, does not require expensive equipment and easy to do. A pair of calipers is used to measure the thickness of the subcutaneous fat at two or three specific designated sites, the sum of which is

used to predict the percentage of body fat. The smaller the value of the sum, the fitter the individual is in terms of body composition. For better results, three measurements should be taken at each site and the middle result used. Measurements are made at the iliac crest, thigh, triceps, chest, abdomen and the calf. The skinfold method, if done carefully by a trained person, can provide a sufficient accurate gross measure of body composition (Wuest & Lombardo, 1994). Another technique is the use of the waist-to-hip circumference ratio. In this method, the circumference of the waist and the hip are measured. After the measurements, calculation is made by dividing the hip measurement by the waist measurement. The Waist-to-Hip Ratio Rating Scale is then used to determine the body composition rating. A high waist-to-hip ratio of greater than 1.0 and 0.85 for men and women, respectively, has been shown to be correlated with a high incidence of heart attack, stroke, chest pain, breast cancer, and death. This is true because experts have shown that upper body fat poses a greater health risk than lower body fatness (Corbin et al., 2003).

The bioelectric impedance analysis (BIA) is also a method used to assess body composition. The method ranks quite favourably for accuracy and has similar overall rankings to skinfold measurements technique. This test has an advantage over the skinfolds method in the sense that it could be performed quickly and is more effective for people high in body fatness. To measure body fatness, electrodes are placed on the body and low dose of currents are passed through the skin to measure the resistance to current flow. The principles behind this method is that muscles have greater water content than fat, and are better conductors and have less resistance to current. Predictions of body fatness are

made considering the overall amount of resistance and body size. Dehydration can affect results, and measurements should not be taken within three to four hours after a meal (Corbin et al., 2003). A more recent method for the determination of fat-free mass (FFM) is the dual-energy x-ray absorptiometry (DXA). This is considered one of the reference methods for body composition analysis, but it requires sophisticated technology. BIA is easy, non-invasive and relatively inexpensive (Pichard, Kyle, Gremion & Slosman, 1997).

The Need for Exercise

Exercise leaders and physicians find variations in motivation, attitude and responses to exercise in any group of people they encounter and advice. These variations may be due to such factors as age, health status, social class and previous experience. Exercise instructors should have a fair knowledge about many factors and the potential of each modifying an exercise prescription. A good understanding of exercise physiology is necessary for prescribing individualized exercise programmes. This knowledge includes such factors as steady state, efficiency, sources of energy and the relationship between work performed and oxygen intake or heart rate. In addition, the prescriber should also know how prescription can be affected by specific characteristics of an activity, which is whether static or dynamic, brief or prolonged, intermittent or continuous. Whether with the arms or legs, while supine, sitting or standing. This would lead to the appropriate selection of exercises, measurement and quantification of exercise. Since exercise may be contraindicated for some people who have certain diseases or medical condition, knowledge about health and fitness is very important (Skinner, 1987). The need for exercise arises when a person's functional capacity,

individual status and interest are known. When these are known, it is the duty of the exercise leader to define purposes of the programmes in order to plan accordingly.

According to Skinner (1987), there is no need for precision in exercise prescription and variation of activities to meet any observed changing needs. He stressed that there are two categories of people who need careful and precise prescription. These are athletes and those who have a disease that adversely affects their ability to exercise (for example coronary heart disease or emphysema). Although health, fun and fitness may come about as a result of intense training, the primary goal of most athletes is to improve performance (that is to acquire performance related fitness). Since this would be the reason the athlete is exercising, the exercise leader becomes more involved than the physician. He determines the specific characteristics of the activity in which the athlete competes, decides on the relative importance of pertinent physiologic factors and design a detailed programme geared specifically to develop those factors in particular athletes so that they can perform as closely as possible to their genetic potential.

On the other hand, disease-limited persons would probably be interested in improving their health. For these groups of people, fun fitness are generally secondary and performance is unimportant. The medical or physician would be more involved because of the medical nature of their problems. This is because they need guidance on how to improve their functional reserves and counteract further degeneration. Because some type of exercises would either be avoided or emphasized, they would have to exercise under varying degrees of supervision.

There are however, some other group of people for whom fun and fitness are the main reasons why they exercise although performance, health and appearance (aesthetic development) may be important considerations. Most of such people select activities that they enjoy or that allow them to have social, recreational or competitive interaction.

Effects of Incorrect Exercise

Exercise can become harmful to the body when practiced incorrectly. It must be controlled exertion focusing the workout of certain parts. Those working out must have a basic knowledge about the impact of the steps that they are performing. The variables in the exercise such as the choice of exercise, the number of repetitions, intensity of workouts, and the essential rest in – between the repetitions must be clear, for performing exercise without this knowledge can be dangerous. This rate of exercise related injuries is increasing daily. The real problem happens in exercise, when the person starts to perform the exercise incorrectly.

Minor incorrect exercises will not create much trouble and the only effect will be that they will not help for expected results, but the incorrect exercises become serious, when the exerciser continues it for better results, unknowing the that it is incorrect. According to Skinner (1987), the primary impact of the repeated incorrect exercise will be the hurting of body parts. He further elaborated that as exercises are focused on muscles, incorrect exercise will mainly damage the musculoskeletal system including muscles, ligaments, tendons and in extreme cases bones too. Incorrect exercises when severe, will lead to over strains which will bring out many physiological, psychological and biochemical

changes. Some of the ill effects of incorrect exercise include an altered heart beat, chronic fatigue, menstrual complaints, gastro intestinal distress, sleep and eating disorders, a decreased rate of healing and an increased occurrence of disease. Incorrect exercise becomes fatal when it affects the normal functioning of the metabolic system. The common metabolic alterations include increased basal metabolic rate, decreased muscle glycogen, decreased lactate response, negative nitrogen balance and hypothalamic dysfunction (Skinner, 1987). The impact of incorrect exercise reminds us about the need for a secure option for exercise. The stopping of the exercise will be the best option to avoid the ill effects of incorrect exercises. It is therefore always advised to perform the exercises with the help of a trainer.

The risk in the use of unknown exercise equipments and getting injured can be avoided with the help of an experienced personal trainer to ensure that you are exercising safely. Experts say that it is better to avoid exercise rather than doing it unknowingly. Exercises are always beneficial, but in correct exercises are the culprits for ill effects.

The Benefits of Physical Fitness

Humankind seems to have digressed into a relatively sedentary way of life. Today's mechanized modern man is also prone to such hypokinetic diseases (disease related to inactivity) as high blood pressure, lower back pain and atherosclerosis or thickening of the inner walls of the blood vessels resulting in a narrowing of their passage and leading to their eventual blockage. It is now believed that physical activity is humankind's most inexpensive and most enjoyable form of preventive medicine.

According to Rost (1987), physically active individuals are less likely than those who are sedentary to experience a heart attack and other forms of cardiovascular disease. An active person who does suffer a coronary attack has a less severe form and will be more likely to survive. Other benefits of physical activity for the active participant include maintenance of proper body weight. People who possess a good high level of physical fitness are seldomly fat. According to Getchell (1983), many studies have shown that body fat is reduced as the result of vigorous, regular training. Exercise is the positive variable in weight control.

Studies have also revealed that active people tend to have lower resting blood pressure than most sedentary people. Physical exercise causes increases in the enzymes responsible for the creation of aerobic energy in the muscle. In short, with increased numbers of mitochondria and a corresponding increase in enzymes (compounds that accelerate the speed of chemical reactions), the trained muscle is able to produce greater amounts of energy - a higher level of physical fitness and performance. One of the world's leading Nutritionist Jean Mayer has reported that he is convinced that physical inactivity is the most important factor explaining the frequency of "creeping" overweight in modern societies.

Another benefit of regular physical exercise is that exercise helps a person look, feel and work better. Various organs, systems of the body are stimulated through activity and as a result function more effectively. Proper exercises that increase the tone of supporting muscles can also improve posture. This not only improves appearance but also can decrease the frequency of lower back pain and disability. People who are habitual exercisers usually state that one of the reasons

they exercise is to “feel” better. It appears that physical activities provide an opportunity for the participant to enjoy a feeling of success that in turn may reinforce a positive self-concept. Dr. Kenneth Cooper of the Aerobic Institute of Dallas feels strongly that people who are physically fit often tend to be psychologically fit. They exhibit a high degree of fitness and improved self-image (Getchell, 1983). Dr. Cooper suggests that when people become physically fit, they feel comfortable because they are more relaxed, more in tune, more aware and more perceptive.

According to Skinner (1987), the benefits of exercise are numerous. One should know that exercise;

- (1) Helps to distribute weight.
- (2) Alone will not cause you to lose weight but physical activity and controlled diet of fewer calories can take pounds off your body.
- (3) Will help you retain an attractive body.
- (4) Will help you regain a well-proportioned and fit body but this will take time and effort on your heart.
- (5) Will keep your body in tiptop working order throughout life only if you have a daily and vigorous workout.
- (6) Coupled with diet and weight control is the most successful means of preventing or retarding the degenerative diseases of life.
- (7) Helps one gain strength and beauty in body movement skills.
- (8) Should be geared towards each individual’s needs.
- (9) Help overcome nervous tension, aids digestion and improves sleep.

- (10) Is useful in rehabilitating a heart damaged through illness, if the programme is graduated as recommended by a medical specialist.
- (11) Tones and firms the muscles of the abdomen, arms, legs and back,
- (12) Improves posture.
- (13) Rejuvenates by making the spine supple and strong.
- (14) promotes grace and poise through improved balance.
- (15) Gives a most pleasant massage to vertebrae through the gentle backward stretch.
- (16) Expands the chest.
- (17) Is beneficial to the bladder and sex organs
- (18) Gives feeling of energy or a quick energizer.
- (19) Helps to sag and firm female organs after childbirth.
- (20) Improves circulation to all parts of the body for example, brain, spine, pelvic area.
- (21) Tones up the central nervous system and calms it.
- (22) Stimulates abdominal organs.
- (23) Relieves palpitation, breathlessness, bronchitis, throat disorders or ailments and asthma due to increased circulation to the head and chest.
- (24) Tones the kidneys and massage the heart.
- (25) Helps to reduce excess fats.
- (26) Relieves menstrual problems.
- (27) Purifies the blood stream and enriches it.
- (28) Helps to lift depression.
- (29) Gives the eyes a clear and shining look.

- (30) Helps to reduce pains and stiffness at the joints.
- (31) Helps to stimulate the endocrines, pituitary and pineal glands into normal action.
- (32) Keeps the prostate glands healthy.
- (33) Helps to prepare women for childbirth.

