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IMPACT OF STRESS ON ACADEMIC PERFORMANCE OF FIRST YEAR MBBS STUDENTS: A GENDER BASED CROSS SECTIONAL STUDY

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Abstract

Background: stress is a global phenomenon and influences a person's efficacy, either by increasing or decreasing it. Stress can have a variety of negative effects including annoyance, anxiety and depression. Exposure to chronic stress and also ineffective stress management could lead to physical and mental illness. Stress is quite common in medical students which leads to deterioration in their cognitive functions which reflects in their academic performance. Gender may also play in manifestation of stress as well.

Aim: To study the differential impact of stress on academic performance between male and female MBBS students, utilizing a cross-sectional design.

Methods and material: a single point cross sectional study was carried out among 150 first year MBBS students of a peripheral medical college in West-Bengal during first internal assessment examination. Eighty-four students were selected based on inclusion and exclusion criteria after taking due consent. Stress levels were assessed using DASS questionnaire. Academic performance was collected from marks obtained in internal assessment examination. Data was statistically analyzed.

Results: out of 150 students, 84 students were selected considering the inclusion and exclusion criteria. Among male students, the majority 31 (59.6%) are having mild DASS Scores, 08 (15.4%) normal, 08 (15.4%) moderate and 05 (9.6%) severe DASS scores. In contrast, in female students, the majority 13 (40.6%) are having mild DASS Scores, 09 (28.1%) moderate, 06 (18.8%) normal and 04 (12.5%) severe DASS scores. Further analyses shows that there is no

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significant association between stress and gender variation. Academic performance in males and females decreased during severe stress. In females however, moderate stress resulted in slight increase in academic performance.

Conclusion This study concludes that a considerable amount of stress is perceived by every medical student and excessive stress results in poor academic performance.

Keywords: [stress] [medical student] [academic performance][DASS questionnaire]

INTRODUCTION

Stress-related illnesses have become very common nowadays and anxiety is one of the causes of stress. According to World Health Organisation (2020) report, impaired mental condition will be the second leading cause of morbidity and mortality after cardiovascular system related disorders **[1]**. Medical academic curriculum is known to be stressful and varied level of stress have been recorded among the medical students. Studies done previously were of opinion that stress related to academics might impair students' academic achievement and depending on severity it might lead to suicidal ideation or burn out **[2]**. Cognitive function may be affected during or after a stressful event and can alter the ability to think during examinations **[3]**. Study shows that perceived stress level was as high as 89.64% in India for students studying medical science and the main stressor was academic activities mainly examinations **[4]**. Chronic stress might lead to the alteration of dietary pattern as a coping strategy to consume excessive fatty meal as well as might lead the person to different addictions like smoking, alcohol consumption etc. The individual has less leisure time to take care of his/her own health and all of these results in impairment of mental and social health and future diseases particularly obesity related disorders **[5]**. Therefore the present study was conducted to assess the stress level of the medical students with help of questionnaires (DASS) and to correlate them with academic performance of undergraduate first year medical students with the help of the marks obtained in semester examinations as a tool of measurement of academic achievement **[6].**

METHODS

Study Design: A single point cross sectional study was carried out in a peripheral medical college of West-Bengal.

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Ethical committee approval: Approval was obtained from the institutional ethical committee (memo no. BMC/32/1(1)).

Study population: 84 out of 150 first year MBBS students who had given their written consent for the study.

Each of the students was enquired about their personal history, family history, history of past illness and treatment history and was recorded accordingly. Height, weight, BMI was measured and written consent was taken. They were requested to pay a visit to the investigator conducting this study on the day of 1st semester examination before commencement of practical examination. After their arrival, DASS questionnaire (DASS = Depression Anxiety Stress Scale) [short version (21 items)] was supplied to each of them and requested to fill that. Students marks in the first semester examination was considered as a marker of his / her academic performance.

It was a convenience sampling and students were selected according to the following criteria:

INCLUSION CRITERIA: -

Only first year M.B.B.S. Students giving written consent were included in this study.

EXCLUSION CRITERIA: -

Students having any psychiatric disorders and taking medicines for were excluded.

DASS QUESTIONNAIRE (21 ITEM VERSION)

Depression Anxiety and stress scale was a 21-item questionnaire to evaluate negative emotional states of depression, anxiety and stress. Students were asked to use 4-point severity / frequency scales to rate the extent to which they went through those episodes over the last week **(table 1)**. They were also instructed not to leave a single item without response and also not to spend too much time to respond to each item provided in the questionnaire.

