CHAPTER-I

INTRODUCTION

1.0 General Introduction

Cardiovascular disease (CVD) is one of the main factors affecting the quality of life of an elderly person. In a number of countries the achievements in Public health since late 1970s have been remarkable and death rate from chronic heart disease, the prime causes of CVD mortality have declined. CVD is a most frequently recorded single cause of death in persons over 65 years of age. In most countries information on causes of death of the elderly population, particularly the very old is either not available or of doubtful validity.

In countries where routine statistical data are available upto 75% of the deaths of those over 65 years of age are attributable to cardiovascular disease (WHO Publication, 1987).

In India, in a report by the office of the Government of India has shown that of the recorded deaths 25.2% is due to CVD. This report also indicated that old aged persons of 65 years and above of the total reported deaths in this age group, 42.7% was due to disease to the circulatory system¹.

The WHO report on mortality from cardiovascular diseases, indicated that CHD was more prevalent in the industrialized as compared to the developing nations of the world.

It has been well established that smoking, hypercholesterolemia, hypertension, obesity and a family history of CHD are strong independent risk factors for CHD.

As the World's population ages, cardiovascular health becomes increasingly important. The ageing process gradually leads to a decline in the structure and function of the cardiovascular system. Other factors associated with ageing can hasten this decline, for instance, life styles that have become more sedentary. Additionally, the prevalence of hypertension, dyslipidaemia and diabetes, major risk factors for cardiovascular disease increase with age. Nutrition throughout the life cycle can help prevent the development of these conditions and appropriate food habits instigated later in life can improve the management of these conditions and their impact on cardiovascular health (Kondo et al 2001).

1.1 Life-style in late 20th century and beyond

Science and technology changes our way of living from vigorous occupation, keeping always safe from the attacks of wild beasts and to survive from various natural calamities by our ancestors into an easy, comfortable and less-vigorous life of present world. Scientific inventions have changed our style of living which includes and will continue to near future into two ways -

(a) the impact of technology on our work and leisure time,
(b) the general aging of the population.
Mechanization and automation, swift communication and transport, computer uses and television viewing have abolished the requirements for vigorous occupation and discouraged involvement in leisure time recreational activity. The reduction in physical activity as a result of technological advancements appear relatively minor and when considered over days or weeks probably have little impact on health. However, when considered over months and years this small reduction in energy expenditure could significantly contribute to the increase in degenerative / hypokinetic disease (Banerjee *et al.* 2006).

1.2 Health well-being and quality of life

Historically the concept of health has been strongly influenced by the traditional medical model. WHO defined health, as long back as 1950, as the “State of complete physical, emotional and social well-being, not merely the absence of disease or infirmity”. For many years this definition of health was the reference for evaluating our health status. In the 1980s health experts began to reconsider this definition. The current definition of health proposed a positive view that focuses on our individual attempts to achieve optimum well-being with in a realistic framework of our individual potential. Health is not just a physical well-being. Rather, it relates to who we are as individuals, how we relates to other, what we value and perceive as important in our life, and the way we respond to the daily challenges of life. Health is a dynamic process, and can be viewed as a continuum from illness to wellness. Health is not by chance but by choice.
Wellness is a conscious and deliberate approach towards an advanced state of physical and psychological health i.e., a movement towards an advanced step to health also called optimal or high level health.

Wellness embodies a characteristic life-style, a mind-set that personifies a positive approach to health. Wellness is a dynamic and multifaceted approach to optimal health that centers upon individuals taking responsibility for their health status. It is the antithesis of present ‘health care system’ which many have more accurately leveled a ‘disease care system’. High level wellness is a process of growth, evolving and changing, optimal development of physical self, management of stress, dealing with emotion, positive use of mind and mastering over environment sensitivity.