Fundamental Exercise Principles

The sedentary lifestyle so prevalent today in most developed countries is associated directly or indirectly with a number of health problems (for example obesity, coronary heart disease, diabetes, hypertension as well as pregnancy related issues). In order to address and modify a person's health status there is the need to consider the proper selection of activities or exercises, understand why certain exercise are used, why certain exercises have to be avoided or emphasized and to determine the efficacy of exercise programmes relative to individual's health and physical needs as well as considering such factors as age, gender and environment (Skinner, 1987). Exercise provides a unique and practical means of assessing the body's capacity for physical effort. It can define the limits of physical and athletic performance as well as the functional capabilities of individuals.

Experts in physical fitness have recommended that a rapid development of cardiovascular endurance largely depends on frequency, duration and intensity of activities. It has been observed that the greater the frequency the longer the duration and the more intense the workout, the greater the impact in improving cardiovascular endurance. Health benefits can result by accumulating 30 minutes or more moderate intensity physical activity on all days of the week. Aerobic

capacity is perhaps the most important area of any fitness programme (Plate et al., 1995). There is a gradual agreement among researchers in the field of exercise that suggests that exercise for development of muscular endurance should be based on repetitions or time than load resistance itself (Fox & Matheus, 1981). Research has shown that a programme (low/high in volume) of sufficient intensity can reduce the risk of cardiovascular disease by enhancing an individual's blood lipid profile. Good muscular endurance also increases the static strength of bones, ligaments and tendons whilst preventing back problems (Holmstrong, 1992).

The basic aspect of all life is the foundation of exercise training. When people exercise and the effort is a little more than normal (called an 'overload'), their bodies respond by improving strength, flexibility, aerobic capacity, or any other component of fitness that the capacity challenged. Although any form of overload induces a response, to get the best response, one needs to perform the exercise in a well-designed, systematic fashion with reference to adaptation, progression, specificity, recovery, overtraining and individual responsiveness. (David & Brian, 2007).

It is important to note according to Pearlman (1988) that exercise should blend several movement techniques including dancing exercise stretches, modified posture movements and effective orthopedic movements for strengthening the back and perfect posture. She went further to say that this exercise programme may not address all fitness needs and that a regular aerobic activity should be included in individual's fitness plan. Aerobic exercises are those that commit an individual to consume more oxygen and are essential for cardiovascular fitness. For aerobic exercise to be effective, one's goal should be

to get the heart beating at the target pulse rate for twenty to thirty minutes. This target pulse rate tells us just how strenuous the workouts should be. This should be from 70 (seventy) to 85 (eighty-five) percent of the maximum pulse rate which can be estimated by subtracting one's age from 220 (two hundred and twenty). For example if a 35 year old woman wants to know how hard she should exercise, her first step is to establish her maximum pulse rate, which is 185 (220 minus 35). Her target pulse rate (70 percent to 85 percent of 185) ranges from 130 to 157. If her exercise programme is vigorous enough to keep her heart beating within this range for 20-25 minutes four times a week she's getting aerobic benefit from her workout. If it is not, she is not becoming aerobically fit. According to her, it is important to choose an aerobic activity, be it a sport, for example cycling, swimming, jogging or rhythmic movements (such as dancing) that appeals to the individual and can be woven into the fabric of his or her days with both ease and pleasure. To maximize mileage from exercise workouts anywhere, anytime, in any clothes, it is essential that you master the following fundamental exercise principles;

- 1) Concentrate and involve yourself as you move. Be aware of the various parts of your body that are moving with each exercise, no matter how simple it may be. Try to develop a sense of total involvement of all parts of the body, even though the action may be concentrated on one or two specific areas. Understand which muscles control which movements. This will not only help you to perform the exercises correctly, but it will also increase and improve your overall balance and coordination,

2) Never strain. You need not agonize to exercise. Everybody should learn the difference in his or her body between pain and the feel of a muscle being worked. Pain is always a red light that something is wrong. You and only you are the best judge of how far to go and how long to continue. Always keep in mind that when any part of your body is genuinely uncomfortable, it is an indication that you are applying yourself too strenuously,

3) Keep your abdominals contracted. As you exercise, whether standing, sitting or doing floor work, constantly remind yourself to pull in your abdomen (without holding your breath). Keeping your abdominal muscles contracted applies when you are concentrating your efforts on your other muscle groups as well. This would give you the proper alignment,

4) Remember to breathe. Correct breathe control is essential in order to keep your muscles well oxygenated. Constricting your breath during exertion can cause a slight headache. When you are first learning an exercise, simply relax and breathe as naturally as possible and when you are familiar with the movement, pay close attention to proper breath control. It is important to note that when you are using weights (lifts), exhalation should accompany the exertion,

5) Never sacrifice good placement for speed. It is far more important to execute an exercise correctly than rapidly. If time is limited and you are unable to complete an entire sequence of movements, do not pressure yourself in order to do so. Choose only what you are able to manage with precision and care

6) Avoid jerky, bouncing motions. Sharp staccato movements can place harmful demands on your joints and muscles. Bouncing can tear the web of connective tissues that holds muscles together. This is not only painful but it causes fluid to

enter the muscle, producing the tight or slightly swollen sensation the day after you exercise too zealously,

7) Instead of a bounce, think in terms of a gentler, pulsing motion. While practicing the exercise, try to avoid common movement errors such as hyper extending your elbows and knees, arching your back, tensing your neck and shoulders and swinging your limbs. All of these errors detract from the effectiveness of an exercise and place harmful and excessive demands on your body instrument. Be prepared to experience minimal soreness if you have not been exercising. Your muscles are being used in unaccustomed ways. Lazy, inactive muscles are naturally going to protest somewhat. This is absolute normal and should not cause you any concern. As the days progress, providing you incorporate some regular exercise, you will notice that the minor aches you formerly experienced will disappear.

8) Regardless of your age or shape, however, if you have had any serious medical problem or have been inactive for a significant length of time, it is always advisable to consult with our physician before attempting any new exercise programme.

Rosato (1986) regards flexibility as joint specific and that a high degree of flexibility in one joint was not indicative of higher degree in other joints. Hoeger and Hoeger (1989) asserts that exercises have been developed by experts to improve and test flexibility. One stretching exercise is required for each major muscle group that permits full range of movements. A complete workout depends on the number and length or repetitions. This according to them should last between 15 and 30 minutes. They further recommend that at each time, the final position should be held for five to ten seconds. However, the subject can

progressively increase the time to a maximum of one minute. Keep fit instructors should design programmes or workouts that contain a section (specific warm-up) where prescribed flexibility exercises are performed. According to Hockey (1985), since flexibility is influenced by age and its development is facilitated by target activity, students in the school should be encouraged to participate in exercises during their school age to enhance their total health through life.

Physical Fitness and Gender

It is well established that women exhibit several anatomic and physiologic characteristics that distinguish their responses to exercise from those of men. These factors have been shown to influence the training response and contribute to lower maximal aerobic power in women. According to Skinner (1987), the reproductive hormones, estrogen and progesterone, can influence ventilation, substrate metabolism, thermoregulatory and pulmonary function during exercise. Pulmonary structural and morphologic differences between genders include smaller vital capacity and maximal expiratory flow rates, reduced airway diameter, and a smaller diffusion surface than age and height-matched men. These differences may have an effect on the integrated ventilation response, respiratory muscle work and in pulmonary gas exchange during exercise. Specifically, recent evidence suggests that during heavy exercise women demonstrate greater expiratory flow limitation, an increased rate of breathing, and perhaps greater exercise induced arterial hypoxemia compared to men. The consequence of those pulmonary effects has the potential to adversely affect aerobic capacity and exercise tolerance in women.

According Holt et al. (1975), every woman has experienced some degree of dysmenorrhoea (painful Menstruation) running the full course from slight twigs in the abdominal region and lower back to violent cramps, nausea and headaches. According to them, every month during the space of 4 or 5 days there is a loss of about 4 ounces blood and endometrial fragments from the uterus. There is a slight swelling and tenderness in the breasts and abdomen and sometimes fluid accumulation in the tissues, which accounts for a small gain of weight at this time. Some female may feel slightly sluggish because of the temporary alteration of physiology, but the greatest inconvenience is the wearing of a protective pad rather than many slowing up of the body processes most healthy women continue their normal activities with little regard for the natural biological process that is taking place. According to them, it is not true that females must force any kind of exercise during menstruation. As a matter of fact, many women find it extremely helpful to participate in moderated exercise as a means of relieving or reducing the discomforts of dysmenorrheal. Internal protection used during the menstrual cycle has become popular among women, but it is advisable to remove the tampon immediately after vigorous exercise and substitute external protection. Friction caused by the activity may cause small fragments of the tampon to come off but the external protection will allow the body to flush out these fragments.

It anything according Holt et al. (1975) physically active women are likely to experience fewer complications during pregnancy and child birth plus a shorter duration of labor. There is a general agreement that moderate exercise during pregnancy is not only permissible but in most case advisable. Your gynecologist obstetrician should inform you about any contraindications. Vigorous or highly

competitive exercise is not recommended and you should best avoid activities where bumps or falls are likely because of the possibility of miscarriage concerning exercise after childbirth they recommend from 6 weeks to 3 months after delivery before beginning a programme to gradually work up to vigorous exercise, depending upon the pelvic examination. Walking and other mild to moderate forms of exercise are usually permissible as soon as you feel up to it.

Fox and Mathews (1974) have conducted a study concerning training frequency, duration and intensity of training programmes designed for females. Even though the information that was obtained was on males, it was released that it was applicable to the female. They came out with the fact that significant physiological changes can be realized from training programmes conducted as few as 2 or 3 times per week. And that female athletes usually train 5, even 6 times per week. According to them although the physiological benefits of more frequent training sessions per week are questionable, more frequent training sessions in this case may be necessary from a skill and or strategy stand point. Concerning duration, they revealed that significant improvement in fitness has been produced in young sedentary, females, with as little as 4 weeks of training with 5 training sessions per week. They further suggest that 6 to 7 weeks of training with 2 or 3 or 5 training sessions per week and 10 weeks with 2 days per week and 10 weeks with 3 days per week have led to significant improvements in aerobic and anaerobic capacities as far as training intensity is concerned, they stated that physical training for both men and women appears to be most critical in bringing about significant change. And that there is a threshold level of intensity which varies from individual to individual which is related to the initial level of fitness

(conditioning) of the participant. Therefore, the determination of proper training intensities based on heart rate and anaerobic threshold measures is also valid for females.