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After receiving the thoroughly filled up questionnaire from the students, scores of stresses of each of them were calculated by summing scores for the stress items only. After summing up the score for the stress items, stress scores were categorized accordingly into normal, mild, moderate and severe **(table 2).**

STATISTICAL ANALYSES:

Data was collected, compiled and entered in Microsoft excel sheet and using Trial version of SPSS 21.0 data was analyzed and interpreted. Chi-squared test and independent t-test was applied with consideration of 95% level of confidence interval, such that $P < 0.05$ as a level of significance.

RESULTS

Eighty-four out of one fifty first year medical students volunteered to participate in the present study. Students were divided into four groups according to their stress level (As per DASS score). Total no. of study subjects (i.e. n=84) were distributed according to Stress Intensity Levels into normal, mild, moderate and severe.

Gender and DASS scores

The **chi-squared test** was conducted to examine the association between **Gender and DASS scores** (Mild, Moderate, Normal, and Severe) **(table 3).**

Among male students, the majority **31 (59.6%)** are having mild DASS Scores**, 08 (15.4%)** normal, **08 (15.4%)** moderate and **05 (9.6%)** severe DASS scores. In contrast, in female students, the majority **13 (40.6%)** are having mild DASS Scores, **09 (28.1%)** moderate, **06 (18.8%)** normal and **04 (12.5%)** severe DASS scores.

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The chi-squared value was calculated as **3.241** with **3 degrees of freedom** and a **p-value of 0.356**. Since the p-value is greater than the conventional significance level of 0.05, this indicates that there is **no statistically significant association** between Gender and DASS scores.

Academic Performance and DASS Score (table 4) (figure 1)

Independent t-test:

- This statistic tests mean is compared between **Gender** and the **Normal** DASS score. Mean score of males is 56.88 and mean score of females is 56.50. The t-value value is 0.066 with 12 degrees of freedom.
  P-value (0.948): The p-value of 0.948 is more than the commonly used threshold of 0.05, which indicates statistically not significant.

- This statistic tests mean is compared between **Gender** and the **Mild** DASS score. Mean score of males is 58.35 and mean score of females is 61.69. The t-value value is 0.960 with 42 degrees of freedom.
  P-value (0.343): The p-value of 0.343 is more than the commonly used threshold of 0.05, which indicates a statistically not significant.

- This statistic tests mean is compared between **Gender** and the **Moderate** DASS score. Mean score of males is 61.63 and mean score of females is 74.44. The t-value value is 2.402 with 15 degrees of freedom.
  P-value (0.030): The p-value of 0.030 is less than the commonly used threshold of 0.05, which indicates a **statistically significant association**.

- This statistic tests mean is compared between **Gender** and the **Severe** DASS score. Mean score of males is 52.50 and mean score of females is 64.20. The t-value value is 5.372 with 07 degrees of freedom.
  P-value (0.001): The p-value of 0.001 is less than the commonly used threshold of 0.05, which indicates **a statistically significant association**

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DISCUSSION

In this study, willing students were divided into four group of stress level – normal, mild, moderate and severe according to DASS score. Result of our study shows 16.7% had no stress (normal), 52.4% had mild stress, 20.2% had moderate and 10.7% had severe degree of stress. But there was no statistically significant association (p value = 0.356) between gender and DASS score. Therefore, no gender variation of stress levels was found between male and female students. According to Subhalakshmi et al, however girls were found to have more anxiety-related problems than boys, and there was a significant (**p<0.001) association between the examination period and anxiety **[7**]. Several studies found no difference in anxiety levels among male and female medical students at the start of medical education but gradually, there was a greater rise in stress levels among female medical students through the course of training **[8-10].**

When we were assessing the impact of stress on academic performance, mild stress has generally no effect on performance whereas with moderate degrees of stress, performance actually increases. However severe stress results in decrease in academic performance. Similar result was found in different previous studies. Too much stress interfered negatively with students' concentration, preparation and performance as shown by Pfeiffer **[11]**. At the same time no such negative correlation was found in case of students having mild stress to their academic brilliance. This finding was also consistent with the studies done previously. Also, it was shown in other studies that some amounts of stress could be helpful for their academic performance too **[12]**.

