Perceived stress among medical students: To identify its sources and coping strategies

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ABSTRACT

Context: Stress in medical education is common and process-oriented. It often exerts a negative effect on their academic performance, physical health, and psychological well-being. **Aims:** This study aims at identification of such susceptible students in the early stage i.e. first year of medical education, and to provide them essential support in the form of an intervention program to lessen the negative consequences of stress. **Materials and Methods:** A cross-sectional survey was carried out among the First MBBS students of NKP Salve Institute of Medical Sciences and Research Center, Nagpur, India. A 41-item questionnaire was designed to assess the sources of stress and their severity. Likert's 5-point scale was used to quantify the extent of severity on each item. Coping strategies adopted by students were assessed by using a 22-item stress inventory, and a questionnaire based on 19 institutional stress-reducing factors was used to identify its role. **Results:** The survey resulted into an overall response rate of 87% (131 out of 150 students). Median stress level based on 41 items was evaluated for each student. About 29% (40 students) had median stress level greater than 3. Female students were more stressed (17.19%) than male students (14.93%). The study revealed that students generally adopt active coping strategies rather than avoidant strategies like alcohol and drug abuse. The study indicated that emotional support system is a major stress-relieving factor for students. **Conclusion:** Prevalence of perceived stress is high among medical students. It seems that academic-related problems are greater perceived stressors. Review of academics, exam schedules and patterns, better interaction with the faculty and proper guidance, intervention programs and counseling could certainly help a lot to reduce stress in medical students.

Introduction

The aim of medical education is to produce competent, physically and mentally strong health professionals, as they are going to be the pillars of future health care system. If they experience any obstacle at the beginning of their career, it may impede their overall professional development or even lead to change of profession. Stress is one of the most common and process-oriented obstacles in medical education. It often exerts a negative effect on the academic performance, physical health, and psychological well-being of the students.[1] Many previous studies have shown fairly high level of depressive symptoms amongst medical students.[2-4] Researchers have also worked on various factors inducing anxiety about professional future amongst students and doctors.[5] It has been observed that academic, physical, and emotional factors are greater perceived causes of stress in these students.[6] Studies have reported that academic constraints and factors like age, gender, ethnicity, and marital status influence students' severity of stress and hence their academic performance.[7-9] Identifying such susceptible students in the early phase i.e. first professional year of medical education and providing them essential support could be a useful intervention to lessen the negative consequences of stress in future.

At the NKP Salve Institute of Medical Sciences and Research Center, Nagpur (India), 150 students from different states of India are admitted every year. More than 50% of the students are from outside. They

have diverse cultural, socio-economic, and educational backgrounds and get exposed to a totally new learning environment with vast curriculum. This sudden change could be stress-inducing with varying degree of severity. Besides this, there could be other sources of stress that could hamper student's performance. Hence, information about the sources and the severity of stress is vital, as it could help in designing proper interventional strategies to enhance their learning abilities of students. In view of this, a study was undertaken with the objectives as below:

- Estimating the prevalence of perceived stress in first year MBBS students.
- Identification of various stress-inducing factors in these students.
- Correlating stress inducing factors to gender, stay, mother tongue, previous educational place, and choice of admission.
- Identifying coping strategies of students that relieves stress.
- Identifying institutional factors that could help in relieving stress and
- Educating students about managing academic failures and about various coping strategies.

Materials and Methods

Study design and participants

A cross-sectional survey targeting first year medical students of NKP Salve Institute of Medical Sciences, Nagpur, India was planned during December 2011. Prior approval was sought from the ethics committee of the institute. A structured questionnaire was designed to know the factors inducing stress (stressors) and their intensities, how students are coping with the stress, and institutional factors that could help in reducing the stress. The questionnaire was peer reviewed by 14 faculty members of Institutional Medical Education Unit (IMEU) before actual survey. Students were briefed about the purpose of study and the questionnaire. Informed written consent was obtained from all participating students. They were assured about the anonymity and confidentiality of responses given through questionnaire.

The questionnaire

The questionnaire was broadly classified into four categories: Demographics, Stress-inducing factors, Coping factors, and Institutional stress-relieving factors. Demographics mainly included personal information of student like age, sex, home town (state), local staying place at Nagpur, mode of travel and travelling time to college, medium of past education (whether regional language or English). These questions were intended to know about the background of each student.

The 41 stressors in the questionnaire were based on previous studies[6,10,11] and were modified according to study requirements. They were grouped into four categories: Academic, emotional, physical, and social. Likert's 5- point scale was used to capture the intensity of stress on each factor. The scaling ranged from 1 (Not stressful) to 5 (Severely stressful). Students were asked to respond to each stressor referring to this scale.

