Introduction
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In the eternal thrust of mankind to move forward and faster, it has successfully, created a complex, multidimensional, modern network for itself. It has removed it from the natural ways of eating, exercising, working and living to a sophisticated, urban style of advancement. Perhaps, this has created biggest impact in this century in terms of life style diseases like coronary heart disease and hypertension.

When Dr. Daniel Levy, Director of the Heart Study of the National Heart, Lung and Blood, Framington, Mass, U.S.A. states that half of men and a third of women will develop heart disease at the age 40 and Dr. B. K. Sharma, Director of Post Graduate Institute of Medical Education and Research (PGIMER), Chandigarh and Dr. Kasliwal - Escorts Heart Institute, New Delhi highlight the rise in the incidence of Coronary Heart Disease and Hypertension in the middle classes and in industrial societies, they were speaking about this century's biggest problem in 1999. That's where the research in the field of internal medicine must take a turn and start seriously considering the psychological correlates of Coronary Heart Disease (CHD) and Essential Hypertension (EHT). The present project is just focussed on this problem.

The human body and it's well being has generated significant interest in the field of psychology in recent times so much that a
Heart cut length-wise to show direction of blood flow. Oxygen depleted blood returns to the heart via the vena cava and the right auricle. It passes through the three-pointed cardiac valve (tricuspid) into the right ventricle. The right ventricle pumps the blood into the pulmonary artery and its branches. Thus the blood is oxygenated again and passes through the pulmonary veins into the left auricle. The blood then flows through the two pointed cardiac valve (mitral) into the left ventricle. The left ventricle pumps the blood into the aorta and the branches, i.e. major arteries. Between both the right ventricle and pulmonary artery as well as between the left ventricle and aorta are the semilunar valves.

The three cross-sections of a coronary vessel show:

a) a normal opening without changes in the vessel walls
b) a partial occlusion due to thickening of the vessel wall at this point
c) a further stage in the development of coronary heart disease
Fig. 11 Normal Coronary Arteries

Fig. 12 Anastomosing or Collateral Coronary Vessels
new area of psychosomatic medicine known as health psychology has emerged. The salience of this area has been sustained by several influences that extend beyond academic and clinical interest. The term 'psychosomatic' can be traced in Heinroth's use of the term as early as 1818. An interest in the psychosomatic approach was in fact the aftermath of World war II, having become too explicit through observation that thousands of soldiers were debilitated by symptoms of psychological stress.

It is obvious that Cardiovascular disorders (CVD) open up a meaningful area of investigation in health psychology where the knowledge about man's mental processes in health or disease on a scientifically firmer basis can lend support to some psychological hypotheses and strengthen the view that the magnificent painting of human life has the great dimension of psychological hue on a physical canvas interwoven in such an intricate way that it assumes inseparable entity (Mohan, 1997). The psychophysical reality is so enormous that emotions, thinking, learning and belief systems get entangled with body functions to such an extent that serious attempts are being made by physicians and psychologists to pool their resources, skills and strategies to understand the complex diseases like coronary heart diseases (CHD) and Essential Hypertension (EHT) or their proneness in terms of behavioral correlates (Mohan, 1999).
Disease of the heart and vascular system account for one out of every four deaths between the ages 35 and 64. They are the major causes of morbidity and mortality in the World and have reached epidemic proportion. Cardiovascular diseases (CVD) are disorders which transcend age, culture, environment, race, sex, etc. Despite considerable and notable advances in research, medical practice and drug therapy over the past three decades, these diseases remain the primary cause of premature death in the World with the United States and United Kingdom leading in death figures. It has assumed epidemic proportion in India (Kasliwal, 1999). Though modern medicine with its rapid strides and astonishing success does have effective arsenal against most of the well defined diseases but when it involves psychogenic factors, it is almost helpless. Thus, one may say that there is an apparent failure of medical therapy to halt the march and threat of coronary heart diseases.

What Galen hinted in his wisdom 2000 years ago, the World Health Organization (WHO) has pinpointed “Coronary heart disease has reached enormous proportions striking more and more young persons. It will result in the coming years, the greatest epidemic mankind has faced unless we are able to reverse the trend by concentrating research into it’s causes and prevention”. The above observations no doubt stimulated the works of prominent researchers like Friedman et al. (1987), Rosenman et al. (1976) and Dembroski et al. (1978). All these investigations implied the role of psychosocial risk factors like Type A
behavior pattern and other personality factors in the development of coronary heart diseases (CHD) and Hypertension (EHT). Similarly, a recent retrospective study in India by Nammi et al. (1991) on patients with first attack of Myocardial Infarction (MI) admitted to medical college hospital, Calicut from 1969 to 1988 revealed a striking increase in the percentage of acute myocardial infarction (MI) cases in the younger persons.

The complexity of the mechanisms underlying cardiovascular disease has been increasingly recognized in recent years. Current concepts of psychopathology of cardiovascular disease emphasize the interplay of several factors. Certain disorders are primarily biological and others are primarily psychological; the holistic position in medicine and clinical psychology has been extensively accepted, namely that all biological disorders have psychological elements and all psychological disorders have biological elements that must be considered in both diagnosis and treatment.