Health and wellness are part of a broad continuum. Health require perfect balance between fitness and wellness. Health is holistic and depends on the satisfaction of human need. It is not important to add ‘years to life’ but “life to years”. The length of life was not as important a criterion of health status as the richness and fullness of life. The active life style can benefit –

(i) health
(ii) economy
(iii) adaptability and
(iv) survival skill

Active individual view each moment as one to be lived. Individualized activity prescription with no cigarette smoking, stress reduction, adoption of better nutritional habits may lead to increase health related benefit and thereby enhance ‘quality of life’(Rosato 1986).
1.3 Consequence of inactive life-style

Movement is the basis of life. Following birth, children grow and develop according to similar patterns until maturity. This growth and development process includes physical, cognitive, social psychologic and motor aspects, all of which are interrelated.

Physical activity and childhood seem natural partners common to all young animal or growing child. However, cultural change is now laying a firm restraining hand on the instinctive movement patterns of the youngsters. Various features of our late 20th century civilization television, spectator sports, cars, labour saving gadgets and urban overcrowding have conspired to create a generation of inactive children. This situation has no historical homologue and seems to contradict the very nature of any young mammal. It is an uncharted life-style and may carry serious hazards for both the physical and the intellectual development of the growing child (Shephard 1982).

1.4 Aging and active life-style

Aging is a universal process of growing old. It touches everyone regardless of age, gender or socio-economic level. We are all travelling at different speeds to the same destination. With respect to the entire range of human life, physical and motor performance measures and physiological function in general improve rapidly from early childhood to a maximum some where between the late teens and about 30 years of age. In most cases a slow decline occurs during maturity and becomes rapid with increasing age. Indeed, some functions do not seem to degenerate
with age. In general, the functions that involve the co-ordination activity of more than one organ system decline most with age and as might be expected, changes due to the aging process are most rapidly observed when the organism is stressed. Homeostatic readjustment is considerably slower with increasing age. (Banerjee et al. 2006).

Two theories exist with regard to aging in general
(i) Programmed senescence: Implies that their exist a controlled, time dependent degenerative process that follows a predetermined, genetically based formula. As a result, in later life cells may fail to produce a factor necessary for cellular function to continue, to suppress the production of a deleterious factor, or to maintain vital cellular reparative processes.

(ii) Random senescence suggests that detrimental changes in cells occur at random, the effects of the random detrimental changes being cumulative and the propensity for the random events to occur increasing with age.

Cardiovascular disease is the most frequently recorded single cause of death in persons over 65 years of age and in developed countries, accounts for one third of the admissions to hospital and more than one-quarter visits to the doctor. In addition, it causes much of the disability in the elderly and thus has an enormous influence on health care needs (WHO Pub: 1987).

Exercise, while not prolonging life, can retard some of the functional declines that accompany aging, such as the loss of
muscle mass, capacity for physical effort, flexibility, endurance, bone strength and efficiency of the heart and lungs. It can also help normalize blood pressure, blood sugar and blood cholesterol levels, as well as ward off depression. Exercise does not improve pulmonary function, but increase the amount of oxygen consumption resulting in the reduction on the work load on the heart. Exercise may not give one all the desired results, but it plays a very important part in keeping us healthy and active, a contributing factor to a good quality of life.

In a study of over 6,000 peoples it was observed a dramatic difference in death rate between those who followed seven simple health habits and those who did not. These simple health habits are –

(i) never smoking
(ii) moderate alcohol intake
(iii) daily breakfast,
(iv) no snacking,
(v) seven to eight hours of sleep daily,
(vi) regular exercise and

1.5 Incidence of cardiac disease in late 20th century and beyond

The prevalence of coronary disease increases as the population ages; roughly 25% of individuals of 65 years and above age have significant coronary disease. Older coronary patients are at particularly high risk for disability. There has been an emphasis on research funding for preventing disability in the elderly, and
along with this has come an interest in the effects of cardiac rehabilitation on physical functioning in elderly patients.

Heart disease is the largest killer in developed countries and is rapidly assuming a similar role in developing countries too. India too is undergoing an epidemiological transition and is on the threshold of an epidemic of cardiovascular disease (CVD). It has been predicted that CVD will be the most major cause of mortality in India by the year 2015. Demographic projections suggest a major increase in cardiovascular disease mortality due to increased life expectancy and life-style changes that are non-conclusive to CVD.