Tactics for coping with stress included 22 items. Even number of items had constructive tactics, while odd numbers had less constructive tactics. Students had to mark those tactics used by them to cope up with stress. Thus, the response on each coping factor was dichotomous.

The Institutional stress-reducing factors included 19 items, and the response to each was sought on 5-point Likert's scale with linguistic descriptors ranging from 1 (Very much useful) to 5 (Not helpful).

Data analysis

The descriptive statistic like median score and inter quartile range (IQR) was obtained for each stressor based on the responses of students on Likert scale. Also, the median score across all stressors was obtained for each student as an indicator of his/her stress level. The data on median scores of students was used to obtain percentage of stressed (median ≥ 3) and not stressed (median < 3) students. These percentages were also obtained according to levels of some key variables like Gender (Male/Female), Stay (Home/Hostel), and Choice of medical education (Own/Alternative). For each stressor, the equality of median values between the levels of each variable was tested using *Wilcoxon rank sum test*.

As regards coping strategies, the number and percentage for each were obtained based on the dichotomous responses. Strategies with at least 50% hits were regarded as the dominating ones. Such dominating strategies were also obtained according to levels of above key variables.

For each institutional stress-reducing factor, the median score along with IQR were obtained to determine the dominating factors as perceived by students.

Results

Demographics

Out of 150, 131 students with 64 (48.85%) male and 67 (51.15%) female students participated in the study. The non-participants were mainly absentees on the day of survey. Amongst these students, 39 (29.71%) were local students and 92 (70.23%) were hostel residents. As regards choice, 87 (79.1%) students opted for medical education as their first choice and for the rest, it was an alternative. The age of students ranged between 17 and 21 years with a mean of 18.5 years and standard deviation of 0.84 years. All participating students completed and returned the questionnaire, resulting into 87% response rate.

Level of stress

It was observed that out of 131 students, 40 (29.05%) were under stress with a median score of at least 3.0. The proportion of stressed male and female students was 14.93% and 17.19%, respectively. This difference was statistically insignificant. As regards 'Stay,' the proportion of stressed students residing in hostels was 17.39%, which was comparable to that of the day scholars (12.82%); and this difference too was statistically insignificant. Amongst the students who opted medical education as a first choice, the proportion of stressed cases was less (11.49%) as against those who unwillingly accepted the profession (33.33%). This difference was statistically significant with *P*-value of 0.024 ($P < 0.05$). The proportion of students who completed past education from rural places were more stressed (27.78%) as compared to those from cities or metros (12.87%), and the difference in proportions was statistically insignificant.

Table 1: Perceived stress level of each stress factor on students classified according to gender, stay, and choice of medical profession based on Likert 5-point scale

