Chapter One

INTRODUCTION

1.1 Background of the Study

Patients experience emotional distress due to the life threatening nature of their disease and are faced with functional impairments that may influence quality of life. In turn, these psychological manifestations interfere with adherence to treatment and increase the risk for mortality and morbidity. The risk incurred by psychological factors is of equal magnitude to that of standard risk factors. Patients’ beliefs about the cause of their diseases are important to effective medical communication, psychological adaptation, and adherence to advice. Health anxiety and stress occur frequently and recognition of their symptoms can be difficult because of co-morbid medical conditions.

This chapter focuses on the psychological manifestation of health anxiety and stress-related symptoms among diabetic, hypertensive and Coronary Artery Disease (CAD) patients. Both mechanisms, biological and behavioral may be responsible for the link between psychological factors and various changes in medical conditions. Results of recent and behavioral and pharmacological intervention trials targeting psychological factors are also presented.

Illness behavior refers to the ways in which symptoms are perceived, evaluated and acted on by different people (Mechanic, 1963). It can be conceptualized as having emotional, cognitive and behavioral components. People develop their own cognitive model of illness that includes beliefs about its etiology,
its symptoms, the personal consequences of the illness, and the extent to which the illness is amenable to control (Weinman, Petrie & Moss-Morris, et. al. 1996). The “illness perception” has been shown to be related to health outcomes including rate of improvement in chronic fatigue sufferers and return to work after a heart attack (Petrie, Weinman & Sharpe, et. al. 1996).

Barsky and Wyshak (1990) researchers have suggested that “somatic sensitivity” is an important determinant of illness behavior, with certain individuals being usually sensitive to and intolerant of normal bodily sensations. The patients may misattribute benign symptoms as a sign of serious disease, make multiple medical visitors, and become dissatisfied with their treatment.

Health anxiety which also influences illness behavior refers to a concern about health in the absence of pathology or excessive concern when there is some degree of pathology (Lucock & Morley, 1996). High levels of health anxiety lead to actions aimed at improving health or ruling out the presence of disease, including repeated consultations with medical practitioners (Conroy, Smyth & Siriwardena, et. al. 1999). Health anxiety may also lead to hypervigilance for bodily events and misinterpretations of normal bodily sensation, thus contributing to somatic sensitivity.

Stress as the state of dynamic tension is created when you are responding to perceived demands and/or pressures from outside and from within yourself. These demands and pressures build up till they trigger the stress response and the release of adrenaline and cortisone. When demands and tension get out of hand, the stress response becomes either too intense, occurs too frequently, or continues for too
long. Stress makes itself felt through a range of physical and mental symptoms that makes things even worse by becoming sources of demand and pressure in and of themselves.

Stress-related disease includes hypertension, headache, ulcers, depression, allergies, stroke, asthma, arthritis, diabetes and even cancer (Greenberg, 1999). When the hypothalamus experiences a stressor, it releases the stress hormones cortisone and aldosterone. It also instructs adrenal medulla to secrete adrenal hormones, which are responsible for physiological changes while experiencing stress such as accelerated heart rate, increased oxygen consumption, perspiration, increased blood pressure and increased blood sugar levels. Stress decreases the amount of saliva in the mouth and increases hydrochloric acid secretion which often results in ulcers. Inhibiting the immune system response, stress helps to develop mutant cells that can lead to tumors.

1.2 Statement of the Problem

The topic of the present study is “a study of health anxiety and stress-related symptoms among diabetic, hypertensive and coronary artery disease (CAD) patients.” Health is the major concern among doctors and health care professionals. More specifically, patients having cancer, diabetes, hypertension, CAD and several other stress-related disorders are the main concern that leads to analyze the present status of the patients.

“Health” is an elusive term. It is a term that many people think they understand until they are asked to define or describe it and then asked how they would measure it. Health has been described as a value judgment, as an objective
state, as a subjective state, as a continuum from illness to wellness, and as a utopian state (rarely achievable). Contributing to the confusion about health are the related concepts of wellness, well-being and quality of life.

There is no one contemporary meaning for the term health. During the past five decades, many attempts have been made by the lay community to define health in the manner that has broad applicability. These global definitions, however, are confusing and make it difficult, if not possible, to clearly operationalise. This confusion has important ramifications when one considers that health is a target goal shared by many professionals and the governments all over the world.

Health is defined as “a state of complete physical, mental and social well-being and not merely absence of disease or infirmity” by the World Health Organization (1948) in its Charter. This definition has been the focus of health professionals. The initial emphasis was on disease and cure. In recent years, it has shifted to prevention and more recently it has gravitated to subjective experiences, personal strengths and social interactions which make life more meaningful.

In common parlance, health is a physical condition in which all the functions of the body parts are healthy. Maintenance of good health is the best gift of God to man. There is nothing like good health.

The Islamic approach to health proposes that social problems must be present in the mind when one talks about health. It is well known that the standard of health in any community reflects its standards of social development. The positive aspect of health is reflected in the Arabian proverb, “A one, who is healthy,
has an optimistic view and who has an optimistic view, has everything” (Husain, 2005).

Thus, it is evident that the present conceptualization of health is not merely the absence of disease but rather as a positive meaningful state of existence, which is in harmony with the existing physio-psycho-social milieu, has been prevalent since earlier times. However, during the last three centuries, refinement in technology and research techniques opened new vistas where internal organs and processes could be studied directly. Micro-organisms that caused a variety of diseases were also identified. Thus, during the nineteenth century, germ and cellular theories of disease were proposed and the biomedical aspects of health became dominant. Health was considered as nothing more than an absence of disease. Mind and body were considered as separate entities which did not interact while the roles of psychosocial and behavioral variables were totally ignored. Even in psychology, the disease model prevailed, where focus was on curing individual suffering.

The definition coined by WHO (1948) emphasizes on the positive and negative dimensions of health. Negative health or ill health has a subjective component expressed in the concept of disease, injury, handicap or deformity. Positive health has two components, well-being and fitness. This state entails an appropriate balance of the physical, mental and social ingredients. Fitness can be considered as the objective physical components, whereas as well-being can indicate the psychosocial component of positive health.

In today’s fast-paced modern life, our health is under attack from innumerable sources of stress, environmental pollution, unhealthy work conditions,
industrial smoke, unsafe water, and noise and so on. There are countless risks to human health. Health risk constitutes a broad category that can include both health risk factors (poverty, role strain, social isolation, and hostile temperament) and health risk behaviors (substance abuse, violence, sedentary lifestyle or habits, unprotected sexual intercourse, poor eating habits). WHO has recently published a report stating ten leading global health risk factors: under weight, unsafe sex, high blood pressure, tobacco consumption, alcohol consumption, unsafe water, sanitation and hygiene, iron deficiency, indoor smoke from solid fuels, high cholesterols and obesity. Together, these factors account for more than one third of all deaths worldwide (cited in Yadav & Sharma, 2007).

1.3 Health Anxiety

Although there is increasing interest in health anxiety, it is still a relatively neglected area of research. Health anxiety refers excessive concern about health in the absence of any physical symptom. Kellner (1985) cites evidence that the proportion of patients presenting to physicians and surgeons where physical illness is not found after routine investigations ranges from 20 to 84 per cent. Barsky and Klerman (1983) estimate that 30-80 per cent of patients who consult physicians present with symptoms for which there is no physical basis. Such patient will receive medical reassurance but in some cases health concerns remains despite reassurance and more extreme cases may fit the diagnostic criteria of one of the somatoform disorders such as hypochondriasis.

Health anxiety which may also influence behavior which refers to a concern about health in the absence of pathology or excessive concern when there is some
degree of pathology (Lucock & Morley 1996). High levels of health anxiety lead to actions aimed at improving health or ruling out the presence of disease, including repeated consultations with medical practitioners (Conroy, Smith & Siriwardena et al., 1999). Health anxiety may also lead to hypervigilance for bodily events and misinterpretations of normal bodily sensation, thus contribution to somatic sensitivity (Barsky & Wyshak, 1990).

Health anxiety sufferers become obsessed by their physical self. Sufferers find it impossible to divert their thoughts away from constantly monitoring their body for aches, pains or strange sensations. Health anxiety causes sufferers to check their pulse, listen to their hearts, take their blood pressure and study medical information, surfing the internet to find explanations of each and every symptoms, sensation or thought which arises.

