

Access this article online
Quick Response Code:

Website: www.jehp.net
DOI: 10.4103/jehp.jehp_321_23

# A study on measure of resilience and impact of demanding clinical training on young medical professional's burnout in a tertiary care hospital, Andhra Pradesh

K Roma Thomas, Venkatesh Reddy B<sup>1</sup>

## Abstract:

**BACKGROUND:** The psychological state of medical students gaining concern on the part of medical institutions in several countries. Numerous studies are being conducted to study stress, burnout, and depression in medical students in India and globally. However, little is known about medical student resilience, particularly in India. The objectives of this study were to study the resilience, self-perceptions of stress coping skills, and burnout among medical students in clinical training in a tertiary care health center, to study factors associated with resilience among medical students in clinical training in a tertiary care health center and to study the relationship between resilience and self-perceptions of stress coping skills and symptoms of burnout.

**MATERIALS AND METHODS:** This cross-sectional study was conducted in a tertiary healthcare hospital in district Guntur, Andhra Pradesh from November 2020 to December 2020, among 186 adult male and female medical students, aged more than 20 years, enrolled in the regular degree course and part of patient care or at least last three months. Participants were randomly selected and a structured questionnaire with Connor Davidson Resilience Scale 10 was used for interviewing. Descriptive and inferential statistics were conducted to measure associations between outcome and explanatory variables. We used multiple linear regression to examine the association between dependent and independent variables. A *P* value less than .05 was considered significant.

**RESULTS:** In the present study, 109 (58.0%) were females. The mean age of the study participants was 25.4 years (standard deviation 2.78). The mean score resilience score of the study participants using Connor Davidson Resilience Scale 10 was 25.1 (standard deviation 7.97). Of the total 44 (23.7%) of the study, participants reported the presence of burnout. A significant positive correlation was between resilience and self-perceptions of stress-coping skills with a Pearson Correlation coefficient of 0.393. Among the study participants, the mean resilience score was higher among those not having any symptoms of burnout. In the hierarchical stepwise multiple linear regression analysis, male gender (*P* value = .014), financial independence (*P* value = .044), and absence of burnout symptoms (*P* value = .004) were significantly associated with higher resilience scores. Psychiatric medicine usage was significantly associated with a lower resilience score with *P* < .05.

**CONCLUSION:** Our study samples had higher resilience and lower burnout prevalence compared to the West. The stressful clinical event experienced by medical students demands training and innovative strategies to foster communication and teamwork skills among medical teams.

## Keywords:

Burnout, coping, education, medicine, resilience

MBBS, Department of  
Community Medicine,  
NRI Medical College and  
General Hospital, Guntur,  
Andhra Pradesh, India,  
<sup>1</sup>Department of Community  
and Family Medicine, All  
India Institute of Medical  
Sciences Mangalagiri,  
Andhra Pradesh, India

## Address for correspondence:

Dr. Venkatesh Reddy B,  
Assistant Professor, of  
Community and Family  
Medicine, All India  
Institute of Medical  
Sciences Mangalagiri,  
Andhra Pradesh, India.  
E-mail: dr.shiva222@  
gmail.com

Received: 06-03-2023  
Accepted: 15-05-2023  
Published: 27-11-2023

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: WKHLRPMedknow\_reprints@wolterskluwer.com

**How to cite this article:** Thomas KR, Reddy BV. A study on measure of resilience and impact of demanding clinical training on young medical professional's burnout in a tertiary care hospital, Andhra Pradesh. *J Edu Health Promot* 2023;12:390.

## Introduction

The psychological state of medical students gaining concern on the part of medical institutions in several countries. In addition to study-related burdens, many demands and responsibilities are placed on these students because the profession has little or no tolerance for mistakes, favoring the event of stress and anxiety.<sup>[1]</sup> Globally, the prevalence of depression or depressive symptoms among medical students varies across studies from 1.4% to 73.5% and those of suicidal ideation vary from 4.9% to 35.6%.<sup>[2]</sup> It is alarming to observe the prevalence of provisionally diagnosed depressive disorder and major depressive disorder in medical students. A recent study from South India among medical students found the prevalence of depression and stress were 59% and 11%, respectively.<sup>[3]</sup>

The National Academy of Medicine, United States defined burnout as one of the most prevalent dimensions of distress, characterized by high emotional exhaustion, high depersonalization (i.e. cynicism), and a low sense of personal accomplishment. Also, long hours of studying, essay writing, meeting project deadlines, an unprofessional environment, criticism, lack of clinical continuity, poor levels of feedback from senior doctors, hostile attitudes, and the changing dynamics of medicine push medical students to struggle with burnout. Research has shown that 50% of medical students experience symptoms of burnout.<sup>[4]</sup> Other stressors during the clinical training include patient death and dying perceptions of unfair treatment and difficult team dynamics.<sup>[5]</sup>