Stress Factors (Stressor)	Stress level							
	Overall		Gender wise median		Stay wise median		Choice wise median	
	Median	IQR	Male	Female	Home	Hostel	Own	Alternative
Competition for post-graduate seats (A) 4 3-4 4 4 # 4 4 # 4 4 # Academic competition with peers (A) 3 2-3 2 3 * 3 3 # 3 3 # Examinations and grades (A) 3 2-4 2 3 * 3 3 # 3 3 # Fear of failure in exam (E) 3 2-4 3 3 # 3 3 # 3 3 #								
Lack of time do to assigned college work (E)	3	2-3	3	3 #	3	3 #	3	3 #
Food in canteen and hostel (P)	3	2-4	2	3 *	2	3 *	3	3 #
Feeling that you do not have time for personal hobbies and sports (P)	3	2	2-4	3	2	2	2	2
Fine imposed as punishment from time to time (E)	2	2-4	2	2	2	2	2	2
College Timing (A)	2	1-3	2	3 *	2	2	2	2
Amount of assigned class work (A)	2	1-2	2	2	2	2	2	2
Quality of Teaching (E)	2	1-2	2	2	2	2	2	2
Receiving criticism about the performance from the teachers (E) 2 1-2 2 2 1 2 2 2 Lack of home atmosphere in living quarters or hostel (E) 2 1-3.25 1 2 * 1 2 * 2 2 Insecurity concerning professional future (E) 2 1-3 2 2 2 2 2 2								
Financial responsibilities (S)	2	1-3	2	1	1	2	2	2
Inconsistency of feedback on your work between different instructors (A)	2 2	1-2	2		2	2	2	2
Fear of being unable to catch up if behind (E) 2 2-3 2 2 2 2 2 2 Inapproachability of teaching staff (E) 2 1-2 2 2 1 2 2 2 Too many internal assessment exams (A) 2 2-3 2 2 2 2 2 2								
Every day travel to college and back (P) 2 1-4 2 1 3 1 2 2 Lack of quite surrounding /environment (E) 2 1-2.25 2 2 1 2 * 2 2 High expectation of parents for your performance (E) 2 2-4 2 2 2 2 2 2								
Conflict with colleagues (S)	2	1-2	1	1	1	1	1	1
Indifferent/Biased behavior of teachers (S)	2	1-3	2	2	2	2	2	2
Compulsion of uniform (E)	2	1-4	2	1	1	2	2	2
Inability to cope with tremendous amount of knowledge (A)	2	1.75-4	2	2	2	2	2	2
Relations with seniors (A)	1	1-2	1	1	1	1	1	1
Atmosphere created by the teachers (E)	1	1-2	1	1	1	1	1	1
Lack of confidence to be a private medical college (E) 1 1-3 1 1 1 1 1 1 Prohibition on the use of cell phones in the college campus (A) 1 1-2 1 1 1 1 1 1 Generation gap between teachers and students (A) 1 1-2 1 1 1 1 1 1 Confusion regarding change in profession (E) 1 1-5 1 1 1 1 1 1								
Personal physical health (P)	1	1-2	1	1	1	1	1	1
Concern about your physical appearance (E) 1 1-2 1 1 1 1 1 1 Lack of communication skill (A) 1 1-2 1 1 1 1 1 1								
Difficulty to cope with English medium (A) 1 1-2 1 1 1 1 1 1 Shortage of equipment / lab facilities (A) 1 1-2 1 1 1 1 1								
Inadequate library facilities, Timing, Internet, Books (A)	1	1-2	1	1	1	1	1	1
Family atmosphere (S)	1	1-1	1	1	1	1	1	1
Inadequate social support (S)	1	1-2	1	1	1	1	1	1
Getting involved in love affairs (E)	1	1-2	1	1	1	1	1	1

* P < 0.05 (S); # P > 0.05 (NS) but with high median score, A=Academic, E=Emotional, S=Social, P=Physical

Stressors and their severity

Out of the 41 stress-inducing factors, 6 factors emerged out as the most dominant ones with overall median score greater than 3, as shown in Table 1. The most stressful amongst all factors was the 'Competition for post-graduate seats' with a median rating of 4. The stress of competition was found equally high on males and females. Also, it was high amongst local as well as hostel students. Moreover, students who opted this

profession of their own were under equally high stress as compared to those who opted this as an alternative. The difference in the median rating values of levels of the variates was found statistically insignificant ($P > 0.05$). Another stressor, 'Academic competition with peers,' was rated high with a median score of 3. Females were under higher stress (median = 3) due to this factor as compared to males (median = 2). The difference in the median rating for gender was found statistically significant with *P*-value of 0.002 ($P < 0.05$). However, the median ratings were high and same across the levels of 'Stay' and 'Choice of profession.' 'Examination and grades' also showed high impact on students with median rating value of 3. Females seemed to be more concerned about their grades with higher median rating than that of males. This difference was found statistically significant with *P*-values of 0.004 ($P < 0.05$). This factor induced equally high stress amongst the levels of 'Stay' and 'Choice of profession.' For 'Fear of failure in exam' and 'Lack of time to do assigned work,' the stress induced across the levels of all the variables was equally high (median = 3). The last major concern for students was the 'Food in canteen and hostel' with median score of 3. Females were more stressed (median = 3) because of the quality of food than males (median = 2), and the difference in the median ratings of the two groups was statistically significant with *P*-value of 0.01 ($P < 0.05$). As regards 'Stay,' students residing in hostel were more worried (median = 3) about the quality of food than those staying in homes (median = 2). The difference in their median ratings was statistically significant with *P*-value of 0.045 ($P < 0.05$). The remaining factors did not induce much stress on the students as indicated by median ratings of less than 3.

Coping strategies

The yes/no response to each coping strategy given by students was used to evaluate which strategies are the most preferred ones for managing stress. Table 2 shows the strategies arranged in the decreasing order of number of hits. It is evident that nearly 75% of students use internet, TV, or listening music to get rid of stress. This emerged out as the most dominating coping strategy, which is equally preferred by males and females. Following this, 'Interaction with friends and use humor' was the next preferred coping strategy adopted by nearly 73% of the students. This strategy was also equally chosen by males and females. This was somewhat more practiced amongst hostel students (72%) as compared to locals (66%). Another highly preferred strategy was 'Seek out friends for conversation and support.' This was adopted by nearly 71% of students. The proportion of males and females following this strategy is almost the same. Few other strategies like 'Try to focus on things under control and accept thing not under control,' 'Take little time to relax, breathe and unwind,' 'Maintain healthy diet,' and 'Get involved in hobby or interest' were adopted by more than 50% of the students to relax themselves.

