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Case Study

Perceived Stress among Undergraduate Medical Students and its Determinants: A Cross-Sectional Study in a Teaching Hospital in West Bengal

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ABSTRACT

Stress among medical students is a growing concern worldwide. The objectives were to assess the perceived stress, its sources and its pattern among undergraduate medical students and to find out determinants of stress among them. This cross sectional descriptive study was conducted among 225 undergraduate medical students of three academic years of Bankura Sammilani medical college during March-June 2015.Data were collected using a pretested, semistructured, anonymous, self-administered questionnaire which consisted of Perceived Stress Scale -10 for assessment of stress . Data were analysed using SPSS version 20.0. Binary Logistic Regression (BLR) model was adopted to find determinants of stress. Proportion of stressed students was 38.2% and mean stress score was 18.41(SD±6.22). Female students were more stressed than male students. About 80% of students perceived 'vast syllabus' and 'lack of attention and time from teacher' as stressors. Around 50% of students reported 'Worry about future', 'Own expectation of becoming doctor', 'Inadequate quantity and quality of food in hostel' and 'Lack of recreation' as stressors. 'Disturbed in-campus political environment' was perceived as a source of stress by 42.2% students. In BLR model, only five stressors, 'Relationship problem with partner/love affair', 'Quarrel/maladjustment with friends', 'Living away from home', 'Competitive environment', 'Lack of attention and time from teachers' were found statistically significant. Most of the stressors were related to academic and psychological domains. Regular review and restructuring of medical curriculum, implementing in-campus health promotional measures for students to cope with stress are needed to address the issue.

Introduction

Worldwide, various studies have shown that medical students experience a high level of stress during their undergraduate courses. [1-5] It was suggested that mental health worsens after students begin medical school and remain poor throughout the training [1]. Previous studies have shown fairly high levels of stress, symptoms of depression [6,7] and even suicidal thoughts among medical undergraduates[8]A majority of medical students from universities in Mumbai and Karachi perceived stress at one time or another during their study period. [9,10] High levels of stress may have a negative impact on the learning ability of students. Excessive stress may result in mental and physical problems and may diminish a student's self-worth and affect his/her academic achievement. [11,12] High level of stress may have a negative effect on cognitive function and learning of students in medical schools. [13,14] Every year, news media report suicidal deaths among medical students in India. [15]

A study conducted in Medical College, Kolkata revealed depression among 41.1% of undergraduate medical students. [16]With this background, the present study was undertaken among undergraduate medical students in a teaching hospital of West Bengal with the following objectives:

1. To assess the perceived stress, its sources and its pattern among Undergraduate medical students in Bankura Sammilani Medical college.

2. To find out determinants of stress among the study population

Materials and Methods

This descriptive cross sectional study was conducted during March 2014-June 2015 in Bankura Sammilani Medical College (BSMC) among undergraduate medical students.

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BSMC is a medical college situated in Bankura district of West Bengal and affiliated with The West Bengal University of Health Sciences (WBUHS) with an annual intake of 100 undergraduate students for MBBS course. The medical education curriculum implemented by WBUHS in all the medical colleges under the same including BSMC is guided by Regulation of Medical Council of India for undergraduate medical courses. The total duration of the MBBS course is 4½ years and it is divided into four academic years, with summative evaluation in the form of Professional MBBS University Examinations at the end of each academic year. Basic science subjects such as Anatomy, Physiology, Biochemistry and Community Medicine are taught in 1st academic year. Second academic year comprises Microbiology, Pathology, Pharmacology, Forensic Medicine and Toxicology and Community Medicine. The 3rd academic year consists of Ophthalmology, ENT and Community Medicine. Clinical subjects like Medicine, Surgery, Gynaecology and Obstetrics and Paediatric Medicine are taught in the 4th and the final academic year. The 1st year students who remain busy during this part of year for their 1st Professional MBBS University Examination were excluded from the study assuming higher stress level among them than the rest. Therefore, the students studying in 2nd, 3rd and 4th years of the course during their mid-session were included in the study.

Data were collected using a pretested, semistructured, anonymous self-administered questionnaire**.** The questionnaire was administered to the students in each academic years separately on pre scheduled dates and they were instructed to return the completed questionnaire The questionnaire consisted of demographic data, 10-itemCohen's Perceived Stress Scale (PSS) [17] and 25 potential stressors selected with the help of literature review [18,19] and in consultation with undergraduate students.

