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Evaluation of Examination Anxiety Status and its Associated Factors Among First Professional Medical (MBBS) Students

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Abstract

Medical education is highly stressful as compared to other professional courses. Examination related anxiety is the most suffered problem in medical students. The present study was planned to assess the exam related anxiety status, analyze factors causing exam anxiety and its correlation between males and females in 1st year M.B.B.S. students. A study using structured self administered questionnaire was carried out on 150 M.B.B.S. 1st Prof students. Survey questionnaire consisted of VAS (Visual analogue scale) to assess anxiety status and a questionnaire comprising of questions related to various factors contributing to examination anxiety. Students were subjected to VAS to assess baseline anxiety 2 months prior to examination and again readministered 1 week prior to 1st semester summative exam to assess exam anxiety along with questionnaire related to factors causing exam anxiety. Results of our study showed that the mean anxiety on VAS scale was 70.89 ± 14.55 and 63.91 ± 11.73 in females and males respectively prior to examination. Female students were found to be more anxious as compared to male students. The major factors reported by medical students contributing to exam anxiety were excessive course load (91.81%), lack of time to revise before exam (87.27%) and lack of systematic studies (80.90%), Parental expectations (80%) and lack of time for physical activity and extracurricular activities (78.18%). This study necessitates the need to take steps to recommend stress management techniques and bring reforms in learning and evaluation system to lower the stress in medical students.

Key words: examination, exam anxiety, stress, medical students

Introduction

Stress is defined as body's nonspecific response to demands placed on it in response to disturbing events in the environment. (1) Stress is a condition which puts mind in state of anxiety, fear, apprehension and worrying.

Medical education in India is very stressful and emotionally demanding for students. Medical students have to undergo a vast and complex curriculum which renders significant amount of stress on them. (2) The potential consequences of psychological stress among medical students range from an alarming amount of stress associated anxiety, depression, substance abuse and sometimes even to suicide. (3)

Medical students face stress at every phase of curriculum. Examinations are important part of medical curriculum and are necessary to motivate students to study, to check their potential to become a competent doctor and to achieve the desired goal of medical education. Examinations are often considered as tiresome and a stressful experience by the student's. Examination anxiety is one of the most widely suffered problems among medical students reported by many authors. (4, 5)

Exam anxiety is a set of responses that includes excessive worry, depression, nervousness and irrelevant thinking to a class of stimuli from an individual's experience of assessment and outcome. It is characterized with various somatic, cognitive and behavioral symptoms of anxiety in period of preparing and performing in exams. Further, exam related

anxiety has also shown to impair memory, concentration, decision making, learning and is associated with lower academic performance.(6,7)

Various factors like extensive curriculum, voluminous textbooks, pattern and frequency of evaluation, enormous content that has to be mastered in short period of time, competitive environment, need to get good marks and high parental expectations, etc have been reported to put tremendous amount of stress among the medical students before and during examination period.(8,9)

Several studies have observed that medical students have marked undue stress prior to and during examination period.(10,11,12) A previous study conducted on basic science medical students have reported prevalence of severe exam anxiety in 50% students.(13) The major areas of stress in medical students which can contribute to exam anxiety reported in literature include academics, social and psychological factors. (14)

Since perception of stress is frequently influenced by sociocultural factors, gender and educational system so the results of studies in one region cannot necessarily be generalized to the other. Hence we undertook the present study to evaluate anxiety status in 1st year medical students prior to their 1st semester summative examination, explore the sources of examination anxiety and to assess correlation of stress across male and female students. Awareness of exam anxiety and factors contributing to exam anxiety is very essential so that preventive interventions and stress management can be incorporated at the earliest of the course in order to enhance student's academic abilities and to improve their psychological health.

Material and methods

The present study was conducted on healthy volunteers of 1st year medical students of Maharishi Markandeshwar Medical College and Hospital, Solan. Ethical approval was obtained from institutional ethical committee before the commencement of the study. A total of 150 medical students of both sexes participated in the study. The data collection was done between a period of 3 months. The purpose and noninvasive nature of the study was explained and informed written consent was taken from the volunteers.