Health anxiety is very destructive. It causes the sufferers to focus on themselves, disregard others, their work, their daily routines and even their personal hygiene. Sufferers often become withdrawn from society, developing social phobia or agoraphobia to prevent exposure to anxiety provoking situations.

Much of the research in this area has focused on quantifying the extent of the problem (Barsky & Klerman 1983; Kellner, 1985) and describing the characteristics of health anxiety and hypochondriasis (Kellner, 1987; Noyes, Kathol, Fisher, Phillips, Suelzer & Ilolt, 1993). Health anxiety is thought to result from a combination of dysfunctional beliefs about illnesses and their consequences, and critical incidents such as experience of symptoms. The beliefs about illness arise from past experience of illness and health in oneself and others. These beliefs
can lead to an interpretation of symptoms as indicative of a serious threatening illness. This negative interpretation of symptoms is a major factor in determining the decision to consult a doctor. When no pathology is found following investigations, reassurance may be given by the medical practitioner. This intervention may be successful in many cases, particularly if the person is given a convincing, non-threatening explanation, or the symptoms diminish. Some individuals, however, remain concerned about their health. In these people with persistent health anxiety a number of factors are proposed which maintain the problem. Central to the cognitive model is the concept of a confirmatory bias in perception. In health anxiety physical symptoms are misinterpreted as indicating a serious illness. There are evidence to support the existence of cognitive biases in those individuals with anxiety problems (Williams, Watts, MacLeod & Mathews, 1988) and some of these studies related to health anxiety specifically (e.g. Mathews & MacLeod, 1985).

There may also be a distorted perception of health-related communications such as the content of the doctor-patient communication. In keeping with other anxiety problems, individuals with health anxiety tent to become vigilant to possible sources of threat. In the case of health anxiety this involves excessive preoccupation with one’s internal bodily state. The individual is then more likely to notice symptoms that can be interpreted as threatening. The cognitive model as proposed by Warwick and Salkovskis (1990) also states that reassurance-seeking behavior is negatively reinforced by a short-term reduction in anxiety following the reassurance. In addition to seeking medical consultations, reassurance-seeking
behaviors can take other forms such as asking friends and family for reassurance, examining one’s body and reading medical books.

Health anxiety varies to the extent it is adaptive versus excessive or maladaptive. Virtually all of us have experienced health anxiety at times in our lives. Often the anxiety is adaptive because it motivates us to seek appropriate medical care. Worry about chest pain in a person with a history of cardiac diseases, for example, can lead him or her to promptly summon an ambulance when the pain occurs, thereby reducing the risk of mortality.

Health anxiety is maladaptive if it is out of proportion with the objective degree of medical risk. Low anxiety in the face of high risk or high anxiety in the face of low risk can be maladaptive. Lack of worry about the health risks of smoking, for example, can have deadly consequences. Excessive worry about minor, harmless bodily changes (e.g., muscle twinges) can cause undue suffering and impairment in social and occupational functioning.

Most people experience anxiety about health at some stage, perhaps after noticing a new or unexpected bodily symptom in response to media coverage of specific disease or following medical test and physical illness. This is usually relatively short-lived, and anxiety subsides as symptoms abate or in responses to reassurance from a doctor or other health professionals. However, in some cases it persists and becomes a clinically significant problem. ‘Severe health anxiety’ or hypochondriasis refers to fear and belief that arise from misinterpreting bodily symptoms and health-related information as evidence of a potentially serious degenerative or life threatening disease. Anxiety of this sort is rarely allayed for a
long by medical reassurance, and tends to shift from one symptom to another (Deale, 2004).

The experience of health anxiety is seen in a range of different anxiety and somatoform disorder. Bodily sensations are often cues for anxiety or emotional distress in person with problems with health anxiety and hypochondriasis (Walker & Furer, 2008). Although hypochondriasis is categorized as a somatoform disorder in the Diagnostic and Statistical Manual of Mental Disorders Fourth Edition-Text Revision (DSM-IV-TR) due to excessive focus on bodily symptoms for at least 6 months, a contemporary conceptualization suggests that hypochondriasis represents an intense form of health anxiety (Braddock & Abramowitz, 2006).

The essential feature of hypochondriasis is a preoccupation with the (inaccurate) belief that one has or is in danger of developing a serious illness. In most patients, the disease conviction is functionally disabling and persists despite appropriate evaluation and reassurance of good health. The preoccupation with hypochondriasis may be symptom based, with a focus on bodily functions (e.g., heartbeat, sweating, peristalsis), minor physical abnormalities (e.g., a small sore or an occasional cough), or vague and ambiguous physical sensations (e.g., “tired heart,” “aching veins”). The person attributes these signs and symptoms to the suspected disease and is concerned with their meaning, authenticity, and origin. Alternatively, the person may have a preoccupation with a specific organ or a single disease (e.g., fear of having cancer).

According to the DSM-IV, American Psychological Association (APA, 1994) hypochondriasis can begin at any age, but most commonly hypochondriasis
occurs in early adulthood. Symptoms often arise during periods of increased stress but may be more directly influenced by recovery from a serious illness, diagnosis of an illness in a loved one, or the death of a close friend or relative (Barsky, Cleary, Sarnie & Klerman, 1993). Exposure to illness-related information in the media likely influences onset and focus of severe health anxiety or hypochondriasis.

Hypochondriasis is usually identified as a categorical diagnostic entity. However, recent work has suggested that hypochondriasis may be a better conceptualized as an extreme form of health anxiety (Barsky & Klerman 1983; Barsky et al. 1993; Sacco & Olczak, 1996; Salkovskis and Warwick, 1986; Warwick and Salkovskis, 1990). Cognitive-behavioral theories (Salkovskis & Bass, 1997; Warwick & Salkovskis, 1990) propose that people experience particularly severe and persistent health anxiety (Hypochondriasis) because they have an enduring tendency to misinterpret bodily variations and other ambiguous health-related information (including the results of medical consultation and tests) as indicating that they may be suffering from a serious physical illness. Such misinterpretation can also involve perceiving the consequences of developing a physical illness as being serious (Salkovskis, 1996). This theory has been used to develop a treatment method for hypochondriasis.

Salkovskis and Rimes (1997) proposed a corollary to the cognitive-behavioral theory of severe anxiety. If patients experience severe health anxiety because they have an enduring tendency to misinterpret ambiguous medical information as a sign of physical illness, it would follow that those with relatively
high levels of health anxiety should be more likely to misinterpret ambiguous medical information such as medical consultations, health screening procedures and information about illnesses describe in the mass media or internet. There are, therefore, a number of important reasons to develop a continuous measurement of health anxiety that is sensitive to normal levels of health concerns as well as clinical hypochondriasis.

People with hypochondriasis have some form of disease fear (Kellner, 1985). There are two types: fear that one currently has a disease, and fear that one might contract a disease in the future. A person can simultaneously have both types of fear, perhaps because are associated with fears of dying and death. People with disease fear become frightened or anxious when exposed to stimuli that they believe to be disease-related, such as bodily sensations or other somatic changes. These people also become anxious when exposed to disease-related information, such as medical programs, which can lead them to worry that they might have acquired the disease in question. They also often become anxious if they come into contact with people who appear to be ill.

1.3.1 Behavioral Responses

It is important to distinguish between the two forms of disease fear because they can lead to different behavioral reactions: reassurance seeking and checking versus avoidance and escape (cited in Taylor & Asmundson, 2004). Fear of having a disease is associated with reassurance seeking (e.g., from primary care physicians), recurrent checking of one’s body (e.g. frequent breast self-
examinations), seeking out other sources of information on the dreaded disease (e.g., checking medical textbook), and trying various kinds of remedies (e.g., herbal preparations).

Sufferers may perpetually adopt a “sick role” living as an invalid and avoiding all effortful occupational and home responsibilities (Barsky, 1992). They may persistently complain about their health, discussing their concern in great details with anyone who will listen. They frequently seek medical attention even though these consultations rarely confirm their beliefs about having a serious disease. During medical appointments they are often difficult to interrupt in terms of discussion about their health concerns. This is what some frustrated clinicians disparagingly call the “organ recital”. It reflects the patient’s preoccupation with disease.

