ISSN: 0975-3583,0976-2833 VOL14, ISSUE 08, 2023

Effect of Stress on Blood Pressure and Thyroid Function in Medical Students

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Abstract

Background: Stress begins when an individual's bodily, social, and emotional needs outweigh his or her capacity and compete with one another. Acute short-term stress raises blood pressure. Medical students are regarded to be under stress, especially before their exams, because of the extensive curriculum they study and the little amount of time they have to do their coursework. **Material and Methods:** Thecross-sectional study was conduct in the department of physiology, in Rama Medical College and Hospital Kanpur (U.P). 100 undergraduate medical students were selected for the study. **Results:** Blood pressure is linked to the cardiovascular system, which is managed by the autonomic nervous system (ANS). Reduced blood pressure indicates a change in the autonomic nervous system's balance components towards parasympathetic activity. **Conclusion:** Stress as a universal risk factor' - this is the most far-reaching strategy for reducing stress or its negative consequences, engaging the entire community. Stress handled as a risk factor in high-risk populations exclusively' - this option accepts the link between stress and cardiovascular disease is causative, but only tailored anti-stress therapies are clinically significant and cost-effective.

Keywords: Stress, blood pressure, thyroid function test and medical students.

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Introduction

Stress starts while the emotional environmental, physical and social needs of the individual compete with one another, and exceed the ability of the individual. Short-term stress (acute) increase the blood pressure. The curriculum studied by the medical students is vast and time in which they have to complete their studies is very short, therefore medical students are thought to be under stress, especially before their examinations. According to the World Health Organization.[1] Hypertension is a public health concern due to its magnitude, risks, difficulty in management, high medical and social costs and severe cardiovascular and renal complications.[2] The role of stress in the pathogenesis of essential hypertension has been suspected for a long time and recently a transversal study showed a positive correlation between stress and diastolic blood pressure at work.[3] Over the past two decades since Holmes and Rahe's (1967) groundbreaking work on life event and illness, acute life event have been the major focus of physiological stress research. yet it is becoming increasingly clear that this

ISSN: 0975-3583,0976-2833 VOL14, ISSUE 08, 2023

attention is misplaced and that chronic stress should be a more central focus.[4] Cardiovascular reactivity define as an exaggerated hemodynamic response. to mental stress, has been identified as a risk factor for hypertension.[5] Saley, who is known as the 'father of 'stress research'.[6] stress is a word to describe experience that are challenging emotionally and physiologically stress leads to anixiety and fear. studies indicates that medical student face difficulty academic challenges, which make them more vulnerable to stress and anxiety then students in other course.[7] Mild stress is beneficial in cognitive tasks and performance but persistently high stress may leads to neuropsychiatric illness like anxiety and depression. The role of stress in the pathogenesis of essential hypertension has been suspected for a long time and recently a transversal study showed a positive correlation between stress and diastolic pressure at work.[8] Thyroid Gland is a butterfly-shaped and a major endocrine glands that contribute to body and fat metabolism. A great bulk of experimental and clinical data has been accumulated in the past several years on the interaction between thyroid axis and the immune system on the basis of either the existence of receptors and thyroid hormones lymphocytes as well as the frequent immune alterations in physiological and pathological fluctuations of thyroid hormones.[9] Under stress the student undergoes smoking habit which directly effect thyroid function. Thyroid hormones—triiodothyronine (T3) and tetraiodothyronine (T4)—are major players in the coordination of vital human processes such as cellular metabolism and growth.[10] Most of the previous studies reported that stress causes hypothyroidism but a strong debate is existed, because some other studies reported an increase in thyroid hormones.[11] For example noise stress has been shown to increase TSH levels and a brief period of immobilization resulted in increase in TSH and T3 levels Stress inhibits thyroid stimulating hormone through the action of glucocorticoids on the nervous system.[12,13] Stress causes hypothyroid symptoms by disrupting HPA [hypothalamo-pitutary-adrenal] axis, reduces the conversion of T4 to T3, promote autoimmunity by weakening immune barriers, causes thyroid hormone resistance and causes hormonal imbalances.[14] It is believed that depression might be characterized 'low-thyroid function syndrome. Hypothyroidism might be associated with anxiety,[15] or refractory depression, suggesting that this characterizes one biological type of refractory depression. There is increasing evidence that stress produce changes in various immune process. some of these changes may be due to neurochemical and hormonal alterations including thyroid hormone level.[16]

Aims and objective:

Evaluation effect of stress on blood pressure and thyroid function in medical students.

1- Effect of stress on blood pressure.
2- Effect of stress on thyroid function test.
3- To find out correlation between stress on blood pressure and thyroid function test.

Methodology

The cross-sectional study was conduct in the department of physiology, in Rama Medical College and Hospital Kanpur (U.P). 100 undergraduate medical students were selected for the study.

