

Stress in Modern Life

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Modern life is full of hassles, deadlines, frustrations, and demands. For many people stress has become so commonplace that it has become a way of life. Stress is not always bad; acute stress can help an individual to perform under pressure and also motivates him to do his best, but chronic stress causes, both the mind and the body pay the price of it over a period of time^[1].

Two kinds of stress have been identified: Eustress and Distress. Eustress is the positive and essentially valuable form of stress that will contribute to the well-being of an organism. When stress becomes unpleasant or harmful, it will result in discomfort and distress. According to caplan, stress is a "condition in which there is a marked discrepancy between the demands made on an organism and the organism's capability to respond"^[2].

An individual can respond to stress in two ways: physiological and psychological.

Physiological Response

It involves the CRH-ACTH-cortisol axis which is central to the integrated responses to a variety of stress stimuli. It was the primitive signal of glucose (substrate) lack that has now expanded to the broader signal of stress or fright which then evokes a coordinated neural and endocrine response in order to maintain internal homeostasis. To meet the emergency situations during stress, there is an increased secretion of

ACTH which is exclusively mediated through the hypothalamus via release of CRH. The paraventricular nuclei produce and secrete CRH into the median eminence, which is then transported via the portal hypophyseal vessels to the anterior pituitary; where it stimulates ACTH secretion^[3]. An increased secretion of ACTH in turn causes an increased secretion of cortisol by the adrenal glands. Stress can override the diurnal variation in cortisol secretion as well as the suppressive effects of negative feedback. Several neurotransmitters mediate the stressful inputs that stimulate CRH (and ADH) release^[4]; as several afferent nerve pathways from many parts of the brain converge on the paraventricular nuclei viz. Nerve fibers from the amygdaloid nuclei which mediate responses to emotional stresses, fear, anxiety, and apprehension cause marked increase in ACTH secretion via CRH release. Input from the suprachiasmatic nuclei provides the drive for the diurnal rhythm. Also in response to injury, the nociceptive pathways carry the pain impulses via the reticular formation to the hypothalamus to trigger increased ACTH secretion. The baroreceptors are also known to exert an inhibitory input via the nucleus of the tractus solitarius^[5].

Both the adrenal medulla and adrenal cortex participate in the process of adaptation to stress. Their intimate anatomical juxtaposition shows the

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fundamental functional relationship between the sympathetic nervous system and the CRH-ACTH-cortisol axis. Stress is perceived by many areas of the brain, from the cortex down to the brainstem. Major stresses almost simultaneously activate CRH neurons, ADH neurons, adrenergic neurons in the hypothalamus; and the activation is mutually reinforcing. The release of CRH (and ADH) elevates plasma cortisol levels and adrenergic stimulation increases plasma catecholamine levels; together these hormones increase glucose production by inducing gluconeogenesis and glycogenolysis. An increased blood glucose levels so produced is then shifted towards the CNS and away from the peripheral tissues. Epinephrine also increases the supply of FFA to heart and the muscles and the cortisol facilitates this lipolysis. Both these hormones raise BP and cardiac output and enhance the supply of substrates to the tissues which are critical to the immediate defence of the organism. Vasopressin causes water retention by the kidneys.

Then it is the norepinephrine and the cortisol which mediate other adaptive responses to stress. Norepinephrine stimulates the pertinent brain centres and produces a general state of arousal, vigilance and an activation of defensively useful behavior along with appropriate aggressiveness in an individual during stress. At the same time there is inhibition of appetite, sexual activity, growth hormone and gonadotropin release, that are brought about by the cortisol input to other hypothalamic neurons. These changes are reinforced by excess of cortisol, which also produces suppression of growth and ovulation. Cortisol suppresses cell mediated immunity with greater effects on T and B lymphocytes^[4].

Psychological Response

The psychological responses are coping mechanisms, which, depending on the emotional, physiological and genetic

predisposition of an individual and the nature and intensity of the threat, can be divided into adaptive and reactive response.

One facet of adaptive response involves fight or flight response. Another facet of the adaptive response is the use of defense mechanisms at the time of crisis. In an attempt to overcome the pain and anxiety generated by stressful circumstances, the individual, very often unconsciously, resorts to one or more of the following psychological defenses: denial, amnesia or selective attention, withdrawal (e.g., escape), counter behaviour (e.g., aggression, prejudice), rituals, somatic complaints and altered state of consciousness. Depending on the personal and cultural attitudes and values, the choice of these or other defense responses may vary from person to person. Objectivity, problem-solving and decision-making processes are other facets of adaptive measures that are being used at the time of crisis. A certain amount of emotional discomfort and anxiety is normally experienced in any response to stressors.

Reactive responses are nonadaptive or distressful responses which consist of severe anxiety, fear, grief, despair, rage and depression. To a mild or moderate degree, these feelings may be experienced as part of adaptive responses in coping with stress, but are more likely to be dominant when the stress is extensive^[2].

To conclude, individual stresses lead to specific patterns of response and different individuals may respond more or less strongly or in qualitatively different ways to the same stress; but usually low responders to one stress (eg: exercise) tend to be low responders for another stress (eg: psychological disturbance). Change in lifestyle such as healthy diet, regular exercise such as a brisk walk, and abstinence from habits like smoking, consumption of alcohol, beverages (tea, coffee), and drugs can reduce the detrimental effects of stress on physical and mental health. Yoga has

also proved to be beneficial in reducing stress as well as in the management of stress related disorders. Yoga has been used for the rehabilitation of patients of post-traumatic stress disorder well.

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