Students experiencing burnout not only have an increased likelihood of depression but also interfere with the teaching/learning process, causing drowsiness, fatigue, eating disorders, migraine, emotional instability, and even the use of illicit drugs.<sup>[1]</sup> Resilience is measuring the ability to cope with stress and thrive when faced with adversity. Fostering resilience mitigates the negative effects of stressors, prevents burnout, and helps students succeed after difficult experiences. Healthcare professionals in India frequently suffer from burnout due to a growing workload and inadequate working conditions. To develop a stable population capable of supporting society, it is important to consider the extent of these issues and the contributing factors. Numerous studies are being conducted to study stress, burnout, and depression in medical students in India and globally. Research on resilience has been gaining momentum. Studies outside India reported that increased resilience creates positive changes at the individual and collective levels.<sup>[1,4-6]</sup> However, little is known about medical student resilience, particularly in India. Therefore, this study determined resilience levels, burnout, and its

associated factors in young medical professionals of Southern India. By examining resilience among medical students in South India, the study can shed light on how this population copes with stress and adversity and identify need for potential interventions to support their wellbeing and academic success.

## Materials and Methods

### Study design and setting

This was a cross-sectional study conducted in a tertiary healthcare hospital in the district of Guntur, Andhra Pradesh.

### Study participants and sampling

The data were collected from November-December 2020 from randomly selected adult males and females aged more than 20 years, enrolled in a regular degree course in a tertiary healthcare hospital and part of patient care for at least last three months. The study participant who was very sick, who did not give consent, or who was not available after three consecutive contacts was excluded from the study. A list of students enrolled in a regular course was retrieved from the appropriate authority. Random sampling was done.

The sample size was calculated based on a mean (standard deviation [SD]) resilience score of 28.21 (6.37) in a cross-sectional study at the University of Chicago Pritzker School of Medicine among medical students.<sup>[5]</sup> The estimate is required within 1 score of the true average score with 95% confidence. The sample size came to be 162. Considering a nonresponse of 15%, the final sample size required is 186 medical students.

### Data collection tool and technique

The data collection instrument was a questionnaire having patient demographics namely age, sex, marital status, residence, religion, other known illnesses, prior schools, financial independence, living situation, and parents' education level. The behavioral health-related aspects included a perception of the student's health, smoking habits, use of habit-forming medications (sleeping pills, staying awake, and anxiety), use of illegal drugs (marijuana, cocaine, and crack), and alcohol.<sup>[7]</sup> Resilience was assessed using the 10-item version of the Connor Davidson Resilience Scale (CD-RISC 10). Study participants rated items on a scale from 0 (not true at all) to 4 (true nearly all the time). Possible scores range from 0 to 40, with 40 representing a more resilient score.<sup>[8]</sup> Symptoms of burnout were assessed using the validated single-item burnout measure. Study participant defined burnout for themselves: Responses are scored on a five-category ordinal scale, where 1 is "I enjoy my work". I have no symptoms of burnout and 5 is "I feel completely

burned out." This item often is dichotomized as  $\leq 2$  (no symptoms of burnout) and  $\geq 3$  (1 or more symptoms).<sup>[9]</sup> A list of clinical events, stressful clinical events, and preferences to discuss with whom was given to the students to mark appropriately. A five-point Likert scale to study agreement with several statements about skills in dealing with difficult experiences and their need for additional resilience training. Study participants rated items on a scale from 5 (strongly agreed) to 1 (strongly disagreed). Possible scores range from 4 to 20, with 20 representing a more coping skills score.<sup>[5]</sup>

The investigator introduced herself to the study participant before the start of the interview. The study participant was given a participant information sheet and they explained the study, its objectives, procedure, and the rights of the participants. If the study participant agreed to participate in the study after going through the information sheet, then a written consent was taken from him/her through online mode. The study participants were given a self-administered questionnaire using the Google platform. The survey was conducted until the final sample size was achieved. The American Psychological Association defines individual-level resilience as the process of adapting well in the face of adversity, trauma, tragedy, or threats. It also includes coping with significant stress caused by problematic and toxic relationships in the family or at the workplace and the capacity to bounce back from difficult experiences.<sup>[10]</sup> In the present study, participant having a score of more than 30 on the CD-RISC 10 was considered to have resilience. The dependent variable was Medical Student Resilience and the independent variables were Demographics variables namely age, sex, marital status, residence, religion, other known illness, prior schools, financial independence, living situation, parents' education level, behavioral health, burnout score, stressful clinical event, and preferences to discuss.

All the data were entered into Microsoft Excel 2010. The analysis was done using SPSS 17. Descriptive statistics were conducted for the percentage, mean, and SD; inferential statistics were conducted using Chi-square test and *t*-test of significance to measure associations between outcome and explanatory variables, as applicable. We used multiple linear regression to examine the association between dependent and independent variables. A *P* value less than .05 was considered significant.

### Ethical consideration

Ethical clearance was received from the Institute Ethics Committee [IEC NRIMC 161, dated Feb 19, 2020]. A written informed consent was taken from participants through online mode.

