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Original Research Article

Level of stress among undergraduate, intern and postgraduate medical students measured using perceived stress scale-10: a cross-sectional study

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ABSTRACT

Background: Medical education both under-graduation and post-graduation is considered as being very stressful now a day and a high level of stress may have a negative impact on cognitive functioning, learning and patient care by the students. So, this cross-sectional study was conducted to determine the prevalence of stress and its determinants among the medical students using perceived stress scale (PSS)-10 scale.
Methods: This cross-sectional study was conducted among under-graduate, intern and post-graduate medical students (n=288) of a medical college in Mumbai metropolitan region in the month of June, 2024. PSS-10 scale was used to assess the stress level among the subjects. Data was collected through Google form and analysed by using Microsoft excel. Descriptive and inferential statistics was applied. Statistical significance level was fixed at $p<0.05$.
Results: Google form was submitted to all (n=583) under-graduate, intern and post-graduate medical students of the medical college. The overall response rate among the study subjects was 49.40% (n=288), 67 (44.67%) under-graduates, 30 (60.00%) interns and 42 (47.73%) post-graduates were having very high (PSS-10 score ≥21) stress level. The 26 (49.06%) post-graduate students from clinical and 16 (45.71%) from non-clinical branches were having PSS-10 score ≥21 i.e. very high stress level. The mean PSS-10 score of post-graduates was more (i.e. 23.04±7.24) compared to under-graduate medical students and interns.
Conclusions: Perceived stress was high among post-graduate, female and hostelite subjects. More than half of the interns were having very high stress level. Academic burden and family issues were common reasons for perceived stress among the subjects. More research is needed to identify potential confounders.

Keywords: Stress, PSS-10 score, Medical students

INTRODUCTION

Stress among under-graduate medical students is increasingly reported in the published literature recently. These under-graduate medical students are subjected to the pressure of academic activities with an obligation to succeed, an uncertain future and hurdles of integrating into the system. They also face social, physical, emotional and family problems which may affect their learning ability and academic performance. The potential negative impact of emotional distress on undergraduate medical students, include impairment of functioning in classroom and clinical performance. Perceived stress has been linked to current mental distress and forthcoming health problems.[1] Medical education is perceived as being very stressful. Due to this many psychological changes occur among the students.[2]

Multiple studies done in India have shown significantly high stress levels among medical students. Self-rated depression is also found to be significantly higher among Indian medical undergraduates.[3] Medicine study is perceived as being stressful and this is attributed to the vastness of the medical syllabus that needs to be learned and the ongoing various forms of assessments. Increased levels of stress, anxiety and depressive symptoms have been reported among medical students due to rigorous and demanding nature of medical curriculum. Medical students, both under and postgraduate encounter different types of stressors during their course. As per the various studies, it is estimated that the prevalence of stress among medical students is 28.5-78%.[4]

Chronic stress can disturb personal life, academic performance and overall development among medical students. Stress can cause fatigue, inability to concentrate and irritability among both under and postgraduate medical students.[5] Medical education is perceived as a stressful training and medical students experience lot of stress during their undergraduate studies, internship and residency training which affects their cognitive function, practical life and patient care.[6] Medical interns are subjected to stress due to direct involvement in the treatment of patients, increased risk of infection, fear of transmission of infection to their closed ones and working under extreme pressure. Stress among medical interns should be focused and tackled in time to protect their health.[7]

Postgraduate medical students suffer from higher stress due to challenging nature of medical education that affects their mental wellbeing. This stress is an external constraint which upsets an individual both mentally and physically.[8] Medical education is broad, stressful and challenging which can lead to many psychological problems among postgraduate medical students. These students are at risk of developing stress due to their professional duties, workloads, peer pressure, academic activities.[9] Stress, anxiety, worry and aggression have significantly increased among postgraduate medical students in recent years.[10] So, the study was planned to assess the level of stress among undergraduate, intern and postgraduate medical students.

METHODS

This cross-sectional study was conducted among under-graduate, intern and post-graduate medical students of Rajiv Gandhi medical college located in Mumbai metropolitan region in the month of June 2024, following purposive sampling method. Necessary permissions and approvals were obtained. PSS-10 scale was used to assess the stress level among the subjects. The purpose of the study was explained to all the subjects. Google form containing relevant variables was sent to 583 medical students of which 400 (68.61%) were undergraduates, 87 (14.92%) were interns and 96 (16.47%) were postgraduate medical students. Consent form was included in the Google form itself. Total 288 subjects responded to the Google form of which 150 (52.08%) were under-graduate, 50 (17.36%) were intern and 88 (30.56%) were post-graduate medical students. Data was entered in Microsoft excel and analysed. Descriptive and inferential statistics was applied. Statistical significance level was fixed at $p<0.05$.

