

REVIEW

Influence of Stress on Various Aspects of Human Performance and its Management

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The term stress has beguiled many researches in this era. It is observed that recent societal changes in lifestyle and behavior are associated with stress. Stress has been extensively studied, so far, but the study of stress continues to develop. As perceived by the individual it can have positive as well as detrimental effects. This review addresses the effects of stress on various systems of the body and different types of management techniques to defy it. The exercise plays an important role in stress management and its incorporation in our daily routine is essential for stress regulation and for overall well being of a person.

Key words: Stress, Stressors, Exercise



BACKGROUND

Mental health is of prime concern in today's society. According to the research cited by The Independent (26 July, 2011) "India was recorded to be among the nations with the highest rate of depression in the world at 36% making it an exception to the rule." The psychological stress leads to imbalances in various systems of the body. Stress is defined as the non specific response of the body to any stressor, whether it is caused by or result in pleasant or unpleasant conditions¹. Stress is an amorphous concept which the scientific community continuously struggles to define.

More recently, Fletcher, Hanton, & Mellalieu defined stress as a reaction occurring in response to an environmental stimulus, an athlete's response, or the result of an interaction between the environment and the athlete². Thus, there is need to understand the term stress, stressors and strain more extensively. The study of stress continues to be heuristic. According to Hanton, Fletcher & Coughlan the term stress comprises not solely the specific constructs but also the interaction of continuum of processes involving stressors, appraisals and coping behavior and resources³. The term stress should focus on the whole process including stressor, strain, appraisals and coping abilities rather than explaining only the interactions between the person and environment⁴. Stressors refer to situations or the events which lead to changes and strain refers to individual's negative reaction to stressor⁵.

Stress is now chronic and endemic in our society. Our bodies are beyond the alarming phase. Despite too many efforts to overcome and resist, it seems unquestionable to alleviate it. It has been established that organism undergoes General Adaptation Syndrome according to which the organism shows a generalized physiological response in its efforts to adapt to demand and pressures it experiences⁶.

According to Mcgrath stress is an interaction between three elements: perceived demands, perceived ability to agree and the perception of the importance of being able to cope with demand⁷. Lazarus and colleagues suggested that events themselves do not result into stress until they are perceived as

threatening^{4, 8}. Stress is caused by stressors and is revealed by changes of physiological and behavioral functioning and subjective well-being during task fulfillment.

Hence, there is a compelling need for innovative approaches to cope up with stress. People often do that by actively striving to overcome the source of stress or by trying to avoid it (active coping) or passively (by taking it without resistance). Thus the objective is to bridge the research with its application in a variety of societal settings. The present review focuses on the main sources of stressors which are existing nowadays, their appraisals and response patterns to these stressors and finally its impact on an individual's well being, coping and performance.

Basic Sources of Stress

In today's environment, the stress is more often elicited by emotional, professional and social factors. This type of psychological stress may be extended and not linked to an increased metabolic demand. Many other types of stressors including surgery, low blood sugar, exposure to cold and childbirth, produce similar effects.

There are two sources of stress:

External sources : These sources of stress mainly includes environmental and social stressors like the demands or pressures from job or college, demands of family or friends, physical or environmental factors (noise, caffeine). Recent changes can also act as stressful events.

Internal sources: These sources of stress include physiological and psychological stressors which result from the reactions to these demands and the demands one put on himself/herself. Examples of physiological stressors include rapid growth of adolescence, menopause, illness, ageing, giving birth, accidents, lack of exercise, poor nutrition, and sleep disturbances. Our brain interprets and perceives situations as stressful, difficult, painful, or unpleasant.

In sports stressors can be classified into two main categories:

- (a) Competitive stress
- (b) Organizational stress

The issues that are directly related to the sports performance come under the category of Competitive Stress whereas the stress which

arise out of interaction between an individual and sports organization is termed as Organizational Stress^{9,10}.

An interesting point to mention here is that according to Mellalieu et al, the elite athletes more often experience stressors which are directly concerned with sports organization than with competitive performance¹¹.

Types of Stress

It is difficult to categorize stressors into objective lists of those that cause positive stress and those that cause negative stress, because different people will have different perceptions and reactions to particular situation. The stress that last for a short duration is called as acute stress. e.g. flat tyre, fight with friend. The stress that continues for a longer period of time is termed as chronic stress. e.g. lack of job, financial worries.