There is a considerable body of evidence indicating that psychosomatic diseases such as Coronary Heart Diseases and Essential Hypertension are sensitive to emotional tension which increases secretion of acid and exerts pressure on the heart. The physiological changes in the heart are the result of parasympathetic influences in the nervous system (Cohen and Herbert, 1996).
Psychoneuroimmunology

Studies of human psychoneuroimmunology help to a great extent in understanding the role of psychological factors in physical illness. First, it provides psychologically and biologically plausible explanations for how psychological factors e.g. stress might influence immunity and immune system-mediated diseases. Second it covers substantial evidence that factors such as stress, negative affect, clinical depression, social support and repression/denial can influence both cellular and humoral indicators of immune status and function. Third, it considers consistent and convincing evidence of relationship between stress and negative affect, and disease onset progression of diseases like AIDS and Cancer in less consistent and inconclusive possibly owing to methodological limitations inherent in studying these complex illnesses or because psychological influences on immunity are not of the magnitude or type necessary to alter the body’s response in these cases. What is missing in literature is strong evidence that the association between psychological factors and diseases that do exist are attributable to immune changes. Much of the psychoneuroimmunology’s popularity with both the public and the psychological community derives from its promise to explore and explain the common belief that our personalities and emotions influence our health (Mohan, 1999, 1997, 1996, 1995, Selvamurthy et al., 1999, Sehgal, 1999).
Studies related to PNI attempt to answer the questions:
(1) can depression, anxiety, psychological distress, social support or an optimistic view alter our ability to resist infection, autoimmune diseases or cancer? (2) what are the biological pathways through which psychological characteristics and states yield physical changes? and (3) can one alter immunity and hence diseases susceptibility through psychological intervention?. Several hundred studies published in the past decade address the relationship of psychological characteristic and states to immune function and to health outcomes thought to be determined by immune alterations. Recently, in India also, many studies found evidence to this effect (Mohan, 1999, Selvamurthy et al., 1999, Sehgal, 1999).

Psychoneuroimmunology (PNI) is basically the study of the interrelations between the central nervous system and the immune system. The term interrelations is used because the assumption is that the relationship is bidirectional. Work with animals has advanced our understanding of this bidirectionality and has provided evidence for nerves connecting the central nervous system (CNS) and the immune system (Sahni et al., 1999), for neuroendocrine-induces alterations of specific immune functions. An important step in establishing that the CNS and immune system interact was accomplished by psychologists working with animals who demonstrated that immune system change could be induces by classically conditioned stimuli (Adler and Matthews, 1994).
The immune system protects the body from damage by invading micro-organism bacteria, viruses, fungi and parasites. These foreign materials are called antigens. Most immune system cells are located in the bone marrow, thymus, lymphnodes, spleen, tonsils, appendix and Peyer’s patches (chunks of immune tissue in the small intestines). Since there is no easy way to access the cells of these organs, PNI work with humans is primarily limited to the study of immune processes occurring in circulating peripheral blood. Circulating blood transports immune component between organs of the immune system and sites of inflammation. Components of the immune system that circulate in blood include white blood cells and antibody, survey for and combat against invading antigens therefore peripheral blood plays a key role in inflammatory and immune processes (Cohen and Herbert, 1996).

The immune system tests, most commonly used in human PNI research include (1) Enumerative essay, most often used involves simply currently the members or percentages of different kinds of white blood cells in the peripheral blood. The white blood cells are neutrophils, monocytes and lymphocytes including natural killer (NK). Quantifying the number of circulating cells is important both because the body cannot respond adequately if antigenic response without a minimum number of each type of immune cell and because an optimal response requires a balance of the various cell types. Both increases and decreases in numbers of circulating cell suggest alternation in the immune system. However, the
changes found in PNI literature are usually quite small and these changes indicate compromised immune function is theoretically unclear. (2) **Functional tests** are used primarily to explore the integrity of one of the other part of immune response namely cellular immunity in which immune cells directly combat antigens and homoral immunity in which products of immune cells (e.g. antibody) combat antigens. It is important to add that these two parts work together in many instances. Lymphocytes are the key cells controlling the immune response. The ability of these cells to proliferate rapidly in the face of an antigenic challenge is essential to an adequate response. NK cells may be thought of as serving a surveillance function because they can detect and kill damaged or altered (e.g. infected or cancerous) cells. The **NK cell cytotoxic activity essay** is another test of cellular immunity used to determine how effectively NK cells can kill transformed cells (Cohen and Herbert, 1996; Selvamurthy et al., 1999).

**IMMUNITY AND DISEASE**

The immune system’s defense against invading microorganisms is composed of a complex cascade of events. Moreover the nature of any given immune response varies with the invaded organism’s history of exposure, the type of antigen and the route of entry into the body. Practically human PNI researchers are limited to assessing a small number of rough markers of immune function rather than anything that resembles a true estimate of the body’s ability to resist disease.
Popular wisdom has it that stress and disease are related. Such psychological factors as our emotional states, the events in our lives and the social context in which we live are seen as greatly affecting our health. For example when asked about the causes of their illnesses or disorders, people often make attributions to stress of life (Leventhal et al., 1980; Cox et al., 1982; Mohan, 1994). The fact that stress and disease are related cannot be simply relegated to the realm of naïve theory because a growing body of evidence gives it a strong empirical foundation.

In fact, the past decade has ushered in a shift of, almost revolutionary proportions, in the study of health and disease. Presently the purely biological model of disease based on the concept of “one germ, one disease, one therapy” is seen as too simplistic (Engel, 1977; Lipowski, 1977). A more complex and holistic model has gained ground which directs attention to interactions among social and psychological as well as biological factors in the etiology, course and treatment of disease. The emerging view incorporates all the diseases not just a few psychological disorders.

