Chapter-1

Introduction

1.1 General Introduction
1.2 Statement of the Problem
1.3 Purpose of the Study
1.4 Delimitation
1.5 Limitation
1.6 Hypothesis
1.7 Definition of the terms
INTRODUCTION

1.1 General Introduction

The terms exercise and physical activity are often used interchangeably, but this article will distinguish between them. Physical activity is an inclusive term that refers to any expenditure of energy brought about by bodily movement via the skeletal muscles; as such, it includes the complete spectrum of activity from very low resting levels to maximal exertion. Exercise is a component of physical activity. The distinguishing characteristic of exercise is that it is a structured activity specifically planned to develop and maintain physical fitness. Physical conditioning refers to the development of physical fitness through the adaptation of the body of which various systems to an exercise program.

The post-world-II period has been a technological age, a period characterized by rapid growth in energy-saving devices, both in the home and at the workplace. During this period, physical activity became less and less common in industrialized countries, especially among the urban population.

Many people are interested in the reasons they should exercise regularly and in knowing what benefits can be derived from regular participation in a well-designed exercise program. The exercise may assume different forms different individuals. It may be jogging, cycling; participation in exercise program markedly influences physical, physiology and mental fitness of an individual.

It is proved that physical exercise is any bodily activity that enhances or maintains physical fitness and overall health and wellness. It is performed for various reasons including strengthening muscles and cardiovascular system, honing athletic skills, weight loss or maintenance, as well as the purpose of
enjoyment. Frequent and regular physical exercise boosts the immune system. It also improves mental health, helps to prevent depression, and helps to promote or maintain positive self esteem. Exercise also reduces levels of cortisone. Cortisone causes many health problems, both physical and mental.

According to the WHO, lack of physical activity contributes to approximately 17% of heart disease and diabetes, 12% of falls in the elderly, and 10% breast cancer and colon cancer. There is a direct relation between physical activity and cardiovascular mortality, and physical inactivity is an independence risk factor for the development for coronary artery disease. Persons who remain sedentary have the highest risk for all-cause and cardiovascular disease mortality.

Physical activity is thought to have other beneficial effects related to cognition as it increases level of nerve growth factors, which support the survival and growth of a number of neuronal cells. A number of factors may contribute to depression including being overweight, low self esteem, stress, and anxiety. Exercise always reduces depression.

Proper nutrition is as important to health as exercise. When exercising, it becomes even more important to have a good diet to ensure that the body has the correct ratio of macronutrients whilst proving ample micronutrients, in order to aid the body with the recovery process following strenuous exercise. - Kimber N. and others, 2003.

For some time now, it has been common knowledge that exercise is good for one’s physical health. It has only been recent years, however, that it has become common place to read in magazines and newsletters that exercise can also value in promoting sound mental health. Although this optimistic appraisal has attracted a great deal of attention, the scientific community has been much more cautious in offering such a blanket endorsement. Consider the tentative conclusions that ‘physical activity appears to relieve symptoms of depression and anxiety and improve mood’ and that ‘regular physical activity
may reduce the risk of developing depression, although further research is needed on this topic.’ -PCPFS Research Digest, 1996.

That exercise is at least as effective as more traditional therapies is encouraging, especially considering the time and cost involved with treatment like psychotherapy. Exercise may be a positive adjunct for the treatment of depression since exercise provides additional health benefits (e.g. increase in muscle tone and decreased incidence of heart disease and obesity) that behavioral interventions do not.

The way in which exercise influences statural, hypertrophic and reparative growth is examined from the perspective of the human lifespan. Statural growth depends on a neuroendocrine program which channels nutrient energy towards increments in lean body mass. Exercise can facilitate statural growth and is a necessary stimulus for reparative growth through its stimulatory effects on secretion of growth hormone (GH) and other anabolic hormones. An exercise-associated increase in GH secretion is a response to acute or prolonged exercise-induced fuel shortage that directs metabolism towards utilization of lipids and promotes growth. Hypertrophic growth is less dependent on hormonal and nutritional support then satural growth, and exercise provides the necessary mechanical stress for growth and remodeling of the musculoskeletal system. Excessive mechanical strain may suppress hypertrophic growth. Exercise provides mechanical and metabolic stimuli that are necessary for hypertrophy of the musculoskeletal system and increased GH secretion for reparative growth. - Sports Med., Uni. Of Michigan, 1995.

