

Stress and Depressive Symptoms among Undergraduate Medical Students of Different Professional Years at a Medical College in Northern India- A Cross-sectional Study

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ABSTRACT

Introduction: Medical students are exposed to tremendous pressure, leading to stress, depression and other psychiatric disorder at increasingly higher rates. The stress and depression can affect their learning and can lead to poor quality of life. The students of different professional year may have differing reasons for being under stress and in depression. Assessing stress and depression in students of different professional years may provide better insights, and help policy makers plan appropriate interventions.

Aim: To measure and compare the prevalence and severity of stress, various aspects of life affected by stress and depressive symptoms among medical students of various professional years.

Materials and Methods: A cross-sectional study was conducted from February 2018 to January 2019; on 150 undergraduate medical students (50 each from 1st, 2nd and 3rd professional year) of a medical institute in Northern part of India. Mini International Neuropsychiatric Interview (MINI version 5) was used to screen

for depression, Student's Stress Dimension Questionnaire (SSDQ) was used to assess for stress prevalence and severity and to find the various aspects of life affected by stress and Hamilton Depression Rating Scale (HAM-D) was used to measure the severity of depressive symptoms. Chi-square test and one-way Analysis of Variance (ANOVA) was used to make the group comparisons.

Results: Overall stress and depressive symptoms were present in 66.67% and 52% of the participants, respectively. The three groups also differed significantly in the total score of SSDQ ($H=13.664$, $p<0.05$) and HAM-D ($H=11.352$, $p<0.05$) with first professional year students having higher scores than second and third professional year students. Domain wise comparison of SSDQ also showed higher prevalence and severity of impaired domains in first professional year students.

Conclusion: Special care must be taken of the medical students. Interventions addressing stress and depression should be initiated from first professional year students itself.

Keywords: Stress domains, Stress management, Student stress dimension questionnaire

INTRODUCTION

Stress and depression are common among medical students. While stress can sometimes be beneficial to the student for improving performance, its long-lasting effect can be damaging both psychologically and physically [1]. Various factors causing stress (stressors) could be related to student's campus life, academic pressure, interpersonal problems with peers and teachers among others [2]. In various studies, 25%-90% of medical students have been found to be stressed [3-5]. In a meta-analysis, including a sample size of 62,728 medical students the prevalence rate of depression among medical students was found to be around 28.0% [6]. Stress, can further lead to depression or other psychiatric disorders or may act independently as morbidity factor [7].

Stress and depression are also responsible for a significant number of suicides in medical students every year [8]. These may be responsible for poor academic function, low self-esteem and overall a poor quality of life [9]. So, identifying and managing even the milder form of stress and depression may be important. With regard to pharmacotherapy, it has been shown to be useful in milder and severe cases but the persistence of effect may not be long lasting. Psychotherapy, may have longer lasting effects, compared to antidepressant [10]. These management approaches, to stress and depression require their adequate characterisation among medical students as the needs of students in different professional years may be different [11,12].

While many studies have been done on the topic of stress and depression, among medical students, only few [12,13] have tried

to compare the stress profile and depression among students of different professional years. There is a steady increase in stress among medical students of different semester and academic pressure is the stressor [12]. As the students are first human being, living in the society and attached to family, all other factors in addition to academic curriculum may be the source of stress. So, students stress needs to be seen more comprehensively and to be compared professional year wise. Such comparisons may provide greater insight into this problem and can be helpful in better guiding our resources in policy making. So, with this aim a study was conducted to compare the stress profile and depression among students of different professional years.

MATERIALS AND METHODS

A cross-sectional, observational study was conducted, in a period from February 2018 to January 2019, among undergraduate medical students, at a Medical College in Northern part of India. The study was approved by the Ethical Committee of the Institute (Letter No. Dean/2018/EC/500).

Inclusion and Exclusion criteria: Students enrolled in Bachelor of Medicine and Bachelor of Surgery course (MBBS) at the institute, studying in any year were recruited in the study. Consenting students were included only when they didn't have to face an exam for at least next one month. If they had examination within one month they were encouraged to participate, after finishing all their exams, for that period. Those students who had completed

the final year MBBS examination, and were in internship, and those who were not willing to give written informed consent, were excluded from the study. The students having chronic or severe medical illness like tuberculosis, uncontrolled diabetes mellitus, asthma, severe anaemia, cancer, Human Immunodeficiency Virus (HIV), etc., and those having diagnosed and currently symptomatic psychiatric disorders like psychotic, bipolar disorder etc., which would make the participation in the study difficult, were excluded from the study.