When we were assessing the effect of stress on academic performance with gender variation, we found that at no and at mild stress, there is no difference in academic performance amongst boys and girls. However, at moderate stress, females were performing better than male students (p value= 0.030). Though at severe stress, overall academic performance is reduced, still females perform academically better than males (p value > 0.001). Only few studies have reported differences in anxiety levels by gender **[13].**

Mukesh et al, in their study stated that in female students increasing amount of stress was having a beneficial effect on cumulative grade points i.e. the stress was related to the improved academic

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performance **[14]**. This finding of female students may be explained on the basis of the phenomenon of 'eustress' where an individual is motivated high enough because of stress to move to action to get things accomplished **[15]**. Takemuray Y, Kikuchi S and Inaba y have reported the similar results where the stress has been associated with improvement in performance **[16-17].**

CONCLUSION

Our study shows significant number of medical students having moderate to severe stress according to DASS score during their examinations. This resulted in poor academic performance. Therefore, the medical students should be made aware of the negative consequences of stress and proper stress ameliorative measures should be implemented in medical schools to promote and produce stress free, healthy holistic environment. Goal may be achieved by adopting multiple strategies to cope with stress. To increase leisure times to indulge them in various sports activities as well as to perform meditation and yoga to benefit in combating psychological stress. Regular day by day reading, mock examination and use of question banks may be of value to reduce examination related stress. Apart from those, better interaction with faculty and proper guidance by them also may be helpful for a student to combat academic stress.

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Authors' contributions:

	AUTHOR 1	AUTHOR 2	AUTHOR 3
Concepts	√	√	-
Design	√	√	-
Definition of intellectual content	√	√	√
Literature search	-	-	√
Clinical studies	√	√	√
Data acquisition	√	√	-
Statistical analysis	√	√	-
Manuscript preparation	-	-	√
Manuscript editing	-	-	√
Manuscript review	√	√	√

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Conflict of interest: NONE

Data availability – THIS RESEARCH WORK IS BASED ON PRIMARY DATA WHICH IS KEPT UNDER THE SUPERVISION OF CORRESPONDING AUTHOR AND DELIMITED DATA CAN BE AVAILABLE CASE TO CASE BASIS BY MAILING THE CORRESPONDING AUTHOR.

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Name: Date:

Please read each statement and circle a number 0, 1, 2 or 3 which indicates how much the statement applied to you over the past week. There are no right or wrong answers. Do not spend too much time on any statement.

The rating scale is as follows:

0 Did not apply to me at all
1 Applied to me to some degree, or some of the time
2 Applied to me to a considerable degree, or a good part of time
3 Applied to me very much, or most of the time

1.	I found it hard to wind down	0	1	2	3
2.	I was aware of dryness of my mouth	0	1	2	3
3.	I couldn't seem to experience any positive feeling at all	0	1	2	3
4.	I experienced breathing difficulty (e.g., excessively rapid breathing, breathlessness in the absence of physical exertion)	0	1	2	3
5.	I found it difficult to work up the initiative to do things	0	1	2	3
6.	I tended to overreact to situations	0	1	2	3
7.	I experienced trembling (e.g., in the hands)	0	1	2	3
8.	I felt that I was using a lot of nervous energy	0	1	2	3
9.	I was worried about situations in which I might panic and make a fool of myself	0	1	2	3
10.	I felt that I had nothing to look forward to	0	1	2	3
11.	I found myself getting agitated	0	1	2	3
12.	I found it difficult to relax	0	1	2	3
13.	I felt down-hearted and blue	0	1	2	3
14.	I was intolerant of anything that kept me from getting on with what I was doing	0	1	2	3
15.	I felt I was close to panic	0	1	2	3
16.	I was unable to become enthusiastic about anything	0	1	2	3
17.	I felt I wasn't worth much as a person	0	1	2	3
18.	I felt that I was rather touchy	0	1	2	3
19.	I was aware of the action of my heart in the absence of physical exertion (e.g., sense of heart rate increase, heart missing a beat)	0	1	2	3
20.	I felt scared without any good reason	0	1	2	3
21.	I felt that life was meaningless	0	1	2	3

Table 1: DASS QUESTIONAIRE (21 ITEM VERSION)

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	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 +

Table 2: showing catergory of depression, anxiety and stress according to DASS score