There are some questions in the mind of people. What actually happens to the body on school going students as a result of regular physical exercise? Which systems are affected and to what extent? What are the differences between the functioning of their systems in well conditioned and poor conditioned students?
In general most of the guardians try to keep fit their sons or daughters through food and medicine. They know, “Without fit nobody can reach to the target.” But they do not know how to keep fit themselves. Being fit means being in good shape physically for everyday workouts, healthy and adaptable. Being in good fit means that individual is physically fit health enough to be capable of extra achievement in everyday life.

Often during adolescence and adulthood, however, habits of inactivity are developed and permitted to become a part daily living. The development of these habits of inactivity is primarily due to the presence of labour serving devices. One hundred years ago, only 6% of energy used to produce goods was mechanical, the remaining 94% was generated by human or animal muscle power. Today, however, as much as 96% of all energy used is mechanical, and 70% of the working population performs non-physical tasks. Power steering and power brakes driving lawn mowers, remote control television and similar devices have made the people weaker and lazier. - Devid K. Miller and others, 1982.

So it is necessary to know about the effect of conditioning on physiological, psychological parameters and physical fitness in the human body.

Conditioning periods should be proceeded by proper warm-up consisting first of gradual stretching followed by a series of active warm-up exercise. At the conclusion of the practice a gradual cool-down should be employed to permit the additional blood volume called forth during exercise to return to the portal reservoir and to allow the body to complete establish homeostasis. - Arnheim and others, 1978.

The main point of conditioning is primarily to develop strength, and endurance in the type of work in which an improvement is sought, whether it may be static or dynamic. It is very usual, within a month reasonable amount of timers, speed, strength, flexibility and also physiological factors are seen to be increased. But the effect of conditioning is not same for all age groups.
Physical activity, exercise, and Fitness

The term “physical activity” describes many forms of movement, including activities that involve the large skeletal muscles. Activities that involve the small skeletal muscles (e.g. playing board games, drawing and writing) are important, but they do not provide the health benefits of activities that involve the large skeletal muscles and require substantial energy expenditure.

Types of physical activity:

(a) Aerobic
(b) Anaerobic
(c) Lifestyle (e.g. walking, climbing stairs etc.)
(d) Play
(e) Sports
(f) Weight bearing (physical activity that requires people to move their own weight.)

Exercise consists of activities that are planned and structured, and that maintains or improves one of components of physical fitness. Physical activity suggests a wide variety of activities that promote health and well-being. Exercise is often associated with fitness maintenance or improvement only.

Types of Exercise:

(a) Calisthenics
(b) Flexibility (Stretching)
(c) Isokinetic
(d) Isotonic
(e) Muscle-fitness.

Participating in physical activity is beneficial to people of all ages. Physical activity contributes to fitness, a state in which people’s health characteristics and behaviors enhance the quality of their lives.
Types of Fitness:

a) Physical fitness: A set of physical attributes related to a person’s ability to perform physical activity successfully, without undue strain and with a margin of safety.

b) Health related fitness: A physiological state of well-being that reduces the risk of hypo-kinetic disease; a basis for participation in sports; and vigor for the tasks of daily living. Components include cardiorespiratory endurance, muscle strength endurance, flexibility, and body composition.

c) Performance related fitness: Common components of physical fitness (e.g. agility, balance, coordination, speed, power, reaction time) that enable participation in sports and other physical activities; also called skill or motor fitness.

Growth and Exercise

Both growth and activity are natural processes and also sure signs of life. The interaction between internal (genetic) and external (environment) forces makes organisms moving and increasing in size right from the moment they are conceived. While activity or movement continues throughout the organism’s predetermined lifespan, growth is limited both by time and space; it almost comes to a dead-end as soon as an organism to full dimensions. Besides good nutrition and congenial environment, physical activity is necessary for the organisms to survive and develop to their full potential. Physical activity is, perhaps, the most important factor for quality growth of an organism.