Sample size calculation: For calculation of sample size, the prevalence of stress and depression were taken at 51% and 39% respectively, as mentioned in a recent systematic review [13] on the topic, the level of significance (α) equal to 0.05 and bound of error 5% (deviation from the actual value), the estimated sample size calculated for the given prevalence at 95% confidence interval was 150.

Singh A et al., has recently published a paper from the sample project on the same populations in 2020 with the aim to compare stress severity among depressed and non-depressed medical students [14]. The study was done on undergraduate medical students, using the tools of Student's Stress Dimension Questionnaire (SSDQ) and HAM-D. In the study, it was found that though depressed students had higher stress a significant number of medical students were there who had no or mild depressive symptoms but had significantly high stress in their lives.

Tools for Assessment

Semi-structured socio-demographic profile proforma: To record the necessary socio-demographic information like age, sex, monthly income, education, domicile, religion and professional year. Socio-economic status was recorded as per modified Kuppuswamy's socio-economic scale [15].

MINI version 5 (MINI-5): Screening questions were used to screen and identify psychiatric disorders, among the participants [16].

SSDQ: It is a self-rated questionnaire, available and validated in both Hindi and English language, to assess common psychosocial factors implicated in causing stress in students. It has total of 93 items grouped under 10 domains: physical, personal, interpersonal, educational, social, behavioural, familial, stress coping, physical and sexual abuse, mood and thought domain. It effectively identifies the common daily stressors in that domain. Scale has high reliability and adequate internal consistency. Each domain, has different number of questions, with personal domain having maximum of 17 questions and social domain having least, with 4 questions. The scoring is done on a Likert scale with response options of 'no', 'may be' and 'yes' and with a score of 0, 1, 2, respectively, provided for each question in the scale. When the score is equal to or more than 40% of the maximum possible score for that domain, that domain is considered as impaired. If score is less than 40% of the maximum possible score for that domain, than it is considered no impairment. The person is taken as stressed, if there is impairment even on a single domain out of the 10 domains of SSDQ. Percentages in all the domains are added to find out cumulative stress index which is a stress severity index. All the items rated 2 are defined as independent stressor which in itself produce significant stress in the life of that person in that area. Items rated 1 are dependent stressors means those can accumulate and produce significant stress even in absence of independent stressor [17].

HAM-D: The Hamilton Rating Scale for Depression was written in the late 1950s by M. Hamilton. The first 17 items measure were used to detect the severity of depressive symptoms. Score of more than 7 was taken as depression [18].

Study Procedure

Students were encouraged to participate in the study through mouth-to-mouth publicity and banners were also stuck on the walls

to encourage the students to participate in the study. Study was done in the Department of Psychiatry at the Institute. Students who came for participation met the trainee psychiatry junior resident. The junior resident had received prior training for the application of the scale and applied these tools under the supervision of consultant psychiatrist. Once the student came for participation, written informed consent was taken and inclusion and exclusion criteria were applied. After the inclusion in study the student was interviewed for socio-demographic profile and clinical history. Then their physical examination was done and they were screened on MINI-5 for diagnosis of depression. Further SSDQ and HAM-D were applied to assess the severity of stress and depression.

STATISTICAL ANALYSIS

Data was analysed using Statistical Package for the Social Sciences (SPSS) Statistic version 22.0 (IBMSPSS Statistics, New York, United States). Descriptive statistics was used for socio-demographic and clinical parameters. Normality of data was assessed using Shapiro Wilk test. Chi-square test and one-way ANOVA was used to make the group comparisons. All tests were two-tailed. The value of $p < 0.05$ was considered as statistically significant.

RESULTS

There were 50 subjects in each of the study groups, 1st professional year, 2nd professional year, and 3rd (prefinal and final) professional year. The prevalence of stress was found among 66.67% of the participants and 14.67% of the participants had depression based on MINI-5. Mild depressive symptoms were found in 36.67% of the participants and 15.33% of the participants were having moderate to severe depressive symptoms, as characterised on HAM-D. [Table/Fig-1] shows category-wise distribution of stress and depression prevalence.