The Students were subjected to a survey questionnaire which consisted of 3 sections. The first section comprised of anthropometric variables and included age, sex, height and weight. The second section included the anxiety scale VAS (visual analogue scale) to assess exam related anxiety status. The third section of questionnaire comprised of questions related to factors causing examination related anxiety in three domains - academics related factors, psychosocial factors and lifestyle related factors

There were 2 steps involved in data collection. The students were first administered the survey questionnaire comprising of anthropometric parameters and anxiety scale 2 months prior to 1st semester examination in month of October to assess their baseline anxiety. The students were then again readministered anxiety scale 1 week prior to 1st semester summative examination in month of December to evaluate their pre-examination anxiety. Survey questionnaire consisting of factors contributing to examination related anxiety was also distributed 1 week prior to examination to assess sources of examination anxiety.

Different scales have been used to assess anxiety in medical students. The scale used in our study to assess anxiety in medical students was VAS (visual analogue scale). VAS is a validated subjective assessment tool used in research to assess subjective states like anxiety and pain.(15) VAS consists of 10 cm line, the ends of which are marked with signs indicating extremes of symptoms, ranging from 0 to 100. Zero indicating no anxiety and 100 indicating severe anxiety. The scale is subdivided to mild symptoms of anxiety from 0-30, moderate symptoms from 40-60 and severe symptoms ranging from 70-100. The students were asked to mark their appropriate level of anxiety on the most appropriate point on the VAS scale.

The students were also subjected to questionnaire consisting of sources of exam related anxiety which included 25 questions divided in 3 domains. Various factors related to academics included were course load, lack of systematic study, fear of failure, duration of exams, lack of knowledge regarding relevant content and pattern of examination etc, lifestyle domain comprised of sleep pattern, dietary habits, physical activity, health issues etc and psychosocial factors included were parental expectations, peer pressure, lack of parental presence, negative thinking and irrational thoughts, etc. The students were asked to respond to each question by ticking yes or no response. The frequency of different responses to the factors contributing to exam anxiety was then analyzed by the research team.

The Data collected was entered in MS Excel spreadsheet. The analysis was done by SPSS version 20.0 and online graph pad software (prism 5 for windows) version 5. Descriptive statistics including frequency, percentage, mean and standard deviation were used to analyze the data. Level of stress and factors were stratified by gender and presented as frequency and percentages. Chi-square test was used to evaluate difference between groups for categorized variables and paired and unpaired student t- test was used to calculate difference of means for quantitative variables. The normally distributed data was presented as means and standard deviation, or 95% confidence intervals. All tests were performed at a 5% level of significance. For all tests an association was considered statistically significant if the p value was less than 0.05.

Results

150 self administered questionnaires were distributed among 1st Prof Medical students, out of which only 110 returned completed questionnaire. The response rate of the survey questionnaire was 73.33%. Out of total 110 students, 64 were females (58.18%) and 46 were males (41.81%). Mean age was 18.41 ± 0.73 and 18.83 ± 1.18 for females and males respectively (Table 1)

The mean level of baseline anxiety i.e. 2 months prior to examination was 13.71 ± 9.13 and prior to examination was 67.97 ± 13.83 respectively as assessed by VAS (Table 2). The results of our study indicate that there was a significant increase in mean anxiety status prior to examination as compared to baseline anxiety in the 1st year medical students.

The mean level of baseline anxiety among female and male students was 14.61 ± 10.09 and 12.46 ± 7.53 respectively. Mean level of anxiety scores on VAS during pre examination period were 70.89 ± 14.55 for females and 63.91 ± 11.73 for males. The mean anxiety levels were significantly higher than baseline anxiety levels in our study in both male and female students. (Table 3) In our study there was a significant correlation between gender and exam anxiety. Female students reported more exam related anxiety as compared to their male counterparts

In the present study, prevalence of severe exam anxiety prior to examinations was 62.72%. It was 73.43% in females and 47.82% in males. More no of females showed severe anxiety as compared to male students. 52.17% of males and 25% females were having moderate anxiety prior to their exams. (Table 4)

While observing various factors contributing to exam related anxiety, excessive course load (91.81%), lack of time to revise before exam (87.27%), lack of systematic studies (80.90%), Parental expectations (80%) and lack of time for physical activity and extracurricular activities (78.18%) were the most frequently reported factors causing exam related anxiety among the 1st year M.B.B.S. students (Table 5). Most of the factors reported were more common among female students.

