Original Research Paper

Assessment of Depression, Anxiety & Stress and their correlation with sociodemographic factors amongst recently enrolled medical and paramedical students.

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ABSTRACT

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Aims: To Assess Depression, Anxiety & Stress and their correlation with sociodemographic factors amongst recently enrolled medical and paramedical students.

Study design: Cross sectional study.
Place and Duration of Study: Recently enrolled 275 post-graduate and undergraduate (Medical & Paramedical) students attending Universitybetween June 2022 and September 2022.
Methodology: Study was conducted among recently enrolled 275 post-graduate and undergraduate (Medical & Paramedical) students. They ~~were given to~~ filled an online ~~anonymous~~ questionnaireanonymously in English, which was made using PsyToolkit software and shared using WhatsApp groups. After their prior informed consent, Depression Anxiety Stress Scale (DASS 21), was used to collect information on symptoms of depression, anxiety, and stress.
Results: Prevalence of depression is 68.4%, anxiety is 78.2% and stress is 33.1% among medical and paramedical students. Depression, anxiety and stress were statistically significantly associated with peer and family pressure to join study-stream (p-value of <0.00001 for all three) and history of mental health issues in family (p-value= 0.002343, 0.00064, 0.006836 respectively). In addition, depression was statistically significantly associated with poor peer-relationship (p-value= 0.018945) and dis~~un~~satisfaction regarding admission (p-value= 0.043734); and stress was statistically significantly associated with dis~~un~~satisfaction regarding admission (p-value= 0.031307).
Conclusion: Prevalence of depression, anxiety & stress among recently enrolled medical and paramedical students ~~are~~ were high providing insight into need for improvement of psychological wellbeing in them; which could potentially have a positive impact upon patient care.

Comment [PK1]: You have to be careful in how you report the results. DASS only provides an indication of various depression, stress and anxiety scores, which can be taken as measure of overall emotional disturbance. DASS is not suitable for diagnosis of mental health conditions.

Comment [PK2]: For p va;ues, up to 2 or 3 decimal values is more than sufficient

Keywords: [Anxiety, Psychological Stress, Depression, Medical Students.]

1. INTRODUCTION

Medical profession has been considered as a very desirable profession in Indian society due to its economic stability and potential for growth. [1] Medical colleges are responsible for ensuring that medical students acquire the necessary knowledge and skills before accepting professional obligations. This is done in order to prepare medical students for a personally rewarding and socially meaningful career. [2,3] Suicide rates are high (relative to the general population) ~~in many of Indian medical colleges~~among medical students and professionals alike. Academic stress followed by mental

health problems were most noticeable reasons for suicide. Suicidal ideation among medical students is high and ranges from 1.8% to 53.6% and. From which only 13% had ever sought psychiatric help before ending their lives.[4]

Personal distress among medical students is relatively significant, which has a in causing negative impact on their academic performance, competence, professionalism, and health. Different factors such as vast syllabus, academic pressure, dissatisfaction with education, worry about the future, parental pressure, and others, are responsible for the high occurrence of psychological disturbances among them. [5-8] Medical students begin to feel stress as soon as they begin their training and this stress has been linked to both mental and physical illnesses and can result in feelings of anxiety, incompetence, helplessness, rage, and guilt. Lack of sleep, impaired attention and concentration, impaired decision-making, poor performance in academics and clinical duties, low levels of tolerance, conflict with oneself and others, dropping out of the course, drug abuse and ultimately decreased productivity in the future are harmful consequences of these. [1,6]

Study conducted by Gupta et al. shows that 39% of people in India had depression with prevalence of major depressive disorder is 21.5% among medical students. [3] Mental health issues can result in a range of financial, educational, and employment difficulties if they are not promptly diagnosed and treated. These could eventually result in a lower quality of life. [10]

Some nations conduct a yearly assessments and reports from medical trainees and trainers on a variety of topics, including mental health, in light of the profession's vulnerability. However, there are no equivalent initiatives in India. This study was aimed to investigate prevalence of depression, anxiety and stress among recently enrolled medical and paramedical students and the epidemiological data produced will aid in enhancing medical student wellness, which may favorably affect patient care.