Conservative estimates suggest that in 1990, CVD caused 2.386 million deaths and the nation incurred a loss of 28.592 million disability adjusted life years (DALYs). A two-fold increase of mortality attributable to circulatory factors between 1985 and 2015 has been predicted in the light of anticipated population growth and age structure. If the expected rise in urbanization and the rise in risk factor levels in the population accompanying altered life-styles are also taken into account, the rise in cardiovascular disease mortality is likely to be even higher.

CHD remains the leading contributor to global mortality and the epidemic threatens to attain a menacing magnitude as it advances and accelerates in the developing countries. The epidemic of CHD will be a public health disaster which wills train human as well as fiscal resources. (Chhajer 2003).
In some countries, e.g. Australia, Belgium, Finland, and the United States of America, cardiovascular disease death rates have fallen in recent decades. In other, e.g., Sweden, they have not. Mortality from cerebro-vascular disease is declining, except in eastern Europe where it is increasing. Mortality from ischaemic heart disease is also declining. There is a 3-5-fold difference between different countries in the percentage of deaths from ischaemic heart disease for the 65-74-year age group.

Data from a study in Glostrup, Denmark, of a group of old people in their eighth decade of life showed that half the deaths were from cardiovascular disease; myocardial infarction accounted for 22.9% (with no difference between the sexes), other heart diseases for 12% cerebrovascular disease for 9.5%, and other vascular disease for 5.1% (2). (WHO, 1987).

According to the World Health Organization (WHO), in 1990 CVD accounted for 2.4 million deaths in India and of these, 52.2 per cent occurred below the age of 70, in contrast to 22.8 per cent in the industrialized nations.

Population surveys have consistently revealed a marked increased in the incidence of CVD among urban India compared to the rural areas. A recent survey conducted by All India Institute of Medical Sciences (AIIMS) and WHO in urban Delhi and rural Haryana revealed a prevalence rate of 10.9 per cent in urban males, 5.5 per cent in rural males; 10.2 per cent in urban females and 6.4 per cent in rural females.
Sedentary life-styles, stress and bad eating habits are said to bring the rot into the system. Add to that other factors like hypertension which causes a strain on the heart in pumping blood, high cholesterol, smoking, lack of exercise and diabetes – one or a mix of some of these make an individual vulnerable for CVD. (Bhardwaj G 323).

In most populations blood pressure increases with age. In the elderly systolic hypertension is particularly prevalent. It is the one risk factor to have been clearly shown to persist after the age of 70 years. It is thus important to measure the blood pressure of an elderly patient regularly, at least once a year, and to start treatment if there is a significant elevation. There is no agreement as to what constitutes the dividing line between a normal and a moderately raised blood pressure in an elderly patient but in the middle-aged it is generally accepted that a blood pressure persistently above 160/95 mm Hg necessitates treatment. For treatment of the elderly weight reduction and lowering the salt intake are important in the treatment of hypertension (WHO Pub: 1987).

1.6 Life-style and cardiac disease

Life-style is essentially the way we chose to live. On the surface level, it is a social commentary on contemporary life-styles, mores, entertainment, values and work ethic. Indeed, much attention has been paid to this aspect of life-style within the last few years.
Our life-style leads us down a road toward illness. In fact, the two major causes of death, heart disease and cancer, are products of life-style choices and habits.

The fact is that certain fundamental life-style choices ultimately dictate health and longevity for each of us. These choices include:

- **Diet**: What and how much to eat.
- **Exercise**: Whether or not to be physically active on a regular basis.
- **Stress**: Whether to manage or ignore it.
- **Smoking**: Whether or not to start, continue or break the habit.

These are the controllable aspects of life-style that count, either for or against good health. The ill effects of bad diet, lack of exercise stress and smoking are cumulative and interconnected. In the final analysis, ill health is not an isolated event but the result of an accumulation of abuses, each a seemingly inconsequential life-style decision.

