Chapter 1

Stress – An Introduction
1.1 Concept of Stress

The word 'Stress' is derived from the Latin word 'stringere', which means to draw tight. The word was used in the 17th century to describe hardship, strain, adversity or affliction. In the late 18th century, stress was used to denote "force, pressure, strain or strong effort," referring primarily to an individual or to an individual's organs or mental powers (Hinkle, 1973). The concept was initially borrowed from the natural sciences. Hans Selye (1936) was first to introduce the concept of stress in the life sciences.

Stress is inevitable in today's complex life and has been chronologically observed as a psychological phenomenon. Right from the time of birth till death, an individual is invariably exposed to various stressful situations. Contemporary human beings are under constant stress. The threat of nuclear holocaust, ecological imbalances, political and economic imbalances and uncertainties, unemployment, poverty, urbanisation, industrialisation and increased socio-economic complexities and innumerable other factors, which are part and parcel of modern life, are contributing to stress. But stress is not a modern phenomenon. In fact stress is as old as the history of mankind and in all probability it would continue to be a part of human life. The caveman of prehistoric
age was under stress due to factors that were more relevant at that time, for instance threats of wild animals, natural and climatic dangers and above all search for food and a constant struggle for survival.

For a layman the term stress is used to connote a variety of meanings. In general, people use the terms 'stress' and 'strain' interchangeably in a non-scientific manner. The common man fails to distinguish between the three sources of stress. Stress may arise because of frustration, conflict or pressure (Coleman, 1973, p.19). Frustration occurs when the ability to achieve a desired goal is delayed or blocked. This may be caused due to physical handicaps or deprivations severely restricting our life activities and satisfaction. People experience stress when they can no longer have control over what happens in their lives. Resulting frustration causes stress. Conflict occurs not from a single obstacle but when a choice is to be made between two or more goals, means, priorities etc. Pressure involves demands that force us to speed up or intensify our efforts. This stems from our aspirations, standards and values. In addition, stress may arise because of a threat i.e. an anticipated harm from a potential source. These broad sources of stress - frustration, conflict, pressure and a potential threat are vital for understanding total stress pattern that an individual faces. As the stress may emanate from either of these roots, personal experiences of stress differ. It is said that the beauty lies in the eyes of the beholder. Similarly, stress lies in the mind of the beholder.

Differences on conceptualization exist among psychologists as well. Though psychologists created awareness on the issue of
stress 'as an area of concern', at the same time they have caused confusion by their inability to succinctly and consistently defining stress. A review of literature shows that there is a lack of consensus regarding the definition of stress.

Hans Selye (1936, 1956) defines stress as a dynamic condition in which an individual is confronted with an opportunity, constraint, or demand related to what he or she desires and for which the outcome is perceived to be both uncertain and important.

Cofer and Appley (1964) define stress as "the state of an organism where he perceives that his well being (or integrity) is endangered and that he must divert all his energies to its protection".

For Janis and Levinthal (1968) it is the unpleasant emotional experience associated with elements of fear, dread, anxiety, irritation, annoyance, frustration, anger, sadness, grief and depression.

McGrath (1970) conceptualizes stress as 'a (perceived) substantial imbalance between demand and response capability, under conditions where failure to meet demand has important (perceived) consequences'.

Lipowski (1975) conceptualizes stress as 'information' interpreted as threat of loss or injury.

According to Cox and MacKay (1979), Stress arises when there is an imbalance between demand as estimated by the individual and their perceived ability to cope with that demand.
This problem is confounded further by the interchangeable terms 'stress' and 'strain' (Spector & O'Connell, 1994). Sauter, Lawrence and Hurrell (1990) specifically highlight this inherent problem by acknowledging, '...the lack of consensus or consistency in interpretation and use'. Even the World Health Organisation (WHO) recognises the lack of definition and quantitative measurement (Fisher, 1985). It could be argued that the confusion in definition of stress is primarily due to the fact that scholars of various disciplines use the same term differently.

This lack of definition has led some researchers to conclude that stress is too large a phenomenon and too all encompassing to investigate (Schuler, 1980). On the other hand, some researchers have even shown a sense of frustration that so much time is spent on defining stress when there are far more important issues to confront (Beehr & Franz, 1987).