As an aspect of development, growth refers to the structural increase caused by the biological process in which the organism increases in size, volume, stature, and dimensions and gain weight. It is a creative process in as it adds something to the physical, mental and intellectual dimensions of the organism. Staring his life almost like an invisible speck, the human organism grows to be more than five feet tall and more than 150 pounds in weight.
Growth is indicative of enlargement of cells, fibres and muscles, elongation of the skeleton and increase in the general volume of the body. It brings visible, measurable and enumerable changes in structure and form. It is quantifiable in the sense that it can be recorded in pounds, inches, and points. Conspicuously marked by structural transformation, it enables us to make clear-cut distinction between an infant and a child, between a child and an adolescent. The growth curve of an individual moves up its pre-determined course up to a certain age and then stabilizes. There is hardly any growth in man past youth.

While physical activity is a generalized term applied to any visible physical movement that organisms, in general, make they a sign of life and survival, exercise refers to the physical activity that is planned, structured, and repetitive for the purpose of conditioning any (rather all parts) of the body, and is utilized to improve health, maintain fitness and is important as a means of physical rehabilitation. Every time we talk of exercise in a formal sense of the term, we, in fact, mean all kinds programs of physical activity, play, recreation, sports etc, that are organized at school, in a gym, in a club, on the athletic fields or elsewhere formally or informally. It is this activity (exercise) that provides real meaning to life because it gives us myriad benefits in terms of growth, health and longevity.

The relationship between growth and exercise is beyond any question because without activity there can be no growth. The effects produced by exercise on the human body may be divided into immediate and remote, subjective and objective, ponderable and imponderable, permanent and temporary, real and imaginary.

Research evidence on the effects of all forms of physical activity indicates that functions of the skin and kidneys are increased; digestion and assimilation are greatly improved; the expansion of our lungs is greater and the contractions of the heart are stronger, blood pressure being slightly increased; and finally, all the muscles, both voluntary and involuntary, contract more
quickly and with greater effectiveness. All these physiological functions have a
direct relationship with the growth of a person, and this relationship continues
almost throughout life. The more these processes are made to work at an
accelerated pace or overload, the greater quality of growth do they ensued.

As result of adequate and regular exercise, an increased supply of oxygen in the capillaries, together with a more rapid and abundant outflow of the products of wear and waste then takes place under the condition of rest, seem to constitute the common primary cause of the improved or efficient functioning of the tissues and organs of the body, in other words, the quality of growth in terms of higher efficiency for work and sport. The condition may perhaps not inaptly be compared with the simple shitting of the lighted candle from the normal atmosphere into one of oxygen. As the candle burns with greater brilliancy, as its wick is consumed more completely, and combustion is more thorough when in an atmosphere of oxygen that it would be if merely surrounded by ordinary air, so also during exercise must all those chemical processes be improved and quickened upon which depend not only the quality but also the quantity of the function of the different cells of the body whenever brought in contact, as is the case during exercise, with an amount of oxygen from two to seven times greater, for a given time, than under conditions of rest, and when, furthermore, the products of such increased combustion are carried off so much more rapidly than is the case under normal conditions. Such general effects as these, directly traceable to almost any form of vigorous, are simple matters of daily experience, and every one of us has, no doubt, experience and verified them frequently.

Though the increases or changes in the dimensions of most of tissues and organs, and the consequent changes in their efficiency naturally occur as a function of time (they are quite naturally to take place as expected), research evidence is fairly wide spread about the more remote, objective and permanent effects of exercise that is carried out in the gymnasium, on the athletic fields or in the swimming pool under well-planned developmental programs. Numerous
studies conducted across continents confirm that regular participation in moderate physical exercise, in most cases of groups put under sustained under scientific observation, brought about substantial gain in height, weight, strength, lung capacity, muscle girth, endurance and such other important variables having direct association with growth and development. Regular physical activity provides young people with substantial physical, mental and social health benefits. Regular practice of physical activity helps children and young people to build and maintain healthy bones, muscles and joints, helps control body weight, helps reduce fat and develop efficient function of the heart and lungs. It facilitates developing the skill of movement and helps prevent and control the feelings of anxiety and depression. -M.Kamalesh, 2012.

