Variable Response Of I[st] Mbbs Students To Exam Stress

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Abstract : Stress is inevitable in today's world however people are different in the way they cope with stress. This study investigated the variable response to stress by the I[ST] M.B.B.S. students during their I[ST] credit examination. Thirty three male students participated in the study. They were divided into 2 groups, Group I- having less than 6 hours sleep, Group II-having more than 6 hours sleep before exam. Pulse rate was significantly higher in both the groups pre- examination (88±8.4 vs.78±4.47/min and 83.26± 9.96 vs 75.26±9.21/ min) Pre examination Systolic (118±7.27 vs 110±7.37mmHg) as well as Diastolic Blood Pressure (77.89±5.47 vs 72.1±5.05 mmHg) was significantly higher in group II. However the same was not significantly different in group I. On comparing the two groups pre exam none of parameters were significantly different while post exam only systolic BP was significantly higher in group I. Marks obtained in 3 subjects by two groups were not significantly different. Students vary in their response to stress as reflected in the sleep hours, reading habits & cardiac responses. Students having an abnormal sympathetic nerve activity at rest & in response to stressor, may be more susceptible to hypertension in future. The students should be screened and those showing sustained BP response should be followed up periodically

Key words : Exam stress, sleep hours, pulse rate, blood pressure, sustained sympathetic response.

INTRODUCTION: Competitiveness in today's world has made stress inevitable in life. All situations positive or negative that require adjustment may be stressful. However people are different in the way they perceive, interpret & cope with the stress. To some extent stress in itself is helpful in coping with situations but too much of it can hinder with the performance. Human body responds to stress by alterations in different biological functions especially autonomic function like heart rate and blood pressure[1]. Normal sleep tends to fragment and shorten with the anticipation of forthcoming high demands[2,3]. The students of 1[ST] M.B.B.S. probably face a major stress especially during the 1[ST] term credit examination[4]. This study was undertaken to observe the influence of exam stress on cardiac functions in the 1[ST] M.B.B.S. students. The study group was divided based on their sleep habits to observe the difference in individual responses to such stress.

MATERIAL AND METHOD: 33 male hostel inmates, due to appear for the 1[ST] M.B.B.S. 1[ST] term credit examination, were selected for the study. It was ensured that all of them were free from any illness. After explaining the purpose and protocol of the study, informed consent was obtained. Detailed history which included age, sleeping and reading habits during past one week was recorded. Depending on the total sleep time students were divided into 2 groups. Group I had no afternoon sleep and total sleep less than 6 hours. Group II had

afternoon sleep and total sleep duration of more than 6 hours.

To study the cardiac functions pulse rate (PR) and blood pressure (BP) were recorded after 15 min of rest in sitting position[5]. The subjects were asked to avoid any stimulants like coffee 30 min before the measurements. All observations were taken one hour before the exam and a week after the exam. Pulse rate was determined once by palpating the radial artery for 1 min. BP was measured 3 times by auscultatory method using mercury sphygmomanometer with a gap of 1 min between the readings and the average of 3 readings was taken[6].

Mean & SD values of age, hours of sleep, PR & BP were determined. Statistical significance of the data was measured by applying paired & unpaired t test appropriately. $p<0.05$ was considered statistically significant.

Table 1: Showing Age & Sleep Hours.(mean ± SD)

	Group I (n=14)	Group II (n=19)
Age(yrs)	17.71±0.95	17.73±0.85
Total sleep time (hrs)	4.85±1.61	6.3±1.04*

* $p< 0.05$

OBSERVATIONS: Results showed that the total sleep time was significantly higher in group II. Pre examination pulse rate (intra group) was significantly higher in both the groups. Pre examination Systolic as well as Diastolic Blood Pressure (intra group) was significantly higher in group II, however the same was not significantly different in group I.

Table 2: Comparison of PR & BP before and after exam. (All values are mean± SD)

	Group I		Group II	
	before exam	**after exam**	**before exam**	**after exam**
Pulse rate	88±8.4	78±4.47*	83.26± 9.96	75.26±9.21**
Systolic blood pressure	114±8.85	117±7.69†	118±7.27	110±7.37***
Diastolic blood pressure	74.57±5.12	74.28±5.34	77.89±5.47	72.1±5.05**

*p<0.05, **p<0.01, ***p<0.001on comparing before exam and after exam, † p<0.05 on comparing group I and group II.

On comparing the two groups pre exam none of parameters were significantly different while post exam only systolic BP was significantly higher in group I.

As shown in table 3 marks obtained in 3 subjects by two groups during the exam were not significantly different.

Table 3. Marks obtained by the students in the exam

	Group I	**Group II**
Anatomy theory (out of 100)	42.43±6.16	44.68±11.04
Anatomy practical (out of 100)	50.71±8.06	53.84±9.54
Biochemistry theory (out of 100)	42.62±6.79	45.53±5.25
Biochemistry practical (out of 100)	48.57±5.97	51.49±8.88
Physiology theory(out of 100)	49.39±7.04	53.53±10.21
Physiology practical (out of 100)	53.86±5.34	54.21±6.93

DISCUSSION: The significant increase in PR in both groups and BP in group II prior to exam occurs possibly as a result of sympathetic activation. This is consistent with the findings of Freychuss et al & Malathi et al who contributed it to increased epinephrine levels[1, 4].