## Results

A total of 186 study participants were interviewed. The response rate was 91.2%. In the present study, 77 (41.0%) were males and 109 (58.6%) were females. The majority 102 (54.3%) of the study participants belonged to the age group 21-25 years. The mean age of the study participants was 25.4 years (SD 2.78). On univariate analysis, the resilience score was significantly more among males ( $P = .007$ ) and users of psychiatric medication ( $P = .002$ ) [Table 1]. The mean and median family income of the study participant was Rs. 10,856.1 (SD 18,117.2) and Rs. 80,000, respectively. The mean and median individual income of the study participant was Rs. 32,260.8 (SD 33,800.3) and Rs. 15,000, respectively. Of all the total, 155 (83.3%) had no morbidity followed by 14 (7.5%) of the study participants having asthma, six (3.2%) were hypothyroid, and four (2.2%) had allergic respiratory symptoms. Table 2 shows a total of 5.4% of the study participants were current smokers and 1.1% were current smokeless tobacco users. Among all, 8.1% were past smokers and 2.2% were past smokeless tobacco chewers. A total of 8.6% of the study participants were current alcohol users. More than 93.8% of alcohol users reported less than daily consumption. The mean number of drinks consumed on a typical day was 3.5 (SD 1.7). Nearly 9.3% of study participants reported using psychiatry medicines. The mean resilience score of the study participants using the CD-RISC 10 was 25.1 (SD 7.97). The resilience score ranged from a minimum of 3 to a maximum of 40 in the present study. More than half of the study participants categorized that occasionally they are under stress, and they do not always have as much energy as they once did, but they do not feel burned out. Of the total, 44 (23.7%) of the study participants reported the presence of burnout [Table 3]. The three most common stressful clinical events experienced by the internship students are Difficult encounters with other staff 40 (61.4%), Dealing with difficult patients 31 (54.4%), and Difficult family discussions 28 (49.1%), respectively. Among postgraduate students, the three most common stressful clinical events were Dealing with difficult patients 104 (80.6%), Difficult encounters with other staff 92 (71.3%), and Difficult family discussions 80 (62.0%), respectively. Nearly 78 (41.9%) of study participants reported that after difficult clinical events, they sometimes reflect on them individually. More than three-fourth of the study participants stated that they discuss a difficult clinical event with the team immediately 71 (38.2%) or later the same day 77 (41.4%). The most common person interns talked to about difficult clinical events were fellow students 48 (84.2%) and postgraduate students were team residents 100 (77.5%) [Figure 1]. Nearly more than half of the medical students in clinical training in a tertiary care hospital agreed or strongly agreed to one or other of the

**Table 1: Distribution of demographic risk factors with resilience score among study participants (n=186)**

Variable	Category	Resilience score		Count	%	P
		Mean	Standard Deviation			
Age in years	21-25	25.1	8.2	102	54.3	0.993
	26-30	25.1	7.1	77	41.0	
	> 30	25.4	13.6	7	3.7	
Gender	Female	23.8	7.8	109	58.0	0.007
	Male	27.0	7.9	77	41.0	
Education status	Internship	24.1	8.3	57	30.3	0.275
	Perusing Postgraduation	25.5	7.8	129	68.6	
Socioeconomic status	Upper	25.1	7.5	155	82.4	0.938
	Upper Middle or less	25.0	10.2	31	16.5	
Financially independent	No	24.8	8.1	166	88.3	0.097
	Yes	27.9	6.7	20	10.6	
Type of the family	Extended	24.6	8.7	18	9.6	0.761
	Nuclear	25.2	7.9	168	89.4	
Lives in hostel	No	24.3	7.9	98	52.1	0.162
	Yes	26.0	8.0	88	46.8	
Mother education status	Graduate or higher	24.5	7.7	88	46.8	0.409
	12 <sup>th</sup> pass or less	25.6	8.2	98	52.1	
Father education status	Graduate or higher	24.8	7.8	129	68.6	0.472
	12 <sup>th</sup> pass or less	25.7	8.2	57	30.3	
Mother Occupation	Homemaker	25.3	8.0	148	78.7	0.603
	Other	24.5	7.9	38	20.2	
Father Occupation	Job	25.4	8.2	85	45.2	0.59
	Other	24.8	7.7	101	53.7	
Current smoker	Yes	24.6	8.5	10	5.3	0.838
Current Smokeless tobacco user	Yes	22.5	2.1	2	1.1	0.644
Current alcohol user	Yes	26.4	7.5	16	8.5	0.485
Psychiatric medicine user	Yes	19.4	5.9	17	9.0	0.002
Other Substance users	Yes	20.0	4.4	3	1.6	0.265

stress-coping skills [Table 4]. Figure 2 depicts the positive correlation is significant at the 0.01 level (two-tailed) between resilience and self-perceptions of stress-coping skills with a Pearson Correlation coefficient (0.393). Among the study participants, the mean resilience score of 26.3 (SD 7.5) was higher among those not having any symptoms of burnout. The presence of symptoms of burnout among study participants is significantly associated with a lower resilience score with  $P < .001$ . In the hierarchical stepwise multiple linear regression analysis, the overall resilience score had a mean of  $25.10 \pm 7.97$ . Demographic factors (Block 1, Table 4) explained 3.9% of the variance (adjusted  $R^2 = 0.039$ ) in the overall resilience score when none of the other factors was controlled for. Socioeconomic and family variables (Block 2,3, Table 4) explained an additional 6.9%, and behavioral factors set up an additional 6% of the variance (Block 4, Table 4). Burnout symptoms explained 10.3% of the variance in the overall resilience score. Male gender, financial independence, and absence of burnout symptoms were significantly associated with higher resilience scores with  $P < .05$ . Psychiatric medicine usage was significantly associated with a lower resilience score with  $P < .05$  [Table 5].