1.3.2. Health Habits

“A preoccupation with one’s body, disease, health may be found among the impassioned proponents of health foods, rigid diets and elaborate vitamin regimens and among physical fitness and exercise fanatics” (Barsky & Klerman, 1983). These people probably represent only a sub-group of cases of hypochondriasis. The majority have no better health habits than people without the disorder.

How can we account for this paradoxical coexistence of excessively high health anxiety and average or even poor health habits? It appears that many people with hypochondriasis are “symptoms-driven” in their behavior. Their activities seem to be motivated largely by the presence of bodily changes and sensations. These people appear to be more intent on escaping current disease threats than on
promoting their health. In our clinical experience, this is especially true for people who fear that they currently have a disease. A healthy lifestyle seems to be more common in people who are frightened of acquiring a future disease, particularly people who believe that such a lifestyle will help them to avoid some dreaded affliction.

1.3.3 Forms of Health Anxiety

1.3.3.1. Abridged Hypochondriasis

Health anxiety, as a primary (most severe) persisting problem, can be clinically important even when the person does not meet the full DSM-VI criteria for hypochondriasis. This form of health anxiety has been called abridged hypochondriasis, which differs from full-blown hypochondriasis, in that one or more of the diagnostic features of hypochondriasis are not present. On the other hand, the person could be preoccupied with fears of disease and be impervious to medical reassurance, but still be able to function reasonably well.

1.3.3.2. Transient Hypochondriasis

Transient hypochondriasis is another common term used to describe health anxiety that does not fully meet the DSM-IV criteria for hypochondriasis. Transient hypochondriasis is actually a form of abridged hypochondriasis in which clinically significant health anxiety lasts for no more than 6 months. Increased knowledge about disease can lead to transient increases in health anxiety. This is exemplified by medical student’s disease, which is the short lived increase in anxiety that occurs when medical students learn about various life-threatening maladies. Another
potent source of disease-related information is the news media, which can play prominent role in the triggering transient hypochondriasis.

1.3.3.3. Disease phobia

The person with disease phobia is fearful of contracting a disease, but does not believe that he or she has already contracting it, and may respond to medical reassurance. Disease phobia can take a variety of forms, with the most common being fear of developing cancer or acquiring a communicable disease. Suppose Mr. X presented with a severe phobia of contracting HIV, associated with and avoidance of public washroom. Although he acknowledged that it was unlikely that he could get HIV from public washrooms, he believed that infection was still possible. He worried that if he had to use a public washroom, the virus might take its way into his body through the pores of his skin.

1.3.3.4. Somatic delusion

People with extremely strong, unshakable, and unfounded beliefs that they have a serious disease are suffering from somatic delusions. The most common forms of somatic delusions are: (1) that one is emitting a foul odor from the scale or a body orifice, (2) that one is infested with insects or parasites, (3) that certain parts of the body are misshapen or ugly, contrary to objective evidence, and (4) that parts of one’s body (e.g., the circulatory system) are not functioning properly APA (2000).

1.3.3.5. Other Disorders

Excessive health anxiety can also be a feature of other disorders, such as panic disorder and major depressive disorder. For example, worry about dying
commonly occurs during panic attacks in people with panic disorder. In these cases, a diagnosis of hypochondriasis would not be given if excessive health anxiety appeared to be part of, or “due to” another disorder APA (2000). That is, these presentations would not be considered to be primarily health anxiety disorders. However, if a person with panic disorder also had a broader pattern of disease convictions and disease fears that were unrelated to panic attacks, then a diagnosis of hypochondriasis or other health anxiety disorder would be considered.

1.4. Stress

With the advancement of information technology and modern-day complexity our lifestyle has undergone radical changes. Stress is the contribution of the modern society. To a moderate level it is essential for life but in excess it taxes the individual. Stress refers to the events that an individual perceives to be harmful or emotionally threatening. Eysenck (1967, 1981) defines stress in terms of strain experienced by the individuals and identical situations may or may not give rise to strain in different individuals. Life stress is the characteristics of stress full events and the individual’s reactions to them (Dohrenwend & Dohrenwend, 1978). It is mainly concerned with person’s recent traumatic events and the meaning he/she may attach to such events. Thus, stress is that stimulus that imposes strain and cannot be easily accommodated by the body and result is impaired health and behavior (Pestonjee, 1992).

Stress is a complex phenomenon. It is very subjective experience. What may a challenge for one person, will be stressor for another. It depends largely on background experiences, temperament and environmental conditions.
Lazarus (1966) maintains that stress occurs when there are demands on the person, which tax or exceed his adjustment resources. McGrath (1976) adopted interactional approach in defining stress. According to him, stress involves interaction of person and environment.

1.4.1. Stress: Concept and Definitions

Stress is a part of life and is generated by constantly changing situations that a person must face. The term ‘stress’ has different meanings for researchers of various disciplines. In the biological literature, it is used in relation to single organisms, population of organisms, and ecosystems. Biologists refer to things such as heat, cold and inadequate food supply as being source of stress. Human biologists add to this microbial infection and taking toxic substances. Social scientists, for their part, are more concerned about people’s interactions with their environment and the resulting emotional disturbances that can sometimes accompany it (Hinkle, 1987).

Since the advent of the term stress, thousands of studies have been published in different scientific journals, even then there is no agreement of what stress is, how it works, or what can be done about it.

In 1910, Sir William Osler explored the idea of stress and strain causing disease when he saw a relationship between angina pectoris and a hectic pace of life. The idea that environmental forces could actually cause disease rather than just short-term ill effects and that people have a natural tendency to resist such forces, we see in the work of Walter B. Cannon in the 1930s. Cannon studied the effects of stress on animals and people and, in particular studies the “fight-or-flight” reaction.
Because of these reactions people and animals will choose to stay and fight or attempt to escape when confronted by extreme danger. Cannon observed that when his subject experienced situations of cold, lack of oxygen or excitements, he could detect physiological changes such as emergency adrenaline secretion. He describes these individuals as being “under stress”.

The concept of ‘stress’ is elusive because it is poorly defined. There is no single agreed definition in existence. It is a concept which familiar to both layman and professional alike. It is understood by all when used in a general context but by very few when more precise account is required and this seems to be the central problem (Cox, 1978). The concept of stress was first introduced in the life sciences by Hans Selye in 1936. Selye developed his concept of stress while studying medicine in Prague. He observed that the stress reactions as an underlying cause or major contributing factor of most illnesses.

Selye (1936) has conceptualized stress in the following ways:

(a) as an external force which is perceived as threatening;
(b) as response to a situation demanding an individual to adopt to change, physically or psychologically;
(c) as an interactional outcome of the external demand and internal resources, and
(d) as a personal response to a certain variation in the environment.

Selye (1956) was the first researcher who proposed an integrative stress theory. According to Selye’s stress theory, stress was understood as non-specific physiological responses, which are caused by environmental stimuli. As Selye’s
stress theory focused on the mechanism of biological stress, no psychological factors were taken into account. However, recent studies on stress have found the important role of psychological factors in understanding the occurrence and the modification of stress responses.

Different people view stress in different ways. Lazarus and Folkman (1984) defined stress as a “relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being.

The nature and consequences of the stress phenomenon have been systematically presented by Pestonjee (1992) who has identified the following three important stressors of life, in which stress originates:

(i) **Job and organization sector:** Work environment and policies task, responsibility, power and accountability, working hours and atmosphere, compensation and rewards, subordinates, colleagues and superior.

(ii) **Social sectors:** Political and cultural factors, religion and caste, region and language, civic amenities and recreational avenues, health services and educational faculties.

(iii) **Intrapsychic sector:** Temperament, attitudes, values and beliefs, aspirations and desires, health problems and abilities.

The available scientific literature reveals that studies on stress can be placed into one of the three groups representing the main approaches to the problems of its definition and its nature. The first approach describes stress in terms of the person’s “response” to disturbing or noxious environments. The second approach describes
stress in terms of the “stimulus” characteristics of those disturbing or noxious environments. The third approach views stress as the reflection of ‘lack of fit’ between the person and his environment. Stress in this form is studied in terms of its antecedent factors and its effects. It is seen as an intervening variable between stimulus and response.

Stress to us is a very general term that means somewhat different though related things at different levels of analysis. Each of the stress analysis is partially independent in that it refers to different conditions, concepts and processes (Lazarus & Launier, 1978).