**Body Composition and Exercise**

Body composition is the proportion of the lean body mass and depot fat and it is one of the most important morphological features characterizing human organization. Obesity is defined as that percentage of body fat that begins to increase the chances for cardiovascular disease. Ideal body fat levels for men are 12% to 17% and 18% to 22% women. Body fat is essential for certain body functions. Sometimes body type, determined genetically, prevents an individual from achieving unrealistic body shaping goals. There are basically three body types. The Endomorph is characterized by a large block shaped body. The mesomorph is characterized by a solid muscular structure. The ectomorph is characterized by a frail, slight build and very little fat.

Body composition assessment has revealed that athletes generally have physique characteristics unique to their specific sports. For example, field event athletes have large quantities of lean tissue and a high percent body fat whereas long distance runners have the least amount of lean body fat weight. Nowadays body composition is considered one of the components of fitness as it plays important role in development fitness. For athletes weight gain must in the form of lean body weight, i.e., muscle mass. Strength training seems to increase muscle mass and strength effectively. Actually, individual
physiological variations and training factors affect weight gain. Because of this body weight body fat should be monitored on a regular basis and training program should be development accordingly. - Dr. Shyam Anand, 2012.

**Psychological variables and Performance**

Although psychological preparation is a component that has been often neglected by athletes and coaches alike, studies have shown that mental readiness was felt to be the most significant statistical link with Olympic ranking. Athletes have frequently been quoted to state how the mental aspect is the most important part of one`s performance. As Arnold Palmer, a professional golfer suggested that the game is 90% psychological. “The total time spent by the golfer actually swinging and striking the ball during those 72 holes is approximately seven minutes and 30seconds, leaving 15 hours, 52 minutes and 30 seconds of “thinking time”.

Within the parameters of psychological aspects of athletic performance, it is interesting to note that more than 70 percent questions raised discussed and debated at the international conferences and seminars on sport psychology pertain to anxiety and aggression as performance influencers, generally taken in a negative sense. Stress, anxiety, tension and aggression all belong to the genre of emotions. They arise under varying sets of circumstances and form a sort of continuum but always moving upward. Their far-reaching consequences for the physical and mental health of the people in general and performing athletes in particular, are an open secret. Stresses result from non-fulfillment of needs; continued stresses create anxieties, and anxiety leads to tension. The residual effect of tension is felt, monitored and evaluated both physiologically and psychologically and is ultimately linked with psychosomatic disorders.

Anxiety has both psychological and physiological implications in sport performance. For example, once aroused, it raise the general arousal level of the player to such an extent that he finds it hard to concentrate on his game due to constant bombardment on his nervous system and his inability to diffuse
tension caused by rising anxiety level. The ability of the players to monitor and judge situation correctly is reduced. His information processing mechanism gets over-stressed resulting either in wrong or slow response even to emergent situations. Under such a condition, the player is not focused—he wishes to do one thing but does something else. He loses control over his body and mind. - M. Kamalesh, 2012.

**Physiological Parameters and Exercise**

Mathew and Fox (1976) are of the opinion that the efficiency of an individual in performing physical activities depends basically on cardio respiratory changes and training causes development of cardio respiratory efficiency. Through training the efficiency of the circulatory and respiratory systems are improved and resting and exercise blood pressure values are lowered.

Long term exercises performed aerobically and anaerobically have different effects on the human body. With the long duration of physical exercises, the size of ventricular cavity of the heart becomes large which means that it is able to hold more blood during resting period. It results in a slower resting heart rate. The blood pressure recovery process following exercise is improved. Also, people who have high blood pressure are able to lower their resting blood pressure as a result of participation in long duration exercises. Total blood volume and hemoglobin increases. The additional hemoglobin increases the capacity of the circulatory system to carry substances to and from the active muscles. Decrease in percent body fat and an increase in lean body weight. It is also notes that regular long duration exercises lower cholesterol and triglyceride levels in the blood. -Ajmer Singh and others - 2003.

