CHAPTER 1

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The stress is unescapable to modern life. No matter what one cannot entirely avoid it. In earlier time when life was simple and slow paced the stress was almost absent. Even though whatever stress was there it was not a serious threat to health and happiness. But the time has changed. The technological development and invention during the last fifty years have created life more complex and tensed. The alarming statistics show that there is a considerable rise in level of psychological tension and anxiety. It has made dramatic increase in the incidence of stress related diseases such as hypertension and coronary diseases. These diseases were relatively rare in earlier time. The chronic stress can cause pepticulcers, hypertension, coronary diseases, many types of allergies, migraine, headaches and several other physical maladies.

From the time Immemorial the relationship between mind and body has intrigued and perplexed philosophers and
1.2. Scientists. Recently an entire field, psychophysiology, is devoted to studying the effects of psychological processes on the physiological systems of the body.

A branch of medical science, named psychosomatic medicine, is concerned with the many examples when psychological processes produce physical diseases. Some of the diseases are enumerated in the lines that follow.

**Stress — High blood pressure**

Hypertension or high blood pressure is a silent but deadly disease that affects approximately one out of every five persons in this highly developed, paced and complex society. It develops slowly over several years depending upon individuals, and often produces no noticeable symptoms until it is in advanced stages. This condition of increased fluid pressure within the arteries can damage the heart and kidneys, is a direct cause of heart attack, and is a major contributor to hardening of the arteries. This has as one of its prime causes of psychological stress. The research
studies have indicated lot of examples of the ability of the ability of the psychological stress to produce a hypertensive pattern of stress and coronary disease.

The coronary diseases:

The coronary disease is much publicized and much feared. Despite its prominent place in awareness of our contemporary society, it was quite uncommon half a century ago. Since that time the incidence has increased continually till today.

In the research on coronary disease there are lot of examples to support the contention that stressful environments create their damage by too often stimulating physiological arousal.

Stress and immunity to infection:

The immunological system is necessary for our body for our survival. Every one is constantly exposed to armies of microscopic invaders, capable of causing any illness or
aggravating existing any diseased conditions and in some cases even death if allowed to enter the body unopposed. The body defends itself via two primary mechanisms - inflammation and specific immunity. When foreign microbes enter the body, the tissue around them becomes inflamed, sealing them off and preventing their spread into the bloodstream. Thus surrounded, the invading microbes often can be destroyed by white blood cells. But when they are capable of surviving these, then specific immunity takes care. Specific immunity refers to the ability of the body to identify and destroy material foreign to it. This is complicated process of a molecular discrimination involving the body's supply of immunoglobulin molecular known as antibodies. These attach themselves to the intruders walling them off from nutrients and starving them.

It has long been a truism that tired, overworked, rundown people are highly susceptible to infections.
1.5. **Stress and Serum Cholesterol**

There are numerous evidences in the literature concerning the relationship between environmental stressors and Serum cholestrol respone. There are several studies on animals and few on human subjects. Most of the research used navy personnels exposed to variety of stressful training situations. Elevated serum cholestrol levels have observed when Ss felt over burdened by demands of training.

Such results have number of theoretical interpretations, but it can at least be argued that cholestrol elevations occurred when subjects believed that the stressful events were beyond their control that is during imminent failure and when environment demands were over burdening them.

**Stress and adrenal corted secretions**

The adrenal corted is known to be involved in the regulation of cholestrol metabolism and may thus play a role.
1.6. in the pathogenesis of coronary disease. The extensive body of research documents have shown a positive association between psychological stress and certain adrenocortical hormones. Elevation of these hormones is not related to specific stressor stimuli, rather it appears to reflect a relatively undifferentiated state of affective arousal.

Stress and adrenal medulla Secretions

The best known hormones secreted by the adrenal medulla are epinephrine and non-epinephrine. They are related to sympathetic nervous system activity, which in turn is responsive to the impact of psychological stressors. The catecholamine important in stress research is evidence suggesting that epinephrine is associated with fear or passive responding and norepinephrine with anger or aggressiveness. This set of association is not firmly established. Indeed it indicates that behavioural and subjective effects of catecholamines are dependent upon the cognitive activity, that is, the psychological
significance of the situation for the individual and not merely on the release of the hormones per se. Whatever the final resolution of these issues, the fact remains that alterations in catecholamine levels coincide with the application of external stress.