Stress is a subset of emotion (Lazarus, 1993). Stress is caused by a multitude of demands (stressors) such as an inadequate fit between what we need and what we are capable of, and what our environment offers and what it demands of us (Levi, 1996). Stress is the external pressures (Saunders, 1997).

In the 1950s stress was described by researchers as a “response to internal or external processes which reach those threshold levels that strain its physical and psychological integrative capacities to, or beyond, their limits” (Basowitz, Persky, Korchin, & Grinkler, 1955).

A stress is any force that puts a psychological and physical function beyond its range of stability, producing a strain within the individual. A threat can cause a strain because of what is signifies to person (Cummings & Cooper, 1979).

Attempts to define stress have been many and varied and examples include: ‘stress is the non-specific response of the body to any demand made up on it’ (Selye 1974), ‘stress is a particular relationship between the person and the environment
that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being’ (Lazarus and Folkman 1984a), and ‘stress is defined as any transactional process in which the organism experiences as an alteration of psychological homeostasis’ (Burchfield, 1985). Conventional treatment of the definitional issues surrounding the stress concept usually divided the various definitions which have been proposed into three categories: stimulus-based definitions, response-based definitions, interactional definitions and transactional definitions.

1.4.2 Stimulus-Based definition of Stress

Stimulus-based definitions of stress have their roots in physics and engineering, the analogy being that stress can be defined as a force exerted, which in turn results in a demand or load reaction, hence creating distortion. If the organism’s tolerance level is exceeded, the temporary or permanent damage occurs. The aphorism “the straw that breaks the camel’s back” encapsulates the essence of stimulus-based definitions of stress. In short, this model of stress as an independent variable elicits some response from the person. Identification of potential source of stress is the central theme of the stimulus-based model of stress (Goodell, Wolf & Roger, 1986). The rationale of this approach is that some external forces impinge on the organism is a disruptive way.

1.4.3. Response-Based Definition of Stress

The work of Hans Selye did most to popularize response-based definitions of stress because of his view the stress was a non-specific response of the body to any demand made upon it. In fact, Selye first used the ‘stress’ to refer specifically to
outside forces acting on the organism in his 1946 paper ‘The General Adaptation Syndrome (GAS) and Disease of Adaptation’, but by 1950 he had revised this definition and the term ‘stress’ now referred to the reaction of the organism to a given stimuli. This stimulus he then called as ‘stressor’.  

Although response based definitions refer to the stimuli which lead to the stress response as stressors, they focus up on the occurrence of the response as the actual stress itself. The response is often viewed in terms of a physiological response pattern which leads to disruption of normal homeostatic regulatory physiological functioning. As with stimulus-based definitions, defining stress merely in terms of physiological (or other) response has proved inadequate in accounting for the complexities of the stress process. For example, the fact that we exhibit physiological stress responses during period of excitement and pleasure is not consistent with the idea of stress as a cause of ill health. In this regard, Selye distinguishes between distress, being negative and resulting in damage to health, and eustress, being positive and enhancing health. As with stimulus-based definition, very few people rely exclusively on a response-based definition (Bartlett, 2010).  

Grinker (1953) attempted to develop an alternative way of defining stress, based on the idea “that the human organism is part of and in equilibrium with its environment, that is psychological process assist in maintaining an internal equilibrium and that the psychological functioning of the organism is sensitive to both internal and external conditions”. Inevitably the difficulties associated with the GAS prompted studies where the focus shifted to exploring the external conditions
that lead to stress. Consequently, the formulation of a stimulus-based approach to defining stress emphasizes on identifying to those events or aspects of events that might cause stress.

1.4.4. Stress as Interaction

In response to the shortcoming of viewing stress solely as a characteristic either of the external environment (a stimulus) or of the physiological response, there has been a tendency to develop models in which aspects of both the environment and the person interact to produce stress. The interactional definition of stress is merely a fusion of the stimulus and response models and labels as stress the whole process from encountering stressful stimuli in the environment, though to the response of the body with its accompanying physiological changes and the phenomenological experiences of stress. Popular interactional definitions of stress consist of the degree of mismatch between the person and the environment, sometimes called the person-environment fit, or P-E fit (Bartlett, 2010).

1.4.5. Stress as a Transaction

Coyne and Lazarus (1980) give some reasons as to why a transactional perspective on stress is superior to other approaches. With the ever-expanding scope of stress theory and the movement towards a biopsychosocial approach in the health field, the limitations of simple concepts of drive, tension reduction or stimulus-response models have become apparent. And the transactional perspective involves extensive psychological mediation and reciprocal feedback loops which cannot be reduced to stimulus-response terms. Current person-environment interactional models of stress, which emphasize environmental stressors,
dispositional properties of persons and stress responses, are limited to an interactional level of analysis. The problem with such models is that they are static and structural, assuming that the person and the environment exist as substantially separate entities and that key person and environment variables can be described prior to connection to each other. Lazarus also makes the point that, even when the conceptual system allows for mediation as in stimulus-organism-response (S-O-R) psychology, such models still presume linear, sequential causation (Lazarus & Folkman, 1984b) and treat the person-environment transaction as a static ‘snapshot’ (Bartlett, 2010).

Among many psychological stress theories, Lazarus Transactional Model (Lazarus, 1966; Lazarus & Folkman, 1984) is the most widely accepted one. According to Lazarus, “stress is as a transactional process from environmental demands to the occurrence of responses under the influences of coping behavior, social support and a number of cognitive variables such as controllability”. A demand from the environment is called stressor. Stressor refers to the internal and external stimuli, which are aversive and threatening for an individual. Responses, which are caused by stressors, are called stress responses, including behavioral, cognitive and physical aspects.

Frustration caused by sexual deprivations, social or peer pressure to conform, and the struggle for professional advancement all cause stress. It was Sigmund Freud (1856-1939) who pointed out that if psychic energy is unable to meet its original objectives, it fixes upon an alternative. This impulse leads to sublimation. This can also lead to stress. While the individual adapts to the
situations, if pressures become unbearable or persistent, he may enter a state of chronic stress. The physiological symptoms become more pronounced, demanding immediate attention and help. Common symptoms are chronic exhaustion, physical illness, anger and depression. A sense of fatigue an exhaustion over-whelms the individual concerned. When these feelings and physiological symptoms persist over a period of crisis, One feels oppressed, becomes highly pessimistic and develops self doubling tendency. In such a situation one also develops an ‘escape mentality’. Peptic Ulcers, tension headaches, chronic backaches, high blood pressure and sleeping problems are some of the prominent symptoms that characterize this stage. They may become acute in course of time.

It is being increasingly recognized that stress is one of the components of every kind of disease and not just of those labeled as ‘psychosomatic’. Infect, researches like (Grant, 1974; Holmes & Rahe 1967; Schmalo & Engel 1967) have established this point beyond doubt that there exists a positive relationship between stressful life events and subsequent illness.

1.4.6. Stress-Related Symptoms

Stress can take a toll on your body as well as your mind and spirit. It is important for a person to know whether he/she is exhibiting a stress related symptoms, because stress can lead to ulcers insomnia, heart disease as well as relationship problems. People may show many physical, emotional, mental or even an occasional anti-social signs on the stress-related symptoms because they are trying to keep up with changing technology.
Stress-related symptoms list includes a few of the most common signs of stress experienced by everyday people: skin problems, poor concentration, sleep deprivation, mood swings, low self esteem, exhaustion, poor memory, changes in appetite muscle tension (DSM-IV, 1994).

Stress-related symptoms list was found in American Psychiatric Association’s Diagnostic and Statistical Manual of Mental Disorders-IV, 1994 edition. They include the following physical signs on their stress related symptoms list such as: sleeplessness, sweaty palms, indigestion, sleep too much, fatigue, tight muscles, diarrhea, tight stomach pain, heart pounding, holding breath, skin breaks out, cold hands, shortness of breath, headaches and nausea.

Person may show a physical stress symptom caused by an illness or disease. It is important to check with medical professional if he/she notices any new stress symptom. Often, they will find their physical stress symptom such as headache is exacerbated by emotional stress.