PERSPECTIVES OF PSYCHOSOMATIC DISORDERS

A psychosomatic disorder is a pathological condition elicited primarily by emotional behavior. Emotional behavior refers to extensive
and intensive changes in physiological functioning that are psychological in origin (Lachman, 1969). The essential difference between emotional and non-emotional behavior is that emotional behavior is characterized by multiple and intrusive changes in physiological functioning of the autonomic effectors, including alterations in heart rate, rate of stomach or duodenal movement, gastric or adrenal gland secretion, among other activities. The changes may involve all parts of an organism via blood vessels, glands and other structures widely distributed and broadly influencing bodily functions. The physiological reactions comprising emotional behavior or measurable implicit behavior are psychological in origin: this means that they are responses to environmental stimulation of these organs or to central nervous surrogates that is 'symbols' of such stimulation.

The term psychosomatic is derived from the Greek words 'psyche' and 'soma' which in ancient times meant soul or mind and more recently has come to mean behavior, soma typically refers to the physical organism or the body. The term 'psychosomatic', therefore, indicates relationships between psychological processes or behavior on the one hand and somatic structures or body organs, on the other (Mora 1967). Psychosomatic disorder are physiological dysfunction and structural aberrations that result primarily from psychological processes rather from immediate physical agents.
The sequence of appearance and disappearance of psychosomatic disorder appears to be directly related to the amount of stress in the individual’s life situation. In general, the development of psychosomatic disorders involves the following sequence of events (a) the arousal of negative or positive emotions (b) the failures of these emotions to be dealt with adequately and (c) response stereotype in specific organ system (Coleman, 1976).

In fact, Matarazzo et al., (1961) concluded that the incidence of physical illness in a population is a good predictor of mental disturbances and vice-versa. It is well known that at least half of the patients who seek medical aid and visit doctors with physical complaints have emotional problems that partly or wholly account for these complaints. Interestingly enough, people are defensive in admitting that the nature of their disease is psychological and feel uneasy on being perceived as pretending and projecting symptoms for some conscious reason, although what the doctors meant is that emotional or nervous tension is the cause of discomfort (Coleman, 1976).

Neki (1976) has advocated the use of somatic and psychological approaches as complimentary strategies in these cases. Perhaps, holism may to considered as a kind of psychosomatic integration. The organism reacts to stress as a psychobiological unit –
that although a disorder may be primarily physical or psychological, in nature, it is always a disorder of the whole person (Lachman, 1972).

A true perspective on psychosomatic disorder like heart disease, hypertension, ulcerative colitis, peptic ulcer, nausea, migraine, gastrointestinal dysfunction etc. may be possible only through our knowledge about the interacting role of biological, psychological and socio-cultural determinants in predisposing an individual to these disorder as well as in precipitating and maintaining them. The incidence of specific disorder, both physical and mental varies in different strata of same society and also varies in different societies. Psychosomatic disease including heart disease (CHD) and hypertension (EHT) occur among all major groups. On the other hand such disorders appear to be extremely rare in primitive societies (Sarafino, 1994). Psychosomatic disorders are classified according to the organ system affected extending the view that no part of the body is immune. For the purpose of present study, only coronary heart disease (CHD and essential hypertension (EHT) will be discussed.

MODELS OF HEALTH AND DISEASE

Health and illness are cardinal notions in biomedical science, behavioral science and social science. To facilitate the understanding of the notion of health and illness, researchers have constructed different theoretical models. Every model enables us to view health from a certain
perspective. In some models health is considered to be a series of total wellbeing. World Health Organization (WHO) defines health as a state of full physical, psychic and social wellbeing and not the mere absence of disease”. In other models health is considered to be a state of harmonic balance with one’s surroundings (Capra, 1982; Dubos 1980) and further models view health as absence of disease (Engel, 1981), as an existential basis of security (May, 1983; Yalom 1980). Some models are health centered, while others are disease centred. Some models are built more or less explicitly on a definite theory of knowledge, while others are more temporary in nature (Mohan, 1999).

There are basically six models of health namely religious, biomedical, psychosomatic, humanistic, existential and transpersonal. Of these six only one was reductionism i.e. the biomedical, while the rest were holistic. The religious, humanistic, transpersonal models could be considered as health models, the biomedical, psychosomatic and existential models as disease or illness models. The different models were assumed to depict different but related ways of representing health and disease. It is probable that different groups in society, including doctors, nurses and patients may look at health and illness from partly different models.
RELIGIOUS MODEL

The religious model of health is primarily a health model and one of the oldest. But the prehistoric man and primitive people of the present day and some ethnic groups have a view of health and disease colored by magical-religious notions (Ackerknecht, 1982; Cohen, 1961; Eliade, 1964; Frazer 1987, Von Scharfetter, 1985). In the religious model, health is perceived as a correct way of living and not just of being free from disease. Moral aspects assume a more central significance i.e. biological, psychological or social aspects. Almost all the major religions like Hinduism, Judaism, Christianity, Islam etc. have provided significant understanding of religious and moral practices and health. According to religious model, people seek ultimate cause of illness and return to correct relationship with God in order to restore a sense of harmony consistent with well-being.

BIOMEDICAL MODEL

The biomedical model has it's roots in traditional Ayurveda and Greek medicine which is ultimately associated with philosophy. The biomedical model is a disease model and reductionist in character. The model considers man in mechanical terms and disease is reduced to being a sort of manner in the works. Such a view is based on assumption that disease is a biological or mechanical dysfunction within the individual. The task of the doctor is to control pathology and repair the body.
In this model, disease is something affecting man from without-through bacteria. It is the task of the doctor to restore health and health is defined by this model negatively as absence of disease. This model excludes psychological, social and ecological factors as these are considered to be caused by circumstances outside the biomedical model’s control. This is the limitation of this model.