1.1 OBJECTIVES

1. To study the prevalence of depression, anxiety and stress among newly enrolled undergraduate students and postgraduate students.
2. To assess correlation of epidemiological factors with depression, anxiety and stress.

2. METHODOLOGY

A Cross-sectional study was conducted among university students attending graduate and post-graduate medical and para-medical courses, after taking permission from Institutional Ethics Committee. Newly enrolled students, who hads joined the institute in tenure the previousof fifteen days to six months from both undergraduate (Medical, Dental and Physiotherapy) and postgraduate (Medical postgraduate only) were included for participation in the study.

Sample size was calculated aprioriusing the following formula: [11]

Comment [PK3]: The Introduction needs more justification on how/why the medical field is a challenging and demanding one; particualrly the high competition, length and nature of study, etc. Since the focus is on medical, more apt justification is needed on how it is different from other fields.

Comment [PK4]: This can be misleading. 39% is too high. The study might be reporting on lifetime prevalence of depression. Please check your sources again
Also, both those statistics were not found on the article by Iqbal et al (2015) at https://doi.org/10.4103%2F0971-5916.156571

Comment [PK5]: Do you mean sociodemographic factors?

Comment [PK6]: So, dental and physiotherapy would be the para medical courses? That has to be mentioned at some point for clarity.

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$$n' = \frac{N\,Z^2 P\,(1-P)}{d^2(N-1) + Z^2\,P(1-P)}$$

Where,

n'= total number with finite population correction

N= population size (not known)

Z= static for level of confidence

P= expected proportion (0.5)

d = precision (0.05)

Using the above ~~data~~ formula, sample size was estimated ~~comes out~~ to be 218. It was decided to achieve n= 250 or more for improving the statistical significance of the study and ease of calculation.

Data was collected by online form after taking participants' prior informed consent through a software "psych-toolkit".Performa containing demographic details and other related information ~~to be~~were filled up by the participants enrolled for the study. Anonymous questionnaire in Englishlanguage made using "psych-toolkit"which contain "Depression Anxiety Stress Scale-21" (DASS-21) was shared using WhatsApp groups.

DASS-21 scale is short scale that allows simultaneous assessment of depression, anxiety, and stress. Each domain contains seven items, divided into subscales with similar content. Depression scale assesses dysphoria, hopelessness, devaluation of life, self-deprecation, and lack of interest/involvement, anhedonia, and inertia. Anxiety scale assesses autonomic arousal, skeletal muscle effects, situational anxiety, and subjective experience of anxious affect. Stress scale is sensitive to levels of chronic nonspecific arousal. It assesses difficulty relaxing, nervous arousal, and being easily upset/agitated, irritable/over reactive, and impatient.

A t~~T~~otal of 327 students had participated in the study out of which only 275 completed surveys. So, 52 forms which were partially filled were excluded, the final number was N=275. Collected data was compiled in MS Excel ~~sheet~~ and data was processed using SPSS trial version 25 (S~~s~~tatistical ~~software~~Package for Social Sciences). Data analysis was done using one-way ANOVA (Analysis of Variance). Differences were tested by two-tailed t-test. The values ~~P~~ *p*< 0.05 were considered statistically ~~symbolic~~significant.

3. RESULTS

The study enrolled total 337 participants out of which only 275 completed the survey.Total 62 participants were dropped due to lack of information. Table-1 shows socio-demographic profile of study ~~populations~~ participantswith an age ranging

Comment [PK7]: What value was taken for Z?

Comment [PK8]: Needs clarification on how higher sample size helps in ease of calculation

Comment [PK9]: More information is needed of what SD details were recorded as they are a big part of the analysis later.

Comment [PK10]: Incorrect description of anonymozing the process. The questionaires are not anonymous, but rather the participant responses.

Comment [PK11]: Consider alternate words like 'developed', 'constructed', 'hosted', etc.

