

Original Research Article

A cross-sectional study on the resilience quotient among medical students of Rajarajeswari Medical College and Hospital, Bengaluru

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ABSTRACT

Background: Resilience is the capacity to adapt positively and recover from stress and adversity. Medical training is inherently demanding, exposing students to intense academic pressure, emotional stress, and clinical challenges, which may affect their psychological well-being. Assessing resilience among medical students is essential to design interventions that promote mental health and prevent burnout. Objectives of the study were: to assess the resilience quotient among undergraduate medical students of Rajarajeswari Medical College and Hospital (RRMCH), Bengaluru, and to identify socio-demographic factors influencing resilience levels.

Methods: A cross-sectional study was conducted over three months among second, third, and fourth-year MBBS students at RRMCH. Using simple random sampling, 261 students were selected from a total population of 750 (sample size calculated using $n = N/1 + Ne^2$ at 95% confidence level). Data were collected using a pre-tested semi-structured questionnaire comprising socio-demographic details and the validated Connor–Davidson resilience scale (CD-RISC-25). Data were analyzed using statistical package for the social sciences (SPSS) v23. Descriptive statistics were expressed as frequencies and percentages. The chi-square test was used to assess associations, with $p < 0.05$ considered statistically significant.

Results: Among 261 participants, 51% were female and 49% male. The majority (61%) demonstrated moderate resilience, 32% had low resilience, and 7% showed high resilience. Moderate resilience predominated across gender, year of study, type of family, and place of stay. Although fourth-year students showed relatively higher moderate and high resilience levels, no statistically significant association was found between resilience levels and socio-demographic variables ($p > 0.05$).

Conclusions: While most students demonstrated moderate resilience, nearly one-third exhibited low resilience, indicating vulnerability to stress. Since no significant socio-demographic predictors were identified, institution-wide resilience-building interventions are recommended to enhance coping skills and promote mental well-being among medical students.

Keywords: Resilience quotient, Medical students, CD-RISC, Cross-sectional study, Mental health, Bengaluru

INTRODUCTION

Resilience is defined as the capacity of an individual to adapt positively and recover from stress, adversity, or challenging life circumstances. Because medical training is inherently demanding, involving intense academic pressure, prolonged study hours, frequent examinations, and early exposure to clinical suffering, resilience has become a more significant construct in medical education.

This is because medical students are increasingly experiencing psychological stress, burnout, and mental health issues.¹

Several studies have demonstrated that although most medical students enter training with adequate coping abilities, resilience levels may decline as academic and emotional demands increase over time. Reduced resilience has been associated with higher levels of psychological

distress, anxiety, depression, impaired academic performance, and poorer quality of life.^{2,3} Conversely, higher resilience has been shown to act as a protective factor, buffering the negative effects of stress and enabling students to maintain emotional stability and adaptive coping.⁴

The assessment of resilience has been facilitated by the use of validated psychometric instruments, among which the Connor–Davidson resilience scale (CD-RISC) is one of the most widely used. Developed to measure resilience, the CD-RISC has shown reliability and validity across multiple populations, including medical students and healthcare professionals.⁶

According to a study of medical students at Khon Kaen University in Thailand, most showed normal resilience, but a sizeable percentage showed low resilience, especially among those in their senior year of training.¹

Other worldwide studies have revealed similar results, indicating that academic and environmental stressors may have an impact on resilience and that it may vary between medical education stages.^{8,9}

In the Indian context, studies during the COVID-19 pandemic found a significant association between low resilience and higher psychological distress, anxiety, and poorer quality of life among medical students.^{3,12} These findings underscore the critical role of resilience in mitigating the mental health impact of academic stressors and public health crises. It has been noted that senior medical students have better coping skills despite higher stress levels, suggesting a complex and multifaceted relationship between resilience and academic exposure.^{8,10}

Resilience-building techniques should be incorporated into competency-based medical education to prevent future medical professionals from burning out and to promote their long-term professional sustainability.^{20,21}

Despite the growing body of national and international research, there remains a dearth of published information from South Indian urban medical schools evaluating undergraduate medical students' resilience using validated instruments. When designing evidence-based institutional interventions, it is crucial to understand resilience levels and their relationship with sociodemographic variables. To determine the resilience levels of medical students at an urban medical college in Bengaluru and to investigate their relationship with specific sociodemographic characteristics, the current study was conducted.