**PSYCHOSOMATIC MODEL**

The psychosomatic model of health and disease was first developed during the era of Helen Flanders Dunbar, who during the 1930’s and 1940’s published a number of scientific papers (Dunbar 1935, 1943, 1947). Dunber is considered to be the grand old master of psychosomatic model. Her books started a series of intensive developments in this field.

According to the psychosomatic model: a collective term for different psychosomatic theories, there are no diseases without emotional and/or social antecedents. On the other hand, no psychological disease lacks somatic symptoms. According to Rene Dubos, “whatever, it’s precipitation cause and its manifestations, the very disease involves both the body and the mind and these two aspects are so interrelated that they cannot be separated from each other” (Dubos, 1968). According to this approach, diseases are developed through a continual interplay between physical and mental factors which strengthen each other by means of complex network of feedback loops. Positive attitudes in combination
with stress-reducing technique are considered to have a strong influence on the body/mind system and help the individual regain the balance which is defined in health (Capra, 1982). The psychosomatic model has a total view of man. It is not unequivocally holistic nor reductionist since it builds on series of different theories some of which are holistic and other reductionist. Of the holistic theories, certain structural and general system theories are related e.g. the psychosomatic structural theory formulated by (Totman, 1979). Engel suggests that the term should be used to describe reciprocal connections between psychological, social and biological factors in health and disease. Jenkins et al., (1979) created a rational framework for psychosomatic medicine known as the bio-psycho-social model.

According to psychosomatic model, health care is not something that can be administered to individuals but something which has to be practiced by everyone. In other words, man has to take responsibility for his own health and must aspire to minimize the consequences of emotion or other stressful situations. This has been demonstrated by the fact that many people who complain of stress, worry and pain seldom receive routine medical treatment. The psychosomatic model has been confronted with difficulties in research because of the fact that the model is so all-embracing and there are too many factors to take into account.
HUMANISTIC MODEL

The Humanistic psychology unfolded in the 1950's as a protest against two developments namely, the psychopathological orientation within psychoanalysis on one and scientific-mechanistically based behaviorism on the other hand. It was initially associated with humanistic psychology of Abraham Maslow and the movement later became known as "the third force" (Maslow 1973). Today humanistic thought and theories include many approaches and rests upon writings of Allport (1955), Glorgiu (1970), Laing (1965), Maslow (1966) etc. The humanistic model of health is holistic in the sense that man is seen as a whole i.e. psychological and biological organism in interaction with it's social environment in contrast to the holistic religious model where the ultimate values and power are ascribed to God or the gods and man is seen as the starting point in everything.

According to humanistic model, man has a congenital nature which is basically neutral i.e. neither good nor bad (Maslow, 1962). This model views health not as a condition but as a process which is ultimately synonymous with a wish, desire or a force towards self-actualization. In Maslow's and Mahrer's view, a healthy person is a person who is striving actualize and live in an authentic life. By analogy, a sick person is an individual whose internal relationships are disintegrative and whose inside is negative and twisted (Mahrer 1978; Maslow, 1962).
EXISTENTIAL MODEL

The existential model has had a series of distinguished adherents in the history of western World. One of these was Socrates, who in his writings brought man’s existential clarity. Another was Augustine who explored the depths of the human life with his deep psychological analysis. Pascal and Kirkegaard can also be considered as adherents of existentialism. However, this model emerged in psychology in 1940’s with the writings of Frankel (1964) and May (1983). About the same time, existentialism was developed by Sartre and Camus (1956) in philosophy and literature and Tillich (1952) in theology.

In the existential model like the humanistic model, the emphasis is placed on reactivity. The central belief is that human being must work out himself on how he wishes to conduct his life. If he wishes to be fit, he can to some extent choose his wish, he can also to some extent consciously or unconsciously choose illness (May 1983). This model is holistic which implies that the individual can be understood in all his existential dimensions. Philosophers and researchers working from the premises of this model are deeply involved in such aspects of human existence as guilt, despair, depression, anguish etc. Health is considered as authentic existence, something which is achieved when the individual works himself through the givens of existence i.e. his ultimate concerns and the conscious or unconscious fears and motives (Hall et al., 1983).
The transpersonal model is a further development of humanistic and existential models and an integration of these models with theories of consciousness and religion. This model has its foundations in transpersonal psychology as developed in the USA in the mid 1960's and is known as the “fourth force”. Those adopting the premises of the transpersonal model work and research in a number of disciplines i.e. medicine, psychology, philosophy, anthropology, theology etc. are united by their common interest in transcendental experiences transcending the individual plane, dualism, time and space. Some leading personalities in transpersonal psychology are Ken Wilber (1991), Maslow (1966), Allan Watts (1961) and Robert Ornstein (1973). This is primarily a health model. In this model, an individual is considered to have health in the sense of well-being, when he is used to perceiving in existence and reaches a stage of consciousness. It is the consciousness and experience of dualism which according to this model, is assumed to create human suffering and disease. According to Wilber (1991) every man and woman who cares to evolve and form his/her consciousness can arrive at higher and superconscious levels. Thought and mindfulness are the primary mental factors. The unhealthy mental factors are agitation, worry and anxiety (Wilber 1991). The method to reach altered stages of consciousness is meditation. Successful and complete meditation moves according to Wilber (1991) first into the psychic realm of intuition, then into the subtle
realms of oneness, light and bliss and through several other stages finally into the ultimate realm of absolute dissolution of the separate self sense in any form. Currently, there are a great deal of research in activity in the field of meditation and disease and the findings have been consistently positive.

