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# Prevalence of depression, anxiety and stress among private medical college students in South India: A cross-sectional study

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## Abstract:

**BACKGROUND:** Medical education is competitive across the globe. The long duration of the medical and paramedical courses and exposure to clinical settings potentially causes mental health issues. The aim of this study was to estimate the prevalence of depression, anxiety and stress among undergraduate students in a private medical college in South India.

**MATERIALS AND METHODS:** This cross-sectional study was conducted among paramedical and medical students at a private medical college hospital and research center in South India in the year 2021. The required sample size was calculated as 783 with an expected prevalence of 53%, 95% confidence interval (CI), design effect 2.0, and non-response of 10%. The study participants were selected based on simple random sampling. After obtaining informed consent, the data was collected using an email questionnaire. Standard data collection tools such as the Perceived Stress Scale (PSS); and the Depression, Anxiety and Stress Scale - 21 (DASS-21) questionnaire were used. The investigator computed the odds ratio (OR) and adjusted odds ratio (aOR) with a 95% CI.

**RESULTS:** Out of 1200 students, 1015 (85%) responded to the email questionnaire. Among them, 639 were females (63%), and 925 were paramedics (91%). Prevalence of depression, anxiety and stress were 59%, 43% and 11%, respectively. Almost 95% of students experienced moderate-to-severe stress in the last one month. Prevalence was higher among females and students of medical courses. Students of final year of college (aOR = 2.0; 95% CI = 1.2–3.5) and students of medical course (aOR = 1.5; 95% CI = 1.1–2.4) were independently associated with stress among the study participants.

**CONCLUSION:** There is high prevalence of depression, anxiety and stress among medical college students in south India. The final year of study and medical course were independently associated with higher stress than others. We recommend periodic assessment of mental health status and additional mental health care for final year students and medical students.

## Keywords:

Anxiety, depression, medical, students, stress

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## Introduction

Medical education is competitive across the globe. The long duration of the medical and paramedical courses and exposure to clinical settings potentially cause mental health issues. The mental health status of a medical student was similar to

the general population before the start of medical training.<sup>[1,2]</sup> Medical school training involves academics and clinical rotations for both medical and paramedical courses. Stress is a perceived imbalance between the demands and capability to respond. Sudden exposure to the vast medical curriculum following school education causes stress and pressure among the students to perform

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better than their peers.<sup>[3]</sup> Besides academics, students have been spending the majority of their time on social media platforms, over-the-top media services (OTT) and video games. Such leisure activities eventually lead to sleep deprivation and poor performance in academics.<sup>[4]</sup> These stressors cumulatively could result in substance misuse and mental health issues like depression, anxiety and burnout. Early identification and addressing of the mental health illness potentially prevent adverse events such as suicide.<sup>[5]</sup> Studies report a high prevalence of mental health conditions among medical college students.<sup>[1-3,6,7]</sup> Medical students experience stress through multiple sources. Challenges faced each year of the study could be different. It could be a new environment for freshers and a battlefield for final-year students. Besides, paying tuition fees and financial concerns are the most common sources of stress among medical students.<sup>[8]</sup> Poor mental health status adversely affects the quality of life of students. Mental health screening should be done periodically to prevent any consequent adverse events.

Evidence suggests that medical students report high levels of perceived stress and apply individual approaches to tackle it. However, interventions such as stress reduction training, peer support programs, student-friendly curriculum and wellness courses could help students overcome stress effectively.<sup>[9-11]</sup> Plenty of standardized and validated mental health screening tools are available across the globe. These tools are easily reproducible and useful in estimating the burden of mental illness in any setting. Many studies have been published that focus on single aspects of stress experienced by medical students such as stressors, distress, and strategies to cope with stress. But they have failed to investigate the relevant aspects in a stress model.<sup>[8,12]</sup> In this regard, the investigators of the current study aimed to estimate the prevalence of depression, anxiety, and stress among paramedical and medical college students, the prevalence of perceived stress, and identify the potential risk factors in south India. To the best of our knowledge this study included the paramedical students; not many studies have reported the prevalence of depression, anxiety and stress in paramedical students using DASS-21 and PSS scale in a private medical college.