RESULTS

Google form was distributed to all (n=583) under-graduate, intern and post-graduate medical students of the medical college of which 400 were under-graduates, 87 were interns and 96 were post-graduate medical students. Of the 400 under-graduate medical students, 150 (37.50%), of the 87 interns, 50 (57.47%) and of the 96 post-graduate medical students, 88 (91.67%) responded to the Google form. Total 288 (49.40%) subjects took part in the study. The overall response rate among the study subjects was 49.40%. The response rate among post-graduate medical students was highest (i.e. 91.67%). Among 288 subjects, 150 (52.08%) were under-graduate medical students, 50 (17.36%) were interns and 88(30.56%) were post-graduate medical students of non-clinical and clinical subjects. The mean PSS score of the study participants was 20.80±7.35. The mean PSS-10 score of post-graduates was more (i.e. 23.04±7.24) compared to under-graduate students and interns. The 52 (59.09%) post-graduate students were from clinical while 36 (40.91%) were from non-clinical subjects.

The mean PSS-10 score of postgraduate subjects belonging to clinical subjects (i.e. 20.74±7.34) was slightly higher compared to the PSS-10 score of postgraduate subjects of non-clinical branches. The mean PSS-10 score of post-graduate student from physiology department was 33.00±0.00, which was higher among the subjects of all other departments. The lowest mean PSS-10 score (i.e.13.00±7.20) was of subjects from anesthesiology department. The mean PSS-10 score of subjects belonging to >20-24 years age group was highest (i.e. 22.04±7.24) compared to subjects belonging to other age groups. Female subjects were having higher PSS-10 score (i.e. 21.98±7.36) compared to male subjects ($p<0.05$).

The mean PSS-10 score was highest among divorced subjects (i.e. 24.00±7.33) compared to subjects belonging to single, married and in relationship group. The hostelite subjects have more stress (i.e. PSS-10 mean score 21.41±7.32) compared to non-hostelite subjects. The distribution PSS-10 score of the study participants is represented in Table 1.

The 67 (44.67%) under-graduates, 30 (60.00%) interns and 42 (47.73%) post-graduates were having very high (PSS-10 score ≥21) stress level. The 26 (49.06%) post-graduate students from clinical and 16 (45.71%) from non-clinical branches were having PSS-10 score ≥21 i.e. very high stress level.

The 55 (53.92%) subjects from >20-24 years age group were having very high stress level (i.e. PSS-10 score ≥21). The 60 (43.48%) male subjects while 79 (52.67%) female subjects were having very high stress (i.e. PSS-10 score ≥21).

Two (66.67%) divorced subjects were having high stress level. The 86 (49.14%) hostelite subjects were having PSS-10 score ≥21 i.e. very high stress compared to the subjects staying in rented house or with own family (Table 2).

Academic burden, financial issues, working conditions, health problems, relation with seniors and family issues are some of the reasons for stress among the subjects as mentioned by them. The 46 (30.67%) under-graduates mentioned academic burden is the reason of stress for them while 52 (34.67%) mentioned family and personal issues are responsible for stress among them. The 26 (52.00%) interns said they suffer from stress due to academic burden. 25(28.41%) post-graduates also mentioned that the academic burden is the cause of stress among them (Table 3).

Table 1: Distribution of mean PSS-10 score (Mean±SD) among the study subjects, (n=288).

Variables	Category	N	Percentage (%)	PSS-10 score, mean±SD
Category of study participants, (n=288)	Under-graduate students	150	52.08	20.29±7.17
	Interns	50	17.36	20.58±7.34
	Post-graduate students	88	30.56	23.04±7.24
Branch of postgraduate students, (n=88)	Clinical subjects	52	59.09	20.74±7.34
	Non-clinical subjects	36	40.91	20.34±7.25
Department of postgraduate students, (n=88)	Orthopedics	10	11.36	19.00±7.52
	Dermatology	04	04.55	21.75±7.64
	Medicine	13	14.77	19.15±7.33
	Ophthalmology	03	03.41	24.00±7.10
	Community medicine	19	21.59	19.15±7.40
	Surgery	05	05.68	23.40±7.36
	Psychiatry	01	01.14	15.00±0.00
	Radiology	02	02.27	23.00±6.40
	Pediatrics	03	03.41	20.67±7.59
	Pathology	07	07.95	22.29±7.45
	Forensic medicine	02	02.27	13.50±7.75
	Anesthesiology	03	03.41	13.00±7.20
	Pharmacology	05	05.68	20.80±7.26
	OBGY	04	04.55	18.50±6.38
	Biochemistry	02	02.27	24.00±7.37
	Physiology	01	01.14	33.00±0.00
	ENT	04	04.55	30.25±7.37
Age groups in years, (n=288)	17-20	82	28.47	20.47±7.31
	>20-24	102	35.42	22.04±7.24
	>24-27	35	12.15	21.29±7.32
	>27-30	36	12.50	21.69±7.35
	>30	33	11.46	17.12±7.36
Gender, (n=288)	Male	138	47.92	19.63±7.33
	Female	150	52.08	21.98±7.36
Relationship status, (n=288)	Single	189	65.63	21.07±7.22
	Married	40	13.89	17.28±7.39
	Divorced	03	01.04	24.00±7.33
	In relationship	56	19.44	22.66±7.32
Residence, (n=288)	Hostel	175	60.77	21.41±7.32
	With family	89	30.90	20.28±7.17
	Rented house	24	08.33	18.92±7.17
Post-graduates, (n=88)	Single	34	38.64	20.50±7.24
	In relationship	17	19.32	20.61±7.37
	Married	35	39.77	20.56±7.40
	Divorced	02	02.27	21.03±7.66