An emotional stress-related symptom which differ from a physical stress symptom and a mental stress symptom. The emotional stress-related symptom list are: irritability, nervousness, moodiness, hostility, depression, anxiety, seriousness, poor and irrational judgment and mistakes in easy computation. Some people say they can’t concentrate. The mental stress related symptom is negative self-talk. A less obvious mental stress-related symptom is being disorganized.

Stress-related symptom does not mean you are weak or inferior person. It simply means your body is giving you a warning signal that you are taking on too much. Everyone has a different response to stress. Likewise, every one may show a
different sign or symptom of stress, depending on their temperament and life situation. For thousands of years, your body has used stress and a warning sign for your personal defense. It is important to know when a stress-related symptom has a warning signal. Your body will tell you something wrong through a stress-related symptom that could be a dizzy spell, rapid heartbeat or tightened muscles.

There are a number of physiological and psychological symptoms of stress that may be experienced. Seeing that this particular response in the body is actually unique per individual, it is important to learn how your body reacts to stress personally. The following symptoms are most common to the individual experiencing this condition:

- Many may experience pain in the body when they experience stress. This pain may be localized to the head and/or back area.
- Sleep disturbances, such as insomnia may become present.
- Many individuals may experience fluctuations in weight.
- Many may find that the muscles throughout their body are stiff and sore when they experience stress.
- If an individual experiences stress consistently, it is very likely that the immune system will become jeopardized easily. This means that he or she may suffer from sicknesses more frequently.
- Gastrointestinal complications are quite common when it comes to individuals who are experiencing stress. It is not uncommon for someone to experience bouts of diarrhea, nausea, and even vomiting.
• Difficulty remembering things and concentrating is common when high levels of stress are experienced.
• Individuals may experience severe mood swings. This includes experiencing depression and anxiety.
• Individuals who experience stress have a difficult time making choices and thinking rationally.
• When stressed, one will find it hard and troublesome to relax.
• Having a "short fuse" or getting angry quickly is a common result of stress.
• Many who experience stress may suffer from the emotional effects of feeling lonely and isolated from others.

Stress is a very personal experience, which every single individual experiences to some degree at least once in their lives. There are a number of reasons why this may be experienced. Something as simple as the inability to sleep, or something as complicated as losing a loved one can result in stress. However, the exact definition of stress varies from person to person and impacts one's life differently, according to his or her circumstances.

1.4.6.1 Physical Symptoms

Physical symptoms can be caused by other illness, so it is important to have a medical doctor to treat conditions such as ulcers, compressed disk, or other physical disorders. Remember, however, that the body and mind are not separate entities.
The physical problems outlined below may result from or be exacerbated by stress:

- Sleep disturbance.
- Tension or migraine headaches.
- Back, Shoulder or neck pain.
- Upset or acid stomach, cramps, heartburn, gas, irritable bowel syndrome.
- Constipation, diarrhea.
- Hair loss.
- Weight gain or loss, eating disorder.
- Fatigue.
- Muscle tension.
- Irregular heartbeat, palpitation.
- High Blood pressures.
- Chest pain.
- Asthma or shortness of breath.
- Cold hands or feet.
- Sweaty palms or hands.
- Skin problems (hives, eczema, psoriasis, tics, itching).
- Reproductive problems.
- Periodontal disease, jaw pain.
- Immune system suppression: more colds, flu, infections.
- Growth inhibition.

1.4.6.2. Emotional Symptoms

Like physical signs, emotional symptoms such as anxiety or depression can mask conditions other than stress. It is important to find out whether they are stress related or not. In either case, the following emotional symptoms are uncomfortable and can affect your performance at work or play, your physical health, or your relationships with other as follows:
• Nervousness, anxiety.  
• Depression, moodiness.  
• “butterflies”.  
• Irritability, frustration.  
• Memory problems.  
• Lack of concentration.  
• Trouble thinking clearly.  
• Feeling out of control.  
• Substance abuse.  
• Phobia  
• Overreaction

### 1.4.6.3. Relational Symptoms

The antisocial behavior displayed in stressful situations can cause the rapid deterioration of relationships with family, friends, co-workers, or even strangers. A person under stress may manifest signs such as:

- Increased arguments  
- Isolation from social activities  
- Conflicts with co-workers or employers  
- Frequent job change  
- Road rage  
- Domestic or workplace violence  
- Overreactions

Severe stress reactions that persist for long periods of time and recur without warning after a traumatic event or even after an intense experience such as an accident, hospitalization, or loss, may become a Post Traumatic Stress Disorder (PTSD) requiring professional assistance to overcome.

The symptoms of stress can be either physical or psychological. Stress-related physical illnesses, such as irritable bowel syndrome, heart attacks, and chronic headaches, result from long term over stimulation of a part of the nervous system that regulates the heart rate, blood pressure, and digestive system. Stress-
related emotional illness results from inadequate or inappropriate responses to major changes in one’s life situation such as marriage, completing one’s education, becoming a parent, losing a job, or retirement. Psychiatrists sometimes use the term adjustment disorder to describe this type of illness. In workplace, stress-related illness often takes the form of burnout- a loss of interest in or ability to perform one’s job due to long term high stress levels.

The very concept of stress has psychological as well as physical connotations. More and more evidence is coming up linking stress with various diseases. Stress can trigger or aggravate almost all major physical disorders. It has been found to play a role in Peptic Ulcers (Weiss, 1984; Wolf & Wolf, 1947), Asthma (Busse, 1990; Cluss & Fireman, 1985; Eiser, 1985), Headaches (Andrasik, Blake & McCarran, 1986; Gannon, Haynes, Cueves, & Chavez, 1987; Kohler & Haimerl, 1990), Rheumatoid arthritis (Anderson, et.al 1985), Skin Disorders such as Hives, Eczema and Psoriasis (Grossbart, 1982), Diabetes (Goetch, 1989) and Cancer (Fox, 1978; Haney, 1977; Kissen, 1969; Selye, 1979).

1.4.7. Classification of Stress-related Disorders

Stress is a systemic biological response of an individual to the variety of situations. A stressor of any kind first acts on the mind and its effect is observed on the somatic structure of an individual. Studies have proved that any change in psychological functioning under stressful state precipitates at the metabolic level, through an integrated series of neurohumoral and endocrinical alterations. Stress response consists of a sequence of physiological changes involving almost all body parts and systems.
Misra and Pandey (1993) subdivided stress response into four activities: (a) cardiovascular activity, which includes rate, depth and amplitude of heart beat, diameter of blood vessels and composition of blood; (b) gastrointestinal activity, including rate and amplitude of stomach contraction, secretion of salivary and gastric juice; (c) respiratory activity, including rate, depth and regulation of breathing; and (d) endocrine activity, including changes in rate and nature of secretions from classic endocrine glands, e.g., pituitary, thyroid, parathyroid, adrenal and pancreas.

The increasing problems of stress disorders present a major challenge for the medical and behavioral sciences. Stress disorders are the physiological conditions of the individuals resulting from altered psychological functioning.

Husain (1999) classified stress related disorders into ten types:

(a) Affective Disorders: ACTH and STH disorders, depression, anxiety, tension headaches, psychogenic headaches, and migraine.

(b) Cardiovascular Disorders: Neurocirculatory asthenia, cardiac neurosis, essential hypertension, coronary atherosclerosis, ischaemic heart disease, angina pectoris, cardiospasm, congestive heart failure, myocardial infarction.

(c) Dermatological Disorders: Urticaria, angio-neurotic oedema, psoriasis, eczma, neurodermatitis.

(d) Endocrine Disorders: Hypo-and hyper-thyroidism, diabetes mellitus, and diabetes insipidus.

(e) Exocrine Disorders: Acne, cotton, mouth, profuse sweating.
Gastrointestinal Disorders: Peptic ulcer-gastric, duodenal and colonic, colitis.

Muscular-skeletal Disorders: Backaches, rheumatoid arthritis.

Neurological Disorders: Impairments in taste, vision, smell and tongue movement.

Respiratory Disorders: Bronchial asthma, hyperventilation.

Urogenital Disorders: Urinary infection, impotence, frigidity, spernatorrhoea in males, amenorrhoea dysmenorrhoea and menorrhagia in females.