Our life-style habits directly affect our health and longevity, particularly where coronary heart disease is concerned.

The effect of poor life-style decisions is to promote heart disease by injuring the coronary arteries, causing strain on the heart and elevating the levels of cholesterol and other fats to produce on imbalance in the blood chemistry.

Smoking, stress, diet, lack of exercise – these are the life-style factors that produce strain on the heart. And yet each of these factors represents a choice (Piscatella, 2002).
1.7 Population aging, cardiac disease and life-style

One of the main features of the world population in the 20th century was a considerable increase in the absolute and relative number of elder people in both developed and developing countries. This phenomenon will continue in the 21st century and is referred to as 'population aging'. Of the approximately 58 crores elderly people (60 years and more) in the world today, around 35 crores live in developing countries.

Over the last fifty (50) years mortality rates in developing countries have declined dramatically raising the average life expectancy at birth from around 41 years in the early 1950’s to almost 62 years in 1990. By 2020, it is projected to reach 70 years.

More recently sharp falls have also occurred in birth rates in nearly all developing countries except for most of sub-saharan Africa. Total fertility rates in China, for example, declined from 5.5 in 1970 to the current 1.8 level. Respective figures for Brazil are 5.1 and 2.2 and for India 5.9 and 3.1. By 2020 the number of elderly people world wide will reach more than 100 crores with over 70 crores of them in developing countries.

Since 1951 the elderly population (60+) has grown steadily with increasing trend in the growth rate during 1981-91 and 1991-2001. Indians elderly population is large and demands immediate attention regarding action plan for the welfare of the aged.
Over the next quarter-century, Europe is projected to retain its title of ‘oldest’ region of the world. Currently, elderly people represent around 20% of the total population now and will represent 25% by 2020.

The oldest country by 2020 will be Japan (31%) followed by Italy, Greece and Switzerland (above 28%). Today, the countries with the highest proportion of elderly people are Greece and Italy (both 23% in 1998). (Srinivasan, 2002).

By 2020, of the ten countries with largest elderly populations in the world, five will be in the developing world. China (23 crores), India (14.2 crores), Indonesia (2.9 crores), Brazil (2.7 crores) and Pakistan (1.8 crores).

As a person ages the heart undergoes a number of changes, such as a decrease in the rigidity of the myocardial wall due to an increase in collagen, or calcification of the mitral ring and the mitral, aortic and pulmonary valves. Simultaneously, the walls of the aorta and of other arteries gradually become more rigid. This processes evolve at various rates in different people, possibly for genetic reasons.

At the same time, systolic blood pressure tends to increase because of the progressive increase in peripheral resistance caused by the loss of elasticity in the arteries, while diastolic pressure remains at the same level or decreases. These consequences of the normal aging of the cardiovascular system produce a slow reduction in the functional reserve of the heart and this, to a great
extent, is the cause of the decreasing cardiovascular adjustment to physical effort characteristics of old age.

This physiological aging of the body as a whole may indirectly affect the heart. An elderly person has less resistance to environmental stress, infections or other noxious influences that may endanger the heart (WHO Pub: 1987).

Coronary heart disease (CHD) generally involves degenerative changes in the intima for inner lining of the larger arteries that supply blood to the heart muscles. The action and chemical modification of various compounds, including the cholesterol in low-density lipoproteins (LDL), initiate a complex process that ultimately causes bulging lesions in the arterial wall.

This changes progressively reduces the capacity for blood flow and causes the myocardium to become ischaemic. CHD has reach epidemic proportion through out the world and specially in most technologically advance society. CHD is the single largest disease in the western world. American Heart Association (AHA) has categorically mention that the chance of dying from CHD increases progressively and dramatically after age 35 in male and 45 in female: between ages 55 & 65, about 13 of every 100 male and about 06 of every 100 women die from coronary artery disease (CAD).