Pestonjee (1999) has identified three important sectors of life in which stress originates. These three sections of life are:

- Job and the organisation,
- The social sector, and
- Intrapsychic sector.

Job and organisation refers to the totality of the work environment i.e. task, atmosphere, colleagues, compensations, etc.

The social sector refers to the social/cultural context of an individual's life. It may include religion, caste, language, dress, food habits etc.
The intrapsychic sector encompasses those things that are intimate and personal like temperament, values, abilities and health.

Stress can originate in any of these three sectors of life or in combinations thereof. Whether these sources lead to actual stress or not differs from individual to individual depending on the differences such as personality, perception, past experience, beliefs, resources, knowledge, values, drives, etc.

Organisational stress originates in organisational demands that are experienced by the individual. Mismanaged organisational stress can induce individual strain, which is detrimental for the human resources in the organisation. This has negative economic implications such as poor quality of work, low productivity, absenteeism, high turnover, etc. When an organisation is able to manage stress, it can lead to improved performance, worker satisfaction, involvement and increased productivity. An aspect of organisational stress is the role stress. Stress is built up in the concept of role which is conceived as the position a person occupies in a system. Role based stress not only effects the interpersonal relationships but also psychological and physical well being of an individual as well as his role performance. It is only through the integration of the self and the role that role stress can be reduced and a person’s effectiveness in the organisation can be ensured.

1.2 Factors Influencing Severity of Stress

Severity of stress refers to the degree of disruption in the system that will occur if the individual fails to cope with the
adjustive demands (Coleman, 1981). The severity of stress in turn, determined primarily by three factors:

- The characteristics of the adjustive demands,
- The characteristics of the individual, and
- The external resources and support available to him.

1.2.1 Characteristics of Adjustive Demands

The importance, duration and multiplicity of demands of the stress situation determine its severity. Also, the length of operation of stress is positively related to severity of stress. The longer a stress operates, the more severe it is likely to become. Similarly a number of stresses operating at the same time or in a sequence are stressful than if these events occurred separately. In general systems theory this is called "overloading" and the behavioral capabilities of the organism tend to drop dramatically with even a mild degree of overloading (Miller, 1960; Gottschalk et al., 1972).

1.2.2 Characteristics of Individual

The characteristics of the individuals too play a mediating role in determining the severity of stress. Individuals stress tolerance and the way he perceives or evaluates the stress situation is particularly important.

People react differently to what is essentially the same stress. An organism's response to stress depends upon the strength of the organism, or its capacity to deal with a particular force at a particular time. Certain factors mediate between stress and peoples reaction to it. First is the individual's endowment. It means all constitutional factors such as the hereditary predisposition's, physical, mental, and neurological
'equipment'. Second, individual's past experiences, both physical and emotional, play a mediating role. The cumulative physical, emotional, and social experience, combined with endowment, result in the formation of a personality: a usual way of behaving and reacting. It is personality that mediates between stress and reaction to it. It is this capacity of man to symbolise that turns a similar event into a catastrophe for one and a blessing for other.

Stress tolerance is the degree of stress the individual can tolerate without undergoing disorganisation and decompensation (Coleman, 1981). In general, evidence shows that women have more stress tolerance than males (Marks, 1972).

For individuals with low stress tolerance, even mild adjustive demands may prove highly stressful. A physical demand that would be comparatively less stressful might prove fatal for a person suffering from severe malaria.

Stress tolerance also involves "weak spots". It refers to high vulnerability to specific types of stress. All individuals have such weak spots or Achilles heel as a consequence of past illness, traumatic experiences and learning which make one vulnerable to specific types of physical or psychological stress.

Related to such susceptibility is the way the individual perceives or evaluates the situation. What one individual views as highly stressful may be only mildly stressful or even enjoyable to another person. An objective observer might not see the stresses in a patient's life situation that led to his acute schizophrenic break, but from the standpoint of the patient,
the situation may be unbearable and intolerable. In general, the degree of threat, which the individual perceives in the stress situation and its potential for harming him, is of key importance in determining its severity regardless of the objective characteristics of the stress situation (Lazarus, 1966; Coleman, 1972). The personality makeup of the individual comes within this realm, particularly his frame of reference involving his assumptions about reality, value and possibilities (Coleman, 1972). Pestonjee (1999) has diagrammatically presented (Figure 1.1) the nature and consequence of the stress phenomenon in relation to stress tolerance limit of individual. According to Pestonjee (1983), stress tolerance limit is made up of four components:

(a) Depression proneness,
(b) Anxiety proneness,
(c) Anger,
(d) Type-A behaviour pattern.