The questionnaire was pretested among 30 undergraduate medical students of another medical college and was modified accordingly.

The Perceived Stress Scale(PSS) is a widely used psychological instrument for measuring the perception of stress. It is a measure of the degree to which situations in one's life are appraised as stressful during the last month. The scale also includes a number of direct queries about current levels of experienced stress. The questions are of a general nature and hence are relatively free of content specific to any subpopulation group.

The PSS 10 item scale contains 10 questions. Each question has five possible answers.

For negatively stated items, score 0-5 is allotted as follows

0 = Never 1 = Almost Never 2 = Sometimes 3 = Fairly Often 4 = Very Often.

To the four positively stated items (items 4, 5, 7, & 8) score is allotted by reversing responses

(e.g., 0 = 4, 1 = 3, 2 = 2, 3 = 1 & 4 = 0).

Total scores are obtained by summing scores of 10 questions. The PSS-10 has a possible range of scores from 0 to 40. The scale yields a single score with high scores indicating higher levels of stress and lower levels indicating lower levels of stress. The range of PSS scores were also divided into stratified quartiles. In the present study, the upper two quartiles and lower two quartiles were combined (20 being the operational cut off value for the upper bound) to form two categories and were labelled as 'stressed' and 'not stressed' respectively. This cut off value was selected in accordance to similar studies from Pakistan and Egypt. [18,20]

The PSS-10 scale English version, has already been validated and the internal consistency, among medical undergraduate students in West Bengal was found high (Cronbach's alpha 0.79). [21]

Ethical consideration

The study was approved by Institutional Ethics Committee (IEC) of Bankura Sammilani Medical College. Informed written consent was taken from every participant prior to interview. The students were assured about anonymity and confidentiality of the responses given in the questionnaire and instructed to return the completed questionnaire. Privacy and confidentiality of participants were strictly maintained during data collection and thereafter by making the questionnaire anonymous.

Variables

Outcome variable: Totalscore of 20 in PSS-10 scale was considered threshold for stress in present study. All students having perceived stress score 20 or above were termed as 'stressed' and those having score <20 were termed as 'not stressed'.

Independent or exposure variables: Back ground information consisted of gender, medium of schooling, residence, monthly expenditure and year of medical course.

A total of 25 potential stressors were listed and grouped as academic, psychosocial and health-related. For each potential stressor, the frequency of occurrence in last one month was classified as never, rarely, sometimes, often and always and often/ always response were taken as positive during analysis.

Statistical Analysis

Data were analysed using SPSS, version 20.0. Bivariate logistic regression was used to estimate the crude associations between each exposure variable and perceived stress among students and to select variables for the multivariate analysis. Then multivariate analysis using binary logistic model was

performed to find the association between selected factors and stress among students. The assumptions of logistic regression were checked to be satisfied. Statistical significance was considered at the 5% level of α.

Results

Baseline characteristics

Out of 296 students in three academic years, 230 students provided informed verbal consent for the study.Again,225 students returned completed questionnaire and they constituted the study population. Therefore, the response rate was 76% (225/296). Among the study population, 137(60.9%) were male and 88(39.1%) were female. Mean age of the study population in years was 20.64 (SD±1.19). Majority of the study population were from urban area (69.3%). Medium of schooling of most of the students was Bengali (57.8%), followed by English (39.1%) and Hindi (3.1%). Seventy-six (33.8%) students belonged to 2rd year, 72 (32%) to 3rd year and 77 (34.2%) to 4th year.

Stress level among students

It was observed that 38.2 % of students were stressed during study period **(Figure 1)**. Mean PSS score was found to be 18.41(SD±6.22). Mean score of female students (19.70, SD ±6.307) were more than that of male students (17.58, SD±6.038) and the difference was statistically significant (p=0.012) [Not shown in the table].Except gender, no other demographic characteristics like age, permanent residence, medium of schooling, year of study was found to be statistically associated with perceived stress.