Significant information has been provided on the natural history and dynamics of heart disease. Various personal characteristics and environmental factors have been identified over the past 30 years that appear to play causative roles in making
individually more susceptible to CHD. The risk factors identified are as follows:

(1) Age and gender  
(2) Elevated blood lipids  
(3) Hypertension  
(4) Cigarette smoking  
(5) Physical inactivity  
(6) Obesity  
(7) Diabetes mellitus  
(8) Diet  
(9) Heredity  
(10) Personality and behaviour patterns  
(11) Sedentary life-style.

Many CHD risk factors can be modified by proper programmes of nutrition, exercise and weight control. This risk intervention generally improved and individual health outlook (McArdle et al. 1996).

1.8 Prevention of Cardiovascular Disease

Preventing cardiovascular events in older persons presents unique challenges to clinicians. Cardiovascular disease (CVD) accounts for a large amount of disability and mortality in older persons. Older persons are often faced with unique and multiple challenges to health, including cognitive decline, social isolation, financial constraints and physical disabilities. As more and more older persons are enrolled in studies that aim to better understand coronary heart disease and its prevention, new information is
becoming available that allow clinicians to improve outcomes in the older adult (Klieman, 2006).

Some of the important preventive measures are as follows:

**Weight control:** Gross obesity is a burden on cardiovascular function, limits mobility, and is a risk factor for hypertension and premature death. For these reasons an attempt should be made to reduce the weight of an elderly patient to the national standard for sex and height. It is, however, often difficult to introduce a change in diet.

**Diet:** Malnutrition is common in the elderly in many societies and an atherogenic diet which could contribute to heart disease is customary in others. The energy content of the ideal diet should be sufficient to maintain normal body weight and it should be redressed if it becomes necessary to reduce weight.

The benefits of consuming pulps, vegetables and fruit should be emphasized, since they offer good quality protein, low fat content, low refined carbohydrate content, vitamins & fibre. Animal protein should be derived from fish, poultry and lean meat; fat consumption should be limited with preference given to unsaturated vegetable oils.

The elderly need to have special attention given to the state of their teeth and mouth and their ability to masticate.

**Salt intake:** It is desirable to keep the intake of sodium chloride (NaCl₂) to below 5 grams a day. This creates no particular hardship
and can achieve by avoiding, for example. Salted fish or meat, salted snakes, canned food, various preserves that contain large qualities of sodium, cheese and bread with a high salt content and mineral water containing sodium salts, and by using very little salt in cooking.

**Smoking:** Cigarette smoking is harmful at any age. Attempts should be made to persuade an elderly patient who still smokes to give-up the habit, though it has been said that to ban a lifetime smoker of 80 years from having an occasional cigarette may cause more harm than good. There is no evidence that stopping an elderly patient from smoking a pipe or cigar will reduce the risk of heart disease.

**Exercise:** Patient who is used to exercise should be encouraged to continue it as long as possible. Even for the sedentary there is evidence that active exercise taken up late in life can be beneficial though its actual effect on heart disease has not been demonstrated. It has, however, been proved that even a limited amount of vigorous exercise can have a beneficial effect on a middle-aged patient with coronary heart disease and this could well be the same for a patient over 65 years of age.

Degree of physical effort can be measured in a simple way by increased heart rate. For the habitually sedentary individual in the seventh decade of life an elevation in heart rate of about 30 beats a minute above the resting rate is a suitable initial intensity. The individual’s health, age and interest determine how strenuous the exercise should be: it is not necessary, and for elderly patients not desirable, to attain near - maximum oxygen uptake and cardiac
out-put. Walking or cycling is convenient activities. For an untrained patient, exercises that demand 60 to 70% of maximum oxygen uptake might, when repeated regularly 2-3 times a week, gradually increase the maximum tolerable workload. Before a physical exercise program is prescribed for a patient whose habitual life-style is sedentary, clinical evaluation must take place, including exercise testing on a bicycle ergometer or treadmill and particularly important for an elderly patient, electrocardiographic monitoring. Gentle exercise may be prescribed, however, without being preceded by special diagnostic measures.