## Materials and Methods

### Study design and setting

A cross-sectional study was conducted between June 2021 and December 2021 in a private medical college hospital and research center in Chennai, India.

### Study participants and sampling

Medical and paramedical students at a medical college were study participants. As the first-year students had

not completed the academic year, we excluded them from the study.

A minimum required sample size of 783 was calculated using expected prevalence<sup>[13]</sup> 53%, 95% confidence interval (CI), design effect 2.0, and 10% non-response which aided in final sample size. OpenEpi was used to compute the sample size.<sup>[14]</sup> All students were listed and selected as study participants through a simple random sampling method using a web-based random number generator.<sup>[15]</sup>

### Data collection tools and techniques

Data on the demographics, academic profiles and personal characteristics were collected.

The standardized data collection tools such as the Depression, Anxiety and Stress Scale - 21 (DASS-21) and Perceived Stress Scale (PSS) were used in the study. The responses were recorded through an email questionnaire. DASS-21 is a standardized and pre-validated short scale that permits the assessment of depression, anxiety and stress simultaneously.<sup>[16]</sup> Each section contains seven items which are divided into subscales. PSS is a standardized and pre-validated data collection instrument that evaluates the perception of stressful experiences in the last month using a five-point Likert scale.<sup>[17]</sup> The PSS has fourteen items, seven of them positive and seven negative, and responses range from 0 to 4 (0 = never; 1 = almost never; 2 = sometimes; 3 = fairly often; 4 = very often). The questions reflect negative feelings and the inability to deal with stress, and the positive questions deal with the ability to act in stressful situations.

### Data analysis

In this study, the categorical variables were described as proportions, and continuous variables as mean and standard deviation (SD).

The study included sex, year of study (final year/others), and course (medical/paramedical) for bivariate and univariate analyses. In this study, a bivariate analysis was conducted to compute the odds ratio (OR) with its 95% confidence interval (95% CI); a multivariate analysis was done with the variables with *P* value <0.2 along with the adjusted OR (aOR) with its 95% CI. Epi Info version 7.2 was used for data analysis.<sup>[18]</sup> A *P* value of <0.05 was considered statistically significant.

## Results

### Characteristics of the study participants

The study questionnaire was emailed to 1200 students and received 1015 (85%) responses.

The median age of the study participants was 20 years (range 18–24 years); 639 participants (63%) were females, and 620 (61%) were paramedical students. Among the 1015 participants, 212 (21%), 181 (18%) and 179 (18%) belonged to the physiotherapy, dental and occupational therapy departments, respectively [Table 1]. The prevalence of depression among the study participants was 59%. Overall, 61% of the participants did not experience depression during the study period. Almost 22% were mildly depressed, 15% were moderately depressed, less than 3% reported severe depression, and none reported extremely severe depression [Table 2]. Prevalence of depression was higher among females (42%) than males (35%), and among medics than paramedics [Table 2].

The prevalence of anxiety among the study participants was 43%. Overall, 2% reported extremely severe anxiety. Prevalence was higher among females (44%) than males (39%) [Table 2]. Prevalence of anxiety did not differ between medics (43%) and paramedics (42%). Prevalence of stress was 11% and none reported severe and extremely severe stress. Prevalence of stress was slightly higher among females (12%) than males (9%), and among medics (14%) than paramedics (9%) [Table 2].

On bivariate analysis, odds of depression were 1.3 times higher among females than males [Table 3]. On multivariate analysis, the investigators could not find an individual risk factor. All the three variables such as female sex, the final year of study, and medical course were not significantly associated with anxiety among the students. On bivariate analysis, the final year of study (OR = 2.2; 95% CI = 1.3–3.7) and medical course (OR = 1.8; 95% CI = 1.2–2.6) were significantly associated with stress among the students. Final year of study (aOR = 2.0; 95% CI = 1.2–3.5) and medical course (aOR = 1.5; 95% CI = 1.1–2.4) were independently associated with stress among the study participants.

