 DOI: 10.18231/2394-2126.2017.0094

Evaluation of Examination Stress by DASS, Effect of BMI on Sensory motor performance among preclinical Medical students

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Abstract

All health professionals face stress because of time pressure, workload, multiple roles and emotional issues. Stress and its psychological manifestations are a major concern in the modern-day society. Presence of psychological morbidity in medical undergraduate students has been reported from various countries across the world, Indian studies to document this burden are very few. Therefore, the present cross sectional study was taken to assess the stress parameters using previously validated and standardized instrument, Depression Anxiety Stress Scale (DASS 21) and the associations with their personal characteristics. Cognitive functions were assessed by visual and auditory reaction time and the effect of BMI on Visual and auditory reaction time was also assessed.

Results: The mean depression score of the respondents is 14.11± 7.82 students showed moderate depression, mean anxiety score is15.33±7.57 showed severe anxiety and mean stress score is 17.83±7.33 experienced mild stress. Main source of stress is overloading of work around (108, 82%) and (62, 47%) of students go to sleep as their main stress coping method. Visual and auditory reaction time was increased in students during exams. Mean visual reaction time is 0.25±0.06 and auditory reaction time is 0.22±0.05. In students with high BMI (27±2.14) visual and auditory reaction time was high also students with high waist to hip ratio(0.81±0.13) showed high VRT and ART but is not statistically significant compared to students with normal BMI and waist to hip ratio.

Keywords: Depression, Anxiety, Stress, Visual reaction time, Auditory reaction time.

Received: 22nd March, 2017 **Accepted:** 18th May, 2017

Introduction

Hans Seyle coined the term stress which he called the general adaptation syndrome and the development of a pathological state from the ongoing unrelieved stress. Stress is a combination of psychological, physiological and behavioural reactions that people have in response to an event. A person in stress show the symptoms such as anxiety, confused emotions and hallucination. Stress in medical students has been a global issue Medical students are predominantly stress suffers because of demanding intense environment of medical education during their undergraduate course.[1,2] Multiple research reported that stress damages mental health, Therefore causes anxiety and depression in medical students not only in advanced countries but also in developing countries like India. Researchers identified that stress of medical students are mainly due to curricular overload and the tough nature of medical practice rather than due to personal issues.[3,4] Some degree of stress is accepted as a normal part of medical training and can be a motivator for some individuals, not all students find the stress manageable, Stress may give rise to a feeling of fear, incompetence, problem avoidance, anger, social withdrawal, sleeplessness, self medication, consumption of alcohol which reduce students' self-esteem and have a negative effect on the cognitive functioning and learning. It also affect their professional life and patient care and can lead to depression, anxiety and poor mental health.[5] This study aimed to evaluate the prevalence of stress among pre-clinical medical students and how each student copes with their stress. The effect of stress on the cognitive functions are assessed by recording the visual and auditory reaction time. Reaction time is the time period between the application of external stimulus and motor response. Reaction time is an index of sensory motor coordination, determines the alertness of a person, involves stimulus processing, decision making and response programming. Stress has a major influence on reaction time also Studies show that Visual and auditory reaction time varies with BMI but there are not many studies in this area so this study also aims to find their relation.

Materials and Method

A cross sectional study conducted in the Department of Physiology at a private medical college in Bangalore Karnataka. The research protocol was approved by local institutional Ethical committee, Informed consent was obtained from each subject prior inclusion in the study. The study population incuded132 preclinical healthy medical student of age group 17 to 20 years of both sex (48 males and 84 females) after getting written consent they were undertaken for study in the month of May 2016 during their final internal

assessment examination those with visual, auditory abnormalities were ruled out by history and examination. Students were instructed not to have caffeinated drink prior to the test. The stress assessment was developed through DASS 21 Questionnaire it is a set of three self report scales designed to measure the negative emotional states of depression, anxiety and stress with 7 items per scale the depression scale assess dysphoria, hopelessness, self depreciation and lack of interest. Anxiety scale assess autonomic arousal, skeletal muscle effect, stress scale assess relaxing difficulty, nervous arousal and being easily agitated. This study was conducted by distributing the questionnaire to the participants 3 days prior to the exams. The vital parameters, pulse rate was noted, blood pressure was recorded by sphygnomanometer, height to the nearest cm and weight in Kgs were recorded.