Variable	1 st Professional year (n=50)	2 nd Professional year (n=50)	3 rd Professional year (n=50)	Total N (%)
Stress (SSDQ)				
Present	40 (80%)	34 (68%)	26 (52%)	100 (66.67%)
Absent	10 (20%)	16 (32%)	24 (48%)	50 (33.33%)
Depression				
MINI-5	11 (22%)	8 (16%)	3 (6%)	22 (14.67%)
HAM-D				
None	11 (22%)	29 (58%)	32 (64%)	72 (48%)
Mild	27 (54%)	13 (26%)	15 (30%)	55 (36.67%)
Moderate-severe	12 (24%)	8 (16%)	3 (6%)	23 (15.33%)

[Table/Fig-1]: Prevalence of stress and depression according to different professional years.

SSDQ: Student stress domain questionnaire; MINI: Mini-international neuropsychiatric interview; HAM-D: Hamilton depression rating scale

Mean age of the subjects in the 1st Professional year group was 19.32 (SD 1.13), 2nd Professional year group was 20.32 (SD 1.15) and 3rd Professional year group was 22.66 (SD 1.49). Male subjects in the 1st Professional year group were 60%, 2nd Professional year group were 80% and 3rd Professional year group were 66%. Majority of the subjects in each group were hostellers. Majority of the subjects in each group were Hindus and belonged to middle socio-economic status. Substance use ever reported in the 1st Professional year group was 10%, 2nd Professional year group was 18% and 3rd Professional year group was 20%. Family history of Psychiatric illness present in the 1st Professional year group was 24%, in 2nd Professional year group was 8%, and in 3rd Professional year group was 4%. History of Psychiatric illness present in the 1st professional year group was 6%, in 2nd professional year group was 8%, and in 3rd professional year group was 4%. History of psychiatric consultation present in the 1st professional year group was 8%, in 2nd professional year group was 2%, and in 3rd professional year group was 2%.

No significant group differences were seen on comparison of the three groups except for the age which was significantly more in 3rd Professional year group ($H=91.139$, $df=2$, <0.05) and the family history of psychiatric illness which was significantly more in the 1st Professional year group (10.606 , $df=2$, <0.05) [Table/Fig-2].

Variable	1 st Professional year n=50	2 nd Professional year n=50	3 rd Professional year n=50	Chi-square/ One-way ANOVA Test Statistics, (df), p-value
	Mean±SD [†] or Frequency (%)	Mean±SD or Frequency (%)	Mean±SD or Frequency (%)	
Age (Years)	19.32±1.13	20.32±1.15	22.66±1.49	91.139, (2), <0.05*
Gender				
Male	30 (60%)	40 (80%)	33 (66%)	4.896, (2), 0.086
Female	20 (40%)	10 (20%)	17 (34%)	
Residence				
Hosteller	47 (94%)	48 (96%)	48 (96%)	0.300, (2), 0.861
Day scholar	3 (6%)	2 (4%)	2 (4%)	
Religion				
Hindu	47 (94%)	48 (96%)	47 (94%)	0.264, (2), 0.876
Others	3 (6%)	2 (4%)	3 (6%)	
SH[‡]				
Yes	5 (10%)	9 (18%)	10 (20%)	2.083, (2), 0.353
No	45 (90%)	41 (82%)	40 (80%)	
SES[§]				
Higher	7 (14%)	3 (6%)	3 (6%)	3.666, (4), 0.453
Middle	42 (84%)	44 (88%)	44 (88%)	
Lower	1 (2%)	3 (6%)	3 (6%)	
FH				
Yes	12 (24%)	4 (8%)	2 (4%)	10.606, (2), <0.05*
No	38 (76%)	46 (92%)	48 (96%)	
PH[¶]				
Yes	3 (6%)	4 (8%)	2 (4%)	0.709, (2), 0.701
No	47 (94%)	46 (92%)	48 (96%)	
PPC^{**}				
Yes	4 (8%)	1 (2%)	1 (2%)	3.125, (2), 0.210
No	46 (92%)	49 (98%)	49 (98%)	

[Table/Fig-2]: Comparison of socio-demographic profile and clinical variables among students of different professional years.