Comment [PK12]: Psytoolkit needs to be cited, and possible URL link needs to be given of the main site atleast. One of the correct citations for PsyToolKit would be
Stoet, G. (2017). PsyToolkit: A novel web-based method for running online questionnaires and reaction-time experiments. *Teaching of Psychology*, 44(1), 24-31

Comment [PK13]: Needs citation regarding information of DASS-21.
The DASS-21 also has not been cited; one of the correct reference entry would be
Lovibond, S. H., &Lovibond, P. F. (1995). *Depression Anxiety Stress Scales (DASS--21, DASS--42)* . APA PsycTests. https://doi.org/10.1037/t01004-000

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Comment [PK14]: 337 or 327? Earlier it was given as 327

Comment [PK15]: Same issue again, earlier it was reported that 52 had dropped out.

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from 17-28 years (Mean- 20.62) and amongst 275 participants, 138 (50.18%) were male and 137 (49.82%) were female. Out of all enrolled participants, majority of them were residing in hostels (n= 222; 80.72%) and only 53 (19.28%) were residing at home. In study ~~population~~ participants, 56 (20.35%) were post graduate medical students and 219 (59.3%) were undergraduate medical and para-medical students; which include 104 (37.83%), 73 (26.55%) and 42 (15.25%) from MBBS, BDS and BPT course respectively.

Comment [PK16]: Standard deviation for age? That is a better indicator than range given in table.

Table-1 Socio demographic Profile

Socio Demographic Variables		Frequency N=275 (%)
Age (years)	**Range**	17-28
	Mean	20.62
Gender	**Male**	138 (50.18%)
	Female	137 (49.82%)
Residence	**Hostel**	222 (80.72%)
	Home	53 (19.28%)
Socio-economic Status	**Lower**	6 (2.18%)
	Lower Middle	75 (27.27%)
	Upper Middle	139 (50.55%)
	Upper	55 (20.00%)
Distance From Home	**Near (Up to 150 km)**	98 (35.64%)
	Far (151 to 700km)	105 (38.18%)
	Very far (More than 700 km)	72 (26.18%)
Study Stream	**MBBS(Medical)**	104 (37.83%)
	BDS(Dental)	73 (26.55%)
	BPT(Physiotherapy)	42 (15.27%)
	Medical PG	56 (20.35%)
Reason to join the study stream	**Personal Choice**	215 (78.18%)
	Peer Pressure	36 (13.09%)
	Parent's Pressure	24 (8.73%)
Relationship with Family	**Strong**	217 (78.90%)

Comment [PK17]: How was SES measured? No indication given in Methodology

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	Fair	47 (17.10%)
	Poor	11 (4.00%)
Relationship with Friends	**Strong**	189 (68.73%)
	Fair	75 (27.27%)
	Poor	11 (4.00%)
Satisfaction with regard to admission in this college	**Satisfied**	204 (74.18%)
	Unsatisfied	71 (25.82%)
Initial impression about their chosen study stream	**As per expectation**	170 (61.82%)
	Below expectation	85 (30.91%)
	Opposite to expectation	20 (7.27%)
History of mental health issues in family	**Present**	115 (41.82%)
	Absent	160 (58.18%)

Figure-1 display average score distribution for DASS-21 scale responses which shows that among study population symptoms such as difficulty in initiating work (1.59), nervousness (1.57), hopelessness (1.56), worthlessness (1.55) and apprehensive expectation (1.53) were scored high.

Comment [PK18]: None of these questions have been indicated in the Methodology earlier. These are useful questions, but needs a better set up in the Methodology.

Comment [PK19]: Not entirely sure what the scores are or how they have been obtained for each symptom. If these are proportion scores, then shouldn't they be between 0 and 1?. If the 0,1,2,3 scoring has been used, then that must be indicated earlier in Methodology