Table 2: Coping strategies adopted by students under stressed situation arranged in descending order		
Coping strategies	**Total**	**Percent**
I use internet/ TV/ music to relax.	99	75.57
I joke with my friends and use humor to take the edge off.	96	73.28
I seek out friends for conversation and support.	93	70.99

I try to focus on the things I can control and accept the things I can't.	86	65.65
I take a little time to relax, breathe, and unwind.	82	62.6
I maintain a healthy diet.	70	53.44
I get involved in a hobby or interests that help me unwind and enjoy myself.	69	52.67
I take some time off and get away from my working life.	66	50.38
I change my outlook on the problem and put it in a better perspective.	64	48.85
I just ignore the problem and hope it will go away.	62	47.33
I ignore my own needs and just work harder and faster.	60	45.8
I pray, meditate or enhance my spiritual life.	59	45.04
I go out shopping and buy something to make myself feel good.	49	37.4
I confront my source of stress and work to change it.	46	35.11
I sleep more than I really need to.	45	34.35
I get irritable and take it out on those around me.	43	32.82
I withdraw emotionally and just go through the motions of my day.	41	31.3
I worry about the problem and am afraid to do something about it.	36	27.48
I engage in some type of physical exercise.	35	26.72
I eat more than usual.	17	12.98
I take medicine to help me relax or sleep better.	13	9.92
I smoke a cigarette or drink a caffeinated beverage.	3	2.29
I drink more alcohol than usual.	0	0

Table 3: Institutional factors responsible for managing stress as perceived by students		
Institutional factors	**Median**	**IQR**
Interaction with your friends and group members	1	1-2
Personal hobbies like music, sports	1	1-2
Vacations and holidays	1	1-3
Departmental ambience of NKP SIMS and RC	2	2-3
Teachers' encouragement, affection, and care	2	1-3
Students scientific programs at college	2	2-4
Psychological reconditioning by teachers when needed	2	2-3
Help from senior students	2	1-3
Making new friends	2	1-3
Involvement in Annual College Gathering	2	1-3
Changes in academic environment, teaching, and learning	2	1-3
Change in curriculum	2	2-3
Various extracurricular programs at the college	2	1-3
Celebrating Friendship day, Valentine's day, Traditional day, Rose and chocolate day at college	2	1-4
Listening to music in various departments	2	1-3
College picnics	2	1-4
Relaxing at College canteen	2	1-4
Beautiful campus of NKP Salve Medical College and Research Centre	3	2-4
Participating in 3 days NSS Camp and other outreach activities	3	1-4

Institutional stress-reducing factors

The institutional factors contributing to stress reduction were rated by students on 5-point Likert scale. The median rating score along with the inter quartile range (IQR) for factors are shown in Table 3. It is evident that 'Interaction with friends and group members' could contribute most in reducing the stress, as indicated by median score of 1 and IQR ranging between 1 and 2. Also, students believe that encouraging 'Personal hobbies like music and sports' by institution could substantially help in managing the stress. These two factors were equally supported by both male and female students. In addition, 'Vacation and holidays' is highly preferred factor that assists in mind diversion from routine activities, thereby to release the stress. Female students have indicated this factor as highly stress-relieving as compared to that of males. Moreover, students residing in hostels have preferred this factor as highly effective in managing stress. Nevertheless, the difference in the median ratings across the levels of 'Gender' and 'Stay' was statistically insignificant for all the factors.

