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EFFECT OF STRESS BEFORE AND AFTER THE EXAMINATION ON PULSE RATE AND BLOOD PRESSURE OF FIRST-YEAR MALE UNDERGRADUATE MEDICAL STUDENTS

Pavana Krishnamoorthy[1,] Sahana Patil[2], Shwetha Rao[3]
[1]Assistant professor, Srinivas Institute of Allied Health Sciences, Srinivas University, Mangalore
[2]Assistant professor, Srinivas Institute of Allied Health Sciences, Srinivas University, Mangalore
[3] Assistant Professor, KLE Dental College, Bangalore

Abstract:
Introduction: Medical students face a variety of stress at medical school, which includes high academic demands, workloads, tough curricular aspects, learning settings, personal life events all are contributing stress among students . When compared to other students academic stress in medical students were found significantly high along with high level of anxiety and depression.
Methods: The present study involved a total of 40 male students were chosen for the study. Aged 18-21years of first year MBBS students of Srinivas institute of medical science and research center. Parameters such as height, weight, temperature, pulse rate , systolic blood pressure and diastolic blood pressure were taken before and after examination on the same day .
Result: Out of 40 male subjects, The mean and standard deviation of BMI in study group of males is 24.4 ±4.54 ,the mean and standard deviation of pulse rate before and after examination was 81.7±13.54 and 75.4±8.50 there was highly significant increase in P value (P<0.0001) respectively .The temperature before and after examination 32.9±1.38 and 32.1±1.42.there was significant increase in P value (P<0.002) respectively . The mean and standard deviation of systolic blood pressure before and after examination was128±3.76 and 110±6.55 there was highly significant increase in P value (P<0.0001) respectively and Diastolic blood pressure before and after practical examination was 86.55±3.14 and 79.55±2.66 there was highly significant increase in P value (P<0.0001) respectively .Conclusion: In order to avoid the long-term negative consequences of elevated stress levels on future doctors' physical and mental health, medical students should receive the proper counseling and stress-relieving activities. and medical curriculum should include mentoring and training assistance programs.
Keywords: Examination Stress, Medical Students, Cardiovascular Vital Parameters, Basal Metabolism, Body temperature

Corresponding author:
Mrs.Pavana Krishnamoorthy,
Department of Physiology,
Assistant Professor, Srinivas institute of Allied Health science,
Srinivas University, Mangalore-574146, Karnataka
India, Email:pavanakanaka@gmail.com,Mobile:9481765665

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INTRODUCTION:

A student of medicine life is full with challenges, and how we respond to them determines whether we succeed or fail. Workloads, exams, a difficult curriculum, a vast syllabus, and personal life events all contribute to stress among medical students during the course of their five-year study period. Their main goal is to perform well in their five years of tenure. As a result, medical students are always under great academic pressure and competition. This can cause a number of physical and emotional issues in them. Examination is a forerunner of stress. Exam stress might occur when you are unable to cope with revision or when you are put under pressure by teachers or family members.

Background:

Stress can be defined as the body's reaction to a change that requires physical, mental, and emotional harmony or reaction (1). While mild stress levels have beneficial effects on cognitive performance, but constantly high levels of stress exposure can lead to anxiety and depression (2). The main components of the stress system are corticotropin-releasing hormone (CRH) and locus coeruleus-norepinephrine-autonomic systems, as well as their environmental effectors (3). As a result of the activation of the stress system, physiological and behavioural changes are seen in the body. The neuroendocrine response, which covers a range of coordinated responses, is provided by the autonomic nervous system and Hypothalamus-Pituitary Gland-Adrenal (HPA) axis. The basic endocrine response, which occurs in the state of stress, begins with the release of CRH from the hypothalamus. CRH causes the release of adrenocorticotropic hormone (ACTH) from the anterior pituitary, and ACTH affects the adrenal cortex, causing glucocorticoid release. In short, stressors trigger the activation of the autonomic nervous system and HPA axis through mechanisms involving the hypothalamus and brainstem. Thus, the HPA axis activates the sympathetic system, leading to changes in pulse rate, blood pressure, respiratory rate and depth, reaction time, body temperature and galvanic skin resistance (4,5).