**RATIONALE OF THE STUDY**

As with many chronic diseases, medical science has come to recognize that the etiology of Coronary Heart Disease (CHD) and Essential Hypertension (EHT) involves a complex interaction of constitutional, environmental and behavioral factors. In the case of these diseases, the behavioral component plays a conspicuous and possibly critical role in heightening the progression of normal disease processes. This behavioral involvement appears to take two general forms. The first consists of behaviors which heighten the risk of CHD through ingestion of substances which disturb or overburden the body's normal metabolism. These consummatory behaviors include smoking, excessive alcohol consumption and dietary intake. The importance of these behavioral factors is underscored by the extensive efforts of governmental and private health groups to persuade and motivate people to eliminate or modify the most damaging of these disorders.

However, behavioral factors seem to contribute to the etiology of Coronary Heart Disease (CHD) and Hypertension (EHT)
through a second set of pathways, which globally speaking, involve the concept of 'stress' as a psychological and physiological response to social and environmental factors. Although the role of stress in cardiovascular diseases (CVD) has been appreciated by practicing physicians for hundreds of years (e.g. William Harvey, John Hunter, William Osler, Von Busch, and others), it is only relatively recent that scientifically based evidence has emerged to support the validity of such processes as contributors to or precipitators of Cardiovascular Disease (CVD).

Apart from the classical and widely known risk factors in Coronary Heart Disease (CHD) and Hypertension (EHT) such as hereditary conditions, family history, cholesterol, obesity, diet, cigarette smoking, hypertension etc., which do not explain comprehensively about these diseases, there has been a large body of evidence implying the role of psychosocial variables in the predisposition, perpetuation and precipitation of coronary heart disease and hypertension. Thus, the failure of individual risk factors to qualify as causes of CHD has led to the wider acceptance that CHD is a multi-factor disorder.

During the last 30 years, an impressive amount of research has been done to improve the understanding of the causes of heart disease and hypertension but much of this work was directed towards the understanding of physiological mechanisms and was implicitly or explicitly epidemiological in nature i.e. emphasis was on distribution of
the disease. The fact remains that unless the psychosocial conditions associated with these diseases are thoroughly investigated, no realistic progress can be made in effecting the control of these disorders. There is a need to determine, both, the degree and type of association between Stress, Personality patterns like Type A behavior and other psychosocial factors and cardiovascular disorders. Besides, one needs to understand the psychophysiological mechanisms, whereby, the above cited behavioral factors may be translated into Coronary Heart Disease (CHD) or may elicit coronary prone behavior and their possible physiological correlates in susceptible individuals.

Despite its central importance in psychosomatic research and theory development, the links between psychological factors and cardiovascular hypertensive disease have received relatively little attention. However, research indicates that classical risk factors account for only about one half of the CHD incidence. There are a number of reasons for the suggestion that greater emphasis should be placed on psychological factors. Firstly, stress and strains must be predicted by taking into account individual's perception of work stressor. Failure to do so will result in little of predictive variance being accounted for. Secondly, if psychological states are important causal agents in the ontogenesis of disease, ignoring them may well lead to models with poor predictive power.
Medically speaking, a large body of evidence has accumulated demonstrating that substantial changes in autonomic and neurohumoral activity can be evoked when an individual is exposed to mental challenges or emotionally arousing stimuli. These changes can frequently result in dramatic increases in heart rate, cardiac output and blood pressure. The recognition of the role of psychosocial variables in CHD and EHT has necessitated the suggestions by medical experts that consideration should be given to mental state of a patient before commencing drug procedure.

The present study is, therefore, an attempt to study the differences between the healthy group (Group I) and the disease groups (CHD/EHT) on psychosocial factors namely, Personality, Stress, Anger, Hostility, Social Support, Loneliness, hopelessness, Negative and Positive affect, Ways of coping, Well being etc.

**OPERATIONAL DEFINITIONS**

The selection of variables or psychosocial risk factors for the present investigation was guided by the consideration that variables have a probability of being related to the diseases in question i.e. Coronary Heart Disease (CHD) and Essential Hypertension (EHT).

For the purpose of the present study, a *risk factor* would be taken as any variable which reliably contributes or has a probability of contributing to the prediction of a disorder. On the other hand,
'psychosocial attributes' in the present investigation have been defined as the aggregate strength of personal characteristics and attitudes which play a role in the etiology or pathogenesis of Coronary Heart Disease (CHD) and essential Hypertension (EHT) considering the fact that there are many reactions within the cardiovascular system that normally occur after emotional stimulation or stressful situation. These include changes in cardiac rate, amplitude regularity; blood vessel dilation and constriction; blood pressure changes; changes in blood corporals content; and changes in the chemical composition of the blood (Lachman 1969). These changes can be explained in terms of:

**Bradycardia**: refers to an abnormal slow rate of cardiac contraction (a heart rhythm of 60 beats per minute caused by emotions).