Perceived sources of Stress

Potential stressors were divided into three categories: academic, social and psychological and health related. Most common potential stressors were academic, like 'Exhaustive syllabus (80%), 'Less time and attention from teachers' (76.9%), 'Worry about future career' (56%), 'Tough examination and difficulty in passing' (49.8%), whereas 'Own expectation of becoming doctor (60.9%)''Lack of recreation(51.1%)' 'Political environment in the college (42.2%)', 'Lack of proper living facility in hostel' (42.2%), 'Feeling lonely' (38.2%), 'Living away from home' (37.8%) were common potential stressors within social and psychological category as reported by the students. Major health related potential stressors were 'Inadequate quantity and quality of food in hostel' (54.7%) and 'Sleeping difficulty' (39.1%) **(Table 1)**.

Determinants of Stress

In bivariate analysis, it was observed that among the academic stressors, 'Competition among students' (p=0.000), 'Language problem' (p=0.004), 'Multiple examinations' (p=0.009), 'Less time and attention from teachers'(p=0.012) ,'Tough examination system difficulty in passing'(p=0.032) and 'Worry about future career'(p=0.041) were found to be significantly associated with stress (Table 1). Academic performance (p=0.001), which was determined by 'passing or failing in last university examination' was also found to be associated with stress.

Statistically significant social and psychological stressors were 'Relationship problem with partner/ love affairs' (p=0.000), 'Maladjustment with friends' (p=0.000), 'Living away from home' (p=0.000), 'Political environment within campus' (p=0.001), 'Feeling lonely' (p=0.010), 'Lack of recreation' (p=0.049) and 'Family problems' (p=0.039).

Among health-related stressors, 'Health problems' (p=0.026)'and 'Sleeping difficulties' (0.004) were found to be statistically significant.

In binary logistic regression model, all those stressors found significant in bivariate analysis were entered and adjusting all variables in the model 'Relationship problem with partner/love affair', 'Quarrel/maladjustment with friends', 'Living away from home', 'Competitive environment', 'Lack of attention and time from teachers' were the determinants of perceived stress among undergraduate medical students **(Table 2)**.

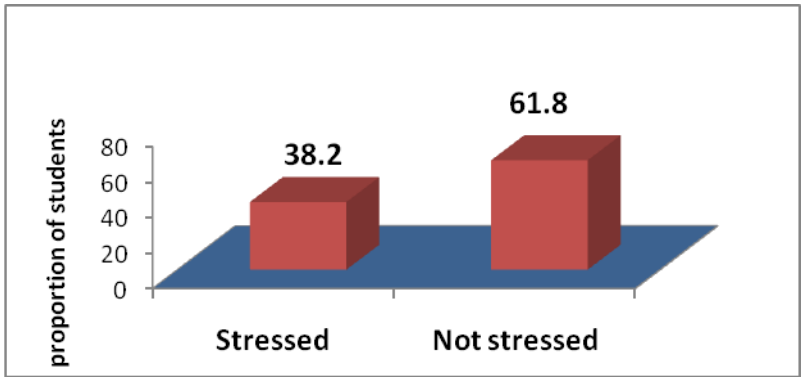

Figure No.1: Level of Perceived Stress among Undergraduate Medical Students (N=225)

Table No. 1: Source of perceived stress among undergraduate medical students: Bivariate Analysis (N= 225)

Stressors	Frequency (%) (always/often)	P value	Odd's ratio 95% CI level
Academic			
1. Exhaustive syllabus	180(80)	0.113	0.870-3.741
2. Multiple examinations	**100(44.4)**	**0.009**	**1.194-3.571**
3. Tough examination system and difficulty in passing	**112(49.8)**	**0.032**	**1.051-3.315**
4. Poor classroom teaching	73(32.4)	0.404	0.721-2.256
5. Academic performance result of last university examination			
Passed	**187(83.1)**	**.001**	**1.662-6.675**
Failed	**38(16.8)**		
6. Problem with language	**75(33.3)**	**0.004**	**1.316-4.117**
7. Competition among students	**82(36.4)**	**0.000**	**2.338-7.449**
8. Worry about future career	**126(56)**	**0.041**	**1.025-3.115**
9. Poor practical /clinical posting guidance and performance	91(40.4)	.254	.848-1.867
10. Less time and attention from teachers	**179(79.6)**	**.012**	**1.24-5.689**
Social and Psychological			
11. Lack of proper living facility in hostel	95(42.2)	0.202	0.826-2.477
12. Living away from home	**85(37.8)**	**.000**	**1.973-6.145**
13. Relationship problem with partner/love affair	**66(29.3)**	**0.000**	**2.725-9.333**
14. Quarrel /maladjustment with friends	**57(25.3)**	**0.000**	**2.625-9.525**
15. Feeling lonely	**86(38.2)**	**0.010**	**1.185-3.585**
16. Monetary problems	28(12.4)	0.342	0.663-3.266
17. Parent's expectation	81(36.0)	0.085	0.934-2.845
18. Own expectation of becoming a doctor	137(60.9)	0.156	0.858-2.604
19. Family problems	**63(28.2)**	**0.039**	**1.033-3.374**
20. Lack of recreation	**115(51.1)**	**.049**	**2.157-6.839**
21. Political environment in the campus	**95(42.2)**	**.001**	**1.427-4.295**
Health Related			
22.Health problems	**84(37.3)**	**0.026**	**1.079-3.268**
23.Substance abuse	65(28.9)	0.772	.505-1.662
24. Inadequate quantity and quality of food	123(54.7)	0.876	0.607-1.797
25. Sleeping difficulties	**88(39.1)**	**.004**	**1.3-3.935**