Exercise programs should involve the large muscle groups of the legs & arms, avoiding static contraction of the small muscle. This is of particular importance for the elderly. Scandinavian researchers have shown, in a group of men aged 69-74 years that it is possible to exercise train elderly patients and that oxygen transport capacity improves with training. It has also been shown that high – density lipoprotein cholesterol, at younger ages known to be a protective factor against coronary heart disease, is higher in elderly sportsmen aged 50-74 years than in sedentary persons of the same age. (WHO, Pub: 1987).

Social Life: Although a specific effect on heart disease has not been demonstrated, social activity improves the quality of life for an elderly person, and also lengthens it. Loneliness and isolation, on the other hand, can result in physical and mental inactivity leading to malnutrition neglect of the treatable symptoms of a disease. Cardiovascular disease prevention programme, therefore, must include mechanisms for social support, such as clubs where social and physical activities are organized and balanced meals are
provided. This kind of facility where the elderly meet each other is particularly important in providing peer pressure, e.g. to stop smoking and support in efforts to change life-style. For those who are confined to their homes, particularly those who live alone, home visiting and assistance from professional and volunteer social groups can do much to avoid or delay entry into an institution (WHO, Pub: 1987).

1.9 Statement of the problems

The present problem is almost a survey type study with objective to identify the risk factors of cardiac disease in the elderly population. The specific research problem is “physique and health status of senior citizen in relation to life-style and cardiac ailments”.

1.10 Purpose of the study

The present study was planned to look in to the following aspects:

(1) To compare the physique of male and female cardiac patients (senior citizen) with that of normal male and female subjects.

(2) To compare the body composition among the said subjects of the study.

(3) To compare the physiological health of the said subjects of the study.

(4) To compare health status among the said subjects of the study.
(5) To compare the various aspects of life-style of the said subjects of the study.

(6) To compare the anxiety level of the subjects of the study.

(7) An attempt will be made to identify prospective risk factors of cardiac ailments, in respect of the subject of the present study.

1.11 Delimitation of the study

(1) The subjects of the present study were from two districts of West Bengal State and therefore are delimitated to Hooghly and Howrah districts only.

(2) Records of cardiac deaths and cardiac ailments were collected from two state general hospitals (Howrah and Hooghly District) therefore the study is delimitated to two hospitals only.

(3) The study was delimitated to the senior citizen aged between 63 to 68 years.

(4) So far life-style was concerned the present study included only a few factors:
   (i) Habits – smoking, salt-intake,
   (ii) Nature of occupation and nature of work
   (iii) Leisure pursuit
   (iv) Food habits and nutritional status
   (v) Socio-economic status

(5) Collection of data was delimitated to 225 no of male and 75 female subjects.
1.12 Limitation of the study

a) Since, the subjects of the study are very old persons, collection of data on the senior citizen was restricted to a handful of parameters, this is a limitation.

b) Due to lack of facility only measurement of blood sugar level was considered, setting aside many other blood biochemical studies.

c) Relevant information on life-style, habits, nature of activity etc. were collected through specific questionnaire. Interaction with the subjects was the key factor, this is a limitation.

d) Some information and data of cardiac death (CD) group were collected from hospital record and from family members of the deceased person, this is also a limitation.

e) In spite of best efforts not more than 25 female subjects in each of the three groups were available to act as volunteers – this is a limitation.
1.13 Definition of Related Terms

**Health:** As a state of complete physical, mental, emotional and social well-being, not merely absence of infirmity.

**Energy:** The capacity of ability to perform work.

**Calorie (Cal):** A unit of work or energy equal to the amount of heat required to raise the temperature of one gram of water 1° C.

**Body Composition:** Different games and sports prefer different body composition. Now-a-day obesity in a great rising problem through out the world, which is due to body composition.

(i) **Body fat %**

The percentage of body fat is proportion to body weight, of the subject. Percentage of body fat serves as dealt weight but it is also reveals that the relative ability to supply O₂ in the working muscles thus cutting down cardiovascular endurance.