STRESS RELATED OUTCOMES

Stress Appraisals and Response

The key components of stress response involve neural and endocrine responses that are regulated by Central Nervous System (CNS). Stress also makes demands on Cardiovascular System (CVS) and creates hormonal imbalances¹².

Neurotransmitters that modulate brain in response to stress are nor-epinephrine and serotonin affecting sympathetic and parasympathetic arms of Autonomic nervous system (ANS) and *Hypothalamic-pituitary-adrenal* (HPA) cortical axis. During stress, nor epinephrine helps to initiate behavioral, cardiovascular and endocrine responses. Serotonin helps the body return to rest after energy expending behaviors¹³.

In emotional stress, the ANS prepares the body for flight and fight response to actual and perceived stress. In exercise stress, the ANS supports increased metabolism of skeletal muscles and regulates breathing and body temperature, and metabolism which is elevated to perform physical work.

The physiological effects of chronic elevated stress hormones can contribute to diseases such as Coronary Heart Disease, Diabetes, Obesity and suppression of body's immune function and various glands.

Stress and its affect on psycho-physiological profile

Subjects respond to stress in different ways. The response generally falls into three categories: physical, cognitive and emotional. Some of the symptoms come on and off as a result of short-term stress whereas symptoms that are associated with more long-term, sustained stress can be harmful. Stress if settled for a longer duration can lead to decreased immunity, headaches, cardiovascular disturbances, psychological disorders like depression, easy fatigability and many more physical and mental ailments¹⁴.

The stressors can harm physically (muscle tension, headache, stomach upset), physiologically (increased heart rate, high blood pressure, sweating, flushing and dry mouth), mentally and emotionally (behavior ranging from aggression to hyperactivity and withdrawal), behavioral changes (e.g. increased alcohol intake, drug abuse, appetite disorders) and sometimes involves medical consequences (e.g. headaches, bowel problems, heart disease, etc.). These signs and symptoms can occur independently or together with stress emotions like fear, anxiety, anger and despair.

The stress response is most maladaptive in the heart and cardiovascular system because it causes the whole system to work harder. Chronic stress results in diseases of the digestive system. Stress can cause ulcers and irritable bowel syndrome. The first noticeable sign is a lack of saliva and dry mouth.

Both the brain and the pituitary release morphine-like substances called endorphins and enkephalin which limit pain perception. Short-term stressors of mild to moderate severity enhance thinking, while enormous or prolonged exposure to stress is disruptive to cognition.

Stress and Ageing

As people and other organisms age, their epinephrine, nor epinephrine, and glucocorticoid levels rise in the normal resting state when there are no stressors present. When there is a stressor, levels rise higher than they do in younger people, but the body is less responsive to them. After the stressor is gone, the levels of these hormones do not return quickly to pre-stress levels. Therefore, it takes

older people and organisms longer to recover from stress.

Effects of stress on performance

Stress is considered to have an inverted U-shaped relationship with performance. Performance may improve under moderate levels of stress but decline under high or constant stress. According to Van Galen and Van Huygevoort, the psychological stress occurs as a result of varied types of workload which tend to tunnel attention, reduce focus on peripheral information and tasks and centralizing focus on main task¹⁵. Baddeley opined that stress results in decrements in the working memory¹⁶.

Effect of psychological stress on performance is of great practical importance. Stress causes impairment in verbal, perceptual motor performance. It is also associated with sweating, tremor, subjective anxiety and pulse changes. It can also lead to emotional exhaustion, and lower organizational commitment. Thus, for improving better performance, one must manage stress and focus on process and not on outcome.

ROLE OF OPTIMAL LEVEL OF STRESS

For every individual there is an ideal level of stress, which differs from person to person. Lack of stress lead to decreased motivation or boredom, and, too much stress results in a drop in performance like inability to concentrate.

Hence one must monitor stress levels to identify one's own optimal level of stress and secondly to gauge the right time to intervene to increase or decrease the level of stress. By managing stress one can improve quality of life and do a better job, either in academic life or professional life. If stress is mishandled it can increase the negative consequences for an individual.