According to Rlafs and Lyon (1978) injuries to the reproductive organs are less frequent and less severe in the female than in the male. The most common injury in the female according to them is to the breast. And that repeated below to the breast can lead to confusions and hemorrhages into the loose fatty tissues. This may result in fat necrosis (death of fatty tissue), a condition which clinically is difficult to differentiate from carcinoma or cancer. It is therefore advisable for females to use breast protectors in most sports where there may be body contacts. In noncontact sports, it is also advisable to wear a good supportive bra in order to minimize the up and down lateral excursions of the breasts resulting from running and jumping.

Haycock and Gillette (1976) have outlined some guidelines for female participation in sports to assist those who may be involved in making decisions regarding participation in sports by girls and young women. The following guidelines were offered, that there is no reason to separate prepubescent children by sex in sports physical education and recreational activities, that girls can compete against girls in any sports activity if matched for size, weight, skill and physical maturation as long as the customary safeguards for protection of health and safety in sports and competitive athletics are followed, that girls can attain high levels of physical fitness through strenuous conditioning activities to improve their physical fitness agility, strength, appearance, endurance and sense of psychic well-being. These have no unfavourable influences on menstruation,

future pregnancy and child birth, that post pubescent girls should not participate against boys in heavy collision sports because of the grave risk of serious injury due to their lesser muscle mass per unit of body weight and that talented female athletes may participate on a team with boys in an appropriate sport provided that the school or community offers opportunities for all girls to participate in comparable activity.

On the average, women are shorter and lighter with more fatty tissue and less muscle mass than men. This is also true when female athletes are matched against their male counterparts for any given sports, subtle differences occur. Some of these performance differences between men and women can thus be explained by these body composition and size differences. Women tend to have lower level of lactic acid in their body following maximal exercise than men Drinkwater and Horvath (1975). One reason is the female's lesser muscle mass. According to Gisolli and Cohen (1979), the worse events for females compared with those of males involve performance times of around 1 to 4 minutes. This indicates that females may be at disadvantage when competing in those events that are explosive in nature.

Physiologically, exercise is a relevant stressor that is capable of activating the stress response and inducing the synthesis of several Heat Shock Proteins (HSPs) in both cardiac and skeletal muscle. Gender dimorphisms exist in many variables in response to exercise and hence, it is not surprising that compared to females, males demonstrate a significant increase in muscle HSP, coupled with enhanced cardio protection following a single bout of exercise. While those gender-biased differences have been largely attributed to estrogen, recent

observations suggest that elimination of testosterone in males suppresses the normal induction of HSP with exercise. Because HSP has been directly linked to exercise-induced cardio protection and inhibition of muscle damage, these observations may have important gender specific implications with regard to the efficacy of exercise and exercise training (Janz, Letucky, Elena, Eichenberger, Burns, Trudy, Torner, James, Willing, Marcia, Levy & Steven, 2010).

Regular exercise has been shown to reduce the risks of developing a variety of physical ailments as well as many life-threatening or debilitating diseases. For example, exercise has been shown to lower the odds of developing some forms of cancer, cardiovascular disease, osteoporosis, hypertension, diabetes and obesity (Dubert, 2002; Schaie, Leventhal, & Willis, 2002). Besides the many positive physical health benefits of exercise, research has also clearly suggested a positive association between exercise and psychological health and well-being across gender. This appears especially true for improvements in mood and the ability to cope with stress (Gauvin & Spence, 1995).

According to Tiggerman and Williamson (2000) women are more likely than men to exercise for appearance-related reasons. Given that women have been viewed as more concerned about their appearance than men, they are likely to exercise more than men as a result.

Objectification Theory can be applied to explain the reasons why women may experience more pressure than men to exercise to enhance their appearance. According to objectification theory, westernized societies sexually objectify and commodify the female body through constant evaluation by the entertainment and advertising industry. These industries are sending a message to society that

women are valued based on what they look like not who they are. Also, the media influence has caused the society in general to expect women to be of an “ideal” size. In this sense, men also come to expect women to be very thin. Women are constantly subjected to articles and advertising in magazines and on television, which promote images of an ideal female physique that has slim hips, bottom and thighs. Their male counterparts on the other hand are under very little or no pressure to fit into one ideal category. For some women, this thin ideal would be almost impossible to attain although they may spend a lot of time exercising (Fredrickson & Roberts, 1997). They further assert ongoing exposure to the sociocultural belief that women are to be judged by how they look leads women to internalize others’ views of themselves. This is referred to as self-objectification. (Strelan & Hargreaves 2005) assert that self-objectifying women would use exercise to respond to perceived sociocultural pressures to attain an idealized body.

Sports success according to Updyke (1975) is not limited to males – nor is it the most important measure of maleness in a man – nor is it indicative of lack of femaleness in a woman. According to him, it is quite possible for a girl or woman to enjoy the benefits of exercise as their men counterparts. Current knowledge, he indicates, reveals that, on the average women are not equal to men in certain sports skills because of difference in exposure to and experience in general. He asserts that, there is not evidence that regular exercise results in any physiological changes in the primary or secondary sex characteristics of male or female. Flexibility depends on factors such as heredity, exercise, age and gender. Women enjoy a higher degree of flexibility (Rosato, 1986). He (Rosato) further indicated

that flexibility appears to reach its peak at age 25 in most men while in women it is between 25 to 29 years. He went on further to say that by the mid-twenties, males experience a steady decline in flexibility whilst that of females is about 30 years of age.

According to Skinner (1987) in the past, when compared to programmes for boys and men, girls and women were denied the opportunity for quality athletics experiences. The United States Civil Rights Act of 1964 prohibited job description on the basis of sex. Certain changes brought about by this Federal Legislation have created considerable confusion and many questions. The impression created was that girls and women were not physically capable of coping with the rigours of high level athletic performance. This did not allow girls and women to obtain the traditional benefits of exercise and sport that boys and men have enjoyed for centuries. It also suggested different format of conditioning and fitness for girls and women than that for boys and men, and that programmes for girls and women should be unique and given special consideration.

In support of Skinner (1987) and Cureton (1973) asserts that women require the same kind of training programme as men with only slight variations. He noted that, before women can throw themselves whole heartedly into strenuous exercise programme they must be convinced that youthful vigor and beauty, good complexion and a trim but sturdy body can come from inside. Furthermore, the woman who is really concerned about her physical wellbeing must overcome the erroneous psychological attitude that there is something unfeminine about exercising the muscles she must accept the fact that there is simply no adequate substitute for walking, running, swimming and gymnastic exercises. Cureton,

further confirms that exercise can help to relieve the discomfort that many women experience during their menstrual periods. This he said, is because exercise has the effect of keeping the body heat up which is especially desirable during menstruation when blood congests in the uterus. The tilting of the pelvis in stretching movements which flatten the lower back helps to relieve the tensions, the congestion of blood and the subsequent discomfort in critical regions.

Hoeger and Hoeger (1989) states that the most common misconception about fitness is related to women and strength training. They said that because of the increase in muscle mass commonly seen in men, some women think that strength training programmes are counter productive because they too will develop large muscles. Simon and Schuster (1984) support the assertion by Updyke (1975) that there are no differences in athletic terms between males and females anatomies. This is because a woman's heart and lung function do not differ significantly from a man's and so there are no longer distinct 'female' training routines.

According to Skinner (1987), it appears that differences in height, weight, circumferences, diameters and skin fold thickness between genders do not exist until the age of 12 to 14 that is approximately the time of puberty. This is because before puberty, there are striking similarities between boys and girls of the same socio-economic background for all indices of sizes and maturity. He went on further to say that at puberty, major differences in body composition begin to develop between the genders largely due to associated endocrine changes. Testosterone secretion by the testes which stops at birth is re-instated at puberty producing an increase disposition of protein in muscle, bone, skin and other parts

of the body. The ultimate result is the male adolescent being larger and more muscular than the female adolescent, characteristics that carry over into adulthood. The anterior pituitary gland is unable to secrete gonadotropic hormones. Thus in girls, sufficient quantity of follicle stimulating hormone begin to be secreted. The ovary develops and estrogen secretion begins. This according to Skinner has a significant influence on body weight, broadening the pelvis, increasing the size of the breast and proliferating the disposition of fat particularly in the thighs and hips. Estrogen also increases the growth rate of bone, allowing the ultimate bone length to be reached between two or four years after the onset of puberty. There are rather substantial differences in anthropometric measurements at maturity. Men have broader shoulders, narrower hips and greater chest girth relative to the total body size. Men also tend to carry body fats in the abdominal and upper regions of the body whereas women pattern their fats in the hips and lower regions of the body.

Donatelle, Snow-Harter and Wilcox (1995) depicts the incidence of heart attacks in men and women as they age. For both sexes, he said, heart attacks dramatically increase with age, but the increase occurs at a later age for women than it does for men. One factor that accounts for this difference according to Donatelle, et al. is that women typically have high density lipoproteins (HDL). The Female sex hormone estrogen stimulates HDL formation, but this risk-lowering advantage is lost when estrogen production is reduced after menopause. Thus, postmenopausal women have almost three times as many heart attacks as premenopausal women. In addition, women over 65 years of age are nearly twice as likely to die from their hearts attacks as are men and special attention should be

given during physical fitness work-outs. The right exercises should be prescribed because the condition of women who are above 65 years of age.

In the view of Kankanala (2009), there are gender-specific benefits of exercise specifically for women. These he said, includes increase bone mineral density, effects on menstrual function, cardio vascular benefits, decreased risk of cancer, increased fitness during pregnancy, better management of musculo-skeletal injuries and increased benefits for women sports. Symptoms of menstrual cycle disorders or problems like low back pain, pelvic pain, depression, anxiety, headache and fatigue can be triumphed over with specific exercise programmes properly designed by exercise experts. Some of the benefits of regular exercise programme during pregnancy are increased aerobic fitness, decreased risk of gestational diabetes, greater chances of easier pregnancy and short labour, decreased post-partum depression, increased muscle tone and decreased post-due-date deliveries. Kankanala said however that, such exercises should be of low intensity aerobic exercises performed six weeks before estimated delivery date. He stated that participation in physical activity rather impacts positively on the reproductive health of women than harmful. For exercise to be harmful, he said, its performance should significantly exceed normal recreational levels in the absence of other stresses. According to him, there has been sufficient research evidence to show that sudden and severe changes in exercise volume can initiate and contribute to disturbances in menstrual function, including hypoestrogenic menorrhoea, anovulatory cycles and luteal phase deficiency. He said however that when severe training is significantly decreases or stopped, normal menstrual function returns within six months.

There is a gradual loss of bone mass in all humans beginning at the age of 30-35 years. According to Ajala (2006), calcium deficiencies have been linked with several major diseases. The most notable today being osteoporosis which consists of a thinning of the bone materials which leads to an actual loss of bone mass. This according to Ajala it causes bone to become brittle and prone to breakage. He said, women especially seem susceptible to this disease and that women as young as age 25 have been diagnosed with signs of significant bone loss. Exercise prescription for women should be done cautiously with professional guidance.