With this backdrop, the present study was undertaken to identify the stressors and measure the intensity of the stress caused by the stressors among first year M.B.B.S students.

We undertook this study to assess the effects of examination stress in medical students by using various cardiovascular parameters. The results have been discussed with a view, particularly in young adults, that the exposure to stress could make them physically and psychologically strong to prepare them to face the arduous responsibilities (of life) ahead.

MATERIALS AND METHODS:

The present study involved a total of 40 male students were chosen for the study. Aged 18-21years of first year MBBS students of Srinivas institute of medical science and research center. The students were asked to come in a relaxed and quiet mood. The data was taken both in the pre-examination (20minutes before the examination) and later in the post-examination period (same day after the examination). Informed consent was taken from the subjects orally. A clearance was obtained from the institutional ethics committee before the start of this study.

Inclusion Criteria were those students who gave consent & were available during the study. The study excluded those students who gave history of hypertension & Mental or family stress or coming from a Psychiatric Background.

Parameters which were studied:

Anthropometric measurements: Anthropometric variables such as weight, height and BMI were assessed. Height and weight of the individual was measured with the help of height measuring scale and standard weighing machine. Body mass index was calculated using formula weight (kg)/Height (m²). As per revised WHO criteria for Indians, BMI from 18.5 to 22.9 is normal, BMI from 23 to 24.9 is overweight and above 25 is obese[6]

Measurement of Blood Pressure: The subjects were made to relax for 10 minutes before the measurement. Pulse was counted for 1 minute on Radial artery and expressed in beats/ minute.
Arterial blood pressure was recorded over the right brachial artery, applying a cuff just above cubital fossa, using a mercury sphygmomanometer kept at level of subjects' heart in sitting position. Systolic blood pressure was recorded by palpatory method and then systolic and diastolic blood pressure were recorded by auscultatory method. Temperature was measured by using standard thermometer and expressed in Celsius.

RESULT:

Statistical Analysis
Statistical software MS EXCEL 2010 was used for analysis. The data was analysed for normal distribution and descriptive statistics were used. The pulse rate, temperature, systolic blood pressure and diastolic blood pressure before and after examination

in males were compared by Paired Student-test. All were two-tailed and conducted at 0.05significance level. The Student t-test was calculated by using graph pad software, quickcalcs.

1. Mean ±SD of age in study group of males is 19.3± 0.56.
2. Mean ±SD of Body mass index in study group of males is 24.4 ±4.54.
3. The mean and standard deviation of temperature before and after practical examination was 32.9±1.38 and 32.1±1.42.there was significant increase in P value (P<0.002).
4. The mean and standard deviation of pulse rate before and after practical examination was

81.7±13.54 and 75.4±8.50 there was highly significant increase in P value (P<0.0001).