Table 2: Distribution of level of PSS-10 score among the study participants, (n=288).

Variables	Category	PSS-10 score, mean±SD	Very low stress (PSS score: 0-7)	Low stress (PSS score: 8-11)	Average stress (PSS score: 12-15)	High stress (PSS score: 16-20)	Very high stress (PSS score: ≥21)
			N (%)	N (%)	N (%)	N (%)	N (%)
Category of participants, (n=288)	Under graduates, n=150 (52.08)	20.29±7.17	05 (03.33)	07 (04.67)	21 (14.00)	50 (33.33)	67 (44.67)
	Interns, n=50 (17.36)	20.58±7.34	01 (02.00)	01 (02.00)	04 (08.00)	14 (28.00)	30 (60.00)
	Post-graduates, n=88 (30.56)	23.04±7.24	06 (06.82)	06 (06.82)	10 (11.36)	24 (27.27)	42 (47.73)
Branch of post-graduate students, (n=88)	Clinical, n=52 (59.09)	20.74±7.34	03 (05.66)	04 (07.55)	07 (13.21)	13 (24.53)	26 (49.06)
	Non-clinical, n=36 (40.91)	20.34±7.25	03 (08.57)	02 (05.71)	03 (08.57)	11 (31.43)	16 (45.71)
Age groups in years, (n=288)	17-20, n=82 (28.47)	20.47±7.31	02 (02.44)	04 (04.88)	13 (15.85)	24 (29.27)	39 (47.56)
	>20-24, n=102 (35.42)	22.04±7.24	03 (02.94)	04 (03.92)	09 (08.82)	31 (30.39)	55 (53.92)
	>24-27, n=35 (12.15)	21.29±7.32	01 (02.86)	01 (02.86)	05 (14.29)	11 (31.43)	17 (48.57)
	>27-30, n=36 (12.50)	21.69±7.35	01 (02.78)	02 (05.56)	04 (11.11)	12 (33.33)	17 (47.22)
	>30, n=33 (11.46)	17.12±7.36	05 (15.15)	03 (09.09)	04 (12.12)	10 (30.30)	11 (33.33)
Gender, (n=288)	Male, n=138 (47.92)	19.63±7.33	09 (06.52)	08 (05.80)	19 (13.77)	42 (30.43)	60 (43.48)
	Female, n=150 (52.08)	21.98±7.36	03 (02.00)	06 (04.00)	16 (10.67)	46 (30.67)	79 (52.67)
Relationship status, (n=288)	Single, n=189 (65.63)	21.07±7.22	05 (02.65)	08 (04.23)	26 (13.76)	56 (29.63)	94 (49.74)
	Married, n=40 (13.89)	17.28±7.39	05 (12.50)	04 (10.00)	06 (15.00)	12 (30.00)	13 (32.50)
	Divorced, n=03 (01.04)	24.00±7.33	00 (00.00)	00 (00.00)	00 (00.00)	01 (33.33)	02 (66.67)
	In relationship, n=56 (19.44)	22.66±7.32	02 (03.57)	02 (03.57)	03 (05.36)	19 (33.93)	30 (53.57)
Residence, (n=288)	Hostel, n=175 (60.76)	21.41±7.32	05 (02.86)	08 (04.57)	20 (11.43)	56 (32.00)	86 (49.14)
	With family, n=89 (30.90)	20.28±7.17	05 (05.62)	05 (05.62)	11 (12.36)	25 (28.09)	43 (48.31)
	Rented house, n=24 (08.33)	18.92±7.17	02 (08.33)	01 (04.17)	04 (16.67)	07 (29.17)	10 (41.67)

Table 3: Distribution of reasons for stress among under-graduate, intern and post-graduate medical students, (n=288).