DASS	Gender			Chi-Square	df	P value
	Male n (%)	Female n (%)	Total n (%)			
Normal	08 (15.4%)	06 (18.8%)	14 (16.7%)			
Mild	31 (59.6%)	13 (40.6%)	44 (52.4%)			
Moderate	08 (15.4%)	09 (28.1%)	17 (20.2%)	**3.241**	**3**	**0.356**
Severe	05 (9.6%)	04 (12.5%)	09 (10.7%)			
Total	52 (61.9%)	32 (38.1%)	84 (100%)			

Table 3: showing association between Gender and DASS scores (Mild, Moderate, Normal, and Severe)

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DASS Score	Academic Performance		t-value	df	p-value
	Male (Mean±SD)	Female (Mean±SD)			
Normal	56.88±8.25	56.50±13.00	**0.066**	**12**	**0.948**
Mild	58.35±11.99	61.69±5.28	**0.960**	**42**	**0.343**
Moderate	61.63±11.68	74.44±10.33	**2.402**	**15**	**0.030***
Severe	52.50±3.42	64.20±3.11	**5.372**	**07**	**0.001***
Total	58.42±10.82	63.91±11.19	**2.226**	**82**	**0.029***

Table 4: shows the distribution of DASS scores (Mild, Moderate, Normal, and Severe) with academic performance across Gender based.

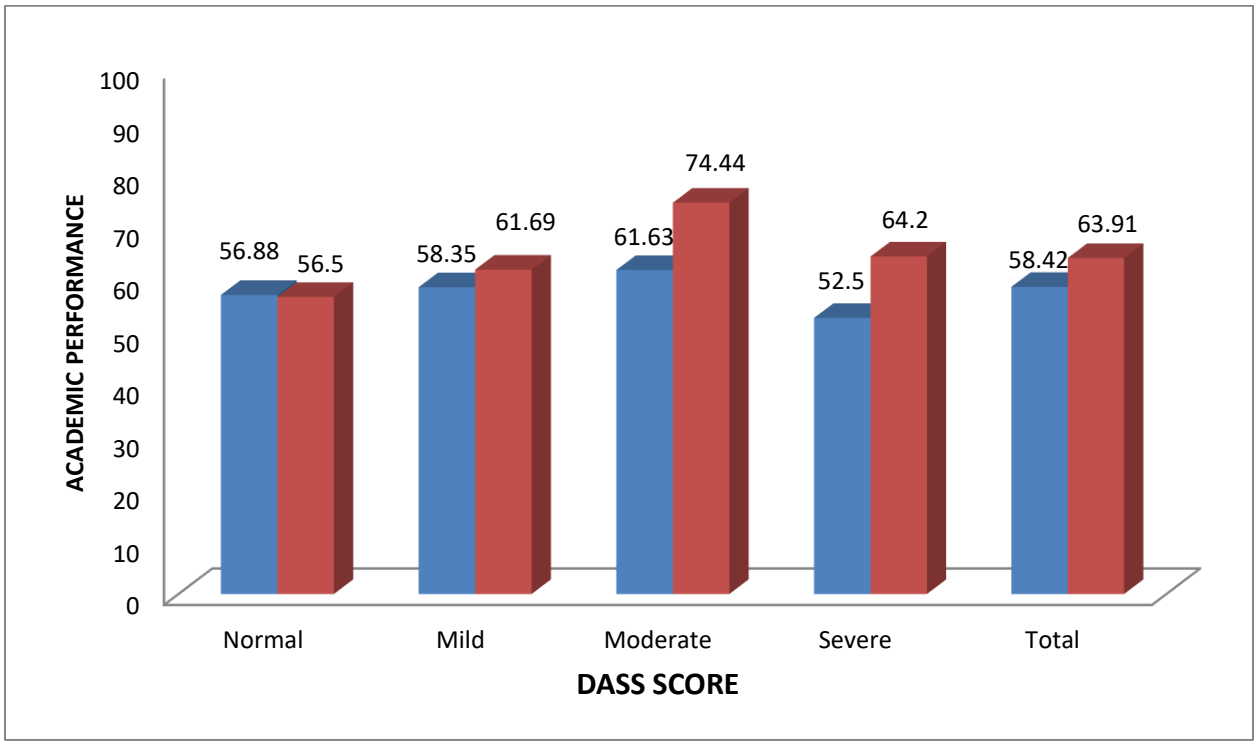

Figure 1: shows association between academic performance and DASS score (normal, mild, moderate and severe) (Male Female).