(ii) **Fat mass (FM)**

Fat include essential fat as well as storage fat in the body. Fat mass means the amount of fat present in the body either as essential or storage fat. Fat mass is determined by the equation;

\[
\text{Fat mass} = \frac{\text{Body weight} \times \text{percentage of fat}}{100}
\]
(iii) **Lean body mass (LBM)**

Lean tissue includes all tissue exclusive of fat, that is muscles, bones, organs, fluids etc. Lean body mass (LBM) is determined by subtracting fat mass from body mass (body weight).

\[
\text{LBM} = \left( \frac{\text{Body mass}}{\text{body weight}} \right) - \text{Fat mass}
\]

(iv) **Body mass index (BMI)**

The Body mass index derived from body mass and stature, is used frequently by clinicians and researcher’s to evaluate the ‘normally’ of one’s body weight. The BMI has a somewhat higher association with body fat than do estimates based simply on stature and mass. BMI is computed as follows:

\[
\text{BMI} = \frac{\text{Body mass (kg)}}{\text{Stature (m}^2\text{)}}
\]

**Resting heart rate (RHR):** The distension of the arterial walls at the beginning of the systolic ejection of blood is not confined to the aorta, but travels down the arteries as a wave followed by a wave of recoil.

**Bradycardia:** A decreased or slowed heart rate.

**Blood Pressure:** The force that the blood exerts against the walls of the blood vessels.

It is increased pressure in arteries that continues on a persistent basis is called high blood pressure. The medical term for the condition is hypertension, meaning high tension in arteries, hypertension doesn’t mean nervous tension. Blood pressure is
considered high, if systolic pressure is consistently 140 mm Hg or higher, diastolic pressure is consistently 90 mm Hg or higher or both.

(i) **Systolic pressure:** the greatest pressure of the arterial blood against the walls of the blood vessels; occurs during the heart’s contraction phase.

(ii) **Diastolic pressure:** the lowest pressure of the arterial blood against the walls of the blood vessels; occurs during the heart’s relaxation phase.

**Diabetes Mellitus (DM):** A metabolic disorder in which the ability to oxidize carbohydrates is more or less completely lost due to faulty pancreatic activity and consequent disturbance of normal insulin mechanisms. This is often accompanied by resistance of receptor cells to insulin.

(i) **Type – I:** all the causes of diabetes that result from destruction of the pancreatic beta cells.

(ii) **Type – II:** all forms of diabetes that is characterized by the combination of insulin resistance and deficient secretion of insulin.

**Cardiovascular disease (CVD):** CVDs any disease that affects the heart or the blood vessels. Coronary artery disease (CAD) blockage in the coronary arteries.
Coronary heart disease (CHD)/ Ischemic heart disease (IHD)

CHD, coronary artery disease, plus its consequences for example, scar tissue due to a heart attack caused by arterial blockage.

Myocardial ischaemia (MI): MI blockage of coronary arteries resulting in insufficient blood and oxygen reaching the heart muscle.

Silent ischaemia: Silent ischaemia, myocardial ischaemia that causes no symptoms.

Angina pectoris (AP): AP Chest pain or pressure that results from myocardial ischaemia.

Myocardial infarction (MI)/ Heart attack (HA): Myocardial infarction, myocardial ischemia that lasts long enough to cause tissue death in the area of the heart supplied by a blocked coronary artery.

Psychological terms

Anxiety: Anxiety appears to be a general fear or foreboding a personality trait marked by a lower threshold to stressful events. Stress is an internal reaction, an interesting variable between situations and performance.

State anxiety: A transitory emotional state or condition of the human organism that is characterized by subjective, consciously
perceived feelings of tension and apprehension and heightened autonomic nervous system activity.

**Trait anxiety:** Trait anxiety is defined as the relatively stable individual difference in anxiety proneness, that is a tendency to respond to situations perceived as threatening with elevations in A-state intensity. It is a relatively stable personality trait.

**Stress:** Any factor that threatens the health of the body or has an adverse effect on its functioning such as injury, disease or worry.