## Discussion

This study was done to estimate the resilience, the self-perceptions of stress-coping skills and burnout, and associated factors among medical students in clinical training in a tertiary care health center in Guntur district, Andhra Pradesh. The present study enrolled 186 adults. Females constituted nearly two-thirds of the study population. More than two-thirds of fathers have studied till graduation or higher. On the other hand, less than 50% of mothers had studied undergraduate or higher. Of the total number of study participants, 47.3% lived in hostels. Financial independence was documented among all 10.8% of the study participants. This indicates the study population was literate and had good economic status. A total of 5.4% of the respondents in the survey were current smokers and 1.1% were current smokeless tobacco consumers. On the contrary, a study from Karnataka, India, the documented prevalence of smoking and smokeless tobacco use was 22.6% among undergraduate medical students.<sup>[11]</sup> In addition, A systematic review from China found the prevalence of current smoking in 24.09% of male medical students.<sup>[12]</sup> This difference could be because of the different study



**Table 2: Distribution of behavioral factors among study participants (n=186)**

Variable	Gender n (%)		Total	Chi-square	P
	Female	Male			
<b>Tobacco Smoking</b>					
Total no. of Current Smoker	1 (0.9)	9 (11.7)	10 (5.4)	10.7	0.005
Total no. of Former Smoker	1 (0.9)	14 (18.2)	15 (8.1)	18.1	<0.001
Frequency of Smoking in the last month (n=10)					
Daily	0 (0)	5 (50.0)	5 (50.0)		
Less than daily	1 (10.0)	4 (40.0)	5 (50.0)		
The mean number of cigarettes/Bidi smoked in a day (SD)			9.1 (8.6)		
<b>Smokeless Tobacco</b>					
Total no. of Current Smokeless tobacco users	0 (0)	2 (2.6)	2 (1.1)	2.8	0.09
Total no. of Former Smokeless tobacco users	1 (0.9)	3 (3.9)	4 (2.2)	1.9	0.168
Frequency of Smokeless tobacco use in the last month (n=2)					
Daily	0 (0)	0 (0)	0 (0)		
Less than daily	0 (0)	2 (100.0)	2 (100.0)		
The mean number of packets of tobacco used in a day (SD)			1.5 (0.5)		
<b>Alcohol</b>					
Total no. of Current alcohol users	1 (0.9)	15 (19.5)	16 (8.6)	19.7	<0.001
Total no. of Past alcohol users	5 (4.6)	24 (31.2)	29 (15.6)	24.2	<0.001
Frequency of alcohol use in the last month (n=16)					
Daily	0 (0)	1 (6.2)	1 (6.2)		
Less than daily	1 (6.2)	14 (87.6)	15 (93.8)		
The mean number of drinks in a typical day (SD)			3.5 (1.7)		
Total no. of other substance users	0 (0)	3 (3.9)	3 (3.9)	4.3	0.22
Cocaine	0 (0)	1 (1.3)	1 (0.5)		
Crack	0 (0)	1 (1.3)	1 (0.5)		
Marijuana	0 (0)	1 (1.3)	1 (0.5)		
Total no. of psychiatric drug users	10 (9.2)	7 (9.1)	17 (9.3)	4.4	0.22
Anxiety drug	4 (3.7)	3 (3.9)	7 (3.8)		
Depression drug	4 (3.7)	0 (0)	4 (2.2)		
Sleeping pills	2 (1.8)	4 (5.2)	6 (3.2)		

populations and different geolocations. A total of 8.6% of the study participants were current alcohol users. Nearly 9.3% of study participants reported using psychiatry medicines. Similarly, a study among Italy and Australian medical students reported 9.1% used psychiatric drugs and 3.5% used psychostimulants.<sup>[13]</sup>