Simple reaction time a non invasive tool to measure the elapsed time in seconds (light and sound) between the presentation of sensory stimulus and the behavioural response was carried out in research laboratory and in silent atmosphere. Visual reaction time (VRT) and auditory reaction time (ART) were measured by PC1000 reaction timer. PC 1000 is a 1000 hertz square wave oscillator which has a soft key for start and stop.[6]

All subjects were right handed each subject was instructed to press the switch as soon as she /he saw the light, minimum of five trials are given for both VRT and ART average time recorded is calculated as final VRT and ART. The data was summarized using mean and standard deviation and student t test was used for statistical analysis.

Results

Out of 150 students 132 completed and returned the questionnaire and one student did not want to take part in the study an overall response rate is 88%. The mean age of students was 18.25(SD=0.703) with a range of 17 to 21 years. Forty seven students were male (35.6%) and eighty five students were female (64%).

The prevalence of the stress among the medical students were evaluated by using the DASS scoring which is used as an indicator for screening. Study group showed that mean depression score of the respondents is 14.11± 7.82, (71, 53.78%) students experience moderate depression, mean anxiety score 15.33±7.57 (111, 84.09%) showed severe anxiety and stress score is 17.83±7.33(64, 48.8%) show mild stress. (Table 1).

	Mean value and SD
Age	18.25 ± 0.70
Pulse rate	88.03 ± 10.00
Systolic blood pressure	123.32 ± 12.65
Diastolic BP	80.29 ± 8.21
Body mass index	21.98 ± 3.10
Waist to hip ratio	0.78 ± 0.08
Depression	14.11 ± 7.82
Anxiety	15.33 ± 7.57
Stress	17.83 ± 7.33
Visual reaction time(VRT)	0.25 ± 0.06
Auditory reaction time (ART)	0.22 ± 0.05

Grades	**Depression**	**Anxiety**	**Stress**
Normal	0-9	0-7	0-14
Mild	10-13	8-9	15-18
Moderate	14-20	10-14	19-25
Severe	21-27	15-19	26-33
Extremely severe	28+	20+	34+

Around 108 students (82%) expressed overloading of work as the main stressor. 23 students (17%) expressed length of course as their main stressor and 18(14%) expressed exams as the main stress factor and 7 students (5%) expressed their problem in understanding the subject, Around 39 (29.54%) students expressed that their relation with teachers were not cordial, 12(9.09%) did not have good friends to express their feelings and around 26(19.69%) students had financial difficulty in paying academic fees.(Table 2).

Sources of stress	**Number**	**Response Percentage (%)**
Academic		
Overloading of work	108	82
Length of course material	23	17
Exams	18	14
Problems with understanding information	7	5
Social issues		
Relation with friends (not good)	12	9
Relation with teachers (not good)	39	29.5
Financial issues	26	20

Majority of research participants think that coping strategies effectively reduces stress.

Study participants reported 8 varieties of coping strategies for minimizing their stress. Those are: (1) share with friends (25, 19%); (2) watch movie and net surfing (6, 5%); (3) playing and watching sports (4, 3%); (4) go to sleep (62, 47%); (5) calling parents on phone (22,17%); (6) go home (5, 4%); (7) meditation and yoga (6, 5%); (8) smoking, alcoholism, (2, 1.51%).(Table 3)

Way to cope with stress	Number	Response in Percentage (%)
Talking with friends	25	19
Go to home	5	4
Playing/ watching sports	4	3
Calling parents on phone	22	17
Go to movie/ social networking sites	6	5
Do yoga	6	5
Smoking/ alcoholism	2	2
Go to sleep	62	47

Cognitive functions were assessed by visual and auditory reaction time there was a definite increase in VRT and ART during exams. Mean visual reaction time 0.25±0.06 (Normal 190ms) and auditory reaction time is 0.22±0.05 (Normal 160ms). students were divided into 2 groups those with high BMI and normal BMI, VRT and ART were studied in both the groups students with high BMI and high waist to hip ratio showed increase in pulse rate, systolic and diastolic blood pressure and also there was increase in VRT and ART but it was not statistically significant. (Table 4)