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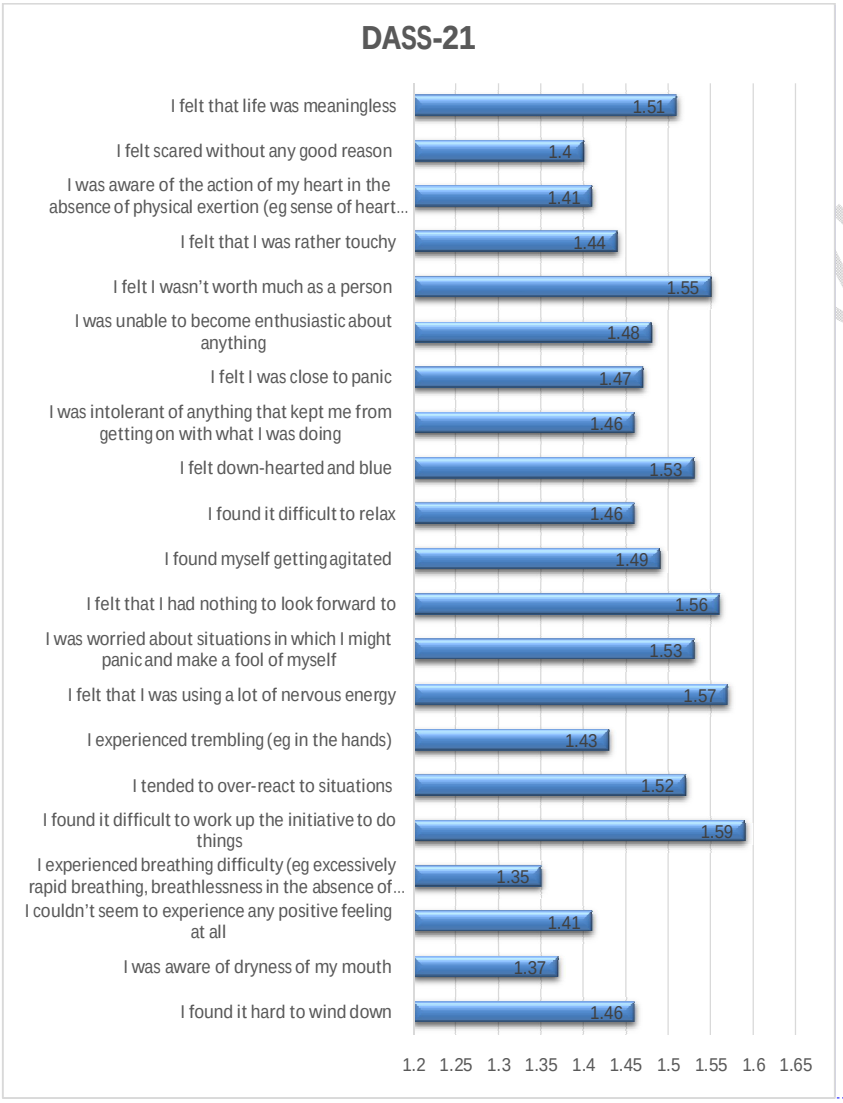
Figure-1 Bar Chart showing average score distribution for DASS-21 scale responses among study population.



Comment [PK20]: Figure is vague and does not provide the best representation of the DASS results/scores

Table-2 display that overall prevalence of depression, anxiety and stress among study population is 68.4%, 78.2% and 33.1% respectively. Prevalence of mild, moderate, severe and extremely severe depression were 15.6%, 32.7%, 10.2% and 9.8% respectively. Prevalence of mild, moderate, severe and extremely severe anxiety were 9.1%, 32.0%, 17.5% and

19.6% respectively and severity of stress in terms of mild, moderate, severe and extremely severe stress were 10.9%, 12.4%, 6.2% and 3.6% respectively.

Table-2 Overall prevalence of Depression, Anxiety and Stress among study population.

Severity	Depression	Anxiety	Stress
Mild	43 (15.6%)	25 (9.1%)	30 (10.9%)
Moderate	90 (32.7%)	88 (32.0%)	34 (12.4%)
Severe	28 (10.2%)	48 (17.5%)	17 (6.2%)
Extremely severe	27 (9.8%)	54 (19.6%)	10 (3.6%)
Total	**188 (68.4%)**	**215 (78.2%)**	**91 (33.1%)**

Table-3 display that prevalence of mild, moderate, severe and extremely severe depression were 12.5%, 32.1%, 19.6% and 5.4% respectively in PG student group and 16.4%, 32.9%, 7.8% and 11% respectively in UG student group. Prevalence of mild, moderate, severe and extremely severe anxiety were 10.7%, 19.6%, 5.35% and 3.57% respectively in PG Student group and 8.67%,32.4%, 18.3% and 18.7% respectively in UG student group. Severity of stress in terms of mild, moderate, severe and extremely severe stress were 10.7%, 19.6%, 5.35% and 3.57% respectively in PG students' group whereas 10.9%, 10.5%, 6.39% and 2.28% respectively in UG students' group.