In keeping with the law of use and disuse, the heart and circulatory system themselves become stronger and more efficient after a prolonged period of regular vigorous exercise. Paralleling the more efficient heart and circulatory system through training and exercise there is a corresponding increase in the
efficiency of the respiratory functions in order to obtain the vital oxygen so
necessary for body processes. Due to training there is a slight decline in the rate
and depth of respiration during rest. This is accompanied, however, by a
slower, more even, and deeper respiration during exercise and return to normal
more quickly following it. There is an actual increase in the pulmonary
ventilation as the lungs can take more air with each inspiration. This is
accompanied by an increased ability to attain a greater minute volume of
ventilation partly due to the increase in the surface of alveoli, thereby
increasing the area from which oxygen can be absorbed. -H.M. Barrow, 1983.

**Performance Related Fitness Parameters and Exercise**

Physical fitness refers to the capacity of the person to function
effectively in physical work, training, and other activities without causing
fatigue. Maintaining good physical fitness requires regular training, healthy

Strength is a part and parcel of all motor abilities, technical skills and
tactical actions. The role of strength training for general health, good posture
and prevention of injuries is usually overlooked which in the long run can
prove harmful. An exercise for strength will results in the movement of specific
strength if the structure of the exercise is same, or at least largely resembles,
with that of the competition activity.

Speed, like strength and endurance, is a conditional ability. It has a
complex nature as it depends to a considerable extent on the central nervous
system. When muscles contract and relax repeatedly in a definite sequence then
the nervous system tends to adapt to this thereby resulting in “speed barrier”

Endurance, agility, reaction time are the very important ability in sports.
Improving personal components of skill-related fitness will allow you to
perform better in almost all situations and especially in the game of ball. For
example, increasing your agility will make you a better player in sports
including the game of soccer. Endurance will help you perform better in long
distance running. Better re-action time means better result of 100 miters Sprint
and especially in the starting of 100 miters Sprint. Through well-designed
physical training athlete can markedly improve the performance related fitness
components.

**Weight and Exercise**

Regular physical activity, a high level of cardio respiratory fitness and
the maintenance of normal weight are known to contribute strongly to several
positive health outcomes. It is also known that physical activity is an important
means of maintaining adequate cardio respiratory fitness and normal body

**1.2 Statement of the problem**

In the present study, an attempt has been made to observe the selected
physiological, psychological parameters and performance related physical
fitness parameters of school going boy students (14-17 years of age) after
giving three months conditioning program. On the basis of the available
literature the problem was stated as: “**Effect of conditioning program on
selected physiological, psychological parameters and performance related
physical fitness of different group of students.**”

**1.3 Purpose of the study**

a) To find out the influence of conditioning program on physiological
parameters such as heart rate, breath hold capacity, blood pressure,
hemoglobin% and body fat% of school going students.

b) To find out the influence of conditioning program on psychological
parameters such as state anxiety and trait anxiety of students.

c) To find out the influence of conditioning program on performance
related fitness parameters such as strength, speed, endurance, agility and
re-action time of school going students.
d) To find out the influence of conditioning program on general physical components such as weight of students.

e) To compare the total variables of control group before and after 3 months of the conditioning program of students.

1.4 Delimitation

The study was limited to the following aspects:

1) For this study 50 (fifty) healthy school boy students and their age ranging from 14 to 17 years, were selected on random basis from Kanaknagar S.D. Institution(H.S) of North 24 Parganas, West Bengal.

2) The selected subjects were divided into two groups. Experimental group I (N=30) underwent conditioning program and control group II (N=20) served as control.

3) The period of conditioning program was limited to 3 months only.

4) The study was restricted to ascertain some physiological parameters such as heart rate, blood pressure, breath holding capacity, hemoglobin% and fat%.

5) The study was restricted to ascertain some psychological parameters such as state anxiety and trait anxiety.