Out of 1015 participants, 961 (95%) reported that they experienced moderate-to-severe stressful conditions in the last one month [Table 4]. The levels of stress perceived by the students were reportedly low (5%), moderate (82%), and severe (12%). On bivariate and multivariate analyses, we could not identify any risk factors predisposed to stressful conditions in the last one month [Table 3].

### Discussion

The study found that a high proportion of students experienced depression, anxiety and stress in a medical college. Medical and paramedical courses are professional education training intended to enhance the capacity of the students to become outstanding professionals in their domain. A high prevalence of depression, anxiety

**Table 1: Age, sex and other characteristics of the study participants (n=1015)**

Characteristics	n	%
Age (IQR) (in years)	20	(19-21)
Sex		
Male	376	36.9
Female	639	63.0
Division		
Medical	395	38.9
Paramedical	620	61.1
Department		
Audiology speech and language pathology	66	6.5
B. Optom	60	5.9
Anesthesia Technology	41	4.0
Critical Care Technology	14	1.4
Bachelor of Occupational Therapy	179	17.6
Physiotherapy	212	20.9
Dental sciences	181	17.8
B. Sc. Nursing	172	16.9
Medicine	90	8.9

**Table 2: Depression, anxiety and stress reported by severity grade as reported by medical students**

Attribute	Normal		Mild		Moderate		Severe		Extremely Severe	
	n	%	n	%	n	%	n	%	n	%
Depression										
Male	244	65.1	70	18.7	53	14.1	8	2.1	0	0.0
Female	373	58.4	149	23.3	103	16.1	14	2.2	0	0.0
Medic	237	60.0	77	19.5	72	18.2	9	2.3	0	0.0
Paramedic	381	61.5	142	22.9	84	13.5	13	2.1	0	0.0
Overall	617	60.8	219	21.6	156	15.4	22	2.2	0	0.0
Anxiety										
Male	228	60.8	43	11.5	79	21.1	20	5.3	5	1.3
Female	355	55.6	89	13.9	144	22.5	36	5.6	16	2.5
Medic	224	56.7	48	12.2	84	21.3	27	6.8	12	3.0
Paramedic	359	57.9	84	13.5	139	22.4	29	4.7	9	1.5
Overall	583	57.4	132	13.0	223	22.0	56	5.5	21	2.1
Stress										
Male	342	91.2	18	4.8	15	4.0	0	0.0	0	0.0
Female	562	87.9	48	7.5	30	4.7	0	0.0	0	0.0
Medic	338	85.6	33	8.4	24	6.1	0	0.0	0	0.0
Paramedic	566	91.3	33	5.3	21	3.4	0	0.0	0	0.0
Overall	904	89.1	66	6.5	45	4.4	0	0.0	0	0.0

and stress could affect their professional training, and the desired objectives of the training might not be met. Our findings are in agreement and disagreement with a few published studies in the literature. A study by Iqbal *et al.*,<sup>[13]</sup> in 2015, in Odisha reported the prevalence of depression, anxiety and stress in 51%, 67% and 53% of participants, respectively. Taneja *et al.*,<sup>[19]</sup> in 2018, reported the prevalence of depression, anxiety and stress as 32%, 40% and 43%, respectively.

Studies have been published using the DASS-21 questionnaire across the globe. A study from Brazil

**Table 3: Depression, anxiety, stress and perceived stress by different characteristics among students of a medical college in South India**