1.5. Diabetes, Hypertension and Heart disease: Incidence and Prevalence in India

Diabetes mellitus, hypertension and heart disease are all interlinked dysfunctions. The major risk factors for these dysfunctions are genetic predisposing, smoking, alcoholism, sedentary lifestyle, hyperlipidemia, obesity and stress. Many of these contributing factors co-exist and therefore higher is the risk of developing these diseases (Pal, 2008).

Hyperlipidemia is a major risk factor. Hyperlipidemia causes acceleration of atherosclerosis, the primary pathophysiologic determinant of blood pressure and coronary perfusion. Recently it has been reported that it is not the hyperlipidemia alone, but the dyslipidemia (disproportionate rise in lipids) that increases the risk.

Role of stress in the pathogenesis of these disorders has gained the primary focus in recent days. Stress, both mental and physical, is the principal culprit for diabetes, hypertension and CAD. The modern man is incessantly running behind purse, position and power. Greed for money and greed for power through unhealthy
competitions has increased his basal adrenaline level and the rate of sympathetic discharge. To achieve everything for him through whatever means has increased the demand on the body to perform always at its peak. A fast and hurried life does not suite the natural Indian atmosphere. May be the rapid development, fast growing economy and heightened competitions in public and private lives have increased the level of stress in Indian population. Rapidity of growth is always welcome, but one cannot ignore the health for his achievements. Same time, one can not abandon development for the sake of his health. Therefore, the greater question before us is how to keep pace with progress without affecting health? One has to learn to achieve and prosper with eustress (normal stress) and without distress (pathological stress).

1.6. Diabetes

Diabetes has emerged a major healthcare problem in India. According to Diabetes Atlas published by the International Diabetes Federation (IDF), there were an estimated 40 million persons with diabetes in India 2007 and this number is predicted to rise to almost 70 million people by 2025. The fourth edition of the World Diabetes Atlas, released in Montreal at the World Diabetes Congress, estimates that more number of people in India have diabetes than previously estimated. India continues to be the “diabetes capital” of the world and by the year 2010 about 50.8 million people in the 20 to 79 age group in the country will have diabetes. The number of Indians with ‘pre-diabetic’ condition of Impaired Glucose Tolerance (IGT) is also very high –about 39.5 million people will have IGT in 2010 and the number will be 64.1 million in 2030.
India with its dubious distinction of being called “the diabetic capital of the world” is presently estimated to have over 30 million individuals affected by this deadly disease. India is ahead of China and USA, which are in second and third place respectively. The number of people with diabetes among adults in India in the years 1995, 2003 and 2030, represents a three hundred percent increase in the number of people with diabetes between 1995 and 2030 (King, Aubert & Herman, 1998). A striking example of the rise in prevalence of diabetes in India is the fivefold increase from 2.1% to 12.1% seen from 1970 to 2000 (Ahuja, 1979; Ramachandran, Snehalatha & Kapur 2001). Two population based studies, the Chennai Urban Population Study (CUPS) and Chennai Urban Rural Epidemiological Study (CURES) showed a marked increase in the prevalence of diabetes within a short span of five years. The CUPS study conducted in the year 1997 revealed that 12% (crude prevalence rate) of the Chennai population to be affected by diabetes (Pradeep, Deepa & Mohan, 2002). The National Urban Diabetes Survey (NUDS), carried out in six cities in the year 2001, reported the age-standardized prevalence rates of 12% for diabetes for urban India (Ramachandran et. al. 2001). The age-standardized prevalence of diabetes in Chennai according to this study was 13.5%. In addition this study also reported that 14% had Impaired Glucose Tolerance (IGT). The city of Hyderabad showed the highest rates of both diabetes (17%) and IGT (30%). In Chennai, Bangalore, Hyderabad and Mumbai, the prevalence of IGT exceeded those of diabetes (Ramachandran et. al. 2001). The large population based study, CURES conducted on 26,001 individuals in the year 2001-2002, showed that according to the
American Diabetes Association (ADA) criteria 19% had diabetes in Chennai and this scaled down to 16% when WHO criteria was used (Mohan & Deepa et al. 2003).

In the new millennium, diabetes mellitus has become a problem of epidemic proportions. It touches us in every walk of life - physician and scientists, family and friend, even governments and communities-and it exacts a costly toll. Diabetes mellitus is defined by the American Diabetes Association (ADA) Expert Committee in their 1997 recommendations as "a group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action or both. The chronic hyperglycemia is associated with long-term damage, dysfunction and failure of various organs, especially the eyes, kidney, nerves, heart and blood vessels." Thus, diabetes covers a wide range of heterogeneous diseases (report of the expert committee). The total number of people with diabetes is predicted to rise to about 300 million by 2025, with one-third of affected individuals living in India.

Diabetes is the result of a deficiency of insulin function. There may insufficient insulin produced by the pancreas, or the insulin produced may not be effectively used so that the person requires more insulin than the pancreas is secreting. This relative insufficiency or hyperactivity of insulin antagonists such as the pituitary, adrenomedullary or thyroid hormones. It may also be due to action of the glucagons produced by the alpha cells of the pancreas itself. Antibodies which combine with a neutralize insulin may also be the cause of the diabetes.

Insulin is produced by the beta cells of the pancreas, and promotes the uptake of glucose from the blood by the body cells. Without insulin glucose may
neither be consumed as a fuel nor adequately stored. It simply accumulates in the blood. When it reaches a sufficiently high level (and passes the renal threshold) it ‘spill over’ into the urine and is excreted. When this occurs, an increased volume of urine is required to carry away the excess glucose, and the body may become dehydrated. Thus severe thirst may be a symptom of untreated diabetes. When glucose is not available as a fuel fat is used instead. However, complete combustion of fats requires the presence of substances produced during combustion of glucose. In the absence of glucose metabolism, fat combustion is incomplete, resulting in the production and accumulation of toxic ketone bodies in the blood. If they collect in sufficient amounts they cause acidosis and eventually coma, which may be fatal.

There are at least two very distinct forms of the disease, namely juvenile and maturity-onset diabetes, although they do present some similar symptoms. Further subdivisions of each of these forms can be described actiological terms. Juvenile or growth-onset diabetes is invariably an insulin requiring form of the disease, while maturity-onset diabetes is generally a milder form of the disorder. Juvenile diabetes tends to be underweight because of large losses of glucose, whereas maturity-onset diabetes tends more often to be overweight. With overweight patients it is often possible to reduce carbohydrate intake to within range with which the endogenous insulin can cope.

In case of underweight maturity-onset diabetes there is insufficient utilization of carbohydrates, and hypoglycemic drugs such as tolbutamid or chlopropamide can be used to stimulate the pancreatic cells to secrete more insulin or to increase the effectiveness of the insulin that is already being produced.
1.6.1. Classification of Diabetes Mellitus

Diabetes mellitus can be classified according to pathophysiologic mechanism leading to hyperglycemia. The classification includes:

I. Type I (Previously termed as Insulin Dependent Diabetes Mellitus IDDM, or juvenile-onset diabetes)-absolute insulin insufficiency.

II. Type II (previously termed as Non-Insulin Dependent Diabetes Mellitus, NIDDM or adult onset diabetes) insulin resistance with varying degrees of insulin secretory defects.

III. Gestational diabetes-form of glucose intolerance during pregnancy.

IV. Other types-resulting from specific conditions such as genetic defects of pancreatic beta cells (also known as Maturity-Onset Diabetes of Young or MODY) or insulin action; disorders involving the exocrine function of the pancreas, endocrine disorder; drugs, surgery, malnutrition, infections and other illness.

Type I diabetes can occur at any age but it typically begins in childhood or young adulthood. Due to the absolute insulin insufficiency, exogenous insulin is necessary to achieve blood glucose control.

Type II diabetes is usually associated with old age, typically after age 40, but children and adolescents may be diagnosed with of this type diabetes. Obesity family history of diabetes or gestational diabetes, impaired glucose metabolism, and physical inactivity are also associated with this type of diabetes. Type 2 diabetes is treated with diet and exercise in combination with various oral antidiabetic drugs.
Diabetes has for a long time been described as an inherited metabolic disease but the mode of inheritance is still largely unknown. One reason of this may have been that the characteristic symptoms of glycosuria and hyperglycemic have, in the past been thought to be indicative of a single disease entity. More recently, however, it has been accepted that diabetes is a range of disorders of deferring etiology. Danowski (1963) cited some of the other factors which have been implicated including obesity, injury to the pancreas, repeated pregnancies and the ageing process.