**Tachycardia**: refers to an abnormal high rate of cardiac contraction (a heart rhythm of 100 beats per minute).

**Arrhythmia/fibrillation**: irregularity in heart beat.

**ROLE OF THE HEART IN HUMAN HEALTH**

The functioning of the heart is important in human health and there are physiological reasons why the heart must maintain its beat of about 70 times per minute and pump about 2700 litters of blood daily to maintain all tissues of the body (Jain and Jain, 1998). There are many mysteries about the heart. Some can be understood and explained,
others can be understood but not explained. Heart failure is one of them. When a strain is put on the heart, the blood that returns each time to the heart is imperfectly oxygenated. Therefore, each time the heart beats, it has to pump more blood to compensate for the poor quality of its aeration. About the size of a fist, the heart weighs roughly 300gm in an adult male and about 50gm less in a woman. The heart muscle is known as the myocardium which is tough and resilient. The incessant beating of the heart would exhaust any ordinary muscle but the heart muscle is virtually inexhaustible. The membrane covering the heart on the outside is the pericardium; and lining it on the inside is the endocardium. There are four chambers in the heart, two above and two below. The two chambers at the top (atria) are thin walled with main functions of receiving blood. One is on the left and the other on the right. Below them lie the other two chambers, the ventricles, one is on the right and the other left. They have thick muscular walls since their main function is to pump out blood into blood vessels. The heart receives blood through its chambers from the coronary arteries. The two blood vessels that are the first to come off the aorta and lie embedded in the heart muscle itself. The right coronary artery nourishes the back of the heart and its sides. The left coronary artery is larger than the right and feeds mainly the front and the left side of the heart. A heart disorder results from any sort of obstruction or blockage or impairment in the coronary arteries (Jain and Jain, 1998).
Disorders of the heart and blood vessels are the leading causes of death, illness and disability in the world. These diseases strike millions of people annually and billions of dollars are consumed every year by Coronary Heart Disease (CHD). The graph of death due to heart disease has been showing a steep rise. The death rate in the United States alone rose from 8 per 100,000 in 1930, to 23 in 1935, to 71 in 1940, to 226 in 1952 and 290 in 1963. There has been a tremendous increase since then. In 1985, approximately 1.5 million suffered heart disease in USA and 35 percent of them died of it. An additional 15 to 20 percent survivors died in the first year of attack. Coronary heart disease is no longer considered as disease of the West and European countries or as part of the aging process. Increasing incidence of the disease in younger people even below 40 years of age cast doubt upon the aging process label. While cardiovascular diseases like heart attack, stroke, hypertension, cancer and diabetes account for 70-80 percent of presentable deaths in the developed world, they are responsible for 40-50 percent of total mortality in the developing countries (WHO Report 1993).

According to the WHO (1996) estimates, coronary heart disease and hypertension claim about 12 million lives each year accounting for between a quarter and a third of all deaths globally. Far too often, victims are under the age of 65. WHO considers these diseases as life style disorders and believe that mortality can be cut by at least a half
by changing to healthy lifestyles thus saving million of lives every year. Men are more susceptible to heart disease or heart attacks than women. The ratio is 12:1 under 30 years and 4:1 above 30 years in India. In USA it is 13:1 for age group 32-44 years and 2:1 for age range 45-56 years.

In India, heart disease has struck millions and continues to be an enigma. **Today over 40 million people are suffering from this disease in India.** The economic cost of providing medical therapies, or pharmacological procedures, bypass operations and angioplasty has become a huge burden and unbearable for the poor even though medical advances have succeeded in reducing the disease by 20-25 percent (Jain and Jain, 1998).

**Coronary heart disease is medically defined as physiological conditions associated with development of atherosclerosis or blockage of the blood circulation in the coronary artery.** Coronary artery is responsible for carrying blood to the lungs for oxygenation. From the lungs via the pulmonary veins, the freshly oxygenated blood enters the left ventricle and then pumped into the aorta - the largest artery in the body so that oxygenated blood may reach the farthest corner of the body. This is how the heart maintains circulation which carries life giving oxygen to parts of the body. Narrowing of the coronary arteries is caused by a process called **atherosclerosis** (fatty tissues) formation. The word atherosclerosis is derived from the Greek words ‘athere’ meaning mush or
porridge and 'sclerosis' meaning hardening which is a consequent process. The present study shall analyze Coronary Heart Disease (CHD) as resulting from the inability of the heart to perform adequately, its function as a pump due to blockage of the coronary arteries which effectively reduces oxygen in blood.

The prominent types of heart disease according to Jain and Jain, (1998) include:

(a) **Myocardial Infarction (M1) : (Heart Attack)**

Myocardial infarction refers to death of a section of the heart due to prolonged cessation of blood supply or critical reduction of blood flow to myocardial tissue long enough to cause cell necrosis. Thrombosis formation and complete blockage of the coronary artery allows no blood to pass through it to supply oxygen to that part of the heart muscle. The result is a severe injury, destruction and death of that part of the heart muscle. This process can as well be called infarction of cardiac muscle. The location and extent of the infarct depend upon many factors including the size and location of nearby blood vessels, the degree of the narrowing of unblocked vessels, the volume of collateral circulation etc. **M1 is the deadliest of all heart diseases, killing one fourth of its victims in less than three hours of attack.** M1 is uncommon in women of reproductive age. Risk factors include stress, age, cigarette smoking, diabetes,
(b) **Congenital Heart Disease**

This type of heart disease is an inborn disorder present from birth. It may affect almost any part of the body and when it affects the heart, it may produce the most crippling deformities. Some congenital heart diseases are hereditary in nature. Some babies with congenital heart diseases have been rather aptly termed 'blue' because of insufficient oxygen in their organs. The general shortage of oxygen tends to interfere with their growth and these children are often small and stunted and basically more susceptible to infections.

c) **Angina Pectoris (AG)**

Angina is a mild form of heart disease and is characterized by pain around the chest area. Julian (1991) defines angina as “a painful, a most disgusting sensation in the breast which seems as if it would extinguish life....” As early as 1768 William Heberden an English physician described angina as pain that develops after exercises causing feelings of foreboding doom. The coronary arteries must be healthy to carry to the heart muscle supplies of blood. When they are not, when their lumen has become narrow and their elasticity is lost, the blood flowing through them diminishes. When the heart muscle is deprived of its essential requirements of...
blood and oxygen, the result is an incessant pain in the chest but if the deprivation of blood is only temporary one, the pain is also of short duration. 'Angina' means strangling while 'pectoris' means breast.