Stress, Catecholamines, Coronary disease:

There is a correlation among environmental stressors, catecholamines and cardiovascular function and pathology. Epinephrine and norepinephrine induce acute hemodynamic effects related to CHD, including elevations of cardiac rate, blood pressure, and release of lipids into the blood. These hormones will also increase the blood glucose levels. So stress can also contribute in precipitation or increase of Diabetes Mallitus which in turn hastens the process of coronary atherosclerosis and thus coronary diseases. The catecholamines can contribute to a myocardial infarction by facilitating the aggression of thrombocytes, which may then lead to thrombosis.
The catecholamines may have a special significance in the development of coronary disease. Any psychological agent which increases circulating catecholamines may be potential pathgen for cardiovascular function.

**Type A Coronary prone Behaviour Pattern**

From the laboratories of Friedman and Roseman the characteristics of coronary prone behaviour pattern have been developed. The pattern is described as a characteristic action emotion complex which is exhibited by those individuals who are engaged in a relatively chronic struggle to obtain an unlimited number of poorly defined things from their environment in the shortest period of time and if necessary, against the opposing effects of other things or persons in this same environment. Individuals who manifest to a greater degree of behaviour pattern indicating the enumerated characteristics are called Type As. Whereas those who tend to show the opposite pattern of relaxation, serenity, and lack of time urgency, are designated Type Bs.
examination to a supine patient under going cardiac catherization and fluroscapy. However it is also recognize that the induction of stress responses, depends upon the mediation of various cognitive factors. The stress reactions become less dependent on the magni­tude of the impinging stimuli or a set of stimulus and more on associated cues that signify or symbolize the implications and consequences of these. So it is more appropriate to say that psychological stress as the threat or anticipation of future harm whether that harm is physical or psychological.

The overall process of primary appraisal (threat evaluation) and secondary appraisal (coping) is more complex. It involves a number of servomechanisms in which stress responses act upon the cognitive appraisal processes and thus affect their outcomes. Here instead of entering into such complexity, it is enough to emphasize that the central concept in stress is perceived threat and its attendant copying processes. The primary threat appraisal
1.11. depends upon two general factors (1) Factors in the stimulus and its context, (2) Factors within the individual - This includes intelligence, resources, copying strategies and related personality predispositions - this include imminence of harmful confrontation and especially perception of stimulus as potentials controllable or uncontrollable.

This view stress does not solely emphasize neither stimulus conditions or response variables. It emphasizes both sets of factors, and more importantly, with respect to mediating cognitive activity. It also recognized certain life events that are almost universally appraised as stressful an assessment of the individual's primary and secondary appraisal processes is nevertheless essential to a firm designation of an event as stressful or benign.

Effects of Psychological Stress on CHD

There are three general classes of life events causing stress.
1.12. (1) General dissatisfaction with various aspects of life.

(2) Chronic or relatively long term life event(s) experienced by individual as stressful, and

(3) Acute life events interpreted by person himself as stressful.

Life dissatisfaction(s):

The various studies from several counties agree that CHD patients report dissatisfaction in many areas of their lives. A group of researchers from Oklahoma observed that more CHD patients frequently experienced job difficulties than the controls. Another has found that CHD patients have indicated more job dissatisfaction, inability derive satisfaction from leisure activities and sudden death in the family. The other factors found are setback in work involving loss of prestige, less satisfaction with jobs, working overtime, etc.
Dissatisfaction with various aspects of life other than occupational sphere has also been reported. They overall experience more unhappiness over their level of education, adult interpersonal relations and marital relations.

Despite the consistent pattern of results, in the dissatisfaction research, a word of caution is necessary. In majority of the studies the results are almost retrospective and could, therefore, result from a tendency among subjects with CHD to be more critical and irritated with their life circumstances. This restrict causal inferences to be drawn.

Chronic Stress :-

The excessive work and responsibility, when approaches the limits of once capacity to control the work precipitable the development of CHD. Ample evidences to support this are available from epidemiologic researches. Additional documentation for the association between occupational stress and CHD can be easily located in more
1.14. focused studies of job stressors and CHD. Here the work overload refers to once feeling that the demands of the job are beyond once control. These studies indicate that there are increasing evidence (s) that chronic work load or at least its implications for lack of feld control plays a significant role in increasing the risk of CHD.

Over and above these, there is a psychological state called helplessness that commonly precceeds the onset of illness and death. Sudden happening of any life situations and resulting helplessness is important. Here once perceives helplessness a non-contingency between his responses and outcomes. One attribute, ones feelings to failures emanating from his environment, and it is to the environment that he looks for a solution to his problem(s). From a behaviou-ral point of view, the helpless person shows a decrement in response initiation and simply gives up efforts to interact with his physical and social surroundings.

It is moreover, a good illustration of the importance of considering the one's perception of life events
and their implications. Cardiovascular effects of psychological stressors are not simply a function of their intensity or frequency. They also depend upon the cognitive context in which the stressors occur, that is, their perceived uncontrollability which may lead to feelings of helplessness.