Need for the study

Exploring the resilience quotient among medical students is vital to developing effective support systems that promote mental health and academic success. As the medical profession continues to evolve, understanding and enhancing resilience will be key to ensuring that medical

students not only survive but also thrive during their training and beyond.

Aim

The aim was to perform a cross-sectional study on the resilience quotient among medical students of a medical college in urban Bengaluru.

Objectives

The objectives were to assess the resilience quotient of medical students at Rajarajeswari Medical College and Hospital (RRMCH), and to identify the factors influencing resilience levels among medical students.

METHODS

Study design

A cross-sectional study was performed.

Sampling technique

Simple random sampling was used.

Study population

All second, third and fourth year MBBS students of RRMCH were a part of the study population.

Sample size

The formula used was as follows, where, N=population proportion, and e=margin of error (For 95% confidence level, margin error=0.05).⁵

$$n = \frac{N}{1 + Ne^2}$$

$$n = \frac{750}{1 + 750(0.05)^2} = \frac{750}{2.875} = 260.86 \\ = 261 \text{ samples}$$

Study period

The duration of the study was 3 months.

Inclusion criteria

All second, third- and fourth-year male and female MBBS students of RRMCH were included.

Exclusion criteria

Students who do not provide informed consent, and students absent during three consecutive visits were excluded.

Study tool

A semi-structured questionnaire consisting of - section I: socio-demographic profile, and section II: assessment of resilience quotient using a validated scale.

Method of collection of data and statistical analysis

Ethical clearance for the study was obtained from the Institutional Ethics Committee.

A total of 750 MBBS students from the second, third, and fourth year of RMCH, Bengaluru, constituted the study population.

The required number of participants to meet the sample size was 261.

Data were obtained using the interview method with a pre-tested semi-structured questionnaire that included a validated scale.

The questionnaire consisted of information regarding the socio-demographic profile of the participants.

Plan for data analysis

The collected data were expressed in terms of frequencies and percentages. Mean and standard deviation were calculated for continuous variables.

Data were analysed using statistical package for the social sciences (SPSS) version 23 and Microsoft excel (MS Excel).

Descriptive statistics

The data were summarised by describing the distribution of demographic variables as frequencies and percentages, while continuous data were expressed as mean with standard deviation.

Inferential statistics

The Chi-square test was used to determine the association between the study variables. A p value of <0.05 was considered statistically significant.

RESULTS

Figure 1 shows the distribution of resilience levels among research participants. The vast majority of students (61%) exhibited moderate resilience. 32% of students showed low resilience, suggesting that almost one-third would be susceptible to stress and have a diminished ability to cope. Only 7% of students demonstrated excellent resilience.

Table 1 illustrates the distribution of students' resilience levels across a few chosen sociodemographic factors,

including as gender, MBBS year, family type, and place of residence. In terms of housing, 51% of the study participants were hostel residents, whilst 49% resided at home. The most prevalent category in both groups was moderate resilience. While students remaining at home had a higher percentage of low resilience than those living in hostels, there was no statistically significant correlation between place of stay and resilience level ($\chi^2=4.04$, $p=0.40$).

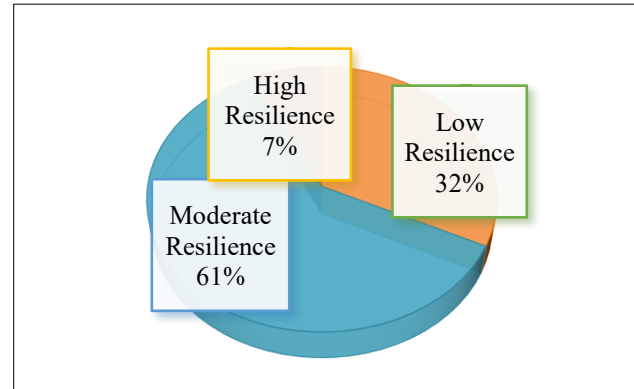


Figure 1: Distribution of resilience levels among students.

In terms of family structure, nuclear families accounted for 64% of the student body, followed by joint families (30%) and three-generation families (6%). Students from nuclear families were more likely to have high resilience. However, no statistically significant association was found between family type and resilience levels ($\chi^2=6.26$, $p=0.18$).