*Statistically significant at $p \leq 0.05$; [†]SD: Standard deviation; [‡]SH: History of any substance consumed ever in life time; [§]SES: Socio-economic status classified according to modified Kuppuswamy's socio-economic scale; ^{||}FH: Family History of psychiatric illness in any of the family member or relatives; [¶]PH: History of any psychiatric disorder; ^{**}PPC: History of psychiatric consultation

Variable	1 st Professional year (n=50)	2 nd Professional year (n=50)	3 rd Professional year (n=50)	One-way ANOVA Test Statistics, (df), p-value	Post-Hoc Bonferroni $p < 0.05$ (two tailed)
	Mean±SD	Mean±SD	Mean±SD		
Physical	27.0600±13.632	20.0800±11.331	19.040±11.446	6.407, (2), <0.05*	I>II>III
Personal	35.1600±12.817	25.900±13.680	22.240±11.368	13.838, (2), <0.05*	I>II>III
Inter-personal	29.4800±13.858	27.460±14.868	23.320±12.508	2.597, (2), 0.078	I>II>III
Social	42.0000±17.956	32.600±17.474	29.800±16.962	6.691, (2), <0.05*	I>II>III
Behavioural	34.040±15.733	30.600±20.022	20.940±12.014	8.727, (2), <0.05*	I>II>III
Family	14.320±9.318	13.660±12.978	9.440±6.360	3.556, (2), <0.05*	I>II>III
Physical and sexual abuse	7.420±8.224	8.940±12.941	3.520±4.616	4.572, (2), <0.05*	II>I>III
Stress coping	35.140±15.331	27.060±14.521	25.860±11.832	6.521, (2), <0.05*	I>II>III
Mood and thought	31.520±17.093	22.700±12.521	26.22±11.077	5.172, (2), <0.05*	I> III> II
Educational	41.040±16.632	34.420±16.590	27.220±10.713	10.750, (2), <0.05*	I>II>III
Mean cumulative SSDQ[†] score	297.640±93.896	243.320±91.905	249.660±93.410	13.664, (2), <0.05*	I>II>III
MINI-5[‡] Depression	11 (22%)	8 (16%)	3 (6%)	2.650, (2), 0.074	I>II>III
HAM-D[§]	10.9200±4.767	7.7800±4.594	7.080±3.379	11.352, (2), <0.05*	I>II>III

[Table/Fig-3]: Comparison of impairment of different domains of SSDQ, MINI-5 diagnosis of depression and total HAM-D score among students of different professional years.

*Statistically significant at $p \leq 0.05$; [†]SSDQ: Student stress dimension questionnaire; [‡]MINI-5 Mini international neuropsychiatric interview; [§]HAM-D Hamilton depression rating scale

On comparing the SSDQ Domain wise and SSDQ total score, significant group differences were seen between the three groups in majority, with 1st professional year group having more score than 2nd professional year which in turn had higher scores than 3rd professional year group, except for the physical and sexual abuse domain in which score of 2nd professional year was higher than 1st professional year group, which in turn had higher score than 3rd professional year group and in mood and thought domain in which 1st professional year group had higher score than 3rd professional year group which in turn had higher score than 2nd professional year group. No significant group differences were seen in Inter-personal domain. The three groups also differed significantly in the HAM-D total score ($H=11.352$, $df=2$, $p < 0.05$) [Table/Fig-3].

DISCUSSION

The study was done with an attempt to systematically assess stress and depressive symptoms among medical students of different professional years. A comparison was made between stress profile and depressive symptoms among students of different professional years, so that the genesis of these conditions in medical students can be better understood. This was the first study from medical college which assess stress and depressive symptoms extensively in all domains of life and provides important data for inclusion, in policy making for mental health condition of medical students.

In the present study, a high prevalence of stress (66.67%) and depressive symptoms (52%), among medical students was found. Depression diagnosable as an illness, was found in 14.67% of the medical students on MINI-5 interview. Although majority of the studies, report a generally higher rate of prevalence [19-22] of these two conditions, among medical students, a few report lower rates [23-25]. A systematic review, done recently on the subject of psychological morbidities among medical students from India, found the pooled prevalence rate of stress at 51.3% (95% confidence intervals: 42.8%-59.8%) and the pooled prevalence rate of depression at 39.2% (95% confidence interval: 29.0%-49.5%) [13]. These findings suggest, medical students at the medical college in which present study was done to be more stressed and having higher depressive symptoms, than most of the other medical colleges in India.

In the present study, stress and depressive symptom prevalence and severity decreased with increasing professional year. This is line with few other studies [26-28], though a few suggest high prevalence of stress and depression among first and third professional year as compared to second professional year [29]. In other studies, they have found higher prevalence of stress and depressive symptoms

among final professional year medical student than among first and second year [30-32]. Family history of psychiatric illness was significantly high in first professional year student, which can act as a significant risk factor for the students to develop stress and depression from early on their career as medical student.