Rather a different view about exercise and gender was shared by Updyke, Schaefer, Stolberg and Johnson (1975). They confirmed the fact that sports medicine authorities and sports psychologists have concluded that outside minor distinctions of body structure and muscle – building capabilities, there are no differences in athletic terms between male and female athletes. They went on further to establish that a woman's heart and lung function do not differ significantly from a man's and so there are no distinct female training routines. They stressed that stretching, aerobic and muscle – building exercises are virtually identical and that hormonal controls do not allow women to develop masculine – type bulging muscles when they are subjected to weight – training exercises.

Gauvin and Spence (1995) examined the psychological effects of exercise among adult women and the impact of menopausal status. Two studies were conducted to examine the impact of menopausal status on the ability of women to derive psychological benefits from exercise. Regular exercises assessed immediately following an exercise class scored significantly lower on negative

mood dimensions and higher on positive mood than did non-exercisers, regardless of menopausal status. According to them, regular exercisers also showed significant improvements in mood state when assessed before and after a single exercise session. This effect was independent on menopausal status. The results suggest that the acute mood – enhancing effects of exercise are maintained despite the endocrine changes associated with menopause. It is argued that encouraging menopausal women to adopt appropriate exercise patterns may assist in the alleviation of psychological distress as well as providing physical benefits.

Peoples' motivation to exercise may vary from health reasons to reasons of improving their self-esteem, body image, and attractiveness. However, psychological and health reasons may be offset by factors that drive those who are motivated to exercise for appearance-related reasons. Indeed, people who exercise for weight loss, body tone and attractiveness reasons may be experiencing body dissatisfaction, reduced body esteem, self-esteem and lowered psychological well-being (Strelan & Hargreaves, 2005).

Exercise and Aging

When one is born, there are functional and structural changes that occur in most cells of the body throughout life. Although these aging changes actually begin before birth its effects are generally counter balanced by growth. At the age of 20 to 25 years according to Skinner (1987), when maturity is reached, growth stops and becomes more noticeable around the age 30. However, this varies from one person to the other and from one body system to another.

Aging is characterized by a decreased ability to adapt to and to recover from physiologic displacing stimuli (skinner, 1987). Since exercise is a form of

physiologic stimulation requiring complex forms of regulation and interaction among many systems, it is not surprising that the performance of certain types of exercises diminish with age. Similarly because training is a form of adaptation to repeated exercise stimulation, it is logical to assume that adaptation to training would also be at a lower level. Therefore people who test and prescribe exercises for the middle aged and older persons should be aware of the effects of aging on the various systems and their ability to exercise and train. A condition like dyspnea (difficult or laboured respiration) with moderate exercise may be due to age, poor fitness or pulmonary disease (Skinner, 1987). He further asserts that age is a risk factor in the development of various diseases and that the effects of these diseases should therefore be considered so that suitable exercises can be selected for the aged or ageing.

Aging is accompanied by such factors as a loss in size, number or both of functional units within every system of the body. Aging is associated with a decreased ability to adapt to and to recover from physiologic displacing stimuli. Aging, according Skinner (1987), is accompanied by a loss of body cells, within the system, body weight and a decrease in body cell mass. There is also a gradual loss of bone mass beginning at age 30 to 35 and accelerates after menopause in women and at age 50 to 55 years in men. This results in weaker bones that become more susceptible to fracture or after a mild trauma. Apart from the decrease in bone mass, the amount of body mass tends to increase and muscle cells decreases. Physiological aging occurs at different rates for different functions but some are apparently age resistant. He asserts that the four most common disorders associated with aging are cardiovascular degeneration, cancer,

arthritis and nervous-system diseases involving the cardiovascular, skeletal, muscle and nervous tissues. He explained however, that regular physical activity can by and large prevent or delay the onset of certain degenerative processes typically associated with aging. He said, it is rather unfortunate that many of the companions of maturity and later life are at the same time, the enemies of fitness and that those who seek to slow up the eroding processes often look to the relationship between physical fitness and longevity. He further revealed the presence of osteoporosis which is related the brittleness of bones with aging which Ajala (2006) also supports. Skinner dilates that age is a risk factor in the development of various diseases and that the effects of exercise on the aged should be considered when prescribing exercises.

Immediately at birth aging begins. This involves a lifelong series of changes in Physiological and Performance Capabilities. These capabilities increase as a function of the growth process throughout adolescence and steadily decline with increasing age. This decline may be due to the sociological constraints of aging than the biological effects. It is possible to maintain a relatively high level of physiological function if an individual maintains an active lifestyle. (Plate, Pratt & Blair, 1995).

Many, experts believe that Physical activity under taken during the school years has a life time impact. Saltin and Grimbsy (1968) supported these assertion in their research which portrayed that keeping up regular training and exercise programme from childhood has a positive impact on physical fitness in adulthood. That is, the functional capacity as an adult appears to be partly a result during the growing years.

According to Pangrazi and Darst (1986), the maintenance of Physical fitness must be on-going since gains in fitness level can be lost in a span of six to eight weeks. Fitness must therefore be made a long life pursuit. Certain exercise according to them such straight-legged fit-up, hurdlers stretch, stretches that demand excessive back cinching placing stress on the neck stretching exercise from a standing position where the knees are hyper extended, this is locked. Also deep knee bends (full squats) and the duck walk should be avoided. Straight leg raises from a supine position should be avoided since they may strain the low back. Flexibility activities should feature static stretching since flexibility is specific to a given joint, exercises must be done to stretch all joints. Muscles must be strong enough not only to accomplish tasks but also to keep the joints in line for good posture. The performing of exercises in the right order aids carry over effects and habits that increase overall physical fitness.

Education according to Cureton (1973) have shown that Progressive Physical training smoothly graduated from low to middle and even to High Gear work, will bring about impressive changes in adult humans. Such changes according to him are greater in those who begin such training in relatively poor physical condition and continue with a systematic programme three to six times per week, averaging an hour per day.

Knapp (1970) indicates that as a person gets older, he finds it increasingly difficult to comprehend verbal or visual data, especially when these are in anyway new or unfamiliar older persons are able to deal fairly well with a situation which can be adequately met by means of what he brings to it from the past but finds it difficult to learn a task which is new in some important way. He concluded that

the speed with which, a given level of performance is reached is related to chronological age. Ultimately, performance begins to deteriorate. This deterioration, he laments can be due to changes in the sensory organs and in the cardio – vascular, respiration and muscular systems, it can also arise because of the slowing down of the discrimination and choice processes in the central nervous system.

In the view of Sharkey (2002), physiological age (also called the biological or functional age) is composed of health, physiological capacity and performance measures. The best single measure of physiological age according to him is probably the aerobic fitness score. It tells us about the health and capacity of the respiratory, circulatory and muscular systems. Moreover, a considerable body of evidence shows an inverse relationship between aerobic fitness and a number of risk factors. It is therefore possible at age 55 (fifty – five) to have the health and performance capabilities of the average 25 – 30 year old. This fact has considerable relevance when it comes to changing our society's view of aging and its consequences, such as age discrimination in hiring. Age according to him does not ensure a rapid decline in performance, and when physical performance is important, the physiological age is a more accurate predictor of performance potential than chronological age.

Werner and Hoeger (1992) have stated that older adults have been neglected in the development of fitness programmes even though fitness is just as important for older people as it is for the young. Older individuals who are physically fit also benefit from better health and a higher quality of life. The trainability of elderly men and women alike and the effectiveness of physical

activity have been demonstrated through research older people who become more physically active gain in cardio vascular endurance strength and flexibility.. the extent of the improvement depends on their initial fitness level and the types of activities selected for their training (walking cycling, strength training and so on. With regard to strength development older adults can increase their strength levels, but the amounts of muscle hypertrophy achieved decreases with age. In terms of body composition, after the age of 60, in active adults continue to gain body fat despite the tendency toward lower body weight.

According to them, older adult who wish to take part in an exercise programme should have a complete medical examination including a stress electrocardiogram test. Recommended activities for older adult include calisthenics walking, jogging, swimming, cycling and water aerobics. They should not do isometric and other intense weight training exercises. Activities that require an all out effort and those that require participants to hold their breath tend to decrease blood flow to the heart and cause blood pressure to get up, placing a bigger load on the heart. Older adults should participate in activities that require continuous and rhythmic muscular activity (about 50 to 70 percent, of functional capacity). These activities according to them do not cause blood pressure to jump or over load the heart.

The aged would perform exercise with the view to improving on their physical appearance which they believe would be enhanced because of decreased body fat and firmer well-toned muscles. This is one of the motivating factors why they would want to continue exercising. Regular physical activity and participation in sports can increase endurance strength, joint mobility and co-

ordination in the aged. Physical activity, apart from preventing many problems that are associated with old age can also improve fitness and lead to improvement in performance levels. It is therefore not surprising that most of the elderly enjoy fitness programmes. There are so many theories of aging including those dealing with gene defects or chromosomal damage errors in protein. Apart from lack of exercise, other factors associated with aging include caloric intake and specific nutrients. Exercise produces free radicals that could harm the body. But moderate activity enhances antioxidant protection and the immune system. Chronic heavy exertion may therefore produce an excess of free radicals that can raise the risk of heart diseases and depress the immune system.

Skinner (1987) further stipulates that because exercise is a form of physiologic stimulation requiring complex forms of regulation and interaction among many systems, it is not surprising that the performance of certain types of exercises diminish with age. He suggests that before people prescribe exercise for the middle-aged and older persons, they should be aware of the effects of aging on the various systems and the ability to exercise and train. He went on further to say that aging is accompanied by a loss in body cells, within the system, body weight and decrease in body cell mass. There is also a gradual loss of bone mass according to him which begins at age 30 to 35 and accelerates after menopause in women and at age 50 to 55 years in men. This, he said results in weaker bones that become more susceptible to fracture or after a mild trauma. Apart from the decrease in bone mass, the amount of body mass tends to increase and muscle mass (size and number of muscle cells) decrease.

It is clear according to Fitts (1981), that with aging, the individual becomes weaker, slower, and less powerful. There is also a reduction in those performances requiring the regulating and coordinating functions of the nervous system in terms of balance, reaction time, agility and coordination. This according to him explains why older people cannot perform well in almost any type of activity except for low intensity activities in which energy demands are easily met.