Gender-wise, 51% of participants were female and 49% were male. There was no statistically significant gender-based difference in resilience ($\chi^2=0.51$, $p=0.77$), and students' levels of moderate and high resilience were similarly distributed among male and female pupils. The largest group among MBBS years was fourth-year students (39%), followed by second-year (36%) and third-year (26%). Fourth-year students were more likely to exhibit high resilience. However, there was no statistically significant correlation between resilience level and year of study ($\chi^2=1.42$, $p=0.84$). Overall, despite differences in resilience levels across sociodemographic groups, none of the correlations were statistically significant, suggesting that these characteristics had no discernible impact on medical students' resilience.

Figure 2 shows the distribution of resilience levels among students across a few selected sociodemographic factors. Among male students ($n=129$), 80 exhibited moderate resilience, 41 had low resilience, and 8 had high resilience. Similarly, among female students ($n=132$), moderate resilience was most prevalent (78), followed by low resilience (43) and high resilience (11). The overall distribution of resilience levels between genders was comparable, with no statistically significant relationship

between gender and resilience level ($p>0.05$), despite males showing a slightly higher proportion of moderate resilience and females a slightly higher proportion of high resilience.

Figure 3 illustrates the distribution of resilience levels among medical students based on type of family.

Students from nuclear families formed the largest group and showed predominantly moderate resilience, followed by low resilience, with a smaller proportion showing high resilience. Among students from joint families, moderate resilience was again the most common category, followed by low resilience, while high resilience was least observed. In the three-generation family group, the majority of students exhibited moderate resilience, with fewer reporting low resilience and none demonstrating high resilience.

Although variations in resilience levels were observed across different family types, the association between type of family and resilience level was not statistically

significant ($p>0.05$). These findings suggest that family structure alone does not significantly influence resilience levels among medical students.

Figure 4 shows the distribution of resilience levels among medical students by residence. Most students living at home were moderately resilient (70 students), followed by low resilience (48 students), and very resilient (10 students per cent). Similarly, the majority of hostel occupants (88 students) were moderately resilient, followed by low resilience (36 students), while only 9 students reported strong resilience. Although the proportion of moderately resilient students in hostels was slightly higher than among those living at home, the overall resilience distributions of the two groups were similar, and there was no statistically significant correlation between place of stay and resilience level ($p>0.05$).

These findings suggest that place of residence alone does not have a significant influence on resilience levels among medical students.

Table 1: Distribution of resilience levels among students based on socio-demographic factors such as place of stay, type of family, gender, and MBBS year.

Socio-demographic factors	Low resilience	Moderate resilience	High resilience	Total no. of students	Percentage	Chi-square test	P value
Place of stay							
Home	48	70	10	128	49	4.04	0.4
Hostel	36	88	9	133	51		
Type of family							
Nuclear	14	46	107	167	64	6.26	0.18
Joint	5	33	41	79	30		
Three-generation	5	10	0	15	6		
Gender							
Male	8	41	80	129	49	0.51	0.77
Female	11	43	78	132	51		
MBBS year							
Second year	6	34	53	93	36	1.42	0.84
Third year	5	21	41	67	26		
Fourth year	8	29	64	101	39		

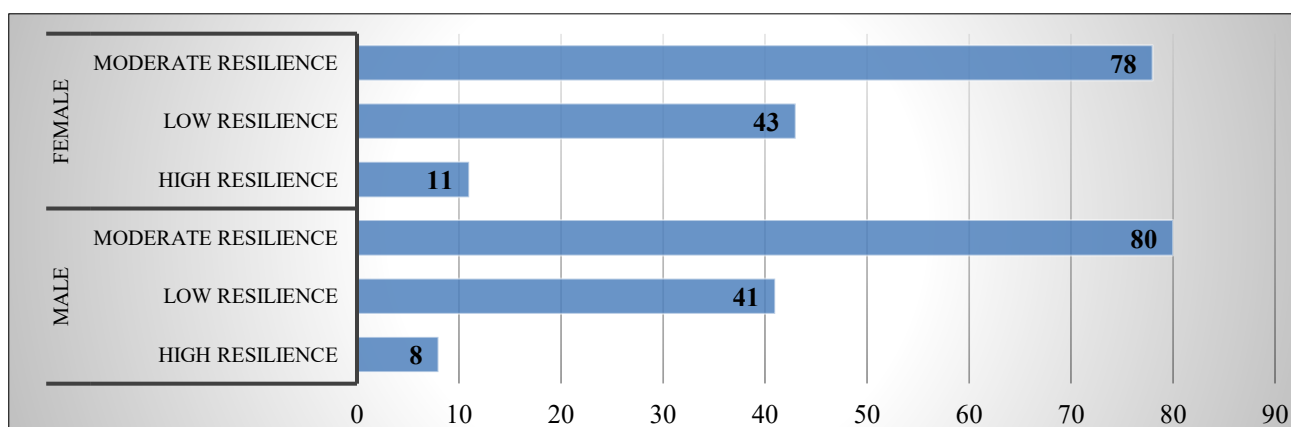


Figure 2: Distribution of resilience levels among male and female students.