Comment [PK21]: Was it checked if it was the same students having higher scores on Depression, Anxiety and Stress? That is very important to explore the extent of emotional disturbance that might require immediate or further intervention

Table- 3 Prevalence of Depression, Anxiety and Stress among PG students and UG students.

Severity	PG Students (N=56)			UG Students (N=219)		
	Depression	Anxiety	Stress	Depression	Anxiety	Stress
Mild	07 (12.5%)	06 (10.7%)	06 (10.7%)	36 (16.4%)	19 (8.67%)	24 (10.9%)
Moderate	18 (32.1%)	17 (30.5%)	11 (19.6%)	72 (32.9%)	71 (32.4%)	23 (10.5%)
Severe	11 (19.6%)	08 (14.3%)	03 (5.35%)	17 (7.8%)	40 (18.3%)	14 (6.39%)
Extremely severe	03 (5.4%)	13 (23.2%)	02 (3.57%)	24 (11.0%)	41 (18.7%)	05 (2.28%)

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Total	39 (69.6%)	44 (78.7%)	22 (39.3%)	149 (68.0%)	171 (78.1%)	66 (30.1%)

Table- 4 shows that when comparison was done using ~~unpaired~~ independent samplesT-test and one way ANOVA test among between different demographic variables for depressive, anxiety and stress symptoms; reason to join the study stream, relationship with friends, satisfaction with regard to admission in this college and history of mental health issues in family shows statistically significant association. (***p-~~value~~ <.05***) Mean value for depression is high among, students who choose the study stream under parental pressure compare to students who has personal choice (f-ration=14.43, ***p-~~value~~<.000~~01~~***), who has poor

relationship with friends (f-ration=4.02, ***p-value=.02***), who has unsatisfaction with regard to admission (t-value=1.72, ***p-value=.04***) and has history of mental health issues in family. (t-value=2.85, ***p-value=.002***)Anxiety is statistically significantly associated with factors like peer and family pressure to join the study stream (f-ration=13.78, ***p-value <.00001***) and history of mental health issues in family. (t-value=3.25, ***p-value=.001***)Stress is statistically significantly associated with factors like peer and family pressure to join the study stream (f-ration=12.41, ***p-value <.00001***), unsatisfaction with regard to admission (t-value=1.87, ***p-value=.03***) and history of mental health issues in family. (t-value=2.48, ***p-value=.006***)

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	DASS-21 Score

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Table- 4Association of different demographic variables with depression, anxiety and stress.

Comment [PK22]: Formatting of the table has to better. Row/Column sizes should be according to content in order to make the table as compact as possible

		Depression			Anxiety			Stress		
		Mean ± SD	t-value/ f-ration	p-value	Mean ± SD	t-value/ f-ration	p-value	Mean ± SD	t-value /f-ration	p-value
Gender	Male	14.20 ± 7.59	0.23	***.41***	13.23 ± 7.35	0.01	***.49***	13.39 ± 7.17	0.11	***.46***
	Female	14.00 ±10.69			13.23 ± 8.87			13.5 ± 10.26		
Residence	Hostel	14.06 ± 8.96	0.25	***.40***	13.1 ± 7.72	0.54	***.29***	13.33 ± 8.53	0.44	***.33***
	Home	14.42 ±10.48			13.77 ± 9.72			13.92 ±10.05		
Socio-economic status	Lower	19.33 ±10.56	0.93	***.42***	17.33 ± 9.85	0.71	***.55***	15.67 ± 9.58	0.85	***.47***
	Lower Middle	13.92 ± 9.73			13.55 ± 8.61			13.79 ± 9.49		
	Upper Middle	13.67 ± 9.14			12.78 ± 7.79			12.69 ± 8.31		
	Upper	15.04 ± 8.70			13.48 ± 8.18			14.67 ± 9.12		
Distance From Home	Near (<150 km)	13.69 ± 9.37	1.75	***.18***	13.20 ± 8.39	0.74	***.48***	12.73 ± 8.62	2.98	***.05***
	Far (151-700km)	13.35 ± 8.47			12.63 ± 7.45			12.63 ± 8.04		