According to Skinner (1987), aging of the cardiovascular system is almost always associated with atherosclerosis. He further states that, aging and cardiovascular diseases have similar effects on exercise capacity. As a result, patients with coronary disease could be considered to have advanced aging of the arterial system. Given these similarities he said, most principles of exercise prescription for these heart diseased patients would also apply to older persons; programmes for both groups require a more systematic and cautious approach. In the view of Kankanala (2009), men and women over 65 years of age benefit from exercise programmes. These benefits he said include maintenance of functional capacity, the ability to live independently and the reduction of risk of falls. He went on to say that, unlike exercise programmes with a stronger emphasis on aerobic exercise, exercise programme for the elderly normally emphasis strength, flexibility and proprioceptive training which promotes activities of daily living. Flexibility training improves joint mobility and fluidity of movement. Regular exercise with moderate intensity is more important for the elderly. Physiologically the following are also associated with aging;

1. There is a greater reduction in the number and size of fast-twitch glycolytic muscle fibers used for strength and speed than that in slow - twitch, oxidative endurance fibers
2. There is a decrease in the number of neurons, nerve conduction frequency and in the amount of connective tissue in the neurons and in the excitability threshold of the muscles in the nervous system,
3. The cartilages, tendons and ligaments become stiffer and more rigid,
4. According to Reddan as cited by Skinner (1987), the older person has less reserve and less room for error in the systems that control ventilation. This according to Skinner is because changes in the respiratory system makes it more difficult for the lungs to supply adequate levels of oxygen to the body during intense exercise.
5. With increasing amounts of connective tissue, decreased elasticity, higher blood pressures (BP) and higher total peripheral resistance (TRP), the heart has to work harder to pump the same amount of blood. This situation however, at rest is of little consequence unless there is a disease present.
6. The aging cardiovascular and respiratory systems are less capable of adapting with increasing amount of exercise.

It is clear, according to Skinner, that with aging, the individual becomes weaker, slower, and less powerful. There is also a reduction in those performances requiring the regulating and coordinating functions of the nervous system in terms of balance, reaction time, agility and coordination. This explains why older people cannot perform as well in almost any type of activity, except for low intensity activities in which energy demands are easily met. By the time most

of us reach the age of 50 or 60 we tend to accept the negative effects of aging as a fact of life that we have little control over. Recent studies according to Skinner have shown that we can alter the rate at which our bodies progress through our life cycle. This explains why some people tend to age much faster than others. There is a large body of scientific evidence that suggests that we can slow down and even reverse the symptoms of aging. In fact, many of us can be in better health in our 70's than we were in our 50's. In prescribing exercise for the elderly and adults, there must be a definition of the degree of risk associated with varying work loads for the prescription. This is because age is a risk factor in the development of various diseases. Suitable exercises should therefore be selected because there are clinical problems associated with aging, for example, hypertension, atherosclerosis, osteoporosis, emphysema, arthritis and neuromuscular incoordination.

It must be noted that the longer individuals have been sedentary and the more restrictions or limitations they have, the higher will be the number of modifications that should be made in their exercise prescriptions. Regular exercise incorporated into our lifestyle can improve heart and respiratory function, lower blood pressure, increase strength, improve bone density, improve flexibility, quicken reaction time, reduce body fat, increase muscle mass, and reduce susceptibility to depression and disease.

Aerobic exercise helps control Type II (Late Onset) diabetes because it aids in the metabolism of sucrose. It also strengthens the heart, helps prevent build up of cholesterol, improves the functioning of the liver, pancreas and most vital organs (Skinner, 1987).

Human growth hormone (HGH) and the lack of it is believed to contribute to the aging process. From the age of 50 most people stop producing HGH and the aging process accelerates as the rate of cellular reproduction, growth and repair slows. The good news is that exercise helps in the production of HGH which in turn helps us to maintain attention and alertness both of which are needed to get information into the memory (Rost, 1987). Exercise is clearly the best weapon we have to combat disease, to slow down and or reverse the effects of aging and to improve the quality of life.

Physiological aging occurs at different rates for different functions, but some are apparently age resistant. Although there is considerable individual variation, the four common disorders associated with aging are cardiovascular degeneration, cancer, arthritis and nervous system diseases involving the cardiac vascular, skeletal, muscle and nervous tissues (Skinner, 1987).

According to Johnson (2006), the period from 18 to 30 years of age is normally the period of greatest physical and mental vitality. It is from this point according to them that strength, muscular endurance and coordination tend to decrease and maximum Oxygen utilization and maximum ventilation also begin to decline. According to them, there is widespread evidence that regular physical activity can, by and large, prevent or delay the onset of certain degenerative processes typically associate with aging which is found in the relationship between activity and coronary artery disease but no evidence that regular exercise provides protection against the other three major age-related disorders like cancer, arthritis and nervous system disease.

It must be noted that when exercise programmes do not attempt to increase socialization and enjoyment, it is unlikely that older people will continue to participate in what should be a regular part of their life – style in addition programmes for the elderly should also be planned in such a way that they are associated with self - care and general well – being. Other general objectives should be to;

- 1) improve cardiovascular condition and general endurance,
- 2) maintain or improve flexibility, coordination and balance,
- 3) increase muscular strength and endurance,
- 4) maximize social contact and enjoyment of life,
- 5) improve weight control and nutrition,
- 6) aid digestion and reduce constipations
- 7) promote relaxation,
- 8) relieve anxiety, insomnia and depression and
- 9) sustain sexual vigour.

The ability to generate muscular force is also related to age. During puberty and adolescence, both male and female are able to increase strength at a peak of about 20 to 25 years of age. At this age, the strength of the muscles begins to decline (Ozhun, Mikesky & Surburg, 1994). According to them, after about 25 years, a person generally loses an average of 1% of his or her maximal remaining strength each year. Thus, at the age of 65 a person would only have about 60% of the strength he or she had at the age of 25. Those people who are more active are those who continue to train to considerably reduce the tendency towards declining

of muscular strength. Strength maintenance is therefore important for all persons regardless of age, gender and level of competition.

CHAPTER THREE

METHODOLOGY

The study appraised exercise prescription procedures by the numerous keep fit instructors in the Kumasi Metropolis, as to whether in prescribing exercises for their clients, they consider age and gender. This chapter contains the research design, the population, the sample and sampling techniques as well as method of data collection. It also describes the instruments that were used for data collection, the procedure followed in conducting the research and how data were analyzed.

Research Design

According to Miles and Huberman (1994) research design is a process which the researcher knows before the field work begins. This includes, what types of events to register, which actors to approach, which processes to consider as well as what instruments to employ.

The descriptive survey was utilized for the study. This design is preferred because it has the advantage of producing a good amount of responses from a wide range of people. It also attempts to measure what exist with respect to variables or conditions in a situation and reports things as they are. This method describes the status quo (Key, 1997). Descriptive research studies are aimed at determining the nature of a group or a situation as it exists at the time of the study. Descriptive surveys are meant to describe one group and that only.

Oppenheim (1996) further contends that, the purpose of descriptive survey is to count; when it cannot count everyone, it counts a representative sample and then makes inferences about the population as a whole. In the view of Fraenkel and Wallen (2000), obtaining answers from large group of people to a set of carefully designed and administered questions lie at the heart of survey researchers. Fraenkel and Wallen outlined three key advantages associated with descriptive survey;

1. It provides a meaningful picture of events and seeks to explain people's perceptions and behaviour on the basis of information obtained at a point in time.
2. It can be used with greater confidence with regard to particular questions which are of special interest and value to the researcher.
3. Follow-up questions can be asked and items that are not clear can be explained further.

Fraenkel and Wallen (2000) also outlined a number of disadvantages including the difficulty of ensuring that questions to be reacted to during interviews, have exact wording. Another is that data could produce untrustworthy result because they may delve into private and emotional matters in which respondents might not be completely truthful. They also point out that retrieving a sufficient number of questionnaires administered for meaningful analysis to be made is a problem of the descriptive survey design.

Population

All keep fit clubs in the Kumasi Metropolis made up the target population. As indicated by Fraenkel and Wallen (2000), the population is described as a

group of interest to the researcher, the group to whom the researcher would like to generalize the result of the study. The accessible population for the study was one keep fit club from each of the following suburbs: Kwadaso, Ayigya, Tafo, Asafo, Patasi, Asokwa, Ashanti Newtown, Suame, Batama and Krofrom totalling about 600. These are people who come from all walks of life. They are made up of employed and unemployed, educated and uneducated, married and unmarried and of different age groups.

Sample and Sampling Procedures

The sample size was 130 respondents, that is, 100 participants and 30 keep fit instructors. This sample size (130) is supported by (Fraenkel, Wallen, 2000) who suggested that a sample size of at least 100 participants is enough if a generalization was to be made from survey study. A sample therefore, consists of a carefully selected subset of the units that comprise the population. Sampling also involves that process of choosing the units of the target population which are to be included in a study.

The sampling techniques comprised of cluster sampling, simple random and census sampling techniques. Cluster sampling is a form of sampling procedure in which the primary selection unit is a “cluster” (Miles & Huberman 1994). This method of sampling technique is employed when no sampling frame is available, when economic considerations are significant and when cluster criteria are significant for the study. According to them census sampling is a sampling technique in which all members of the population are included in the research. The Metropolis was divided into 10 clusters including Kwadaso, Ayigya, Tafo, Asafo, Patasi, Asokwa, Ashanti Newtown, Suame, Batama and

Krofrom. The fish -bowl simple random sampling was used to select one keep fit club from each of the clusters, making 10 keep fit clubs for the study. With this, numbers 1 to 10 were written on pieces of papers, put into a container and well mixed. Each of the numbers written on the pieces represented a name of keep fit club in each cluster. The first number picked from the container from each cluster represented that cluster for study. For the individual participants who took part in the study, numbers of 1 to 50 were used. But where the number of participants at the keep fit was less than 50, the pieces of paper with the numbers were reduced to the number of members present. Those who took part in the study were individuals who picked number 1 to 10 from the container. These ensured that every group had an equal chance of being selected for the study. Again, the fish-bowl technique was used to select 10 individual participants from each of the 10 keep fit club for the study. Census sampling technique was employed in selecting 30 keep fit instructors from the 10 selected keep fit clubs for the study.

Instruments

Two sets of self-developed survey instruments were used for collection of data from respondents for the study. One questionnaire for keep fit instructors and the other for the members of the keep fit clubs, called participants questionnaire. The composition and construction of the items were guided by the variables and related issues prevailing in the literature. The keep fit instructors' questionnaire contained 29 items whereas the participants' questionnaire contained 19 items. Keep fit instructors' questionnaire contained demographic data (age, sex, marital status, occupation, and academic qualification). Eight items (3, 5, 8, 12, 21, 25, 26, 28) were formulated for research question one, 8 items (7, 13, 14, 15, 16, 17,

33 and 27) for research question two, four questions (9, 11, 20 and 29) for research question three and one item (18) for research question four

The questionnaire consisted of close-ended items which demanded respondents to tick responses that best applied to them. It was anticipated that the calibre of respondents involved would supply true, genuine and reliable responses devoid of extraneous influence. The close-ended items aimed at ensuring uniformity in the response and thereby preventing subjectivity of any kind.