6) The study was restricted to ascertain some performance related fitness parameters such as speed, strength, endurance, agility and reaction time.

7) The study was restricted to ascertain general physical component such as weight only.

8) The physiological parameters such as blood pressure and hemoglobin% were measured by an expert doctor.

9) The duration of the conditioning program was stipulated to 14 weeks for 3 days per week for 50 minutes per day.
1.5 Limitation

1) All subjects resided in their own house; food habits and life style were not under the control of the investigation.

2) The hereditary and environment subjects were not ascertained and these would influence the criterion variables.

3) Atmosphere could not be controlled of the investigation.

4) The gender and age, which would influence the criterion parameters, were recognized as limitation.

5) Period of conditioning program was the limiting factors of this study.

1.6 Hypothesis

1) It was hypothesized that there will not be significant difference in the changes in selected physiological parameters of pre and post conditioning program.

2) It was hypothesized that there will not be significant difference in the changes in selected psychological parameters of pre and post conditioning program.

3) It was hypothesized that there will not be significant difference in the changes in selected performance related fitness parameters of pre and post conditioning program.

4) It was hypothesized that there will not be significant difference in the changes in weight of general physical component of pre and post conditioning program.
1.7 Definition of the Terms

**Conditioning**

Conditioning is the augmentation of the energy capacity of muscle through an exercise program. Conditioning is not primarily concerned with the skill performance as would be the case of training. - Dr. Shyam Anand, 2012.

**Breath Holding Capacity**

Breath Holding Capacity is defined as “the duration of time through which one can hold his breath without inhaling or exhaling after a deep a deep inhalation.” - Chatterjee, 1980.

**Blood Pressure**

Blood pressure is the lateral pressure exerted by the blood on the vessel’s wall while flowing through it.

**Systolic Pressure**

Systolic Pressure is obtained when blood is ejected into the arteries.

**Diastolic Pressure**

Diastolic Pressure is obtained when blood drains from the arteries. - Dr. Shyam Anand, 2012.

**Heart Rate**

Pulse rate or heart rate is the rate of beats of the heart per minute.

**Hemoglobin %**

Hemoglobin is a complex protein present in the blood cell which gives the red color to the blood. Hemoglobin is complex protein rich in Iron. The amount of hemoglobin in normal blood is about 15 gm/100 ml blood and this ammunition is called “100 percent”. Any this over 90% is considered as normal. - Evelyn C. Pearce, 1985.
**Fat%**

The proportion of body fat to lean tissue in an individual usually given as a percentage of body weight that is fat.- Aggarwal, 2006.

**State anxiety**

State anxiety can be defined as fear, nervousness, discomfort, etc. and the arousal of the autonomic nervous system induced by different situations that are perceived as dangerous. This type of anxiety refers more to how a person is feeling at the time of a perceived threat and is considered temporary. - Spielberger and others, 1994.

**Trait anxiety**

Trait anxiety can be defined as feelings of stress, worry, discomfort etc. that one experience on a day to day basis. This is usually perceived as how feel across typical situation that everyone experience on a daily basis. -Spielberger and others, 1994.

**Speed**

Speed is the performance prerequisite to do motor action under given conditions (movement task, external factors, individual prerequisites) in minimum of time. - Thiess G. and Schnabel G., 1987

**Strength**

Strength is the ability to overcome resistance or to act against resistance. Strength should not be considered a product of only muscular contractions. It is, in fact, a product of voluntary muscle contractions caused by the neuro-muscular system. - Hardayal Singh, 1991.

**Endurance**

Endurance is the ability to do sports movements, with the desired quality and speed, under condition of fatigue. -Hardayal Singh, 1991.
Agility

Agility is the ability to change and control the direction and position of the body while maintaining a constant, rapid motion. - www.google.co.in

Reaction time

Reaction time is the ability to reach or respond quickly to what you hear, see or feel. - www.google.co.in

Weight

The force that gravitation exerts upon a body, equal to the mass of the body times the local acceleration of gravity is called weight. - www.google.co.in