5. The mean and standard deviation of systolic blood pressure before and after practical examination was128±3.76 and 110±6.55 there was highly significant increase in P value (P<0.0001).
6. The mean and standard deviation of systolic blood pressure before and after practical examination was128±3.76 and 110±6.55 there was highly significant increase in P value (P<0.0001).
7. The mean and standard deviation of Diastolic blood pressure before and after practical examination was   86.55±3.14 and 79.55±2.66 there was highly significant increase in P value (P<0.0001).
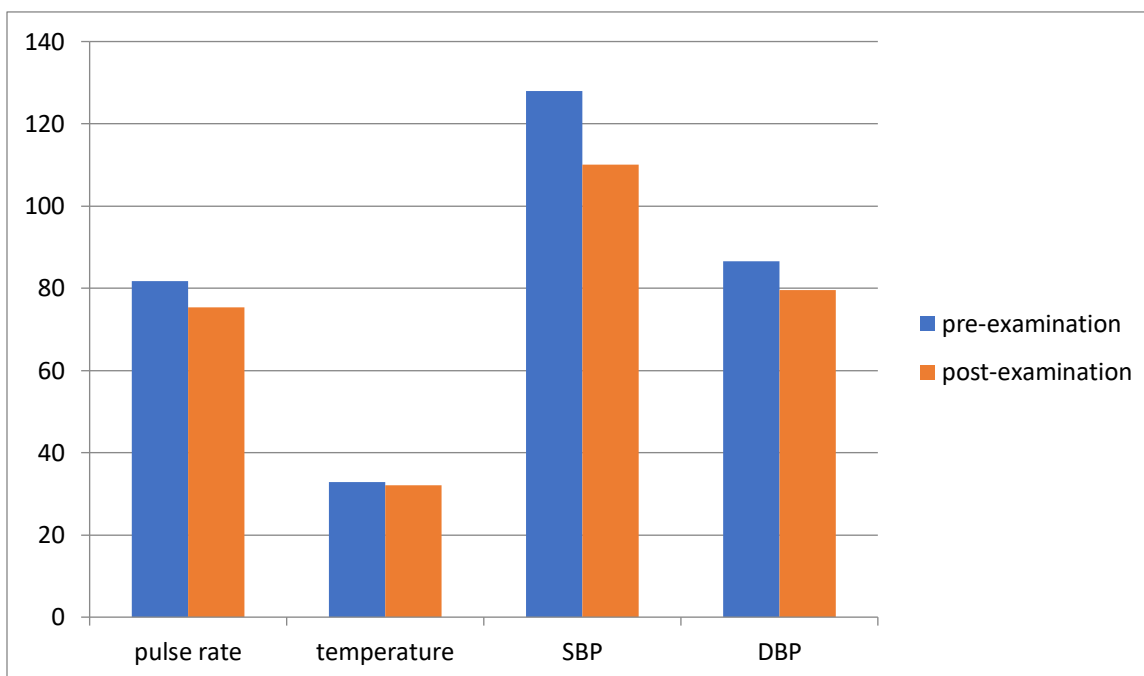

Figure-1 Bar diagram showing pulse rate (per minute), temperature (Celsius), systolic blood pressure (SBP), diastolic blood pressure (DBP) changes during pre and post practical examination. N=40, values are expressed in Mean.

DISCUSSION:

In present study, there are 40 males subjects are chosen and evaluated the cardiovascular status of medical students by measuring their body temperature, pulse rate and blood pressure before and after the examination. Mean and standard deviation (SD) was calculated.

In our study the Mean temperature was high in students before the examination as compared to after examination other study showed that the mean oral temperature immediately before examination was higher than what was taken at the same hour of the day 3 days after the exam [7] also   During emotional excitement the body temperature slightly increases due to involuntary increase tension in muscles [8]

Casper et al explained that increase in body temperature and sweating was produced as a result of increased sympathetic activity caused by stress.[9]

In our study there was highly significant increase in pulse rate and significant increase in systolic and diastolic blood pressure in medical students during pre-examination period when compared with these parameters during post –
examination period.[10,11] Similarly The significant increase in Pulse rate can be seen in others study possibly as a result of sympathetic activation.[12]

Under stress, the hypothalamus acts on adrenal glands to produce adrenalin and cortisol [13] and release them in to the blood stream, which leads to increases the heart rate, BP and metabolism [14]. The stimulation of the adrenergic nervous system that leads to release of catecholamine in particular noradrenalin at the postsynaptic neuron and adrenaline or epinephrine from adrenal medulla that result in activation of α1, β1 and β2 receptors consequently elevation of systolic blood pressure also The relationship between task difficulty and increase in heart rate and blood pressure was observed by other studies[15].

CONCLUSION:
It was concluded from the current study that medical students experience high levels of educational stress followed by social and personal problems. Because stressors cannot be eliminated permanently, medical education tends to employ stress management strategies. Student counselling and informal mentoring are very important during this time. Soft skills course, stress management program .A development approach at the beginning of medical activity may be advantageous. Stress reduction includes relaxation techniques such as meditation and yoga, and physical activity such as outdoor sports.

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