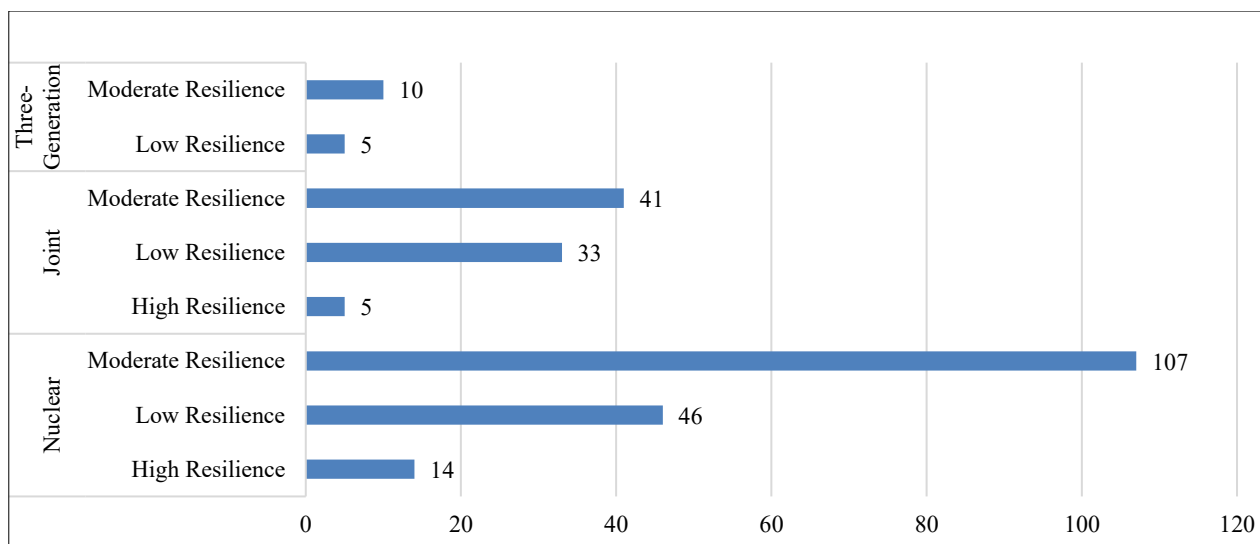


Figure 3: This figure represents the distribution of resilience levels among medical students based on MBBS year.

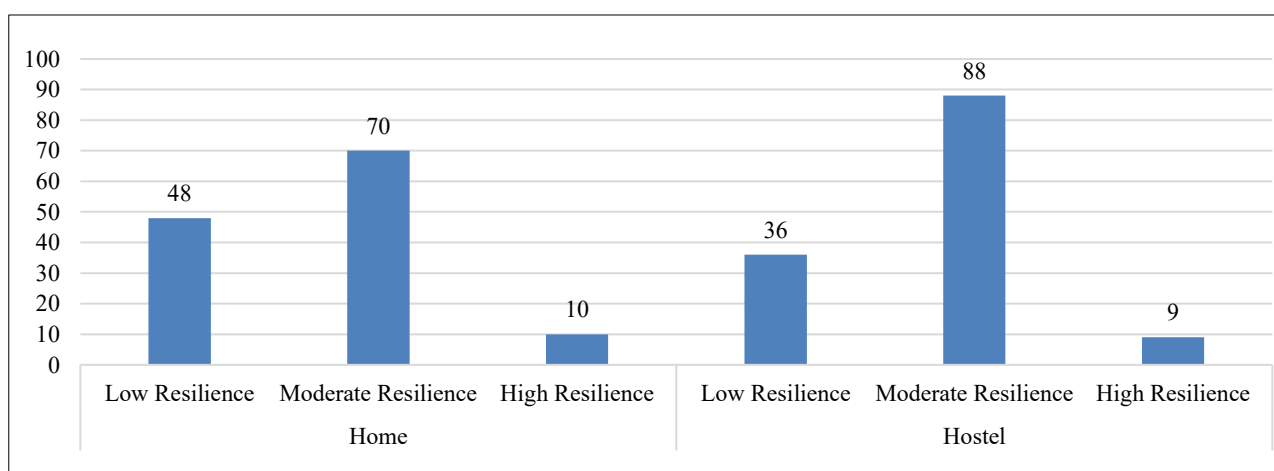


Figure 4: Distribution of resilience levels among medical students based on their place of stay.