Notwithstanding the lapse of close-ended items in restricting the responses of the respondent, its adoption ensured effective editing and analysis of data (Schotte, Maes, Cluydts, & Cosyns, 1996).

The questionnaire offers:

1. The respondents limited interference.
2. Quick results and can be completed at the respondents' convenience.

It also has a higher degree of transparency and accountability than other instruments such as the interview technique.

Pre-testing of Questionnaire

After the questionnaire had been certified as meeting face and content validity by my supervisors and other senior lecturers of HPER, it was administered to a comparable sample in order to ensure that items were worded correctly and were understandable to respondents. This is done to sharpen and fine tune it by correcting possible weaknesses, inadequacies and ambiguities that could characterize the items. This afforded me the opportunity to ascertain whether the instructions provided for the items were explicit enough to elicit the desired responses. Four keep fit instructors and 48 participants of two different

keep fit clubs were sampled in Cape Coast using the census sampling, for this exercise. These participants were used because I considered them as having similar characteristics with those that were sampled for the actual study. Extra sheets of paper were attached to the questionnaire for respondents to comment on any identified inaccuracies and inadequacies. They were asked to read the items critically and indicate those that were difficult to understand and quite ambiguous. Based on these comments, I scrutinised and evaluated unclear, biased and deficient items and came out with those that were simply worded, self explanatory and free of ambiguities.

Validity and Reliability of the Instrument

To ensure the soundness or appropriateness of content validity of the questionnaires or instruments, the expert views of the principal supervisor, the co-supervisor as well as some lecturers of physical education department of the University of Cape Coast were taken into consideration. The responses were vetted and scored on a five point Likert scale so that items with a substantial correlation are retained whilst those with low correlation were discarded. The constructed scale was then administered to all respondents. The Cronbach coefficient alpha, a measure of internal consistency was used in the determination of the reliability of the study. The questionnaire for keep fit instructors yielded an internal consistency reliability of 0.76. This was considered to be acceptable since according to Fraenkel and Wallen (2000), the reliability coefficient should be at least 0.70 and preferably higher.

Data Collection Procedure

Data collection process started with the supervisor's approval. An introductory letter was sought from HPER department. Permission was sought from the keep fit instructors in order to conduct the study. The questionnaire were administered on the training grounds after a day's work out session, one week was given for the respondents to return the completed questionnaire. Completed questionnaire were collected at the training grounds.

Data Analysis

The participants were expected to respond to all the items of the questionnaire. Options were provided for respondents to choose from. The responses were edited, coded, scored and then entered into the computer for analysis using the Statistical Package for Social Sciences (SPSS) version 16.0 for windows. Since the study adopted the descriptive survey design, the data was analyzed using frequency counts and percentage scores. Percentage ranges of 0-50 was considered low and 51-100 was considered high for in the analysis of all research questions. To make discussions clearer and give quick visual impression, tables were used to simplify the analysis. Percentage ranges were used to actually draw conclusions in order to answer the various research questions. These were 0 – 50 (low) and 51 – 100 (high). One hundred and thirty respondents responded to the questionnaires. All questionnaires were returned (100% response rate). Since gender is dichotomous, values of 1 and 2 were assigned to men and women, respectively.

CHAPTER FOUR

RESULTS AND DISCUSSION

The purpose of the study was to investigate whether keep fit instructors of the various keep fit clubs in the Kumasi Metropolis consider the age, gender, risk factors associated with exercise and health implications of exercise before prescribing exercises for their clients. The views of the instructors and their clients were analyzed. Thirty male instructors participated in the study. Of this 19 had full time employment, seven unemployed and four pensioners. Two of the instructors had Teachers' Certificate 'A', five had Teachers' Diploma, one had Advanced Level Certificate, four - Ordinary Level Certificate, three - Middle School Leaving Certificate, four - Basic Education Certificate Examination and 11- no formal education. With this group of people the contents of the questionnaire was explained to them in the Local Language (Twi) in order to assist them to answer.

Research Question 1: To What Extent are Keep fit Instructors in the Kumasi Metropolis Aware of the Fundamental Exercise Principles?

The fundamental exercise principles include frequency, duration, intensity and type of activity being engaged in as well as overload, specificity, rest and recovery. Exercise is a necessity in maintaining perfect health. It focuses on exerting the body to burn calories, build lean muscle mass and lose weight. It must be a controlled exertion focusing workout of certain parts. Therefore those

leading workouts must have a basic knowledge about the impact of the steps that they are adopting.

Table 1: Knowledge about the Fundamental Exercise Principles

| Item | <u>Yes</u> | | <u>No</u> | |
|--|------------|-------------|------------|-------------|
| | n | % | n | % |
| Have you attended any course or workshop on physical fitness? | 6 | 20 | 24 | 80 |
| Do you engage the group in physical exercises at least three times a week? | 0 | 0 | 30 | 100 |
| A training session is at least one hour. | 30 | 100 | 0 | 0 |
| Are the clients engaged in moderate to vigorous physical activities? | 5 | 16 | 25 | 84 |
| Are the activities designed for specific needs of the clients? | 0 | 0 | 30 | 100 |
| Total | 41 | 27.2 | 109 | 72.8 |

Percentage ranges: 0 – 50% (low), 51 – 100 (high)

It is expected that exercise leaders become familiar with exercise variables such as the choice of exercise, the number of repetitions, intensity of workouts and the essential rest in between the repeats. These must be clear before subjecting people to begin an exercise programme. Biographic data on the instructors revealed that only four (13%) are first degree holders. The rest have certificates below first degree with 11(37%) without any formal education. Additionally, from Table 1, it was realized that out of the thirty instructors that were sampled, six (6) attested that they have attended courses or workshops on

physical fitness forming 20% of the total number. Twenty four instructors forming 80% of the total have not had any form of workshop or course on physical fitness and depended on their own experience to prescribe exercises for their members which is very dangerous.

If children are getting involved in sports, the ACSM (1993) recommends that stakeholders check out the qualifications of the coaches and trainers who will be working with the children. Just because somebody has worked out for years in gyms or competed in competitive athletics does not in itself qualify the person to be responsible for the safety and health of other individuals. There is certainly nothing wrong with having being a competitive athlete or body builder as these activities can be useful and positive experiences that one can draw upon to help and to inspire others. However, having been an athlete or body builder "in and of itself" does not always or necessarily qualify a person to be knowledgeable and competent in the design and implementation of safe exercise programs for the different populations of potential clients. Past quality experience along with education/training in the exercise science field is a plus. According to ACSM certified athletic trainers should have, at minimum, a bachelor's degree, usually in athletic training, health, physical education or exercise science. In addition, athletic trainers should study human anatomy and physiology, biomechanics, exercise physiology, athletic training, nutrition and psychology or counseling. It is incumbent on athletic trainers to participate in extensive clinical affiliations with athletic teams under appropriate supervision.

Skinner (1987) has reiterated that it is better to avoid exercise rather than doing it unknowingly. And that even though exercises are always beneficial,

incorrect exercises are the culprits for ill effects. The primary impact of repeated incorrect exercise prescribed for innocent clients will be the hurting of body parts. In support of this, 77% of respondents who are clients to these instructors stressed that they feel discomfort in their muscles during workouts. Sixty four percent indicated they are not able to cope with all the activities throughout each session. As a result 69% affirmed they feel pains during work outs. As exercises are focused on muscles, incorrect exercise will mainly damage the muscle skeletal system including muscles, ligaments, tendons and in extreme cases bones too. The most serious ill effects of incorrect exercise include an altered heart beat, chronic fatigue, menstrual complaints, gastrointestinal distress, a decreased rate of healing, sensitivity to stress, impaired immune function depression, decreased self-esteem and an increased occurrence of disease according to Skinner. He went on to say that incorrect exercises become fatal when it affects the normal functioning of the metabolic system. The common metabolic alterations include increased nasal metabolic rate, decreased muscle glycogen, decreased lactate response, negative nitrogen balance and hypothalamic dysfunction. It is in this light that the researcher believes that exercise leaders must avail themselves with information on exercise and physical fitness in order to prescribe and apply exercise correctly so that their members do not suffer the ill effects of exercise. If 24 instructors forming 80% of those sampled answered in the negative, it shows to a large extent the danger posed by keep fit instructors in trying to satisfy human needs.

As to whether instructors engaged the groups in physical exercises at least three (3) times a week all thirty (30) instructors responded in the negative and that

they meet once a week and on public holidays to exercise. This in the view of Plate et al. (1995) is not sufficient to reap substantial health benefits. For substantial health benefits to be achieved, Plate et al. prescribe thirty (30) minutes of moderate to vigorous intensity of physical activity on all days of the week.

When asked whether they designed their activities or programmes to cater for specific needs of their clients, all 30 of them (100%) said no. They said that they engaged their members in general physical activities with the hope that if any member has any physical need it may be catered for. According to Skinner, in order to address and modify a person's health status there is the need to consider the proper selection of activities or exercise, understand why certain exercises are used, why certain exercise have to be avoided or emphasized and to determine the efficacy of exercise programmes relative to individual's health and physical needs. The researcher found out that the keep fit instructors lacked that knowledge and which at times led some of the members out of the group because they do not seem to gain any health benefits from their associations with the clubs.

According to Brown, Burton and Rowan (2007), one does not need to work hard for a long time in order to benefit from exercise. Thirty minutes daily is good. They went on further to say that one can do ten (10) minutes in the morning, ten (10) minutes after lunch and ten (10) minutes at night. However, this can be built on to thirty minutes if one is able. They lament that most adults can tolerate up to an hour or more of exercise. It is generally a good idea for adults to rest a day before exercising again they said. Working out two days a week to start, leaving a day or two between sessions and then increasing to three and five days a

week is usually tolerated. They advised people not to exercise beyond five days a week unless there is a personal instruction from a professional.

According to Gaziano, Manson and Ridker (2007), there are three specific frequencies that we need to care about; these are the overall exercise frequency (shows how often and how many times we do any form of exercise per week), weight training frequency (shows how many times and how often we weight train per week), and muscle group or body part frequency which also indicates how often and how many times we train each muscle group or body parts per week. They recommended that for overall exercise frequency, at the very most, one can do six times per week but on the average three-five times per week is ideal with weight training frequency, majority of the population showed weight train three to four times per week and never more than two consecutive days in a row. These recommendations they said, creates a sweet spot in terms of allowing for optimal recovery and for best results. For muscle group or body part frequencies, they suggest the working out of each muscle group once per week, twice per week and at most three times per week.