Statistically significant difference were observed in all the three domains contributing to exam anxiety i.e. Academic related factors, lifestyle related factors and psychosocial factors, with female students reporting more anxiety than their male counterparts as shown in (Table 6). In our study only 57.81% students were aware of stress reduction techniques but only 32.18% students were aware and implementing them

Table 1 Mean age of the subjects

Gender	Mean Age
Female (n=64)	18.41±0.73
Male (n=46)	18.83±1.18

Table 2 Mean Anxiety Status by VAS

	Mean anxiety status
Baseline anxiety	13.71±9.13
Preexamination anxiety	67.97 ±13.83

Table 3 Relation of mean anxiety status with gender

Gender	Mean anxiety status	
	Baseline anxiety	Preexamination anxiety
Females (n=64)	14.61 ±10.09	70.89±14.55
Males (n=46)	12.46±7.53	63.91±11.73
P value	.000**	.000**

** Highly significant

Table 4 Prevalence of Pre examination anxiety

Gender	Females (n=64)			Males (n=46)		
	Mild n(%)	Moderate n(%)	Severe n(%)	Mild n(%)	Moderate n(%)	Severe n(%)
Preexamination anxiety	1(1.56%)	16(25%)	47(73.43%)	0	24(52.17%)	22(47.82%)

Table 5 Results of questionnaire regarding factors contributing to exam anxiety filled by medical students

Factors contributing to exam anxiety	Total (n=110)	Percentage	Male (n=46)	Female (n =64)	p-value
Excessive course load	101	91.81%	43(93.47%)	58(90.62%)	.590
Lack of time to revise before exam	96	87.27%	39(84.78%)	57(89.06%)	.506
Lack of systematic studies and time management	89	80.90%	32(69.56%)	51(79.68%)	.224
Parental expectation	88	80%	35(76.08%)	53(82.81%)	.384
Lack of physical and extracurricular activity	86	78.18%	32(69.56%)	54(84.37%)	.064
Unable to recall and review	85	77.27%	32(69.56%)	53(82.81%)	.102
Fear of failure	83	75.45%	34(73.91%)	49(76.56%)	.750
Fear of facing teacher during viva	78	70.90%	28(60.86%)	50(78.12%)	.049
Lack of parental presence and Home sickness	77	70%	29(63.04%)	48(75%)	.117
Irrational thoughts about examination and result	76	69.09%	31(67.39%)	45(70.31%)	.774
Lack of knowledge about exam pattern	75	68.18%	34(73.91%)	41(64.06%)	.274

Not studying adequately	64	58.18%	23(50%)	41(64.06%)	.140
Studying all night before exam	64	58.18%	29(63.04%)	35(54.68%)	.381
Distractions in the form of mobiles, internet etc	62	56.36%	39(60.93%)	23(50%)	.000
Disturbed sleep	61	55.45%	25(54.34%)	36(56.25%)	.843
Negative thinking and self criticism	53	48.18%	17(36.95%)	36(56.25%)	.046
Dietary habits	49	44.45%	22(47.82%)	27(42.18%)	.557
Peer pressure	48	43.63%	22(47.82%)	26(40.62%)	.453
Type A personality	46	41.81%	15(32.60%)	31(48.43%)	.097
Health problems	41	37.27%	17(36.95%)	24(37.50%)	.954
Failure to respond well in discussion with colleagues	38	34.54%	19(41.30%)	19(29.68%)	.206
Lack of knowledge of relevant content	34	30.90%	12(26.08%)	22(34.37%)	.353
Memorizing the text without understanding	29	26.36%	12(26.08%)	17(26.56%)	.955
Finding medical concept difficult	27	24.54%	9(19.56%)	18(28.12%)	.303
Long duration of exam	26	23.63%	10(21.73%)	16(25%)	.691