Inclusion Criteria

Healthy first year medical students, who are mentally, physically and medically fit, will be included in this study.

Subject comes under DASS score will be included in these studies.

Exclusion Criteria

- Subject with high or low blood pressure

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- Subject who had under gone any major surgery
- Subject on any long-term medication or drug
- Smokers and alcoholics
- Subjects havingany mental disorder.
- Subject suffering from thyroid disorder.
- Subject not comes under DASS score.

Parameters:

To determine the changes in blood pressure parameters i.e.

- Systolic blood pressure
- Diastolic blood pressure
- Pulse rate
- Pulse pressure
- Mean blood pressure

To assess effect of examination stress on thyroid function i.e.

- Triiodothyronine (T3)
- Thyroxine (T4)
- TSH

RESULTS

Blood pressure is linked to the cardiovascular system, which is managed by the autonomic nervous system (ANS). Reduced blood pressure indicates a change in the autonomic nervous system's balance components towards parasympathetic activity, as documented by Santha Joseph et al,[17] and Anand BK et al.[18] It is widely documented that glucocorticoids, the HPA axis hormone, play a significant role in the stress-induced inhibition of the immunological response. Thyroid hormones have been shown to modulate the immune system,[19,20] as well as stress-mediated changes in thyroid activity.[21]

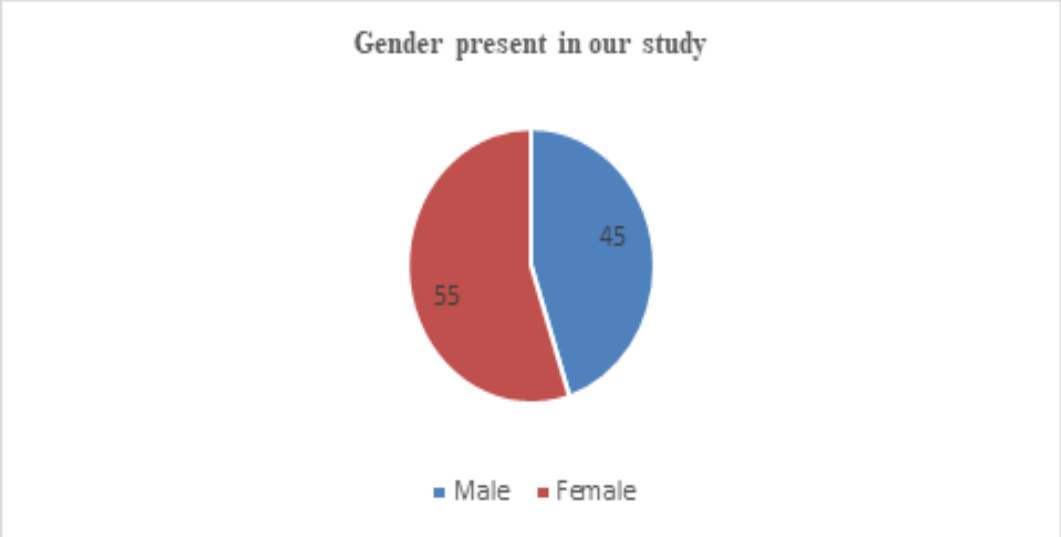

Figure 1: shows the present of males and female in our study.

Table 1: shows the present of males and female mean age group.

Gender	Mean	Std. Deviation	Std. Error Mean	Sig.	T
Female	20.58	1.833	.247	0.190	1.329
Male	20.14	1.407	.212		

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Table 2: shows the present of males and female mean weight.

Gender	N	Mean	Std. Deviation	Std. Error Mean	Sig.	t
Female	54	56.7593	9.43685	1.28419	0.179	0.783
Male	44	55.4773	5.95131	.89719		

Table 3: shows the present of males and female mean height.

Gender	Mean	Std. Deviation	Std. Error Mean	Sig.	t
Female	157.1818	30.31201	4.08727	.174	1.169
Male	162.6818	8.10619	1.22205		

Table 4: shows the present of males and female mean SYSTOLIC BP.

Gender	Mean	Std. Deviation	Std. Error Mean	Sig.	t
Female	125.2182	6.89254	.92939	0.00	3.542
Male	129.1556	3.13308	.46705		

Table 5: shows the present of males and female mean DISTOLIC BP.

Gender	Mean	Std. Deviation	Std. Error Mean	Sig.	t
Female	80.8909	5.64595	0.76130	0.002	2.242
Male	83.15	4.14485	0.617		

Table 6: shows the present of males and female mean MAP.

Gender	Mean	Std. Deviation	Std. Error Mean	Sig.	t
Female	94.69	8.35	1.12	0.001	2.961
Male	98.63	3.20	0.48		

Table 7: shows the present of males and female mean PP.