Stress-induced pain relief

The body synthesizes different classes of opioid compounds: enkephalin, and endorphins. Release of these compounds in stressful situations is shown to occur on the battlefield, in sports, and in everyday exercise programs. After about 30 minutes of exercise, endorphins are released, masking sensations of pain, causing a "runner's high". With prolonged exposure to stress, the body's supply of opioids

runs out and the sensation of pain returns. There appears to be no stress-related disease that results from excess opioid release.

STRESS MANAGEMENT

The primary goal in stress management is to determine the aspects of a situations to which person is targeted. The main thrust should be realization of physiological, emotional, intellectual response cues to stress and acknowledging the specific occurrences. According to Butler and Hope (1995) to avoid the stress cycle one should adequately rest, relax and should have a strong social support¹⁷. Further exploration of and understanding of underlying mechanisms of coping seems to be an essential step in crisis resolution as the life stressors put serious demands on the coping resources of an individual.

Coping refers to the strategies to handle problem real or anticipated by the use of action, thoughts and feelings. Coping has been conceived as "the cognitions and behaviors, adopted by the individual following the recognition of a stress encounter, that are intended to deal with the encounter or its consequences"¹⁸.

The sources to handle stress can be classified into three subcategories: Adaptation interventions which work towards adaptation to stress. It includes Progressive Muscle Relaxation, biofeedback, abdominal breathing exercises, cognitive distortions, support system, self esteem, coping statements and restful sleep etc., Absorbing interventions which focuses on the preventive methods to delay the onset of symptoms and includes exercise , good nutrition , relaxing environment, meditation , imagery and education about the stress and Management interventions which act to remove or negate the effect of stress and includes communication skills, negotiating skills, play time, time management, problem solving, respond to criticism, assertiveness training approaches¹⁹.

There is significant role of counselors which help the individual understand the existing situation and advise management skills appropriate for the condition.

Things to avoid

One must not indulge in smoking, chewing tobacco, gambling, over-spending, drug

abuse, seeking loneliness or drinking alcohol, etc. in order to cope up with stress.

STRESS AND EXERCISE

As our society has become more health conscious, there has been an increased focus on the importance of exercises. Nowadays people exercise to control weight and get in a better physical condition, and exercise and stress share a close linkage²⁰. The research documents the beneficial effects of regular exercise in preventing or ameliorating the metabolic and psychological reactions induced by chronic stress. The chronic stress if not handled properly adds to cardio metabolic and emotional disorders in the society. The one of best ways to prevent and battle this burden is by regular exercise.

Exercise can advance performance by fostering positiveness in individuals by altering the mood. It contributes to higher levels of self efficacy and lower levels of anxiety²¹, more positive approach and peaceful existence toward life²² and improves efficacy of expectations²³. The physical activity produces CNS adaptations that eliminate the harmful effects of stress on physical and mental health. Exercise has been said to play a protective role in stress regulation as dysregulation of stress can lead to increase in allostatic load leading to chronic disease²⁴. Exercise training has been said to play an important role in alleviating stress and related co- morbidities. Regular moderate exercise has cardiovascular, psychological and metabolic benefits.

Aerobic exercises are better in comparison to anaerobic exercises as it has been reported to increase the feeling of positive well being and decrease psychological stress. Apart from the beneficial effects of exercise on physical and metabolic aspects related to stress there are cognitive benefits too. Decrease in depression and anxiety scores is observed after exercise²⁵. It was observed that exercise had a better effect on the outcome for those who are psychologically unfit. Exercise stimulates the secretion of endogenous opioids that produces a state of euphoria²⁶. The mental and physical health can be ensured by modulating the factors like duration of stress exposure, perceived

controllability of stressor and the physiological state of the organism²⁴.

Exercise also helps in improving the cognitive functioning thus increasing the self perception, appraisal of anxiety and attentional focus²⁷. So one must exercise to maintain overall health and sense of well being which is essential to combat daily hassles.

CONCLUSION

For positive health one requires combination of healthy nutrition, positive approach towards life and physical activity. The lack of consistent findings underlying the huge complex phenomenon of stress, its appraisal and stress management including coping resources require substantial amount of in-depth research focusing on exploring the situation specific reactions to stressors. The key message which emerges from this review is that there is potential hazard to health and performance due to psychological stress. The dynamicity and the rapid changes in contemporary life style indicate towards inculcation of stress managing strategies and the dire need to monitor and address stress effectively as early as possible.

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