1.2.3 External Resources and Support

The third factor determining the severity of stress is the external resources and support available to the individual. Lack of resources, either interpersonal or material, ordinarily makes a given stress situation more severe and reduces an individual's capacity for coping with it (Coleman, 1972).

Recognition at work also plays an important part in determining an individual's stress tolerance limit. Recognition and awards impact on the coping pattern. According to a study published in the Annals of Internal Medicine, Oscar's
Figure 1.1 Model of Stress Tolerance Limit

Organisation-Individual
Normal Interaction Pattern

Minor surface changes
Adaptation Attempt
A. Extra effort
B. Excessive concern about task
C. Worries
D. Anxiety

* Stress Tolerance Limit
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Major Surface Disfigureation

Frantic Coping
A. Extraordinary effort
B. Worry and anxiety about the self
C. Onset of psychological symptoms
D. Aggressive tendencies

Breakdown and cracks

Failure in coping
A. Work related symptoms
B. Psychological symptoms
C. Physiological symptoms

* Stress Tolerance Limit
Disintegration or falling apart

*Dissociative Personality*

A. Somnambulism  
B. Multiple personality  
C. Feeling and thought disturbance  
D. The stage of medical or psychological help.

*Source:* D. M. Pestonjee (1983)
winners live nearly four years longer than either actors who were never nominated or those who were nominated and did not win. Multiple winners are even better, living an average of six years longer than their less fortunate counterparts. The inner sense of peace and accomplishment alters the way the body copes with stress on a day-to-day basis (HT, 2001).

1.3 Approaches to Stress

There are four major approaches to stress, which are briefly discussed here.

1.3.1 The Response Approach

Hans Selye, a physician, was intrigued by the common inflammatory responses he observed in patients regardless of their particular disease or exposure to medical procedures. On the basis of his experience, Selye proposed that when under stress an individual will exhibit a three-phase response. This is called the General Adaptation Syndrome (GAS).

According to GAS model stress from any source will trigger off the following sequence of events: the alarm reaction stage, the resistance stage, and the exhaustion stage.

1.3.1.1 The Alarm Reaction Stage

The first response made by the body to the stress is the alarm reaction. It starts when an individual perceives oneself in a threatening situation and the body alerts the defence system. The initial and swift reaction against the stressors is generated by the two parts of the autonomic nervous system - the sympathetic and para-sympathetic. Together they attempt to adjust the body functions to
meet the stressors. The body adapts to bring about the fight or flight response. There is a release of adrenaline, which mobilises sugars, providing the energy to fight or run faster (flights). This reduces the supply of blood to non-essential parts of the anatomy and ensures that energy is not wasted and also ensures that there is an increase in the blood supply to essential organs. When the threat is removed or diminished the physiological function involved in this alarm reaction subside and the body regains its internal equilibrium.

1.3.1.2 The Resistance Stage

The second stage is that of resistance. If the stress continues the body's resources are mobilised to deal with the specific stressors. The production of chemicals in the body is maintained at a lower level as the body becomes used to the stressors. The symptoms characteristic of the alarm reaction disappear. The resistance of the body increases to levels above normal. However, if the stressor persists, or if the defensive reaction proves ineffective, the body deteriorates to the next stage.