	Very far (> 700km)	15.86 ±10.03			14.14 ± 8.72			15.61 ± 9.90		
Study Stream	MBBS (Medical)	15.40 ± 9.94	2.03	***.11***	13.96 ± 8.44	0.84	***.48***	14.56 ± 9.30	1.79	***.15***
	BDS (Dental)	12.05 ± 9.34			12.05 ± 8.18			11.51 ± 8.73		
	BPT (Physiotherapy)	13.71 ± 8.22			13.67 ± 7.55			13.48 ± 7.19		
	Medical PG	14.79 ± 8.20			13.07 ± 7.91			13.89 ± 8.96		
Reason to join the study stream	Personal Choice	12.78 ± 8.71	14.43	***<.00 001****	12.01 ± 7.86	13.78	***<.00 001****	12.31 ± 8.21	12.41	***<.00 001****
	Peer Pressure	16.72 ± 7.06			16.11 ± 6.47			15.17 ± 7.18		
	Parent's Pressure	22.33 ±11.79			18.83 ± 8.73			21.08 ±12.03		
Relationship with Family	Strong	13.63 ± 9.11	2.28	***.10***	13.19 ± 7.95	.08	***.92***	13.22 ± 8.73	.39	***.68***
	Fair	16.72 ±10.23			13.57 ± 9.19			14.47 ± 9.78		
	Poor	12.91 ± 5.61			12.55 ± 7.49			13.64 ± 6.56		

Relationship with Friends	Strong	13.08 ± 8.73	4.02	**0.02***	12.68 ± 7.82	1.44	***.24***	12.69 ± 8.37	2.71	***.07***
	Fair	16.35 ± 9.68			14.35 ± 8.62			14.77 ± 9.24		
	Poor	17.09 ± 12.28			15.09 ± 9.57			17.45 ± 12.10		
Satisfaction with regard to admission in this college	Satisfied	13.57 ± 8.61	1.71	**.04***	12.87 ± 7.55	1.23	***.11***	12.86 ± 8.07	1.87	**.03***
	Unsatisfied	15.75 ±10.78			14.25 ± 9.59			15.13 ±10.59		
Initial impression about their chosen study stream	As per expectation	13.78 ± 9.10	1.54	***.22***	12.73 ± 7.98	1.43	***.24***	13.35 ± 8.83	2.46	***.09***
	Below expectation	14.02 ± 8.53			13.62 ± 7.64			12.68 ± 7.65		
	Opposite to expectation	17.60 ±12.69			15.80 ±10.86			17.50 ±12.33		
History of mental	Present	15.98 ± 7.52	2.85	***.002****	15.08 ± 7.03	3.25	***.0006****	14.99 ± 7.49	2.48	***.001****

health issues in family	Absent	12.80 ±10.13			11.90 ± 8.61			12.34 ± 9.55		

*p-value <0.05 is significant.

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4. DISCUSSION

This study is a type of cross-sectional study conducted among recently joined medical and paramedical students (within fifteen days- six months) to find out the prevalence of depression, anxiety and stress in medical and para-medical students and its relation to various demographic variables.

In present study, results from the DASS-21 scale was ~~suggestive~~ suggest~~of~~ a high prevalence of depression, anxiety and stress in PG medical student group, 69.6%, 78.7% and 39.3% respectively; compared to 68%, 78.1% and 30.1% in UG student group respectively. A descriptive cross-sectional study done among medical students by Saumik Chakraborty et al. in India which found prevalence of depression, anxiety and stress to be~~is~~ 45.3%, 52.4% and 31.9% respectively. [1] This is comparable to our data in which overall prevalence of depression, anxiety and stress is 68.4%, 78.2% and 33.1% respectively. Another cross-sectional study done by Gupta et al. in India among undergraduate medical students found that more than half were affected by depression (51.3%), anxiety (66.9%) and stress (53%) which is comparable to our study in which prevalence of depression, anxiety and stress is 68%, 78.1% and 30.1% in UG student group respectively.[3] Similar research was done in Brazil by Natalia et al. using the DASS scale, and they discovered that 34.6%, 37.2%, and 47.1% of medical students had depression, anxiety, and stress, respectively.[12]