Epinephrine secretion is increased in presence of stressor like exam where the outcome is unpredictable. This sympathoadrenal response to stressful situation occurs in various forms including raised PR & BP[1,2,3,8-10].

The raised cortisol level may also contribute to increased alertness to prepare for emergency situation. This alertness may attribute to decreased hours of sleep before exams[9-12]. Total sleep time was significantly less in group I compared to group II. The students in group I were taking stress more overwhelmingly and it affected their total sleep hours.

BP was significantly higher in group I after the exam which suggests persistent sympathetic activity after the stressor is over. The sympathoadrenal system doesn't shut down when not needed [12-13].

However there was no difference between marks of the two groups suggesting both groups were taking stress as needed by them. But the group I students could not shut down their stress after the need was over[12-15].

The students in group I may have an abnormal sympathetic nerve activity at rest and in response to stressor, making them more susceptible to hypertension in future[11-14]. A screening and more stringent follow up of such students at school or college level is advisable to prevent and detect any chronic disorders related to stress. A study with a large sample size and measurement of heart rate variability as a measure of autonomic function would be more conclusive.

To conclude individuals vary in their response to stressors as reflected in the sleeping habits, reading habits and cardiac responses. The students should be screened and those

showing sustained BP response should be followed up periodically for their susceptibility of developing hypertension at a later stage in life.

CONFLICT OF INTEREST: None declared.

REFERENCES:

1. Freychuss U. Hjemdahl P. Juhlin Dannfelt A. Linde B. Cardiovascular & Sympathoadrenal Responses To Mental Stess- Influence Of β-Blockade. Am.J.Physiol. 1998; 255: 1443-1451.

2. Akerstedt T. Psychosocial Stress And Impaired Sleep. Scand J Work Environ Health. 2006 Dec; 32(6): 493-501.

3. Akerstedt T, Kecklund G, Axelsson J. Impaired Sleep After Bedtime Stress And Worries. Biol Psychol. 2007 Oct; 76(3): 170-173.

4. A.Malathi, Vidya G. Parulkar. Evaluation Of Anxiety Status In Medical Students Prior To Examination Stress. Indian J. Physiol. Pharmacol. 1992; 36(2): 121-122.

5. Zeller A, Handschin D, Gyr N, Martina B, Battegay E. Blood Pressure And Heart Rate Of Students Undergoing A Medical Licensing Examination. Blood Press. 2004; 13(1): 20-24.

6. P Armario, R H del Rey, M Martin-Baranera, M C Almendros, L M Ceresuela and H Pardell. Blood Pressure Reactivity To Mental Stress Task As A Determinant Of Sustained HT After 5 Years Of Follow Up. J.Hum. Hypertension 2003; 17: 181-186.

7. T. Matsukawa, E. Gotoh, S. Uneda, E. Miyajima, H. Shionoiri, O. Tochikubo, M. Ishii. Augmented Sympathetic Nerve Activity In Response To Stressors In Young Borderline Hypertensive Men. Acta. Physiol. Scand. Feb1991; 141(2): 157-165.

8. McEwen B.S. Protective & Damaging Effects Of Stress Mediators. New Eng. J. Med. 1998; 328: 171-179.

9. Jagmohni Kaur Sidhu. Effect of Stress on Medical Students. IeJSME 2007: 1 (1): 52-53.

10. Jenny firth. Levels And Sources Of Stress In Medical Students. British Medical Journal MAY 1986; 292: 1177-1180.

11. Supe AN A Study Of Stress in Medical Students at Seth G S Medical College. J Postgrad Med 1998; 44(1); 1-6.

12. Karen A. Matthews, Karen L. Woodall, Michael T. Allen. Cardiovascular Reactivity to Stress Predicts Future Blood Pressure Status. Hypertension. 1993; 22: 479-485.

13. Douglas Carroll, George Davey Smith, Martin J. Shipley, Andrew Steptoe, Eric J. Brunner, And Michael G. Marmot. Blood Pressure Reactions to Acute Psychological Stress and Future Blood Pressure Status: A 10-Year Follow-Up of Men in the Whitehall II Study. Psychosomatic Medicine 2001; 63: 737–743.

14. Kathleen c. Light, carol a. Dolan, Mark r. Davis, and Andrew Sherwood. Cardiovascular Responses to an Active Coping Challenge as Predictors of Blood Pressure Patterns 10 to 15 Years Later. Psychosomatic Medicine 1992; 54: 217-230.

15. Mona Bedi, V. P. Varshney and Rashmi Babbar. Role of Cardiovascular Reactivity to Mental Stress in Predicting Future Hypertension. Clinical and Experimental Hypertension 2000, 22(1): 1-22.