Reasons for stress	Total, (n=288)	Under-graduates, (n=150)	Interns, (n=50)	Post-graduates, (n=88)
	N (%)	N (%)	N (%)	N (%)
Academic burden	97 (33.68)	46 (30.67)	26 (52.00)	25 (28.41)
Financial issues	45 (15.63)	31 (20.67)	03 (06.00)	11 (12.50)
Work related	21 (07.29)	00 (00.00)	11 (22.00)	10 (11.36)
Health problems	07 (02.43)	03 (02.00)	00 (00.00)	04 (04.55)
Relation with seniors	28 (09.72)	04 (02.67)	07 (14.00)	17 (19.32)
Family issues	71 (24.65)	52 (34.67)	02 (04.00)	17 (19.32)
Other reasons	14 (04.86)	09 (06.00)	01 (02.00)	04 (04.55)
No answer	05 (01.73)	05 (03.33)	00 (00.00)	00 (00.00)

DISCUSSION

In the present study we observed mean PSS score of 20.80±7.35 among the study participants. The mean PSS-10 score of post-graduates was more (i.e. 23.04±7.24) compared to under-graduate students and interns. Among postgraduates, 59.09% were from clinical while 40.91% were from non-clinical subjects. The mean PSS-10 score of post-graduate medical student from physiology department was highest compared to the subjects of all other departments. The lowest mean PSS-10 score was of postgraduate subjects from anesthesiology department. Anuradha et al in their study in Tamil Nadu among undergraduate medical students observed, mean perceived stress score of 25±5.44.[1] The mean perceived stress score among female and male medical students was 26.19±5.57 and 24.83±5.15 respectively. Academic stressors were the most important reason for increased stress among undergraduate medical students. They observed, vast syllabus, fear of failure and lack of recreation were important determinants of stress. They also observed that the major significant psychosocial stressors were loneliness and family problems.

Abdulghani et al in their study in Saudi Arabia among medical students observed, the total prevalence of stress was 63.00% and the prevalence of severe stress was 25.00%.[2] They also observed that the prevalence of stress was higher among females (75.70%) than among males (57.00%). In the present study, it is observed that the female subjects were having higher PSS-10 score compared to male subjects. The mean PSS-10 score was highest among divorced subjects compared to subjects belonging to single, married and in relationship group. The hostelite subjects have more stress compared to non-hostelite subjects. Garg et al in their study among medical students from North Indian medical university concluded that stress amongst medical students is a dynamic process as the stressors keep changing with the year of study and constantly changing expectations of students and system.[3]

In our study we observed, 44.67% under-graduates, 60.00% interns and 47.73% post-graduates were having very high (PSS-10 score ≥21) stress level. 49.06% post-graduate students from clinical and 45.71% from non-clinical branches were having PSS-10 score ≥21 i.e. very high stress level. We also observed, 30.67% under-graduates mentioned academic burden is the reason of stress for them while 34.67% mentioned family and personal issues are responsible for stress among them. The 52.00% interns said they suffer from stress due to academic burden. The 28.41% post-graduates also mentioned that the academic burden is the cause of stress among them. Ragab et al observed in their study in Sudan, the overall prevalence of stress among medical students was 31.70%.[4] The main sources of stress were time pressure, heavy workload, fear of failure and frequency of examination. They also observed female medical students were more stressed due to academics than males. As per the various studies, it is estimated that the prevalence of stress among medical students is 28.50-78.00%.

AI Houri et al in their study in Syria among medical students observed, majority of the subjects had mild (50.60%) and moderate (37.00%) stress levels.[5] Academic-related stressors were the most important causes of stress among undergraduate medical students. Abdulghani et al in their study in Saudi among interns observed, most of the interns were affected by a severe level of stress (34.90%), followed by mild (19.30%) and moderate (18.80%) levels of stress.[6] The stress level was significantly higher (84.00%) among female interns in comparison with male interns (66.50%). Their study showed that nearly 73.00% of the interns were under stressed conditions. Gyan et al in their study observed, 62.47% medical interns and doctors posted in COVID duties were having moderate stress and 34.58% were having mild anxiety.[7] The mean score of stress was 21.14 with SD of 7.45 measured with PSS-10 scale.

Anjali et al in their study observed, moderate level of stress among postgraduate medical students.[8] They observed statistically significant difference in the stress level among clinical and non-clinical postgraduate medical students. They observed mean stress score of 15.30±3.93 measured with DASS-42 among postgraduate medical students. Rabha et al in their study in Assam observed 90.74%, 05.55% and 03.74% postgraduate medical students were having moderate, high and low level of stress respectively.[9] The stress was associated with marital status, gender, residence and clinical and non-clinical departments. Gobbur et al in their study among postgraduate medical students in Kalaburagi observed, majority of the postgraduate medical students were suffering from stress due to various factors.[10]

CONCLUSION

The stress was found to be prevalent among undergraduate, intern and postgraduate medical students. Preventive mental health services could be made an integral part of routine clinical services for medical students. Medical students counseling center may be useful to help them to cope with the stress among them.

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