1.3.1.3 The Exhaustion Stage

When the body's resources are eventually depleted, the final stage of exhaustion sets in. The adrenal glands do not function properly and this leads to drop in blood sugar levels. This in turn leads to various psychosomatic disorders such as high blood pressure, heart disease, asthma and ulcers. If the pressure is not removed and continues, in the long run it may even lead to death (Edworthy).
1.3.2 The Stimulus Approach

In the 1960's, psychologists became interested in applying the concept of stress to psychological experiences. Holmes and Rahe (1967) proposed a stimulus based theory of stress. It was based on what happens when a person experiences "change" in life circumstances. This approach treats changes in life or "life events" as the stressor to which a person responds. Holmes and Rahe developed a tool known as the social readjustment and rating scale. The scale was purported to measure stress defined and operationalised as the adjustment required by selected major changes or life events. The main proposition of the stimulus-based model is that too many life changes increase one's vulnerability to illness. The social readjustment rating scale (SRRS) consisted of 42 life events that were assigned a priori weights arrived at by calculating the mean ratings of the estimated amount of adjustment the event would require. But the stimulus approach was based on certain untenable assumptions regarding human nature. The main theoretical proposition was based on the following premises:

a) Life changes are normative and that each life change results in the same readjustment demands for all persons.

b) Change is stressful regardless of the desirability of the event to the person, and

c) There is a common threshold of readjustment beyond which illness results.
Sarason, Johnson, and Seigel (1979) developed another measure, the Life Experiences Survey (LES). The LES not only incorporated the person’s view of whether the life event was desirable or undesirable but also incorporated the degree of impact the event had on the individual’s life. This was a theoretical step forward but still researcher-selected events do not have a uniform effect on individuals.

The stimulus-based approach is challenged by Kobasa (1979) who introduced the concept of hardiness as a moderator variable. Hardiness is described as (a) a strong commitment to self, (b) a vigorous attitude toward the environment, (c) a sense of meaningfulness, and (d) an internal locus of control.

1.3.3 The Transaction Approach

This approach is based on the interaction of the person and the environment. This approach focuses on the response pattern displayed by an individual. However, it does conceptualize stress as something that occurs within the individual when they are faced with demands that tax or exceed their resources. It sees interaction occurring between the external demands and the individual’s inherent vulnerability and defence mechanism. Lazarus developed and tested a transactional model of stress (Lazarus, 1966; Lazarus & Folkman, 1984). Lazarus (1966) contended that stress does not exist in the “event” but rather is a result of a transaction between a person and his or her environment. Perceptual and cognitive characteristics are considered vital in determining an individual’s response differences to stress. Lazarus draws attention to the importance of the
individual’s ability to appraise the situation. Appraisal plays an important role in this approach.

Precursor models to Lazarus’s transactional model of stress included those proposed by Janis (1954), Bosowitz, Persky, Korchin, and Grinker (1955), and Mechanic (1962). Bosowitz et al. (1955, 7) defines stress as feelings that typically occur when an organism is threatened. Mechanic (1962) defined stress as “discomforting responses of persons in particular situations”. Janis (1954) proposed a model of disaster that included three major phases of stress: (a) the threat phase, (b) the danger impact phase, and (c) the danger-of-victimization phase.

Responses or coping strategies aimed at alleviating stress are both physiological as well as psychological. If the coping strategy fails, the stress may be prolonged and result in functional and/or structural damages. Cox and MacKay (1979) give five stages in their transactional model.

a) The first stage is represented by the demands being made on the individual.

b) The second stage concerns the individual’s perceptions of the demands.

c) The third stage concerns the responses an individual makes to overcome stress.

d) The fourth stage concerns the consequences of the coping strategies.
The final stage is that of feedback. This occurs throughout and is effective in shaping the outcome at each stage (Edworthy, 2000).

1.3.4 The Engineering Approach

In engineering, the word stress is used to describe environmental force/forces acting upon a body, hence the name. Psychologists such as Cox (1990) and Fletcher (1988) have used the term stress in this sense. It is seen as a parallel to Hooke’s Law of Elasticity, which relates stress and strain. It states that if the strain produced by a given element of stress falls within the elastic limit of the material, the material will return to its original condition when the element of strain is removed. If the strain pass beyond the elastic limit of the material some permanent damage is likely to result. Similarly individuals have different levels of resistance to stress. If the level of stress goes beyond an individual’s tolerance level, permanent physiological and/or psychological damage is likely to occur (Edworthy, 2000, 5).