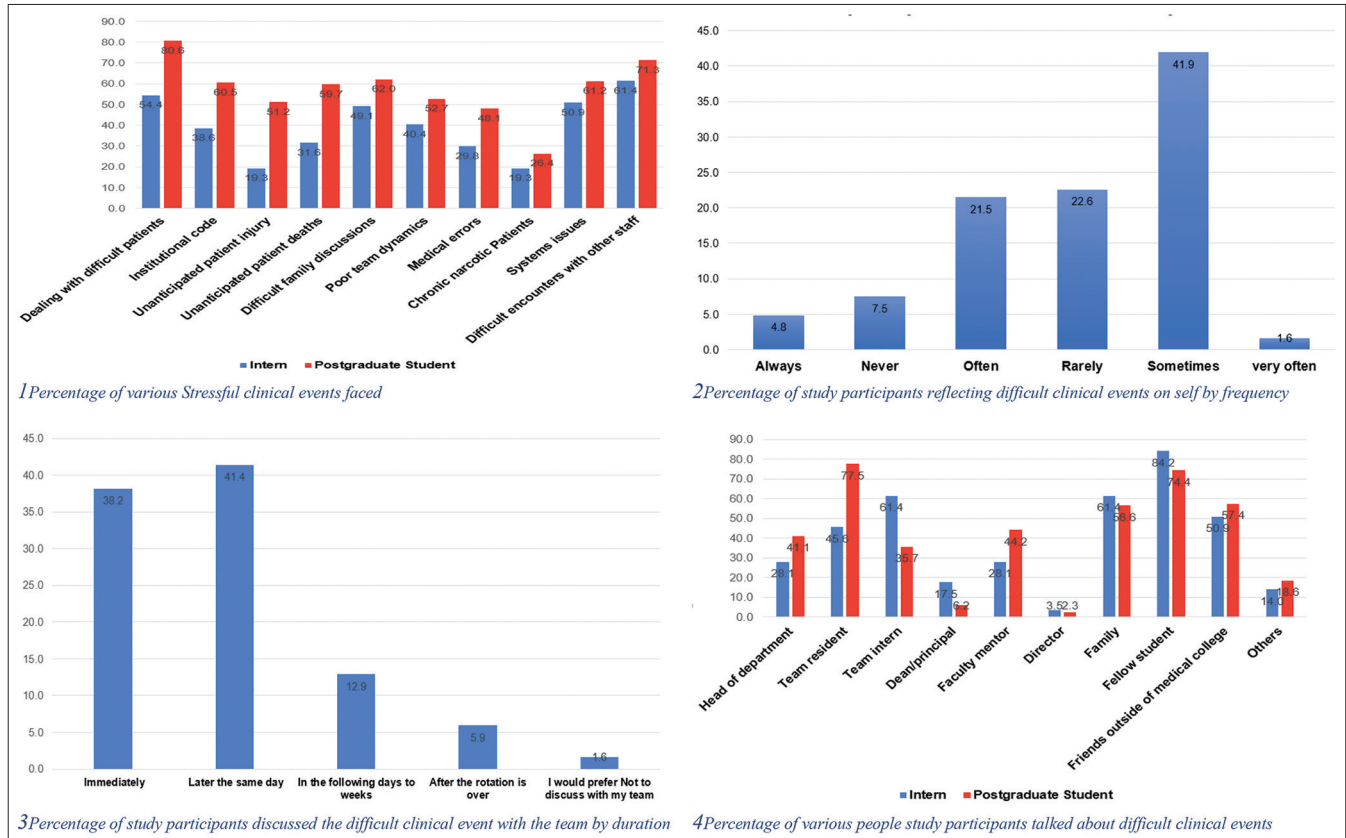
The mean resilience score using the CD-RISC 10 among medical students in clinical training in a tertiary care health center in the present study was 25.1 (SD 7.97). In the present study, a total of 22% of the medical students scored more than 30 on the CD-RISC 10. Our results were similar to a study among 899 frontline care staff conducted in 2020 using CD-RISC 10. The study reported a mean CD RISC 10 score of 26.36 (7.99) in frontline medical workers in Hubei Province and 27.47 (8.80) frontline medical workers in other regions of China.<sup>[14]</sup> Another cross-sectional study from the University of Chicago Pritzker School of Medicine in 2016 among 117 medical students documented a CD-RISC 10 score of 28.21 (6.37).<sup>[5]</sup> Medical students who score higher on the CD-RISC are more likely to exhibit positive coping behaviors, have better mental health outcomes, and

perform better academically. Other studies among medical professionals from Canada,<sup>[15]</sup> China,<sup>[16,17]</sup> and Australia<sup>[18]</sup> found CD-RISC mean resilience score was more than 50. Resilience levels among medical students in India may be lower compared to other countries due to several reasons. One possible explanation is that medical education in India is highly competitive and stressful, with a heavy emphasis on rote learning and high-stakes examinations. This can result in significant pressure and stress, which may impact students' resilience levels. Additionally, cultural factors such as collectivism, where individuals prioritize group harmony and conformity over individual autonomy, may also play a role.

The presence of burnout was recorded by 23.7% of the research participants. Similarly, another study from Bhubaneswar, India found the prevalence of burnout was 15.31% using Maslach Burnout Inventory and resilience scale among medical students.<sup>[19]</sup> Our results were comparable to a systematic review published in 2019, which stated the pooled prevalence of burnout ranged from 23% to 27% among doctors.<sup>[20]</sup> Also, in a recent meta-analysis of burnout in medical schools, the

**Table 3: Rate of burnout among medical students in clinical training in a tertiary care hospital**

Burnout category of study participants	Frequency	Percent
(1) 'I enjoy my work. I have no symptoms of burnout'	41	22.0
(2) 'Occasionally I am under stress, and I don't always have as much energy as I once did, but I don't feel burned out'	101	54.3
(3) 'I am burning out and have one or more symptoms of burnout, such as physical and emotional exhaustion'	33	17.7
(5) 'I feel completely burned out and often wonder if I can go on. I am at the point where I may need some changes or may need to seek some sort of help'	4	2.2
(4) 'The symptoms of burnout that I'm experiencing won't go away. I think about frustration at work a lot'	7	3.8
Total	186	100.0