There are two types of angina namely stable angina which is characterized by fixed obstruction level and this limits any increase in blood flow. The pain is predictable and related to certain exercises. The unstable angina on the other hand is characterized by unpredictable pain and obstruction varies. At least 90-95 percent of patients with angina are beyond the age of 40 and more than 70 percent are beyond the age of 50. For angina the ratio of occurrence between men and women is 3:1 while for MI it 5:1 under 50. The general symptoms of heart disease include pain, palpitation, weakness, fever, nausea, vomiting, giddiness, anxiety, high blood pressure etc.

Coronary Heart Disease (CHD) continues to challenge the healthcare system globally. Until the discovery of a lasting treatment procedure, prevention will continue to be the only way to slow down the epidemic. Prevention depends on identifying high risk behaviors and the psychosocial factors that predict those risk behaviors. This approach has been strengthened by the fact that atherosclerosis can regress following lifestyle modification and risk of CHD decreases by 30-35 percent.
Angioplasty or bypass surgery is usually suggested for patients with over 40 percent blockage of artery even though there are still chances that subsequent blockage may recur in patients who had surgery.

HYPERTENSION

Hypertension which used to be regarded as a disease of the developed world has become a major problem in many developing countries experiencing epidemiological transition from communicable to non-communicable chronic diseases. The emergence of hypertension and other CVD's as a public health problem in these countries is strongly related to psychosocial conditions, aging of population, urbanization, economic changes, sedentary habits, obesity, alcohol, salt intake etc. The concept of hypertension is clinically important since clinicians and psychologists now have access to wider range of clinical tests that enhance treatment as well as modification of life style (Strauer et al., 1998).

In medical parlance, it is known as the silent killer disease. One may be suffering from it for years till it manifests itself in a fatal stroke or a range of cardiovascular ailments. Chances are that one may give up treatment midway as a result of disgust or the treatment itself may cause complication that could be life threatening. It is not 100 percent amenable to medical treatment and generally asymptomatic. It is a disease as well as a risk factor for CVD contributing to high mortality and morbidity.
The natural history of hypertension demonstrates its relation to heart disease but heart disease represents only one part of the problem of hypertension. Hypertension or High Blood Pressure (HBP) is one of the most important risk factor in the development of Coronary Heart Disease (CHD). In simple terms, this can be medically defined as physiological conditions characterized by sudden rise in blood pressure. It's causes may include kidney failure, congenital defects, as well as psychological factors like personality and stress (Aubert et al., 1998; Mohan, 1996).

Blood Pressure (BP) is the hydrostatic pressure of blood inside the arteries (blood vessels which carry blood away from heart to the other parts of the body). The normal blood pressure in adults is about 120 mm.Hg systolic; 120/80 mm.Hg diastolic. However, the systolic pressure may vary from 100 to 140 mm.Hg; and diastolic from 60 to 90 mm.Hg. In older people it may be slightly higher. In children, the pressures are much lower – In fact, the younger the child, the lower the pressure. In the new born for instance, the pressure may be no more than 60-80/40-60mm.Hg. In adults, 140/90mm.Hg. is usually considered the upper limit of a normal pressure. Systolic BP is the maximum pressure reached during contraction where as diastolic BP is the residual pressure inside arteries. Blood pressure is not constant during the entire twenty four hours. It is lowest in the morning and higher in the evening. It rises with meals, exercises, emotions etc. Elevated Blood Pressure (EBP) tends to be
asymptotic and not usually associated with specific complaints. High Blood Pressure (HBP) invariably leads to heart disease and statistics show that **20 to 50 percent of cases of heart disease are due to high blood pressure**. Every abnormal level of blood pressure brings one closer to developing heart disease.

In India, **hypertension has in fact emerged as the leading lifestyle disease** in the population segment over 35. According to national projections of Indian Council Of Medical Research (ICMR) and All India Institute of Medical Science (AIIMS) 40-45 million Indians are believed to be suffering from this disease that is a key risk factor for Coronary Artery Disease (CAD), diabetes and kidney failure. The number is expected to rise to 54-60 million by the year 2001(Jain and Jain, 1998).

Hypertension is found in about 50 percent of men and about 75 percent of women with coronary heart disease. Statistics show that 20 percent of adult population in USA suffer from this. According to figures from the U.S. National Commission on High Blood Pressure Reports 1993, **about 50 million Americans have high blood pressure**. In the Farmingham study in USA, it was found that a blood pressure reading of greater than 160/90 mm.Hg produced a three fold increase in risk of heart attack for men between 50 and 59 years of age and six fold increase in risk for women of the same age. Since there is no dividing line between normal and high blood pressure, arbitrary levels have been established to define
those who have an increased risk of developing a heart disease or Cardiovascular Disorder (CVD). Patients with diastolic pressure reduction in disease and mortality with adequate fragment while males with normal diastolic pressures less than 82 mm.Hg but elevated systolic pressure more than 158 mm.Hg. have a 2½ fold increase in their cardiovascular mortality rates when compared to those with systolic pressures of less than 130 mm.Hg. The World Health Organization (WHO) in 1996 redefined the threshold for hypertension as 140/90 mm against 160/95 mm.Hg recommended by the 1978 expert committee. Any one who crosses this threshold must take preemptive steps, because, 30 percent of the cases of hypertension related stroke and coronary artery disease are reported among the healthy people in the 120/80-140/90 range.