Table 6 Relation of most frequent factor contributing to exam anxiety with gender

	ACADEMIC FACTORS	LIFE STYLE FACTORS	PSYCHOSOCIAL FACTORS
Females(n=64)	38.79±16.67	29.53±9.79	38.80±11.39
Male (n=46)	25.57±11.37	21.12±6.35	23.6±8.36
P VALUE	.021*	.006**	.043*

* Significant

**Highly significant

Discussion

Exam anxiety is an emotional reaction that students face prior to and during examination. Researchers suggest that some amount of anxiety is a sign of one's concern towards exam and is beneficial to students as it keeps them task oriented and is essential for better performance and preparation of examination. However excessive worry can be debilitating and can lead to low performance, demotivation, low academic achievement and psychological distress if not managed properly. (16)

The results of the present study indicated that there was marked increase in anxiety levels in medical students prior to their examination. The overall prevalence of severe anxiety was 62.72 % and mild to moderate was 37.27% in our study. 73.43% females and 47.82 % males had severe examination related anxiety. Results of our study are comparable to previous studies that have also reported high prevalence of anxiety in medical students due to pressure of exams and studies. (17)

The high prevalence of mental distress observed in 1st Professional medical students prior to their 1st semester summative exams in our study support the findings of earlier authors that first year medical students are more vulnerable to stress during pre examination and examination period. (18, 19) The reasons for this marked undue exam anxiety in the newly entered medical students could be attributed to the unfamiliarity of new study environment and medical curriculum, due to academic pressure owing to vast syllabus which has to be covered in short period of time, and the high expectations of family and faculty.

In our study there was also statistically significant difference in anxiety levels on basis of gender. In our study the female students experienced higher level of anxiety as compared to male students before their exams. This substantiate

presence of sex difference in exam related anxiety has also been reported by many other researchers.(20,21) It is suggested that the possible reason for this gender difference could be due to increased emotional vulnerability of females owing to difference in their social roles.(22) Females have a tendency to perceive evaluative situations as threatening rather than challenging. Another reason for this pronounced level of anxiety among females could be that they tend to be more concerned about working hard to secure higher marks in exams and about their performance in exams. They also have lower threshold for tolerating stress and are more afraid of failure.

The results of the study show extensive course load, lack of time to revise and lack of systematic studying and time management as the major academics related factors contributing to exam anxiety. In our study 91.8% students reported extensive course load as major academic factor contributing to anxiety. Almost equal proportion of males and females had exam anxiety due to extensive course load. These findings are well in agreement with previous literature which has also suggested that student's perception of extensive course load as the leading cause of exam related anxiety in medical students. (23). The reasons for this marked anxiety due to course load in newly entered medical students could be due to drastic change from school environment to a new professional study environment and extensive curriculum. Students are introduced to 3 new subjects that is Anatomy, Physiology and Biochemistry in the 1st year in an Indian medical school and are subjected to regular tutorials, formative and summative assessments in all the three basic subjects. Extensive new information that has to be mastered in short period of time requires taking more responsibility for own learning which imposes tremendous stress among the 1st year students due course load. Reforms in curriculum and education environment can help students in reducing this academic exam anxiety. Vision 2015 by MCI suggests foundation course of 2 months duration after admission which can be helpful to prepare students to adjust to new environment and study medicine effectively.

Majority of Students, 89.06 % females and 84.78 % males are also stressed due to lack of time to revise before examinations. In another study 65% students were stressed due to not enough time for revision.(24) Lack of preparation done by students before starting the study session and not being regular in studies is contributing to this stress. They spend most of the time studying through inconsistent content coverage, which results in inefficient studying with lack of preparation and leaves little time to review and revise the course material, and hence contributes to exam anxiety. The students must be made aware of the importance of regularity and encouraged to give full interest in their studies from the beginning to avoid the exam related problems.