Table No.2: Adjusted Odds Ratios Predicting Stress among Medical Students by Selected Social, Personal and Academic Variables: Binary Logistic Regression Model

Correlates	P value	Adjusted Odds Ratio (95% CI)
1. Multiple examinations	.086	.915-3.873
2.Tough examination system and difficulty in passing	.347	.679-3.012
3.Academic performance Failed	.088	.893-5.175
passed	1	
4.Problem with language	.240	.738-3.374
5.Competition among students	**.012**	**1.228-5.268**
6.Less time and attention from teachers	**.034**	**1.08-7.058**
7.Worry about future career	.335	.344-1.438
8.Living away from home	**.010**	**1.292-7.410**
9.Relationship problem with partner/love affair	**.002**	**1.599-8.025**
10.Quarrel /Maladjustment with friends	**.011**	**1.290-7.410**

11.Feeling lonely	.685	.543-2.534
12.Family problems	.915	.408-2.234
13.Lack of recreation	.973	.335-3.101
14.Political environment in the college	.386	.514-5.606
15.Health problems	.215	.756-3.456
16.Sleeping difficulties	.710	.388-4.020

Omnibus Tests of Model Coefficients: Chi-square value: 92.534, d.f=16, p=.000

Discussion

Throughout the world, studies have been conducted on stress in medical education though the settings and instruments used vary widely which limits the comparability of the current study with them. In the present study, PSS 10 has been chosen as an instrument to assess the stress among medical students by authors as it is brief, easy to apply and has been documented by its reliability and validity. [17,22-27] It has also been found to have equivalent psychometric properties as PSS-14 recommended by Cohen and William and used in other studies.[17,18]Moreover, it can also be applied to a wide range of settings, different subject types and includes item measuring reaction to stressful situations and also measure of stress. [17, 20-22]In spite of that, few studies among medical students using the above instrument have been reported in literature so far.

In the present study, 38.2 % of students were found to be stressed which was much lower than another Indian study conducted in Medical College in Mumbai (73%).[9] Cohen PSS 14 has been used in Pakistan study[18] which showed that mean PSS score was above the operational cut off point of 'stressed' and 'not stressed'. In the present study, mean PSS score was below the cut off. The Thai study showed that 61.4% of students at Thai Medical School had come across some degree of stress calculated by Thai Stress Test.[28] Abdul Ghani reported higher stress level (63%) using Kessler 10 Psychological Distress Inventory. [29]

Prevalence of stress was also found to be higher in studies conducted in Egypt (43.7%) [30] and Malaysia (41.9%). [31] Study conducted in forth year medical students in three universities in UK found stress among 31.2% of students, proportion lower than that of the present study. [32] The Nepal study also showed lower prevalence of psychological morbidity (20.9%) using General Health Questionnaire (GHQ) among medical students than that of the present study.[19]

Similar to The Pakistan study (18), present study also found higher mean stress score among female students compared to their male counterparts. Studies in Saudi Arab and Egypt also reported more stress level among female students compared to their male students.[19, 29] However, Cohen reported no significant difference in stress using PSS between male & female students.[22]Studies in Europe and Australia, found no gender difference in stress among medical students, too.[32-34] The possible reason behind this disparity was difference in social status of women in the developing and developed world.

Present study has shown no association between stress level and year of study. However, previous studies have demonstrated increase in stress level with increasing year of studies.[9,29, 34,35]. But Guthrie showed that stress decreased on subsequent year from first year. [36] This disparity can be due to cross sectional nature of study, difference in the instrument used and overall lower stress level in current study.