As to whether clients engaged in moderate to vigorous physical activities twenty-five (25) of the respondents (84%) answered yes whilst five (5) answered 'no' (16%). Byberg et al (2009) outlines hazardous activities for high-risk individuals. Older people according to them intense workouts may be particularly hazardous for those with risk factors heart disease. Activities such as shoveling, running race, walking, tennis, heavy lifting and heavy gardening lead to stress the heart, raise blood pressure for a brief period and may cause spasms in the arteries leading to the heart which may pose danger to those high-risk individuals. They

further stated that competitive sports which couple intense activity with aggressive emotions are more likely to trigger heart attacks and recommends the advice of a physician before engaging in any activity of high intensity.

For heart protection according to Mikkelsen, et al (2006), the elderly above fifty years of age should start with 5-10 minutes of low-impact aerobic activity every other day and build towards a goal of 30 minutes per day and three times per week.

Research Question 2: To What Extent do Keep Fit Instructors Consider Age Differences in Their Exercise Prescription?

Table 2 found out the extent to which keep fit instructors in the Kumasi Metropolis considered age differences in their exercise prescription. When asked whether when admitting new members, their ages were factored in, all 30 (100%) instructors indicated that they did not consider clients ages be admitted so long as they (clients) were willing to join them. Skinner (1987) indicated explicitly that since exercise is a form of physiologic stimulation requiring complex forms of regulation and interaction among many systems, it is not surprising that the performance of certain types of exercises diminish with age. He went on further that age is a risk factor in the development of various diseases and that, suitable exercises should be selected for the aged.

Again, he stated that aging is accompanied by a loss of body cells, within the system and that there is a gradual loss of bone mass beginning at the age of 30 to 35 and accelerates after menopause in women and at age 50 to 55 years in men. This results in weaker bones that become more susceptible to fracture after a mild trauma. Ajala (2006), also revealed the presence of osteoporosis which is related

to the brittleness of bones and instructs that the effects of exercise on the aged should be considered when prescribing exercises. Fitts (1981) stated that, with aging, the individual becomes weaker, slower and less powerful. For that matter there is a reduction in those performances requiring the regulating and coordinating function of the nervous system in terms of balance, reaction time, agility and coordination and so low intensity activities in which energy demands are easily met must be adopted to cater for the aged. Clearly in the view of the writers, there is no way that instructors should subject the young ones and the aged in performing the same activities.

Table 2: Age and Exercise Prescription

| Item | <u>Yes</u> | | <u>No</u> | |
|---|------------|-------------|------------|-------------|
| | n | % | n | % |
| When admitting new members, do you consider their age? | 0 | 0 | 30 | 100 |
| Do members of all age groups perform the same activities? | 25 | 84 | 5 | 16 |
| Do the aged participate fully in the activities of the club during workouts? | 3 | 10 | 27 | 90 |
| Are the aged regular at workout sessions? | 4 | 13 | 26 | 87 |
| Are the physical fitness programmes drawn to cater for the aged and children? | 3 | 10 | 27 | 90 |
| Total | 35 | 23.4 | 115 | 76.6 |

Percentage ranges: 0 – 50% (low), 51 – 100 (high)

As to members of all age groups performing the same activities, 25 (84%) instructors subjected all members without regard to age to perform the same. According to Maeve O’Carroll and Odile Hendriks (2003), most women lose 25%

of bone mass by the age of 65, which is accompanied by reduced muscle strength and flexibility making the body less adaptive and more prone to injuries for such women. They lamented that instead of four 30-minute sessions each week, such women should do a low intensity workout of four exercise sessions a week to prevent bone injuries. This also explains the reason why 27(90%) of the instructors said the aged were unable to participate fully in the activities of the clubs during workouts. This means that their bodies naturally reject those activities that are likely to cause injury to them whilst those who do not listen to their bodies during exercise may be at risk.

As to whether physical fitness programmes were drawn to cater for the aged and children, only three (10%) of the instructors answered in the affirmative. This is what exercise experts (Skinner,1987; Fitts, 1981) have discouraged. According to Mustelin, Silventoinen, Pietil, Rissanen and Kapilo (2009), older people need a longer period to warm up their muscles. It helps in the transition from rest to activity. This prevents soreness or injuries in the elderly. They prescribe stretching exercises, quiet calisthenics and walking as ideal for the elderly. Stopping exercise too suddenly can sharply reduce blood pressure and is dangerous for older people. It may also cause muscle cramping. After exercise, older people should walk slowly until the heart rate is 10 – 15 beats above the resting heart rate.

Byberg et al. (2009) reiterate that elderly adults who exercise twice a week can significantly increase their body, strength, flexibility balance and agility and that small improvements in physical fitness and activity can prolong life and independent living. In spite these gains, they recommend that older persons

should have a complete physical and medical examination as well as professional instruction before starting an exercise programme.

Research Question 3: To What Extent do Keep Fit Instructors Consider Gender Differences in Their Exercise Prescription?

Research questions three was designed to find out whether the keep fit instructors in the Kumasi Metropolis consider differences in their exercise prescription. When asked whether they recommend the same exercises to both sexes, 12 (40%) of the response were affirmative whereas 18 (60%) responded in the negative. This suggests that a good number of the instructors did not encourage both men and women to do the same workouts or activities. This response was described as false by the clients of these instructors.

Eighty nine (89%) of the clients indicated all members (both males and females) are made to perform the same type of activities every training session. Exercise offers several benefits that vary among genders. The calorie burn is dependent on body size and muscle mass. In general, men are bigger than women and their bodies are higher in muscle, which means that they burn more calories doing the same workout.

Table 3: Gender and Exercise Prescription

| Item | <u>Yes</u> | | <u>No</u> | |
|---------------------------|------------|----|-----------|----|
| | n | % | n | % |
| Do you recommend the same | 12 | 40 | 18 | 60 |

| | | | | |
|--|----|------|----|------|
| exercises to both sexes? | | | | |
| Do you put both males and females together to perform the same activity? | 25 | 84 | 5 | 16 |
| Are the female members able to cope with all activities as their males counterparts during workouts? | 0 | 0 | 30 | 100 |
| Total | 37 | 41.3 | 53 | 58.6 |
| Percentage ranges: 0 – 50% (low), 51 – 100 (high) | | | | |

This is true for men and women who weigh the same as well. For example, if a man runs with the partner or spouse for the same length of time at the same intensity, their calorie burn will differ. Men and women differ in various biological dispensation and structure and therefore will be variations in exercise type, duration and intensity.

Lung capacity is a health component that may affect exercise in men versus women. A woman's lung capacity is often smaller than a male counterpart, which means that she may have difficulty breathing in some circumstances. If this occurs, a woman may have to stop while a man can keep going, making the workout more beneficial among males. According to Swedan (2001) muscles in both men and women possess an equal number of muscle fibers. However, a woman's muscle fibers are not as large. This is due to hormonal differences, as men have higher levels of testosterone, which is a potent hormone that causes much of the muscle growth seen during the adolescent growth spurt. This

hormonal difference is also responsible for the fact that women will develop less muscle when training with weights. As such men may be able to do more intense workouts than women. DiMenna stressed that males possess considerably greater strength than females for all muscle groups. On average, women score about 50 percent lower for upper-body strength and about 30 percent lower for leg strength. However, this does not mean that women have weaker muscles compared to men. Generally speaking, a woman's muscle will be capable of generating the same amount of force per unit of its cross-sectional area. This means that the strength difference relates exclusively to the fact that women have less total muscle to activate. Women will also respond similarly to a resistance-training program when it comes to proportional strength increase.

The absolute VO₂ max, which is the total volume of oxygen you can consume each minute, is typically more than 40 percent greater in men (DiMenna, 2011). This difference persists, although to a lesser extent, when the value is adjusted for body weight. This means that a man's aerobic capacity is greater, and this is reflected in the fact that female performance times are approximately 10 percent less in most track sports. Organ size and body mass are important determinants of this difference, as more weight distributed as fat is a hindrance to endurance performance. Men also have a larger heart, which gives them greater oxygen transport capacity. Conversely, women with smaller hearts require more blood to be pumped each minute at a given level of submaximal exercise because they have less hemoglobin in their blood to carry oxygen.

As a result of the anatomical, physiological and psychological differences between men and women, women have less strength, less speed and speed

endurance than men. The effectiveness in biomechanical and muscular activity of women is also less than men. According to Cohen, Beaton & Mitchell (2011), the general rule when training both men and women is that the training load for women should be about two thirds of the training load of a man and that training loads for women must be phased in over longer periods of time than for men. Strength training exercises must be applied more gradually for women than for men. Women finish their adolescent growth spurt earlier than men, and women can therefore start with strength training immediately after the adolescent growth spurt, up to 2 years before the men to compensate for the gradual application of strength training. Technically, the training of women should also be adjusted. In running events, the stride length of women is shorter and the arm action is less efficient, but the cadence (stride frequency) is the same for both men and women. Due to the shorter legs, hurdles for women must be lower. The lower hurdles allows for a low angle of attack, a faster and better co-ordinated action of the free leg and a speedier and more economic action of the driving leg. In jumps women must use techniques that rely less on leg strength, The run-ups for all jumps should be shorter for women. A longer run-up requires more leg strength during take-off in the jumps.

Research Question 4. To What Extent are Keep Fit Instructors in the Kumasi Metropolis Aware of the Health Implications of Exercise?

Exercise is a necessity in maintaining perfect health. Exercise focuses on exerting the body to burn off excess calories, build lean muscle mass and lose weight. However, exercise can become harmful to the body when practiced

without recourse to some basic underlying principles. People can get hurt and experience adverse effects to their health and even die as the result of a personal trainer not taking safety precautions.

Table 4 indicates that instructors do not sought medical examination from clients before admitting them into their clubs. A preliminary medical visit is normally recommended before the commencement of a physical and sport activity. This medical visit has as an objective to detect possible contraindications with the practice of sports or certain particular physical activities.

A contraindication can be given temporarily. Not all exercises are suitable for everyone. AAFP stressed that before one begins an exercise programme, one must have permission from the doctor. According to Calton et al. (2006), people who have medical conditions such as uncontrolled diabetes, uncontrolled seizures, uncontrolled high blood pressure, heart attack within the previous 6 months, hearth failure, unstable angina, significant aortic valve disease, aortic aneurysm, moderate or sever high blood pressure (systolic blood pressure over 160mm Hg or diastolic pressure over 100mm Hg) should seek a doctor’s approval before starting any exercise programme.