In our study, 79.68% females and 69.56% males also reported lack of systematic study, and time management contributing to exam anxiety. Earlier studies have also reported lack of systematic study and time management linked to high level of stress .(25) Comprehensive information acquisition in medical curriculum necessitates the need of employing effective study strategies and proper time management in order to achieve academic success. Newly entered medical students during 1st professional year are encountering completely different subjects and teaching methodologies. They are mostly unaware of effective studying styles and lack time management skills. This highlights the importance of teaching the students to set up a study plan, arrange their daily schedules properly, effective study habits and time management skills which will help them manage the course load and prepare for exams effectively. Studies have reported that better time management skills are useful in reducing anxiety and improving academic performance in medical students.(26)

Fear of failure and fear of facing teacher during viva and irrational thoughts about the examination and result were also reported to cause exam related anxiety among majority of medical students. Similar finding have also been revealed by an earlier study among medical undergraduates. (27) In the present study the fear of failure and fear of facing teacher during viva was more common in females as compared to that of males. Feeling of insecurity and threats to their self

esteem posed by failure in examinations explains the onset of such anxiety among girls. Previous studies have reported decreased self confidence and increased anxiety in females in issues related to their competence.(28)

The results of our study helps us to understand that academic factors like course load, lack of time for revision,lack of time management skills and fear of failure play a very important role in causing exam anxiety. This highlights the importance to develop appropriate strategies and reforms in curriculum to stimulate student learning and decrease student academic stress. Introduction of horizontal and vertical integration, structured teaching with specific curriculum objectives, small group teachings can be very beneficial for improving the learning skills of students and hence help in reducing student academic anxiety There is also need of improving the evaluation system to make it less stressful and help the students to face exam with less stress.More emphasis on regular tests and question banks could help to alleviate students fear and anxieties associated with exams.(29) As suggested by various medical education training programmes that students should have more formative tests which give them feedback and guide them to improve their deficiencies in their learning. Studies have suggested that students also value formative assessments and consider summative assessment as stressful.(30)

Lifestyle related issues like lack of physical exercise and extracurricular activities, improper nutrition and sleep disturbances were also reported by majority of students contributing to their exam anxiety. Lack of physical exercise and extracurricular activities was major lifestyle factor resulting in exam anxiety in 84.37% females and 69.56 % males in our study.Students spend many hours studying huge course content, leaving them with no time for self, family recreation and relaxation.Medical students were also anxious as most of the time for relaxation was spent in distractions like watching television, mobile usage, internet etc. More opportunities for recreation facilities like indoor and outdoor sports, music art gallery, debating club, social meets and cultural events should be provided to students in medical colleges.Students should be encouraged to participate in sports and extracurricular activities and enrich their hobbies as it can act as stress buster. Studies have suggested that students engaged in physical activity have low level of anxiety than those having low activity level.(31). Physical activity has also been shown to enhance cognitive functioning(32). Since physical activities are indispensable for individual growth and to foster personal development, so it is recommended that sports,aerobic exercises and yoga should be made part of the optimal curriculum and can be important contributing factor in positive physical and mental health of future doctors. (33)

In our study 63.04% males & 54.68% female students reported inadequate sleep due to studying all night before exam and 55.45% students, males and females almost in equal proportion reported disturbed sleep contributing to exam anxiety.Results similar to our study have been reported by other authors which also suggest that medical students have sleep problems when worried.(34,35) Literature suggests that the normal sleep tends to fragment and shorten with anticipation of forthcoming demands. Extensive course load, inappropriate time scheduling and studying beyond their threshold induces lot of stress on the students and they end up sleep deprived. This inadequate and disturbed sleep creates overall fatigue among students which may also lead to lower performance in exams. So the students should be made aware that relaxation and sufficient sleep is very essential for refreshing the brain and to enhance the overall performance.

Dietary factors like improper nutrition also contributed to exam anxiety in 44.45%students, almost unequal proportion among male and female students.Previous studies have also shown positive correlation between exam anxiety and dietary habits,eating behavior and food intake.(36)In our study 60.86% males and 54.68% females were skipping meals,47.82% males and 35.93% females were eating late,63.04% males and 53.12% females were having less intake of food during examination period.Unhealthy dietary habits like skipping meals and not eating properly was more common in males as compared to females in our study.Previous studies on effect of academic exam stress on dietary habits have also exhibited decrease in appetite during examination days. (37) Excessive intake of caffeine and

beverages were reported by 37% students almost in equal proportion among males and females and Overeating was observed in few students in our study. This is in agreement with previous study that students with high test anxiety and stress show increased energy consumption.(38). Results of our study suggested that change in appetite along with unhealthy dietary choices and eating habits are prevalent among large proportion of medical students due to demands of their academics and examinations. The findings of our study highlight that the students need to be made aware of eating sensibly and taught to monitor their own health by improving their eating habits and maintaining healthy lifestyle in order to cope with stress better.