Gender	Mean	Std. Deviation	Std. Error Mean	Sig.	t
Female	43.80	4.57611	.61704	.384	2.841
Male	47.73	9.18348	1.36899		

Table 8: shows the present of males and female mean PR

Gender	Mean	Std. Deviation	Std. Error Mean	Sig.	t
Female	91.80	8.62	1.163	0.118	1.08
Male	89.82	11.04	1.64		

Table 9: shows the present of males and female mean T3

Gender	Mean	Std. Deviation	Std. Error Mean	Sig.	t
Female	2.4718	2.72043	.36682	.302	.561
Male	2.1756	2.50136	.37288		

Table 10: shows the present of males and female mean T4

Gender	Mean	Std. Deviation	Std. Error Mean	Sig.	t
Female	7.04	2.25	0.30	0.73	0.13
Male	6.98	2.15	0.32		

Table 11: shows the present of males and female mean TSH

Gender	Mean	Std. Deviation	Std. Error Mean	Sig.	t
Female	3.01	2.08	0.28	0.96	-0.65

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Male	3.29	2.10	0.31		

DISCUSSION

Blood pressure is linked to the cardiovascular system, which is managed by the autonomic nervous system (ANS). Reduced blood pressure indicates a change in the autonomic nervous system's balance components towards parasympathetic activity, as documented by Santha Joseph et al,[17] and Anand BK et al.[18] It is widely documented that glucocorticoids, the HPA axis hormone, play a significant role in the stress-induced inhibition of the immunological response. Thyroid hormones have been shown to modulate the immune system,[19,20] as well as stress-mediated changes in thyroid activity.[21] However, the link between stress, the thyroid axis, and immunity is not well understood. As a result, the current study investigated the effect of chronic stress on the thyroid axis and its relationship with an allogenic immune response. Researchers demonstrate no link between stress and thyroid, and my work likewise indicates no link between stress and thyroid. This study found that diastolic blood pressure rose considerably throughout the transition from hyperthyroidism to hypothyroidism and reduced significantly when euthyroid was restored in 40 previously thyrotoxic individuals. These findings corroborate Davis and Davis4's4 findings in some of the elderly thyrotoxic patients whose clinical responses to radioactive iodine therapy they reported. When they were hypothyroid, 40% of our patients had diastolic blood pressures above 90 mm Hg, and the majority of them decreased below 90 mm Hg after appropriate replacement medication. These findings support the theoretical potential that some hypertensive individuals have undiagnosed hypothyroidism and can be brought back to normal with thyroxin supplementation. Researchers Davis and Davis found a link between blood pressure and thyroid function, but there was no such link in my work. Few researches have looked at the links between FT3, FT4, and TSH levels and the occurrence of high blood pressure. To the best of our knowledge, only a small-scale cohort research (n = 2282) explored whether FT4 and TSH levels within the guideline range were risk factors for high blood pressure in the Tehran population.24 Their findings revealed that a 1 ng/dL rise in FT4 was associated with a 40% greater risk of raised BP14, but no significant association was seen between TSH and elevated BP. There were no statistically significant changes in thyroid hormone concentrations or baseline TSH secretion between our sample of 20 patients with severe chronic obstructive pulmonary disease and a control group of similar age with normal respiratory function. TSH responses to TRH were delayed and lowered in both groups, demonstrating that these abnormalities in the hypothalamic-pituitary-thyroid axis were not exclusive to hypoxic individuals in our investigation. Reduced reactions have been described as an age-related impact, particularly in men,[23] whilst delayed responses are assumed to be the result of hypothalamic injury.[24]·In my study, there is no substantial difference between thyroid and TSH, according to researchers Sayner PJ, Utiger RD.

CONCLUSION

Systolic blood pressure, diastolic blood pressure, arterial blood pressure, pulse pressure, and pulse rate are less than 5%, the null hypothesis is rejected. There are at least four potential preventative scenarios:

1. Stress as a universal risk factor' - this is the most far-reaching strategy for reducing stress or its negative consequences, engaging the entire community.
2. Stress handled as a risk factor in high-risk populations exclusively' - this option accepts the link between stress and cardiovascular disease is causative, but only tailored anti-stress therapies are clinically significant and cost-effective.
3. Stress is just a risk marker' - in this scenario, stress is viewed as a risk marker to identify at-risk groups for focused prevention that focuses on the management of typical stroke risk factors in this group. Alternatively, this strategy is used in population-wide initiatives

ISSN: 0975-3583,0976-2833 VOL14, ISSUE 08, 2023

when persons with stress are merely one of the populations that benefit from the intervention.

4. Wait for more definite evidence' - This option defers the incorporation of stressors in universal or targeted cardiovascular disease prevention initiatives until more definite evidence is available.

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