In the present study, among first professional year students stress was higher in physical, personal, social, behavioural, family, stress coping, mood and thought and educational domain of SSDQ as compared to second and third professional year students. This would translate to a higher difficulty that first year medical students have to face in their social life, less help seeking behaviour from others when in any problem, difficulty dealing with peers, difficulty dealing with course curriculum, higher low self-esteem and difficulty in expressing oneself, more recent break up with romantic love interest, difficulty in their current relationship, their nonaccomplishment with number of friends they have, difficulty trusting others, higher dissatisfaction with home life, less support of family members in studies, less pocket money received from parents/guardians and minimal communication with their family members. All these, reasons for stress showed a declining trend with increasing seniority at medical school. This could be explained by sudden change in their social scenario, peer pressure, difficulty in coping with hostel-environment and living away from home for the first time severely impact their stress level.

In one study [12], the authors reported higher stress scores in final year medical students as compared to initial year and cited the reason as the uncertainty about future their future which creeps in as medical students have to face highly competitive post graduate entrance examinations. However in this regard, the scale used by the study more specifically assessed stress in educational domain as compared to SSDQ which was used in present study so stress was studied more comprehensively. In present study, though majority of the students included in the study were hostellers, drastic change in curriculum from higher secondary and intermediate school and pre-medical test preparation to MBBS curriculum also adds to this pressure. So, students suddenly feel overburdened and exhausted with this change in social scenario and curriculum. They have to modify their study pattern, which many students face problems adjusting. Also, slower adaptation to these processes leads to lower stress and depression with increasing seniority.

Also, the relatively older studies done in 1980's and 1990's [33,34] have quoted lesser rates of stress and prevalence of depression compared to newer studies on the topic [28-32]. It can be hypothesised, that with time, demands of medical education has considerably increased. The curriculum has become more difficult. Also, in previous years, MBBS in itself was considered self-sufficient as degree and post-graduation was considered optional. Scenario has changed gradually and in current times, specialisation and super-specialisation has become a dictum for fetching good jobs and for a doctor to remain in demand in the society. It could be hypothesised that with this change stress and depression has increased in prevalence from earlier.

The various sources of stress and depression, quoted in various studies include- inability to cope with the vast curriculum, repeated examinations, academic performance, high expectations of the parents, teachers, and patients, and time constraints for pursuing their alternate interests, staying in a hostel, drug abuse and family history of depression [6,13,26].

The use of SSDQ scale in this study enabled an assessment of the individual's perception, of common daily stressors holistically across the broad range of life domains (not just focused on education and career oriented), both quantitatively and qualitatively. In the present study, stress could be assessed and compared, more comprehensively than the previous study on the subject in which

the authors have used higher education stress inventory which is a 33 statement, 4 point-Likert scale mainly focus on the course induced stress. Other aspects of stress are relatively ignored. It may be because of this fact, they found increasing stress with increasing seniority, maximum in final semester [12]. Also, the use of MINI version 5 screening questions for depression and then the detailed assessment on HAM-D was a major strength, as previous studies on the topic have assessed depression on the basis of self-reported questionnaire which have lower reliability and validity than present study tools.

Limitation(s)

The present study had some limitations. A sample of convenience was chosen rather than a randomised sample. The study was cross-sectional in nature, depression and stress level as measured may depend on situation the students were exposed to at the time of assessment. Absence of control group with a study population from different stream was another limitation. Also, in the study no assessment was done for other confounding factors which may lead to stress and depressive symptoms like subclinical hypothyroidism, mild anaemia, nutritional factors etc. The study results being derived from a single medical institution cannot be generalised to other populations. Also, the participants were not excluded for any stressful event they may had to face recently except for the exam, like any personal situation, any recent breakups, etc.

CONCLUSION(S)

Due to paucity of Indian literature on stress and depressive symptoms in medical students, the present study was an attempt to give more insight on these issues. The medical college students encounter a number of common daily stressors in their day to day life, which leads to high prevalence of stress and depressive symptoms, especially in their early career. If not dealt appropriately, it can only escalate and hamper their academic performance, emotional and social well-being. It is recommended that, sensitisation programs be directed towards these aspects also through various methods like group counselling and various other education programs, assigning medical teacher as their guardians starting early on, from first year itself to identify and help those in need, and further motivate them to seek assistance of mental health professional years to tackle stress and depression.

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