	Visual reaction time	Auditory reaction time	Pulse	SBP	DBP
High BMI (27.1±2.14)	0.248±0.06	0.212±0.04	87.8±8.65	129.4±12.9	84.16±7.48
Normal BMI (21.4±1.96)	0.232±0.02	0.207±0.05	85.4±6.42	122±12.12	79.12±9.96
	P Value 0.41	**P value 0.50**	**P value 0.29**	**P value 0.21**	**P value 0.05**
High waist/ Hip ratio (0.81±0.13)	0.270±0.08	0.217±0.04	91.54+11.41	126.6+10.0	81.2+8.90
Normal waist/ Hip ratio (0.79±0.05)	0.238±0.05	0.211±0.05	89.9+9.98	125+12.1	78.7+7.66
	P value 0.97	**P Value 0.16**	**P value 0.85**	**P value 0.06**	**P value 0.23**

Discussion

Mental health is a level of Psychological well-being, mental health includes an individual's ability to enjoy life, and create a balance between life activities and efforts to achieve psychological resilience. The WHO states that the well-being of an individual is encompassed in the realization of their abilities, coping with normal stresses of life, productive work and contribution to their community. According to mental health specialist and psychoanalyst Sigmund Freud's the capacity "to work and to love" is considered to be a simple and more accurate definition of mental health. Medical students experience a high level of stress during their undergraduate course which has a negative effect on the cognitive functioning and learning. Studies suggest that mental health worsens after students begin medical school and remain poor throughout the training period. The consistent stress increase heart rate, elevates levels of stress hormones epinephrine, norepinephrine, cortisol rising the blood pressure, increases the risk for cardiovascular disease, stroke, cancer and can take a toll on the body.[7]

Exposure to intense and chronic stressors during the developmental years has long-lasting neurobiological effects and puts one at increased risk for anxiety and mood disorders, aggressiveness, structural changes in the CNS, and early death. Stressful events often precede anxiety disorders long-term follow-up studies have shown that anxiety occurs more commonly before depression. Our study also reports that around 111 (84.09%) students experience severe anxiety, moderate depression (53.78%), and mild stress (48.8%) which is really very alarming to the medical educators. Similar results were found in studies conducted in Saudi Arabia and Malaysia.[4,7,8]

Around 108 students (82%) express overloading of work as the main stressor. 23 (17%) expressed length of course as the main stressor and 18(13%) expressed exams as the main stress previous studies from Mohsin shah et al and shah C et al shows similar results.[8]

Studies have reported that under stressful conditions, the cognitive system is overloaded, reduces a person's attentional resources. Stress acting through sympathetic nervous system and brain –pituitary – adrenocortical axis affect decision making and attention.[11,12] It is observed in our present study that the stress scores were increased also there visual and auditory reaction time is increased these findings are in

agreement with previous authors. Ganesh Pradhan and et al.[13] Continued stress over years may lead to weight gain and increased BMI as proved by Yvonne H. C. Austal.[14] Stress changes eating patterns by alterations in the hypothalamic-pituitary-adrenal (HPA) axis, glucose metabolism, insulin sensitivity, and other appetite-related hormones and hypothalamic neuropeptides.[14,15,16,17]

The epidemic of overweight and obesity is on the rise, and the respective values are projected to be 2.3 billion[1] and Long-term obesity and long-term underweight in adulthood are associated with lower cognitive scores in late midlife Overweight and obesity, have been found to be associated with a higher risk of dementia.[3,4] In our study around 25 students had high BMI and 31 students had high waist to hip ratio there cognitive functions were assessed by measuring the VRT and ART though VRT and ART were increased it was not statistically significant. John Gunstad and et al has show in their study that elevated body mass index is associated with executive dysfunction. It appears that in our study long term followup is required to study the association between BMI and cognition.[4] Some long-term prospective studies[7–12,17,18,19,20] measured BMI in midlife, but it remains unknown when the association between BMI and late life cognition becomes apparent.

Public health messages should promote a healthy weight at all ages.

Conclusions

The goal of medical education is to train knowledgeable, competent, and professional physicians equipped to care for the nation's sick, advance the science of medicine, and promote public health. The findings our study suggest that medical students are under stress and overloading of work is the main reason that led to stress. When students are admitted to the medical school, special care must be taken to find out student's problems or psychological stress among them. The students should be taught different stress management techniques to improve their ability to cope with the demanding professional course.

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