1.7. Hypertension

Hypertension is another serious disorder of modern times. Conceptual definition of hypertension was given by Kaplan (1983) “the level of blood pressure at which the benefit (minus the risk-and-costs) of action exceeds the risks and costs (minus the benefit) of interaction”. Hypertension is also known as high blood pressure. Blood pressure is measured by two numbers; one represents systolic pressure and another represents diastolic pressure. The systolic measure is the amount of arterial pressure when the ventricles contract and the heart are pumping; the diastolic measure is the degree of arterial pressure in a young adult would be 120 (systolic) over 80 (diastolic). A blood pressure level that is over 140 (systolic pressure) and does not fall below 90 (diastolic pressure) is usually considered high. High blood pressure indicates that there is resistance to the flow of blood through the cardiovascular system. This condition places pressure on the arteries and forces the heart to work harder to overcome the resistance. Cardiovascular disease caused 2.3 million deaths in India in the year of 1990; this is projected to double by the
year 2020. Hypertension is directly responsible for 57% of all stroke deaths and 24% of all coronary heart disease death in India. Indian urban population studies in the mid 1950s used older WHO guidelines for diagnosis (BP > 160 and/or 95mmHg) and reported hypertension prevalence of 1.2-4.0%. Subsequent studies report steadily increasing prevalence from 5% in 1960s to 12-15% in 1990s. At an estimate, there are 31.5 million hypertensive in rural and 34 million in urban populations (Gupta, 2004).

This disease disposes people to atherosclerosis (clogging of the arteries), heart attacks, strokes, blindness and it can also cause death through kidney failure. One in every six Indians has hypertension varying degrees of hypertension are found in 15 to 33 percent of the adult population of the United State, as many as two percent of American College Students have hypertension. Black suffers from hypertension twice as compared to whites (Edwards, 1973; Mays, 1974).

Unlike other diseases, there are usually no symptoms to signal high blood pressure. The individual experience no personal distress. In severe cases; some people complain of headaches, tiredness, insomnia occasional dizzy spells-symptoms often easy to ignore but most persons suffering from hypertension receive no warning symptoms. Nelson (1973) found that one third of the adults tested had high blood pressure, only half of them had been aware of it.

Although in certain cases, kidney dysfunctions or pathology of some physical system may cause hypertension, organic factors are not identifiable in 90 to 95 percent of hypertension cases (Byassee, 1977). Thus, the condition is often
called essential hypertension. Essential hypertension means hypertension without an evident organic cause.

It is therefore more likely that psychological factors play a role in the development of this disorder. The classical psychoanalytic interpretation is that suppressed anger is the cause of the hypertension. Many researches support this hypothesis (Dimsdale, Pirce, Schoenfeld, Brown, Zusman & Graham 1986; Gentry, Chesney, & others, 1982; Spielberger, Johson, Russell, Crane & Wordon 1985). Although some evidence relating expressed anger with hypertension is also available, (Harburg, Gleiberman, Russell & Cooper 1991).

1.8. Coronary Artery Disease (CAD)

Coronary artery disease (CAD) is the scourge of modern civilization. According to World Health Organization (WHO), CAD is the leading cause of death in the world. Age adjusted death rates for CAD contributing to “all-cause mortality” was 30% in the USA, 27% in United Kingdom and 5% in India Health Information (1988). The prevalence of CAD in urban north India varies from 7 to 10% (Reddy, 1993) while it is higher in south India varying from 7 to 14% (Begum & Singh 1995; Rama, Balakresnan, Jayasree & Thomas, 1993).

Since 1960, life expectation in India has increased by 20 years to 60 years of age (Reddy & Yusuf, 1998). From 1960 to 1995, the prevalence of CAD in adults increased from 3 to 10% in urban Indians and from 2 to 4% in rural Indians, with women having similar to men (Gupta, 2001). Although the prevalence of CAD in rural India is half that of urban India, this is still two fold higher than the overall CAD rates in the US and several-fold higher than in rural china (Wu Z, Zhao, Wu
G, Wang & W. Liu, 2001). In 1990s, there were 783000 cases of CAD in India and this is projected to be double by the year 2015, primarily due to affluence and urbanization. Young Indians with CAD have extensive coronary atherosclerosis.

Coronary artery disease (CAD) also has been thought to have a psychosomatic component; the three stages of coronary artery disease are atherogenesis, atherosclerosis, and arteriosclerosis. With atherogenesis, the initial stage of a fatty streak appears on the inner lining of the artery wall. There is evidence that this can occur as early as ages 3 to 5 years. As the fatty streak continues to develop around the perimeter of the artery and grow in length, a buildup of plaque occurs. This plaque results in a narrowing of the inside of the artery and is referred to as atherosclerosis. As the plaque accumulates, other constituents in the blood are attracted to the site, including calcium, resulting in an increased resistance in the blood flow and increased blood pressure. As the individual ages, plaque hardens, resulting in rigid artery walls that no longer can constrict or dilate. These compounds the effect of high blood pressure and is one reason why resting pressure increases with age. At the third stage, arteriosclerosis, the arteries become hard and possibly occluded from the flow of blood. When the blood flow to any organ is impeded, signs of ischemia develop, resulting in pain (angina) or death of tissues (infraction). The degree of coronary artery blockage and the location of the affected artery determine the severity of the heart attacks. The most extreme result is death. Similar etiology occurs in the carotid arteries that lead to the brain and arteries within the brain that provide oxygen to this major organ.
Strokes, like coronary heart disease, are the end result of blocked arteries, creating an inadequate oxygen supply to the brain (Guyton, 1996).

Persistent stress, low social class, lack of control in one’s job, job strain (defined by high psychological demands and lack of control), and certain enduring dispositional attributes are believed to affect arterial lesion progression and the development of coronary artery disease over time (Bosma, Marmot, Hemingway, Nicholson, Brunner & Stansfield, 1997; Cohen, Kaplan, & Manuck 1994; Everson, Lynch, & Chesney 1997).

Community-based prospective studies have suggested that higher hostility, as measured by questionnaire (Barefoot, Dodge, & Peterson, 1989) or interview, predicts both the severity (Seaward, 1997) and the progression (Dembroski, MacDougall, & Costa, 1989; Hecker, Chesney, & Black, 1988; Helmer, Krantz, & Howell, 1993; Julkunen, Salonen, & Kaplan 1994) of coronary artery disease. Hostile individual have shown excessive cardiovascular reactivity in the form of heart rate and sustained blood pressure responses to interpersonal laboratory stressors. Laboratory stressors produce these findings were: conflict discussion tasks (Hardy & Smith, 1988; Smith & Allred, 1989), unsolvable anagrams with misleading instructions (Weidner, Friend, & Ficarrotto, 1989) and anagram tasks accompanied by harassment (Suarez, Kuhn, Schanberg Williams, & Zimmerman, 1998; Suarez & Williams, 1990).

In short, chronic elevations in cortisol and sympathomimetic neuromediators appear to facilitate the development of coronary artery disease and atherosclerosis. Stressors, in the social environment, recurrent hostility, and a hard-driving
Coronary artery disease manifests itself in many forms. The most common of these are “angina pectoris” and “myocardial infarction”.

1.8.1. Angina pectoris

Angina pectoris is the medical term for chest pain or discomfort due to coronary heart disease. Angina is a symptom of a condition called myocardial ischemia. It occurs when the heart muscles (myocardium) doesn’t get as much blood (hence, as much oxygen) as it needs. This usually happens one or more of the heart’s arteries is narrowed or blocked. Insufficient blood supply is known as ischemia. Typical angina is uncomfortable pressure, fullness, squeezing or pain in the neck, jaw, shoulder, back or arm. Many types of chest discomfort aren’t related to angina American Heart Association (AHA, 2002).

Angina often occurs when the heart needs more blood. For example, running to catch a bus could trigger an attack of angina while walking might not. Angina may happen during exercise, strong emotions, eating or extreme temperatures like cold weather. Angina is a sign that the person is at an increased risk of heart attack, cardiac arrest and sudden death (AHA, 2002).

Angina may take three forms-stable angina, unstable angina, or variant angina.