Similarly, individuals who have arthritis of the hips or knees, blood clots, chest pain, chronic lung disease, eye injury or recent eye surgery, joint swelling, history of smoking, hernia, shortness of breath and obesity should do likewise (Byberg et al., 2009).

Table 4: Knowledge about the Implications of Exercise

| Item | <u>Yes</u> | | <u>No</u> | |
|------------------------------|------------|---|-----------|-----|
| | n | % | n | % |
| Do you request for a medical | 0 | 0 | 30 | 100 |

| | | | | |
|---|---|-----|-----|------|
| examination before admitting members? | | | | |
| Do you conduct physical examination for new members? | 5 | 16 | 25 | 84 |
| Are the physical fitness programmes drawn to cater for the aged? | 2 | 6 | 28 | 94 |
| Are the physical fitness programmes drawn to cater for members recuperating from illness? | 0 | 0 | 30 | 100 |
| Total | 7 | 5.5 | 113 | 94.5 |
| Percentage ranges: 0 – 50% (low), 51 – 100 (high) | | | | |

They stressed that these conditions should be brought to lower levels before a person starts vigorous exercise program. According to Henderson (2011) exercise is good for the heart and circulation and that regular physical activity can speed recovery from a heart attack. He emphasized that people with heart problems should always check with their doctor or heart specialist before starting any exercise programme. The doctor has the client's history and can therefore determine how much physical activity is safe to engage in. It is therefore imperative to discuss with a doctor and a qualified trainer about the types of exercises that can build the strength and flexibility needed for particular reason. Although most sports or recreation require a mix of strength, agility, endurance and coordination, the degree of development required in specific areas will vary.

In order to ensure that all those who availed themselves as clients did not have any health conditions which could make certain activities dangerous to their conditions, I enquired if instructors conducted physical examination of new

members before admitting and subjecting them to exercise. Table 4 indicates 25 (84%) of the respondents do not conduct such important exercise. The absence of such an exam increases the health risks of the clients. According to Quinn (2011), the exam can help screen clients for potential illness or conditions that may limit or restrict their sports or recreational activity. Calton et al. (2005) further stated that people over 40 years old whether or not are at risk for heart diseases, should have a complete physical examination before starting or intensifying an exercise programme. Additionally, Gaziano et al. (2007) has suggested that anyone with a heart condition or history of heart disease should have a stress test before starting an exercise programme. They further recommend this test before a vigorous exercise programme for older persons who are sedentary and even in the absence of known or suspected heart disease.

Strenuous strength training or high-impact exercise is not recommended for people with uncontrolled diabetes (Mikkelsen et al., 2006). Such exercises can strain weakened blood vessels in the eyes of patients with retinopathy (a common diabetic complication). High-impact exercises may weaken many also injure blood vessels in the feet.

Regardless of the physical activity programming being used, some individuals will demonstrate improvement (i.e., responders), while others will not (i.e., non-responders). The individual response (i.e. adaptation) to physical activity is highly heterogeneous. No two individuals will respond in exactly the same way to a similar dose of physical activity. Heredity determines many physiological factors such as heart and lung size, characteristics of muscle fiber, physique and balance. The amount of rest and sleep as well as responses to the

environment (heat/cold, pollution, stress and altitude) vary from one person to another. Nutrition and past or current illness or injury will also have an influence on ability to perform. The body's physiological readiness for training is another important factor. Persons at the same chronological age can be at very different levels of maturity.

Therefore, the dose-response relationship is highly individualistic (Bouchard & Rankinen, 2001). The regimen is to be designed to suit the physical state of the individual. Table 4 indicates that the instructors did not factor in the aged and invalids who happens to be a part of the group. This only means that either they do not benefit entirely from the exercise programme or their situations are worsened.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The purpose of the study was to appraise the exercise prescription procedures by the keep fit instructors in the Kumasi Metropolis of Ghana. This chapter is devoted to the summary, conclusions and recommendations drawn from the findings of the study. Suggested areas for further research have also been captured.

Summary

The formation of keep fit clubs in Ghana came as a result of the awareness by both Government and individuals of the need to be fit in order to be useful citizens as well as increase productivity. Even though the keep fit programme started in the late 1970s, the early 1980s marked the beginning of the keep fit activities in the country. The first club to be formed was the Dansoman keep fit club in Accra by the then athletics coach of the National Sports Council. Since then keep fit clubs in the country have assumed new dimensions and have attracted people of different ages. It is in this light that the researcher conducted this study to appraise the work of the instructors on their familiarity with fundamental exercise principles with regard to age and gender as well as the risk factors associated with exercise. This is to find out whether the clients of the various clubs are exercising safely so that they do not suffer the effects of incorrect exercises.

The framework for this study was in five phases, with each phase elaborated in one chapter. Chapter one looked at the benefits engaging in regular physical activity and repercussions of leading a sedentary life. Four research questions were formulated to guide the study.

Relevant literature related to the study was theoretically and empirically reviewed in Chapter two. Literature related to cholesterol was reviewed under the following headings; the concept of physical fitness and exercise, the concept of fitness clubs, components of physical fitness, the need for exercise, effects of incorrect exercise, benefits of physical fitness, fundamental exercise principles, physical fitness and gender or age. The study was a descriptive survey since it considered gathering of data over a wide population to analyze and draw valid conclusions. Cluster sampling, simple random and census sampling techniques were used to select 130 participants for the study. A questionnaire was designed to gather data. The items in the questionnaire were mainly close-ended and were pretested with keep fit clubs in Cape Coast. It yielded a reliability co-efficient of 0.76. Frequencies and percentages were the statistical tools used in the analysis.

Main Findings

1. Keep fit instructors in the Kumasi Metropolis are not familiar with fundamental principles of exercise.
2. Keep fit instructors in the Kumasi Metropolis do not consider age differences in their exercise prescription.
3. Keep fit instructors in the Kumasi Metropolis do not consider gender differences in their exercise prescription.
4. Keep fit instructors in the Kumasi Metropolis are not familiar with the health implications of exercise.

Conclusions

It is concluded that a part from the fact that instructors in the Kumasi metropolis are of familiar with fundamental principles of exercise they do not also consider gender and age differences in their exercise prescriptions.

Recommendations

The following recommendations are based on the conclusions of the study.

1. Keep fit instructors should encourage their clients to go for a medical checkup from their doctors before engaging them in any physical training regimen
2. Keep fit instructors should adopt individualized exercise prescription within their programmes. That is to group clients according to the age ranges, different fitness levels, similar interest and gender.
3. Keep fit instructors should conduct physical examination of clients before beginning any exercise programme
4. Instructors should interview clients to find out whether they have a history of heart disease, smoking, hernia, chronic lung disease, chest pain, uncontrolled diabetes, uncontrolled seizure, high blood pressure or heart attack within the previous six months since these conditions need a doctor's recommendation or approval before exercising

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QUESTIONNAIRE

KEEP FIT INSTRUCTORS

Please respond by ticking (✓) against the appropriate answer in the space provided.

Male ()

Female ()

Age.....

Marital status: Married () Single () Widowed () Divorced ()
Separated ()

1. What is your occupational status?
Employed () Unemployed () Pensioner ()
2. What is your academic qualification?
Middle school certificate () O' Level () A' Level ()
Teacher's certificate 'A' () Teacher's Diploma () First Degree ()
Second Degree () No formal education ()
3. Have you done or attended any course or workshop on physical fitness?
Yes () No ()
4. How long have you been with the club?
(a) 1 – 5 years () (b) 6 – 10 years () (c) above 10 years ()
5. How did you get involved in the training of members of the club?
(a) Personal interest () (b) Approached by members ()
(c) Hired () (d) Applied for the position ()
6. How many times do you exercise in a week?
(a) Once () (b) Twice () (c) Thrice () (d) More than Thrice ().
7. How many times do you contact the group in a week?
(a) Once () (b) Twice () (c) Thrice () (d) More than Thrice ().
8. When admitting new members, do you consider their age?

Yes () No ()

9. When admitting new members, do you consider their gender?

Yes () No ()

10. What has been members' response to training?

(a) Average () (b) Above Average () (c) Below Average ()

(d) Indifferent ()

11. Do recommend the same dosage of exercises to both sexes?

Yes () No ()

12. Do members of all age groups perform the same activities?

Yes () No ()

13. Do you request for a medical examination before admitting members?

Yes () No ()

14. Do you conduct a physical examination of new entrants?

Yes () No ()

15. Do you subject them to any test before accepting them to know whether they are healthy to participate?

Yes () No ()

16. How long is a training session?

(a) 30mins () (b) 1hour () (c) 1 ½ hour (d) 2 hours ()

(e) More than two hours ()

17. Do members complain of discomfort, shortness of breath or pain after workout?

Yes () No ()

18. Do you have members dropping out of the fitness club since you took over?

Yes () No ()

19. Do you see improvement in the fitness and health of your members?

Yes () No ()

20. Do you put together both males and females to the same physical activities?

Yes () No ()

21. Do the aged participate fully in the activities of the club during workouts?

Yes () No ()

22. Are the aged regular at workout sessions?
Yes () No ()
23. Do you encourage your members to engage in other activities or games apart from general exercises? Yes () No ()
24. Are physical fitness programmes drawn to cater for the aged?
Yes () No ()
25. Are physical fitness programmes drawn to cater for members who have special health problems?
Yes () No ()
26. Are programmes drawn specially for members who are recuperating from illness?
Yes () No ()
27. Do you encourage the aged to do fitness activities outside your normal fitness programmes?
Yes () No ()
28. Do you offer assistance in the form of supervision to the aged?
Yes () No ()
29. Are the female members able to cope with all activities during workouts as their men counterparts?
Yes () No ()

8. Are you able to cope with all the activities throughout each session?
Yes () No ()
9. How often do you go for medical check up?
(a) Once a month (b) Twice a month (c) Once a year (d) None at all.
10. Has there been any improvement in your health since you joined the club?
Yes () No ()
11. Do all members perform the same activities?
Yes () No ()
12. Do you have any medical condition that you think exercise can help you solve?
Yes () No ()
13. In your opinion, do you think it is good to get involved in physical fitness programmes at your age?
Yes () No ()
14. Are you able to do all the activities at your age?
Yes () No ()
15. Do you encounter any pains during workouts?
Yes () No ()
16. How do you feel after workouts?
(a) Good (b) Very good (c) Pains all over (d) Stiffness in the joints.
17. Should physical fitness be left to the youth alone?
Yes () No ()

18. Do you enjoy the workouts during training sessions?
Yes () No ()

19. Do you think it is good to subject males and females to the same physical activities?
Yes () No ()