In present study depression is associated with factors like peer and family pressure to join the study stream, poor relationship with friends, unsatisfaction with regard to admission and history of mental health issues in family; anxiety is associated with factors like unsatisfaction with regard to admission and history of mental health issues in family; and stress is associated with factors like peer and family pressure to join the study stream, unsatisfaction with regard to admission and history of mental health issues in family. Some factors are protective such as strong relationship with family members, personal choice for joining the stream and satisfaction with chosen medical college and stream.

Due to the high academic, financial, and social expectations that college environments place on students at a time when they are also dealing with challenges connected to lifestyle and jobs, medical students experience high rates of psychiatric problems. When students enter medical school, they begin their professional journey with high parental expectations, a challenging curriculum, and intense peer and academic pressure. Students also experience feelings of loneliness as they leave the safe, indulged, and incredibly supportive environment of their family and move to a dorm in a highly competitive environment. This might explain why first-year medical students in this study had higher rates of stress, anxiety, and depression. [1]

Postgraduate medical students may experience increased psychiatric morbidity due to psychological stress brought on by their high levels of responsibility, demanding work schedules, lack of sleep, and frequent exposure to emotionally charged situations. Patient care quality, patient safety, and professionalism may all deteriorate as a result. Mental health issues may cause a number of impairments in terms of schooling, employment, and financial stability in the absence of prompt diagnosis and treatment.

Conducting stress-management workshops at the institutional level, routine mental-health check-ups in healthcare institutions, mental-health screening for students enrolling in healthcare courses, and prompt referrals to mental healthcare facilities are the main preventive measures to reduce mental health related issues and suicides among students.

Comment [PK23]: This is true for most students joining colleges for the first time for any courses. Needs better justification for medical students/field.

Comment [PK24]: This part needs to be expanded further. The whole point of the article is on the vulnerable state of meedical students; thus some thought has to be given on the study's implications and steps to curb the problems.

5. CONCLUSION

This study shows that there is high level of depression, anxiety & stress among recently enrolled medical and paramedical students which provide insight into need for improvement of psychological wellbeing in them; which could potentially have a positive impact upon decreasing suicide rates and ~~,their~~ increase theirquality of life and improving~~ed~~ patient care. Earlier the problems are identified; the earlier these measures can be instituted so mental health screening should be done to all students entering into medical and paramedical courses at regular intervals. Counselling and preventive mental health services should be an essential part of the routine investigation of medical students and actions should be taken to encourage the students to seek help on exposure to distress.

Comment [PK25]: Consider alternate wording

6. LIMITATIONS

- Some factors are not studied as academic and educational factors.
- Only recently joined medical and paramedical students are taken in the study; other semesters students should also be also taken for better outcome.

Comment [PK26]: This is very vague, please give examples

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- Further studies should be done to identify different sources and causes of stress especially related to academic and educational factors, and the effect of different intervention measures to avoid or cope with the psychological effect of the life tension.

Comment [PK27]: Consider alternate wording. 'Distress' has been used mostly in the rest of the article

CONSENT

Prior informed consent was obtained through software 'psytoolkit' from the participants before collecting data for using data in future for analysis andpublication.

ETHICAL APPROVAL

Prior permission of SumandeepVidyapeeth institutional ethics committee (SVIEC) was taken to start the study (SVIEC/ON/MED/SRP/4/22026)

REFERENCES

Comment [PK28]: Reference entries are not consistent to the Vancouver style followed by the journal. The order of title,date, volume, etc. are incorrectly done for a number of entries Also, URLs/DOIs are missing for all entries.

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Comment [PK29]: This is APA style, not Vancouver

Comment [PK30]: This is a seperate entry altogether. Since, it is a numbered list, care has to be taken that the list is correctly represented.

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