**Figure 1: Details of clinical event experiences**

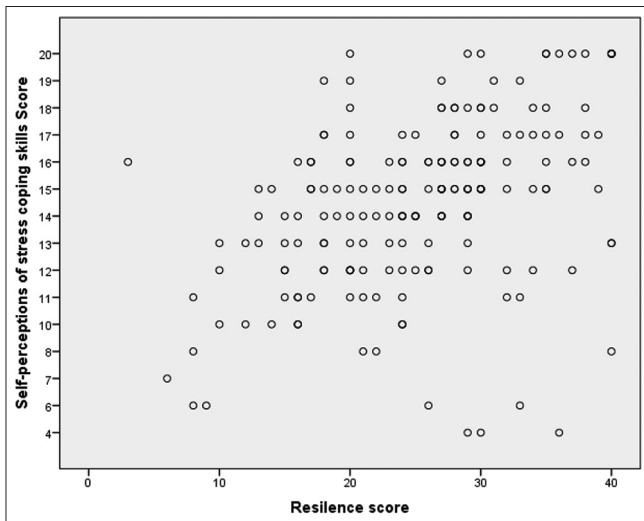
prevalence ranged from 7% to 75.2%.<sup>[21]</sup> The prevalence of burnout in the present study was higher compared to a study from Karachi medical students (18.2%)<sup>[22]</sup> and Riyadh medical students (13.4%).<sup>[23]</sup> This could be due to the differences in the geographical area, study tool, and the number of subjects. On the other hand, studies from Chinese and US medical schools registered burnout rates at 50%.<sup>[24-27]</sup> This emphasizes multiple factors cause stress and burnout. The services and interactions of developing world facilities offer students a more mature opportunity to live, lead, and participate.

The three most common stressful clinical events experienced by the medical students were Difficult encounters with other staff, Dealing with difficult

patients, and Difficult family discussions, respectively. This is possible because of their position in the hierarchy, the pressure of assessment, and lack of accountability as a student of medicine. The three most common people medical students talked to about difficult clinical events were peer, family, and resident, respectively. A cross-sectional study from Chicago among medical students mentioned the majority of students listed weak team dynamics as the most stressful, during clinical training. A lot would still choose to discuss these activities later that day with their team. Students shared incidents more with friends than with residents or stakeholders. Students who felt relaxed communicating with friends about depression and burnout showed greater resilience. Based on age, undergraduate major,

**Table 4: Self-perceptions of stress-coping skills among medical students in clinical training in a tertiary care hospital**

Domain	Strongly agree		Agree		Neutral		Strongly Disagree		Disagree	
	n	%	n	%	n	%	n	%	n	%
I have the skills necessary to personally cope with difficult clinical events (i.e., unexpected deaths, difficult patients, medical errors)	27	14.5%	72	38.7%	61	32.8%	14	7.5%	12	6.5%
I feel comfortable talking about stress and burnout with my peers	37	19.9%	85	45.7%	41	22.0%	10	5.4%	13	7.0%
I have the skills necessary to manage stress and prevent burnout	35	18.8%	73	39.2%	54	29.0%	12	6.5%	12	6.5%
I feel comfortable talking about medical errors I have been involved in, with my peers	33	17.7%	84	45.2%	47	25.3%	9	4.8%	13	7.0%



**Figure 2:** Correlation between resilience and self-perceptions of stress coping skills (n = 186)

or path to medical school, there was no significant difference.<sup>[5]</sup> Research among nurses in South Africa stated to balance the emotional essence of the job, work ethics, staff shortages, and physical demands of the work participants experienced adverse working conditions and required resilience.<sup>[28]</sup> Students indicated that they seldom communicate with their heads and seniors about stressful clinical incidents, which could be due to several factors, including weak comprehension, their position in the hierarchy, fear of failure, lack of accountability, etc. Team-building exercises and effective communication tool training can bridge these gaps and further enhance resilience.

In the present study, resilience score was significantly higher among males and financially independent medical students. A likely systematic review<sup>[20]</sup> and studies from the United States<sup>[29]</sup> and Canada<sup>[30]</sup> mentioned female gender was associated with an increased risk of burnout. We found a positive correlation significant at the 0.01 level between resilience and self-perceptions of stress-coping skills. Similar was the finding from a study from China among medical staff members

reported a significant negative correlation between perceived stress and resilience.<sup>[17]</sup> Another study showed lower stress levels were correlated with higher levels of resistance.<sup>[18]</sup> However, it is important to note that resilience is not a fixed trait and can be developed through various interventions such as mindfulness training, cognitive-behavioral therapy, and social support. Therefore, identifying lower resilience levels among medical students in India highlights the need for targeted interventions to support their wellbeing and academic success.