1.4 Stress – Good or Bad?

The term stress is normally used in negative sense. Actually stress is not a inherently destructive or bad phenomenon. In fact an optimum level of stress is desirable. An individual needs a moderate amount of stress to be alert and capable of functioning effectively in an organisation (Kets de Vries, 1979). Pestonjee (1987) too agrees with this contention. Mathew (1985) goes a step further and advocates that particular types of stresses are essential for being creative. In a study on managers and system analysts, Pestonjee and Singh (1987) found that private sector employees scored higher on
both stress and satisfaction as compared to their public sector counterparts. Private organisations generate greater stress and, in turn, lead to higher job satisfaction.

Stress may become harmful when it crosses the desired level. This desired level might differ from person to person. Eustress is the term used to describe the level of stress that is good and necessary for an individual for achieving peak performance and managing minor crises. However, this has every chance of turning into distress, the term used to define that manifestation of stress that is unacceptable. It is distress that is cause of worry for individuals, managers and organisations.

As noted earlier, some pressure or stress is needed to get improved performance and it is natural in our personal and work lives. However, distress is to be avoided. Organisations, thus, have the delicate task of promoting a critical level of stress that leads to achievement and improved performance. At the same time, there is a need to ensure that the stress may not reach unacceptable levels and causes detrimental effects.

1.5 Stress and Performance

Yerkes and Dodson (1908) examined the relationship between stress and performance and presented it diagrammatically. According to them, initially a person’s performance increases under pressure until an optimum level is reached. Afterwards if more pressure is applied the performance begins to decline and if pressure is sustained, not only performance is impaired but individual’s health may also suffer.
Figure 1.3 Graphic Representation of Yerkes-Dodson Law

Source: Yerkes and Dodson, 1908
As is clear from the Figure 1.3, if an individual is not under any real pressure, he/she will lack motivation and performance will be impaired. Also if stress level rises too high, performance is again affected due to the psychological and physiological effects of the stress. Therefore, there is a need to maintain the stress levels in the middle area. In this area, an individual would experience a level of stress that will motivate without causing distress. The individual would than be able to function efficiently and effectively.

1.6 Stress and Health

The relationship between mind and body has received attention from philosophers, scientists and physicians throughout history. It was believed that person’s mental state and physical activities were part of an individual whole. Today path-breaking researches in genetics, psychoimmunology, neuroendocrinology, and neurophysiology are leading us to take a new look at the mind body relationship. The issue of how stress affects our health, physiologically and psychologically, is getting increasing importance. By engaging the important integrative system of the body, stress can cause disease by lowering of immune response, creating endocrine problems, altering the balance of autonomic control; altering sleep pattern with attendant impact on protein metabolism; hormone secretion, and other vegetative functions; changes in peptide release in extra CNS sites; and affecting neurotransmitter, neuromodulator, and neuroendocrine functions of brain. (Srivastava, 1999). Studies have shown that stress may result in many problems such as hyperirritability, sleep disturbances, disturbed interpersonal

1.6.1 Physiology of Stress

As noted earlier, stress is concerned with a stimulus and the organism's response to it. In the wake of stressful stimulation various parts of our body are influenced including brain. When stressed, the body uses all of its resources to produce stress hormones and loses its ability to produce the chemicals that protect us from viruses, bacteria etc. The level of impact that stress will have on immune system will depend upon the nature, duration and frequency of the stressful situations (Edworthy, 2000, 51.). In the wake of stimulus various parts of body are influenced including the brain. Brain impulses are associated with psychological processes. This influence occurs partly through the autonomic nervous system and partly through the endocrine glands. The hypothalamus serves as the connecting link between the two (Levi, 1981)

1.6.1.1 The Autonomic Nervous System

Human body is full of nerves. Some transmit impressions from the skin, others direct voluntary impulses to the muscles. Both of these involve what are generally conscious phenomenon.

There is, however, another important group of nerves, over which we do not exercise conscious control. The term autonomic indicates that human body does not
exercise conscious control over it. These nerves regulate internal organs - the heart, intestine, glands etc. These have their Centre in the part of brain called hypothalamus.

Anatomically, the autonomic nerves can be classified into two groups - sympathetic and parasympathetic. Sympathetic system accelerates the activity of heart and lungs but inhibits the digestive system. The parasympathetic nerves stimulate the digestive system but inhibit the heart and lung. The body adjusts to the demands of life by increasing or decreasing the relative activities of one of these two systems.