Discussion

In this study, we identified the causes of stress, their intensities, the most frequently adopted coping strategies, and institutional stress-relieving factors as perceived by first year medical students. The very obvious finding was that, nearly 29% of students are under stress due to one or more factors. A study from MCOMS, Nepal has also reported higher level of psychological morbidity in first year students as compared to second year (28.4% against 16.3%) among basic science students.[9] There are some other reported studies with overall proportion of stressed students ranging between 40% and 70%.[6,9,12-15] The stress was higher in females compared to males. This is in agreement with one study conducted in Pakistan where mean PSS (Perceived Stress Scale) for females was 31.94 as against males' score of 28.60.[14] In Indian scenario, higher stress in females could be because of their sensitive nature and the way of reacting to stressful situations. Out of the six dominating stress inducing factors identified through study, three factors *viz.* 'Competition for post-graduate seats,' 'Examination and grades,' and 'Fear of failure in exams' are in common with some of the previous studies.[6,13-15,16] 'Fear of failure,' which is a very serious concern to medical students, is mainly because of the enormous syllabus to be covered in a limited time. Many parallel academic activities make it difficult for students to manage their time effectively, which adds to their stress level. Besides, there is continuous flooding of information and knowledge in medical science, which indirectly adds to the stress level of students. Above all, the new environment, teaching faculty, and expectations from parents create social stress on students leading to fear of failure.[17] Students staying in hostel have more concern about the hostel environment, friends, and food facilities as compared to locals. Females get more stressed because of poor food quality compared to males.

As regards type of stress, the major contributors were academic followed by emotional stress as evident from Table 1. The identified academic stressors speak about anxiety of students about their professional future. Previous studies have also shown that academics is the common stress element among medical students.[6,13,15,16] This is an indicator to educationist and policy makers to revisit the examination process to make it less stressful. The physical and social factors induce lesser stress as perceived by students.

Coping strategies are defined as how a person reacts or responds to a stress.[18-21] Effective and appropriate coping strategy may minimize the impact of stressful situation on one's well-being. Coping strategies refer

to specific efforts, both behavioral and psychological, that people employ to master, reduce, tolerate, or minimize stress due to undesired events. 'Active coping' means taking action or exerting efforts to remove or circumvent the stressor, while 'Acceptance' means accepting the stressful event, 'Planning' consists of thinking about how to confront the stressor, 'Positive' reframing means making best of the situation by growing from it and 'Denial' is an attempt to reject the reality of stressful event and 'Behavioral disengagement' means giving up or withdrawing efforts to attain goal.[9]

Studies from United Kingdom have reported that coping strategies of medical students are generally 'use of alcohol, tobacco, and drugs.'[22-25] This study showed that students have adopted 'Active coping' strategies for releasing stress. We found that major coping strategies practiced by students were constructive, and they were in the form of mixing and joking with friends, turning to hobbies like sports and music, and use of television and internet. Only a handful of students had adopted strategies like taking medicines to sleep better (5.61%), smoking (2.21%), and none to alcohol consumption.

The study found that the major institutional stress-relieving factors as perceived by the medical students were 'Interaction with friends,' 'Personal hobbies like sports and music,' and 'Vacation and holidays.'

Dominant coping strategies adopted by students and institutional stress-relieving factors perceived by them suggest that emotional support system is a major stress relieving factor.

Regardless of the positive coping strategies pursued by students, the prevalence of stress is quite high. This calls for organizing an intervention program at the level of students, teachers, parents, and administrative authorities. Such programs would provide conducive learning environment, may give emotional support and help medical students to cope with the stressors, especially the academic ones. Few studies from US medical schools reported that an elective in 'Mind-Body medicine' and teaching stress management and self-care skills to medical students may be successful.[26,27]

At NKPSIMS and RC, Nagpur, one such mentorship-based program called 'ANUBANDH' has been initiated wherein one teacher is the mentor for a group of 10 students from Ist, IInd, and IIIrd MBBS. Each group meets once in a month and discusses curricular, co-curricular, and problems pertaining to institutional support system like food in canteen, personal health etc. As the group involves senior and junior students, it helps in minimizing inhibitions, solving problems, promoting healthy habits, and giving emotional support to each other. The impact and effectiveness of these intervention programs in reducing stress levels of medical students are recommendations for future research. Also, a longitudinal research could be helpful to investigate amount of stress during the academic career.

Conclusion

This study confirms the findings of other studies that the prevalence of perceived stress is high among medical students. 'Academic'-related problems are the greater perceived stressors. Review of academics and examination schedules and patterns, better interaction with the faculty and proper guidance, intervention programs and counseling for the stressed ones could help a lot to reduce stress in medical students. We have taken a step in this direction through 'ANUBANDH.' Anubandh is a mentorship program implemented in our institute to narrow down the teacher student gap. It was implemented in the year 2012, and hence we have not yet studied the results unless it will be implemented to the students of

all batches of MBBS. Rather, this is the limitation of this program as of now. Our further interest would be to follow these students during their academic career and evaluate the effectiveness of this novel intervention.

Authors' contribution

SG carried out the study and prepared the manuscript. SC designed the study and helped in preparing final draft of the manuscript and paper for submission. MG helped in administering the questionnaire.

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