### Limitation and Recommendation

Some limitations of the present study are first resilience is often measured through self-report questionnaires, which may be subject to bias. Participants may not be entirely honest in their responses. Second, findings may not be generalizable to different populations or cultures. And finally, it is a cross-sectional study meaning they are conducted at a single point in time. It can be difficult to assess the long-term effects of resilience on individuals or groups, as factors such as trauma, stress, and other life events can impact resilience levels over time.

Despite these limitations, study has contributed significantly to our understanding of how medical young professionals cope with stress and adversity, and it can help inform interventions and strategies to support individuals in building resilience. A better understanding of resilience especially one that focuses on medical students needs a qualitative study, which was beyond the scope of this study.

### Conclusion

Medical students in clinical training in a tertiary care health center in Andhra Pradesh, India had higher resilience and lower burnout prevalence compared to Western World. Resilience played a defensive role in the experience of burnout among medical students. In line with the health policy of institutions, mentorship

**Table 5: Hierarchical stepwise multiple linear regression analysis**

Analysis Block	Adjusted R <sup>2</sup>	Independent Variable	B	95.0% Confidence Interval for B		B	P
Dependant Variable=Resilience Score							
Block 1							
Demographic factors	0.039	Age	0.5	-2.6	1.5	-0.03	0.617
		Gender	3.2	0.6	5.6	0.1	0.014
		Living in hostel	1.2	-1.1	3.6	0.07	0.309
Block 2							
Socioeconomic factors	0.045	Socioeconomic status	0.9	-3.2	1.2	-0.06	0.399
		Financially independent	3.8	0.09	7.5	0.1	0.044
Block 3							
Family factors	0.024	Type of the family	0.5	-3.5	4.5	0.02	0.799
		Mother education status	0.09	-2.7	2.9	0.01	0.949
		Father education status	0.6	-2.3	3.6	0.03	0.664
		Mother Occupation	0.3	-2.6	3.3	0.01	0.821
		Father Occupation	0.1	-2.3	2.6	0.01	0.897
Block 4							
Behavioural factors	0.06	Current smoker	1.09	-6.0	8.2	0.03	0.761
		Current alcohol user	0.96	-4.1	6.0	0.03	0.710
		Current smokeless tobacco user	1.9	-15.3	11.3	-0.01	0.767
		Psychiatric medicine user	4.6	-8.9	5.2	0.1	0.040
		Substance abuse	6.3	-16.3	6.7	0.1	0.215
Block 5							
Burnout	0.103	Burnout Symptoms	4.2	-6.9	5.3	0.2	0.004

programs, peer counseling, student counselors, etc., can help boost resilience and reduce the burnout of medical students. The stressful clinical event experienced by medical students like difficult encounters with other staff, dealing with difficult patients, and difficult family discussions, respectively, demands training and innovative strategies to foster communication and teamwork skills among medical teams.

### Acknowledgments

Our sincere gratitude to our Institute for its immense support to conduct the study. We are grateful to ICMR for granting short-term studentship for the study. We also thank the Department of Community Medicine for their support. We also thank all participants for their time and participants.

### Ethical approval

All participants in this study approved and provided their informed written consent for the authors to analyze the information retrieved from them. The informed written consent was aimed to encourage free and informed participation of the participants. The participants were informed that their participation was completely voluntary and that the authors would ensure the confidentiality of the data provided in any of the reports that resulted from this study. The study protocol, including the use of informed written consent, was approved by the Institute Ethics Committee, NRI Medical College and General Hospital, Guntur, Andhra Pradesh (IEC NRIMC 161).

### Financial support and sponsorship

The study was funded by Indian Council of Medical Research (STS 2020-08629). The funding body has no role in the design of the study and collection, analysis, and interpretation of data and in writing the manuscript.

### Conflicts of interest

There are no conflicts of interest.

### References

- Bony RADS, Paiva CE, de Oliveira MA, Luchet G, Fergana JHTG, Paiva BSR. Burnout among medical students during the first years of undergraduate school: Prevalence and associated factors. *Plos One* 2018;13:e0191746.
- Rosenstein LS, Ramos MA, Torre M, Segal JB, Peluso MJ, Guille C, et al. Prevalence of depression, depressive symptoms, and suicidal ideation among medical students: A systematic review and meta-analysis. *JAMA* 2016;316:2214–36.
- Raja S, Balasubramanian G, Jamuna Rani R. Prevalence of depression, anxiety and stress among private medical college students in South India: A cross-sectional study. *J Educ Health Promot* 2022;11:373.
- Morcos G, Awan OA. Burnout in Medical School: A Medical Student's Perspective. *Acad Radiol*. 2023 Jun; 30 (6):1223-1225.
- Hoppy JC, Lee WW, Woodruff JN, Pinacate AT. Medical student resilience and stressful clinical events during clinical training. *Med Educ Online* 2017;22:1320187.
- Farquhar J, Kamei R, Vidyarthi A. Strategies for enhancing medical student resilience: student and faculty member perspectives. *Int J Med Educ* 2018;9:1–6.
- Oliveira ACPD, Machado APG, Arana RN. Identification of factors associated with resilience in medical students through a cross-sectional census. *BMJ Open* 2017;7:e017189. doi: 10.1136/bmjopen-2017-017189.