In our study the major psychosocial factor contributing to exam anxiety was Parental expectations as reported by 80% students. 76% males and 82% female students were under stress due to parental expectations. Results of our study are in line with previous findings that have also suggested high parental expectation as a major emotional stressor (39). The medical students have to face lot of expectations and the compulsion to succeed which creates excessive pressure and anxiety among them. Parent should be counseled in order to avoid their over expectations from their kids as in medical school to remain always at the top is difficult.

Lack of parental presence and homesickness was also leading to exam related anxiety among 70% students. An earlier study also reported the same finding among 1st year students.(40) 1st year students are more stressed due lack of parental presence and homesickness during examination time as they have come to stay away from parents for the first time and are adjusting to studying alone in a new environment. Students should be encouraged to make healthy interactions with colleagues, seniors and friends as it can be helpful in adapting to new environment.

Irrational thought about examination, were reported by 70% females and 67% males contributing to exam anxiety. Female students significantly outnumbered males in having negative thinking and self criticism. These findings are similar to those reported by authors, indicating that among anticipated sources of stress those dealing with perceived failure are also highly stressed (41)

In the present study the females outnumbered males in all the 3 domains contributing to exam anxiety. Similar results are reported by previous studies which also suggest females to be more test anxious. (42,43) Various reasons have been postulated to justify female predominance in this regard. Some of these include female tendency to over report psychological problems, exaggerated concern about volume and complexity of course, excessive stress due to self expectations, feeling of lack of competence and emotional vulnerability. (44)

Results of our study indicate that 1st year MBBS students are under tremendous stress due to examinations due to academics, psychosocial and lifestyle related issues. This period of beginning of medical under graduation should be considered very important and various corrective efforts should be incorporated for developing reforms in curriculum and introducing early stress management interventions in students entering medical education system to reduce level of negative emotional states in students and help them overcome stress in a more efficient manner and achieve academic stress.

In our study only 57.81% students were aware of stress reduction techniques but only 32.18% students were aware and implementing them. Various studies have come forth and recommend various coping methods to reduce student anxiety and stress.(45,46) Stress management workshops and training programmes should be conducted for students at the entry of students in a medical school. These stress management workshops will be helpful to improve the knowledge of students to stress and enhance their ability to cope with stresses associated with a demanding professional medical life. They should be taught various relaxation techniques like meditation, yoga, pranayam can help them cope with stress better, reduce test anxiety and avoid stress burnout (47,48). Professional, personal development, mental wellness and psycho educational lectures, soft skill development classes should be taken for students for their better personal, professional and mental growth. Student counseling should also be initiated at the beginning to help the vulnerable

student's. Studies have shown that Communication with Psychologist can prepare the students to cope with anxiety state better. (49) There is also need of improving social support system. Studies have suggested that social support system plays important role in combating stress. (50) Informal mentorship programmes in which a teacher can act as a mentor to a group of students and a mentor can help them with their academic and nonacademic problems can be very effective. This support system provide opportunity to the students to express emotions, to resolve academic and emotional conflicts and enhance affiliation with peers and help them in better adaptation to environmental stresses .

Conclusion

Our study concludes high level of anxiety due to examination in 1st year medical students. Females suffered from higher anxiety than males during exams in our study. It also highlights that academics along with psychosocial and lifestyle factors are contributing to exam anxiety. Medical students are important pillars of our future medical population. It is essential to monitor their stress levels and sources contributing to their anxiety. The present study also highlights the need to incorporate strategies to improve the teaching, learning, evaluation and educational environment and help the students develop stress coping skills in early medical career in order to reduce negative effects of stresses of medical life on their health.

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