*Psychophysiology of Stress*

The credibility of the stress hypothesis in CHD does not depend exclusively on the psychological theory and data collected in this regard. There are several research data show that stressful events provoke changes in physiological and biochemical functioning that are present in CHD and non-CHD Ss. These studies have demonstrated a close relationship between life events causing stress and changes in cardiovascular function that could lead to vascular injury and coronary disease. They are briefly summarised below:
Experimental data suggests that stress increases cardiac output, decreases total peripheral resistance and shunts blood away from skin and viscera to the skeletal muscles. It turns out, however, that the picture is more complicated. Heart rate slows down in the face of certain types of stressor stimuli, as when an individual is trying to decoet and control potentially stressful events in the environment. Moreover, vasoconstriction in the skeletal muscles is associated with heart rate decrements, whereas vasodilation appears with stressors that do not involve scanning the environment.

A Model of Stress

The term stress in psychology and medicine was borrowed from physics and engineering, where it meant something quite precise, namely the application of sufficient force to an object or system to distort or deform it, perhaps this original meaning of word has kept us thinking too long in terms of forces outside ourselves in the
1.17: environment that, if strong enough, inevitably or automatically produce "strain", or tension, or disease. Thus we tend to think of ourselves as carried along by social forces or trends quite beyond our control. Recently Herbert Benson defined stress as "environmental demands that require behavioural adjustment." It can be seen that here, as in physics, stress is defined as some set of objective conditions in the environment that require a response from the individual person. Hans Selye, the eminent physician who conducted much of the early research on the physiological effects of stress, has defined it in terms of the physiological response of the body to any demand made upon it. As per these two definitions is that they clearly conceptualize stress as something that affects people in an automatic, reflexlike way. This implies that their model of human functioning does not take into account the cognitive appraisal system. This represents a bias picture.

R. S. Lazarus has also clearly drawn the attention to the important and vital limitation of these mechanistic
conceptions of stress. Because, events do not in themselves produce stress reactions. Events are neutral. It is primarily our perceptions or appraisals of events that make them stressful. Environments place demands or requirements. But they reacted to as demands only if they are understood and taken seriously. Demands can also fail to produce stress if they are seen as unimportant or implying no consequences. It is further contended that demands not only must be both perceived and consequential to produce stress, they must also call into question the degree to which the individual believes he can respond with success and comfort. A student who is brilliant in mathematics suffers little anxiety when faced with the necessity of making an above average score on a college entrance test of mathematical ability. But a student who is poor in mathematics will experience serious anxiety. So the stress is not out in the environment. It is "in here" within the human brain. It occurs between the stimulus and the response. It is always linked to some act of understanding resulting from the interaction between the environment
and the organism. To complete the model of stress we describe the reaction of the organism to stress, and, in so doing complete the definition of stress. The stress arouses, alerts or otherwise activates the organism. This arousal or activation may be intellectual or behavioral, emotional or physiological. Some degree of physiological activation accompanies all stress. The arousal that is most often linked to stress is that of the fight-or-flight response. This is a coordinated pattern of responses that occurs whenever the body responds to a perceived 'emergency'. Whenever a person is confronted with dangers his automatic nervous system prepared him to respond to the threat either by speedy retreat or aggressive attack. The perceived danger activated the 'Fight-or-flight' response and produced a patterned, reliable series of changes.

Once the sympathetic branch of the autonomic nervous system aroused, the part of the brain stem known as a hypothalamus would activate the pituitary gland, which in turn activates the adrenal glands which are above the
kneys. The adrenals then secrete various steroid into the blood. These circulate through the body causing changes that are necessary and important to the organism that must attack or flee in order to survive. The blood is directed to brain and skeletal muscles, providing us with energy for quick thinking and various physical activity. The pupils of our eyes dilate making them more sensitive to graduations in sight. Hearing becomes more acute. Our hands and feet perspire. The blood pressure is elevated. Heart rate increases. Breathing becomes more rapid, and oxygen consumption increases. All these reactions occur automatically. Once a situation is perceived as threatening. Accompanying these physiological changes very often are the emotions we associate with fighting or fleeing, anger or fear respectively. Once the individual perceives himself in danger (future or present) physiology and emotions respond relatively, automatically. The fact that arousal is the automatic result of stress should not lead us to believe that the fight-or-flight response is a direct response to changes in environment.
Thus the stress is a perception of threat or expectation of future discomfort that arouses, alerts or otherwise activates the organism. This suggests the three levels of components of the stress reaction: the environment, the appraisal and evaluation of the environment and reaction of emotional and physiological arousal.