8. Elkudssiah Ismail N, Hui WM, Goh KW, Jimam NS, Hermansyah A, Ming LC. Resilience among Malaysian community pharmacists and general medical practitioners using the 10-item Connor-Davidson resilience scale (CD-RISC): The First national survey. *Behav Sci (Basel)* 2022;12:272.
9. Dolan ED, Mohr D, Lemma M. Using a single item to measure burnout in primary care staff: A psychometric evaluation. *J Gen Intern Med* 2015;30:582-7.
10. The road to resilience. Washington (DC): American Psychological Association; 2009. Available from: <http://www.apa.org/helpcenter/road-resilience.aspx>. [Last accessed on 2020 Jan 13].
11. Patel J, Angolkar M, Murthy S, Mallapur MD. Prevalence of tobacco consumption and its contributing factors among students of a private medical college in Belgaum: A cross sectional study. *Ethiop J Health Sci* 2016;26:209-16.
12. Niu L, Liu Y, Luo D, Xiao S. Current smoking behavior among medical students in mainland China: A systematic review and meta-analysis. *Asia Pac J Public Health* 2018;30:610-23.
13. Carletto S, Miniotti M, Persico A, Leombruni P. Emotional distress and psychiatric drug use among students in an Italian medical school: Assessing the role of gender and year of study. *J Educ Health Promot* 2021;10:451.
14. Liang Y, Wu K, Zhou Y, Huang X, Zhou Y, Liu Z. Mental health in frontline medical workers during the 2019 novel coronavirus disease epidemic in China: A comparison with the general population. *Int J Environ Res Public Health* 2020;17:6550.
15. Wang C, Grassau P, Lawlor PG, Webber C, Bush SH, Gagnon B, *et al.* Burnout and resilience among Canadian palliative care physicians. *BMC Palliat Care* 2020;19:169.
16. Lin J, Ren YH, Gan HJ, Chen Y, Huang YF, You XM. Factors associated with resilience among non-local medical workers sent to Wuhan, China during the COVID-19 outbreak. *BMC Psychiatry* 2020;20:417.
17. Huang L, Wang Y, Liu J, Ye P, Cheng B, Xu H, *et al.* Factors associated with resilience among medical staff in radiology departments during the outbreak of 2019 novel coronavirus disease (COVID-19): A cross-sectional study. *Med Sci Monit* 2020;26:e925669.
18. Bacchi S, Licinio J. Resilience and psychological distress in psychology and medical students. *Acad Psychiatry* 2017;41:185-8.
19. Pharasi S, Patra S. Burnout in medical students of a tertiary care Indian medical center: How much protection does resilience confer? *Indian J Psychiatry* 2020;62:407-12.
20. Kesarwani V, Husaain ZG, George J. Prevalence and factors associated with burnout among healthcare professionals in India: A systematic review and meta-analysis. *Indian J Psychol Med* 2020;42:108-15.
21. Erschens R, Keifenheim KE, Herrmann-Werner A, Loda T, Schulle-Kiuntke J, Bugaj TJ, *et al.* Professional burnout among medical students: Systematic literature review and meta-analysis. *Med Teach* 2019;41:172-83.
22. Asghar AA, Faiq A, Shafique S, Siddiqui F, Asghar N, Malik S, *et al.* Prevalence and predictors of the burnout syndrome in medical students of Karachi, Pakistan. *Cureus* 2019;11:e4879.
23. Altannir Y, Alnajjar W, Ahmad SO, Altannir M, Yousuf F, Obeidat A, *et al.* Assessment of burnout in medical undergraduate students in Riyadh, Saudi Arabia. *BMC Med Educ* 2019;19:34.
24. Chunming WM, Harrison R, MacIntyre R, Travaglia J, Balasooriya C. Burnout in medical students: A systematic review of experiences in Chinese medical schools. *BMC Med Educ* 2017;17:217.
25. Dyrbye L, Shanafelt T. A narrative review on burnout experienced by medical students and residents. *Med Educ* 2016;50:132-49.
26. Rotenstein LS, Torre M, Ramos MA, Rosales RC, Guille C, Sen S, *et al.* Prevalence of burnout among physicians: A systematic review. *JAMA* 2018;320:1131-50.
27. Thompson G, McBride RB, Hosford CC, Halaas G. Resilience among medical students: The role of coping style and social support. *Teach Learn Med* 2016;28:174-82.
28. Benadé P, du Plessis E, Koen MP. Exploring resilience in nurses caring for older persons. *Health SA Gesondheid* 2017;22:138-49.
29. Jordan RK, Shah SS, Desai H, Tripi J, Mitchell A, Worth RG. Variation of stress levels, burnout, and resilience throughout the academic year in first-year medical students. *PLoS One* 2020;15:e0240667. doi: 10.1371/journal.pone.0240667.
30. Neufeld A, Malin G. Exploring the relationship between medical student basic psychological need satisfaction, resilience, and well-being: A quantitative study. *BMC Med Educ* 2019;19:405.