In the present study, the sources of stress as reported by students were both academic and psychological which corroborates the findings from other studies. [9,18,29] It was found that 80% of students perceived 'exhaustive syllabus' as the cause of stress in present study. Other studies corroborated the finding. [9,18,29]. 'Vastness of syllabus' is always a common problem in medical education in background of rapidly growing knowledge load in medical science. The problem can be overcome by regularly updating the medical curriculum, clearly demarcating the 'Must know area 'of curriculum along with regular training, retraining and assessment of medical teachers.

Previous studies reported that examinations were common source of stress among medical students which conforms current study finding.[9,17,18,28,31,36] Although examination is necessary for evaluation of students, the examination could be made more simple and less stressful by sticking to strict norm and regulation with monitoring and keeping conformity with syllabus.

Similar to the Nepal study [19], academic performances were found to be negatively associated with the stress level in the present study. However, Pakistan and Saudi Arab studies found no relation of academic performances with the stress. [18,39]

In the present study, psychological and social factors like 'Living away from home', 'Improper living conditions in hostel', 'Relationship problem with partner or love affair', 'Feeling lonely', 'Lack of recreation', 'Own and parental expectations of becoming doctor' were found to be important sources of stress. These findings corroborate those of previous researches. [9,19,28,37]

One important finding is that more than 1/3rd of students reported disturbed political environment within the college as one of the perceived sources of stress and this factor was also found to be statistically significant in bivariate analysis. The college and university administration must take necessary steps so that political turmoil would not be able to affect the

standard medical teaching and safety of students with in campus.

In binary logistic regression (BLR) model, 'Competition among students', 'Less time and attention from teachers', 'Relationship problems', 'Living away from home' and 'Quarrel/Maladjustment with friends' were found to be statistically significant determinants of stress in the p 56 study.

One of the novel finding which was revealed by our study that 'Less time and attention from teachers' was an important determinant of stress among students in BLR model. The study has been conducted in a rural medical college of West Bengal, where most of the teachers have to spend considerable amount of time for travel and there is huge patient load in hospital. May be these factors are responsible for 'Less time and attention' of teachers for medical teaching. The university and college administration must take initiative to rethink and restructure medical education system by giving emphasis on regular monitoring of quality and schedule of teaching.

Love affair, relationship problem and maladjustment with friend are natural as far as the age is concerned, but in the background of competitive environment and huge academic pressure this natural phenomena may become stressful. Medical schools in United States and Canada have initiated health promotion programmes and have reported positive results in reducing the negative effects of stress upon health and academic performances of medical students.[2,29,38] Similar approach can be adopted with logical indigenous modifications in medical colleges in West Bengal. Proper positive coping strategies and methods of stress management could be incorporated in the curriculum.

'Lack of recreation' was also found to be an important stressor by authors. The existing recreational facility must be strengthened, refined and encouraged by teachers and medical administration. Planning of healthy recreational facilities for both male and female students like sports, cinema, excursion, gymnasium etc could be considered during curriculum planning.

Limitations

The current study has many limitations. Firstly, the chance of non- response bias could not be excluded inspite of high response rate. A few possible reasons for non-participation were the sensitive and personal nature of the study and the students being out of station. It would have been better if interview of a sample of non-responders could be taken regarding their stress level and psychological status.

Secondly, the cross sectional nature of study did not establish cause effect relationship between stressor and stress. Thirdly, qualitative research was not considered in our study which might have added more valuable information to this sensitive problem. Finally, the current study did not explore the coping behaviour of the students, which would have provided more insight of the problem.

Further in depth, prospective studies, involving other medical colleges of the state is necessary to understand the whole gamut of the stress related problems and their determinants.

6. Conclusion

The current study revealed that more than one –third undergraduate students were stressed and female students had higher stress level than male students. Most of the stressors were found to be related to academic and psychosocial domains. Initiatives must be taken by college and university authority for regular logical reorientation of medical curriculum and correct implementation of it. Teachers should be more involved in curriculum planning and implementation to ensure healthy student –teacher relationship. The need of implementing health promotional measures for students to cope with stress in the form of healthy recreational facilities like sports, cinema, and excursion should be seriously considered. Further in-depth studies, involving other medical colleges are required on this vital issue.

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