Characteristics	Depression (n=397)		No depression (n=618)		OR	95% CI	aOR	95% CI
	n	%	n	%				
Female Sex	266	67	374	61	1.3	1.0-1.7	1.3	1.0-1.7
The Final Year of Study	46	12	54	9	1.3	0.9-2.0	1.4	0.9-2.1
Medical	158	40	237	39	1.1	0.8-1.4	1	0.8-1.3
	Anxiety (n=435)		No Anxiety (n=583)		OR	95% CI	aOR	95% CI
	n	%	n	%				
Female Sex	285	66	355	61	1.2	0.9-1.6	1.2	0.9-1.2
The Final Year of Study	43	10	57	10	1	0.7-1.5	1.0	0.6-1.6
Medical	171	40	224	38	1.1	0.8-1.4	1.0	0.8-1.4
	Stress (n=111)		No Stress (n=904)		OR	95% CI	aOR	95% CI
	n	%	n	%				
Female Sex	78	70	562	62	1.4	0.9-2.2	1.5	0.9-2.2
The Final Year of Study	20	18	80	9	2.2	1.3-3.7	2.0	1.2-3.5
Medical	57	51	338	38	1.8	1.2-2.6	1.5	1.1-2.4
	Moderate-to-High Stress (n=961)		Low Stress (n=54)		OR	95% CI	aOR	95% CI
	n	%	n	%				
Female Sex	602	63	38	70	0.7	0.4-1.3	1.6	0.4-0.6
The Final Year of Study	97	10	3	6	1.9	0.6-6.2	0.7	0.4-1.3
Medical	379	39	16	30	1.5	0.9-2.8	1.5	0.8-2.7

**Table 4: Perceived level of stress by sex and course of study**

	Low (n=54)		Moderate (n=833)		High (n=128)	
	n	%	n	%	n	%
Male	16	4.3	320	85.3	39	10.4
Female	38	5.9	513	80.3	89	13.9
Medic	16	4.1	324	82.0	55	13.9
Paramedic	38	6.1	509	82.1	73	11.8
Overall	54	5.3	833	82.1	128	12.6

reported that 34.6%, 37.2% and 47.1% of medical students suffered from depression, anxiety and stress, respectively.<sup>[20]</sup> Another study from Nepal reported depression (30%), anxiety (41%) and stress (27%) among medical students.<sup>[6]</sup> Medical education is stressful and medical students remain as a vulnerable group. It is a fact that medical students experience three times more stress than the general population.<sup>[21-23]</sup> In comparing these studies, our study reports a significantly lower prevalence of stress which reflects a better mental health status. The prevalence of depression, anxiety and stress was higher among females than males. This finding is consistent with the available studies.<sup>[1,6,7,19,20]</sup> Similarly, the prevalence of depression and stress was higher among students of medical courses than in paramedical courses. This could be attributed to exposure to a vast curriculum, clinical postings, and more frequent assignments than paramedical students. The risk factors for depression, anxiety and perceived stress were not identified in the last month. Perceived stress could be due to multiple factors apart from the curriculum. However, the final year of study and medical course remained independent predictors of stress. This finding points

towards additional mental health support for the final year and medical students for their overall betterment. The strength of the study is the inclusion of paramedical students and the weakness is that study was conducted at a single center.

### Limitations and recommendation

This study has a few limitations. Firstly, the recall bias of the participants is challenging because the tendency of humans is to remember the most recent events completely. So, considering the impact of stressful conditions, we believe that participants were less likely to remember the stressful conditions in the past. Information bias in terms of lack of accurate data recall by the participants were observed. The researcher minimized this bias by using anonymized questions without potential identifiers, including the email ID of the participants. Thus, it was less likely to affect the study outcome. There was a selection bias because we had more female participants in our study. Since female students constitute the major proportion of paramedics, this was inevitable. We eliminated the selection bias using simple random sampling method to select the participants and ensuring the probability of an equal chance of being selected.

### Conclusion

There is high prevalence of depression, anxiety and stress among medical college students in south India. Students in their final year of study and medical courses are also overwhelmed with financial commitments towards study loans and were independently associated



with higher stress than others. A periodic assessment of mental health status for the betterment of the students and additional mental health care for the final year students of paramedical and medical students are recommended.

### Ethical considerations

The participation was entirely voluntary, and informed consent was obtained through a digital signature in the email questionnaire. We did not collect the data on potential person identifiers during data collection. We sought institutional ethics committee approval from SRM Medical College Hospital and Research Centre, Chennai, India. Ethics Clearance Number: 1757/IEC/2019

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### Conflicts of interest

There are no conflicts of interest.

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