1.6.1.2 The Endocrine Glands

The autonomic nervous system functions closely with the endocrine glands in helping the body to adjust to the demands of the environment. These glands produce the hormones that are distributed with the blood to all parts of the body.

An important hormone-producing gland is pituitary (hypophysis). It is the Centre for the regulation of hormones and is located at the base of the brain. The hypophysis influences the activity of nearly all endocrine glands. It does so by discharging biologically potent substances into the blood. These include Adrenocorticotropic hormone (ACTH), which acts upon the adrenal gland. The hormones of the adrenal medulla are called adrenaline and noradrenaline. They are jointly instrumental in heightening the body’s state of readiness, rousing it to fight or flight and stepping up its
performance in a critical situation. In short, endocrine glands function in collaboration with autonomic nervous system. This collaboration is achieved through pituitary, the Centre of endocrine glands and hypothalamus.

1.6.2 Psychology of Stress

The three most common psychological manifestations of sustained stress are - depression, burnout and breakdown. Although no data is available regarding India, but the enormity of the situation can be gauged from the fact that it is estimated that in UK alone the cost of certified absence from work due to one of these illness is £5.3 billion in 1991. Similarly the cost of stress to U.S. organisations is estimated at $150 billion per year (Karasek & Theorell, 1990). Surveys indicate that the future will witness a dramatic increase in mental disorder making it a "crisis of the 21st century". It has thus been decided by the World Health Organisation to observe the year 2001 as the "year of mental health" and April 7 as the "world mental health day" (The Economic Times, 2001).

1.6.2.1 Depression

Depression is a disturbance in mood, a prolonged emotional state that colours all mental processes (Rice, 1992, 97). Depression changes everyday life of the individual concerned. A depressed employee function's feeling hopeless and helpless. It becomes difficult to concentrate on the work and in many serious cases thought disturbances such as suicidal tendencies and delusions of persecution may result. Depression triggers increased production of adrenaline and cortisol, which
ultimately suppress the immune system. Research has shown a direct correlation between the incidence of depression and headache, asthma, ulcers and coronary heart disease (Friedman and Booth-Kawley, 1987). People with severe depression tend to experience high levels of stress in their lives and have fewer personal resources/supports than do their peers who are not depressed. Acute depression may even lead to suicide (Singh, 2001)

The WHO predicts that by 2020, depression is expected to emerge as the second largest global factor contributing towards increase in the number of unproductive years in an individual’s life. This would have serious repercussions for organisations.

1.6.2.2 Breakdown

Breakdown often occurs when a person is under sustained stage 3 stress for long periods and has become totally exhausted. The onset of mental breakdown is often slow but is fast and severe in physical breakdown. Physical breakdown may manifest as a stroke or heart attack (Edworthy, 2000, 58). Some of the symptoms of breakdown are:

- Obsessive activity like persistent washing of hands or checking that door is locked;
- Manic depression, where there are extreme mood swings;
• Behaving irrationally, such as shoplifting, giving up a good job, breaking up a good relationships; and

• Screaming, shouting and self-mutilation.

1.6.2.3 Burnout

Burnout is said to occur when individuals who are extremely enthusiastic and conscientious about their jobs appear to lose interest. According to Maslach and Leiter (1997) burnout is expressed in three ways:

• An erosion of commitment with the job - the worker loses interest;

• An erosion of emotions where feelings such as happiness, enthusiasm and security are replaced by depression, apathy and anxiety; and

• Lack of fit between the person and the job.

Common symptoms of burnout are:

• An increasing tendency to think negatively;

• A feeling of lack of control over events;

• A feeling of being 'useless'; and

• Problems with relationships in and out of work.

Often burnout manifests itself in a lowering of productivity and efficiency and dissatisfaction with the job. All managers are not able to view this condition correctly and interpret the symptoms as laziness and inefficiency.
Summing up the discussion it may be noted that many things mediate / moderate the feeling of stress. The same event may be stressful for one while it may be enjoyable to another. Pestonjee’s (1999) diagrammatic representation shows that stress is cumulative. The stress tolerance limit may differ from person to person but nobody is safe from the ravage of stress.

This study explores the problem of stress in information technology industry. The next chapter provides a brief profile of the information technology industry. A brief historical account is presented in this chapter followed by a detailed discussion on characteristic features of information technology in India.