Apart from classical risk factors for hypertension like obesity, alcohol intake, diabetes, smoking, sedentary life, diets, heredity conditions etc, the role of stressful situations and personality characteristics have been implicated.

CLASSIFICATION OF HYPERTENSION (Strauer et al., 1998)

1. **Normotension** : (a) This is blood pressure less than 140/90 in ages between 17 and 40 or (b) blood pressure less than 160/100 at age over 60.

2. **Hypertension** : (a) This is when blood pressure is above 160/100 at
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ages 17 to 60 or (b) when blood pressure is above 175/100 at age over 60.

3. **Borderline Hypertension**: This is the blood pressure readings between the hypertensive and normotensive range.

4. **Arterial Hypertension**: This indicates a chronically elevated systolic and diastolic arterial BP. The higher the arterial pressure systolic or diastolic, the greater the cardiovascular risk.

Hypertensive diseases vary from organ to organ but there are two characteristic types of hypertension namely **Essential hypertension** which constitutes about 70 percent of all cases characterized by unknown etiology and **secondary hypertension** which has physiological conditions associated with its etiology. Secondary hypertension can occur at any age. The pressure is much higher than in essential hypertension (the diastolic pressure is about 140 mm. Hg). If untreated it progresses inexorably to a rapid fatal end. **Two thirds of all cases of essential hypertension are in the 45-60 age group (WHO, 1996).**

**RACE AND CULTURAL ISSUES IN HYPERTENSION**

A paradox emerges in research on cultural and racial differences. Although race and culture are widely used in hypertension research as a marker of increased risk, their meaning as etiological quantity is obscure. The existing literature devoted to etiologic explanations is
impoverished about the interplay of genes. Even though numerous studies links hypertension to racial differences, no credible evidence exists that pathways to hypertension are different between ethnic groups. Race and culture are troublesome concepts on a number of levels. The flaws inherent in race as a biomedical concept have been portrayed in many studies. The underlying hypothesis that emerges from literature is the existence of innate physiological differences between population groups. The attempt to interpret race as a causal entity falters on technical and logical grounds. Cooper and Kaufman (1998) and Simons et al., (1998) drew attention to the difficulty of evaluating racial predisposition to diseases. They correctly pointed out that racial predisposition is usually taken to imply the existence of an inborn genetic flaw and there are inherent weakness in efforts to date to infer genetic effect from observed phenotypes.

Race and culture no doubt pose challenging questions in cardiovascular research and will continue to receive research scrutiny in the near future. However, for the purpose of the present investigation, only brief explanation has been given.

**ESSENTIAL HYPERTENSION (EHT)**

Essential hypertension (EHT) is a major risk factor for coronary heart disease (CHD), stroke (Gentry 1985). Essential Hypertension (EHT) has been theoretically associated with increased
activity of the sympathetic nervous system (Aubert et al., 1998), particularly with the neurotransmitter norepinephrine. The autonomic and related neuroendocrine systems are largely responsible for the regulation of the heart rate and blood pressure and are therefore primarily involved in the cardiovascular responses to all physical and mental stressors. Epinephrine is a circulating hormone that is released from the adrenal medulla. The levels of circulating epinephrine are relatively low in most physiologic situations after stimulation. However, during acute stress responses, large amounts of epinephrine are released from the adrenal medulla into the circulation. Thus during stress responses, epinephrine might enhance cardiac performance.

Essential hypertension constitutes about 70 percent of all cases of hypertension though its etiology remains unknown unlike secondary hypertension which is caused by physiological conditions. The term 'essential' refers to unidentifiable physical cause.

The main thrust of the present investigation is to focus on the role of psychosocial factors in the development of Coronary Heart Disease (CHD) and Hypertension (EHT) with their physical symptoms that are usually the consequence of sustained emotional tension and stress. The study essentially investigates the role of Personality variables, Anger, Stress, Social Support, Locus of control, Negative and Positive affect, hostility and ways of coping in the predisposition of coronary heart disease
and hypertension. In other words, the purpose of the study is to extend the line of research and to establish a causal relationship between stress and cardiovascular disease on one hand, and other psychosocial variables on the other.

Having considered the various models of health and disease, it may be stated that the present study shall investigate coronary heart disease and essential hypertension as ailments of psychosomatic cardiovascular nature prone to variations in respect of certain psychosocial variables explained in terms of various personality dimensions, Stress Measures, Anger Expression Styles, Social Support, Negative and Positive affect, Mental health, Wellbeing and Self esteem.

Psychosocial variables that predict cardiovascular diseases or those which promote psychological health and wellbeing have not been well researched in recent years. However, the variables selected for the present investigation may offer considerable potential over existing pathological constructs. It is believed that the inclusion of certain psychosocial variables may improve the prediction of cardiovascular diseases more accurately than is possible from a purely pathological approach.

It could be agreed that the literature is full of a type of evidence suggesting the role of many known and many unknown
psychological factors of Coronary Heart Disease (CHD) and Essential Hypertension (EHT), but the search for specific answers to some questions is always called for. Though this study cannot aim to be all inclusive, it plans to be fairly exhaustive to include some of the measurable behavioral analysis and qualitative interpretation.