1.8.1.1. Stable angina

People with stable angina (or chronic stable angina) have episodes of chest discomfort that are usually predictable. They occur on exertion or under mental or
emotional stress. Normally the chest discomfort is relieved with rest and/or medication.

1.8.1.2. Unstable angina

People with unstable angina, the chest pain is unexpected and it usually occurs while rest. The discomfort may be more severe and prolonged than typical angina. The most common cause is atherosclerosis.

1.8.1.3. Variant angina

Variant angina pectoris is Prinzmetal’s angina. It is a relatively uncommon form of unstable angina characterized by recurrent and prolonged attacks of severe ischemia. And nearly always occurs when a person is at rest. It doesn’t follow physical exertion or emotional stress. Attack can be very painful and usually occurs between midnight and 8 a.m. variant angina is due to coronary artery spasm. About two-third of people with variant angina have severe coronary atherosclerosis in at least one major vessel.

1.8.2. Myocardial Infarction

Myocardial Infarction (MI) is the medical term for heart attack. MI occurs when there is an abrupt decreased in the blood supply to part of the heart muscle-the myocardium. This reduction or stoppage of blood supply happens when one or coronary arteries supplying blood to the heart muscles are blocked. This is caused usually by atherosclerosis. If the blood supply is cut of for more than a few minutes, muscles cells suffer permanent injury and die. This can kill or disable someone, depending on how much heart muscles is damaged.
Sometimes a coronary artery temporarily contracts or goes into spasm. When this happens the artery narrows and blood flow to part of the heart muscles decreases or stops. A spasm can occur normal-appearing blood vessels as well as vessels partly blocked by atherosclerosis. This causal mechanism of the spasm is not known, but a severe spasm can cause a heart attack. The first coronary presentation for women is more likely to be angina, whereas in men it is more likely to be myocardial infarction.

1.9. Research Objectives

The present research is systematically designed in accordance with the following main research objectives:

1. To examine the main effects of gender (male and female), types of disease (diabetes, hypertension and CAD) and the interaction between them on health worry and preoccupation factor of health anxiety.

2. To examine the main effects of gender (male and female), types of disease (diabetes, hypertension and CAD) and the interaction between them on fear of illness and death factor of health anxiety.

3. To examine the main effects of gender (male and female), types of disease (diabetes, hypertension and CAD) and the interaction between them on reassurance seeking behavior factor of health anxiety.

4. To examine the main effects of gender (male and female), types of disease (diabetes, hypertension and CAD) and the interaction between them on interference with life factor of health anxiety.
5. To examine the main effects of gender (male and female), types of disease (diabetes, hypertension and CAD) and the interaction between them on overall scores of health anxiety.

6. To examine the main effects of gender (male and female), types of disease (diabetes, hypertension and CAD) and the interaction between them on mental symptoms of stress.

7. To examine the main effects of gender (male and female), types of disease (diabetes, hypertension and CAD) and the interaction between them on physical symptoms of stress.

8. To examine the main effects of gender (male and female), types of disease (diabetes, hypertension and CAD) and the interaction between them on emotional symptoms.

9. To examine the main effects of gender (male and female), types of disease (diabetes, hypertension and CAD) and the interaction between them on social symptoms of stress.

10. To examine the main effects of gender (male and female), types of disease (diabetes, hypertension and CAD) and the interaction between them on overall stress symptoms.

1.10. Research Questions

The following questions have been framed for the present study:

1. Do male and female patients differ on health anxiety?
2. Do male and female patients differ on the factor of health anxiety namely, *health worry and preoccupation, fear of illness and death, reassurance seeking behavior and interferences with life*?

3. Do diabetic, hypertensive and coronary artery disease patients differ on health anxiety?

4. Do diabetic, hypertensive and coronary artery disease patients differ on factors of health anxiety namely, *health worry and preoccupation, fear of illness and death, reassurance seeking behavior and interferences with life*?

5. Do male and female patients differ on symptoms of stress?

6. Do male and female patients differ on mental, *physical, emotional and social symptoms* of stress?

7. Do diabetic, hypertensive and coronary artery disease patients differ on the symptoms of stress?

8. Do diabetic, hypertensive and coronary artery disease patients differ on *mental, physical, emotional and social symptoms* of stress?

### 1.11. Significance of the Present Study

The researcher has chosen the present research topic as “*A study of health anxiety and stress-related symptoms among diabetic hypertensive and coronary artery disease (CAD) patients*” because of its relevance. The research is needed in this area with conditions like diabetes, hypertension and coronary artery disease because it is evident from the survey of literature and other means specifically in our country. Various survey reports based on Indian Health Ministry that 10% of adults suffering from hypertension and the country is home to 25-30 million
diabetics. The number of death from heart attack is projected to increase to two million in 2010. Six millions people have coronary artery disease and five rheumatic heart diseases. Premature mortality among Indians is posing serious challenges to the economy.

In this way the researcher has enough evidence to believe and to prefer the present topic of research as compared to other. The researcher believes that health anxiety affects patient’s response to the feeling of discomfort and pain. Health anxiety also appears to affect the whole health behavior, with patients who are anxious about their health being more likely to consult physicians and report increased health problems.

The other most important aspect of the present study is stress. Stress can have serious health implications, increasing the risk of cardiovascular disease and exacerbating medical conditions such as asthma, diabetes, and hypertension. Stress is unavoidable, that is why it is globally accepted that in modern era, stress plays a very significant role in leading or causing various fatal diseases like chronic diabetes, hypertension, CAD, brain stroke, and cancer etc. Stress also plays vital role in susceptibility, progress, and outcome of cardiovascular diseases. Thereby, stress is now used as an umbrella term that summarizes the effects of psychosocial and environmental factors on physical or mental well-being. The interest of various medical fields and disciplines in the area of stress-related diseases and research is rapidly growing. This is the reason for selecting stress with health anxiety with reference to diabetes, hypertension and CAD.
1.12. Operational Definitions

1.12.1. Health anxiety

Health anxiety refers to a concern about health in the absence of pathology or excessive concern when there is some degree of pathology (Lucock & Morley, 1996).

1.12.2. Symptoms of Stress

Stress as the state of dynamic tension created when an individual respond to perceive demands and/or pressures from outside and from within. These demands and pressures build up till they trigger the stress response and the release of adrenaline and cortisole. When demands and tension get out of hand, the stress response becomes either too intense, occurs too frequently, or continues for too long. Stress makes itself felt through a range of physical and mental symptoms that makes things even worse by becoming sources of demand and pressure in and of themselves.

There are number of mental, physical, emotional and social symptoms of stress that may be perceived by an individual. Seeing that this particular response in the body is actually unique per individual, it is important to learn how your body reacts to stress personally.

1.12.3. Diabetes Mellitus

Diabetes mellitus is a chronic disease which occurs if the pancreas dose not produces enough insulin, or if the body cannot process the insulin adequately. One of the most important biological effects of insulin is the acceleration of the intake of glucose in muscles and fat cells.
1.12.4. Hypertension

Operationally, the time-honored blood pressure values that identify hypertensive individuals are a systolic blood pressure of 140mmHg or a diastolic blood pressure of 90mmHg-values that are associated with an approximate doubling of cardiovascular risk, as compared to the values that characterize the normotensive state. Except for very high blood pressure values or the presence of cardiovascular disease and organ damage, these systolic and diastolic values must be confirmed by sphygmomanometric (clinical) blood pressure measurements made over a period of several weeks.

1.12.5. Coronary Artery Disease (CAD)

Coronary artery disease (CAD) is the end result of the accumulation of atheromatous plaques within the walls of the coronary arteries that supply the myocardium (the muscle of the heart) with oxygen and nutrients. As the degree of coronary artery disease progresses, there may be near-complete obstruction of the lumen of the coronary artery, severely restricting the flow of oxygen-carrying blood to the myocardium. Individuals with this degree of coronary artery disease typically have suffered from one or more myocardial infarctions (heart attacks), and may have signs and symptoms of chronic coronary ischemia, including symptoms of angina at rest and flesh pulmonary edema.
1.13. Conceptual Framework

Health Anxiety

- Health worry and preoccupation
- Fear of Illness and Death
- Reassurance seeking Behavior
- Interference with Life

Stress-Related Symptoms

- Mental
- Physical
- Emotional
- Social

Diabetic

- Female

Hypertensive

- Male
- Female

CAD

- Male
- Female