DISCUSSION

The present cross-sectional study assessed resilience among undergraduate medical students at an urban medical college in Bengaluru and examined its association with selected socio-demographic factors. The findings showed that a majority of students (61%) demonstrated moderate resilience, while nearly one-third (32%) exhibited low resilience, and only a small proportion (7%) showed high resilience. These findings indicate that although most students have an average ability to cope with academic and personal stressors, a substantial proportion remain psychologically vulnerable.

The predominance of moderate resilience observed in the present study is comparable with findings reported by Seehamongkon et al, who assessed resilience quotient among medical students in Thailand and found that most students exhibited normal resilience, with lower resilience more common among students in senior academic years.¹ Similarly, Golui et al reported that 25.2% of Indian

medical students demonstrated low resilience during the COVID-19 pandemic, underscoring the susceptibility of medical students to stress-related psychological challenges, especially during periods of heightened academic and environmental stress.³

Foundational psychological literature, such as an introductory analysis, has emphasised resilience as a dynamic and modifiable construct rather than a fixed trait, highlighting the roles of individual experiences, environmental stressors, and adaptive coping mechanisms in shaping resilience.⁵ This theoretical framework supports the variability in resilience levels observed among students in the present study.

The use of the Connor–Davidson resilience scale (CD-RISC) in the present study further strengthens its validity, as CD-RISC is among the most widely accepted tools for measuring resilience. Connor and Davidson demonstrated that resilience can be reliably quantified using standardised psychometric instruments with strong validity and

reliability.⁶ A methodological review by Windle et al further supported CD-RISC as one of the most appropriate tools for resilience assessment across academic and healthcare settings.⁷

In the present study, no statistically significant gender difference in resilience was observed, although females showed a slightly higher proportion with high resilience. This finding aligns with Indian studies by Ransing et al and Chandra et al, which likewise reported no significant association between gender and resilience among medical students.^{12,15} However, Sanphiboon et al reported contrasting findings, observing significantly higher resilience among males in a Thai population during the COVID-19 pandemic, suggesting that gender-related differences in resilience may be context-specific and influenced by sociocultural factors.²

Regarding year of study, fourth-year students showed higher proportions of moderate and high resilience than junior batches, though this association was not statistically significant. Similar trends have been reported by Tempiski et al, who found that resilience may improve with academic progression as students adapt to the demands of medical training and develop coping strategies over time.⁸ Howe et al also emphasised that resilience in medical training is shaped by both individual adaptability and institutional culture, reinforcing the importance of supportive learning environments.¹⁰

Analysis by family type showed that students from nuclear families formed the majority and had higher proportions of moderate resilience. However, no statistically significant association was observed between family structure and resilience. These findings align with previous Indian studies, including those by Singh et al, which reported inconsistent associations between family structure and resilience, suggesting that the quality of social support may be more important than family type itself.¹⁴ Mesman et al highlighted the multisystem influence on resilience, involving family, social, cultural, and individual factors, supporting the multifactorial nature of resilience.⁴

Regarding place of stay, hostel residents showed slightly higher moderate resilience than students staying at home, though the difference was not statistically significant. This finding aligns with earlier studies showing that living arrangements alone do not independently predict resilience. McKinley et al similarly reported that resilience among medical students is more strongly influenced by academic stress and institutional support than by residential status.¹¹

The absence of statistically significant associations between resilience and socio-demographic variables in the present study underscores the complex, multidimensional nature of resilience, as emphasized by Southwick et al, who described resilience as an interaction among biological, psychological, social, and cultural determinants.¹⁶ This complexity explains why isolated

socio-demographic variables may not independently predict resilience.

From a public health and medical education perspective, the finding that nearly one-third of students exhibit low resilience is concerning. Low resilience has been linked to burnout, poor work–life balance, and reduced quality of life among healthcare professionals, as reported by Shanafelt et al.¹⁷ Organizational-level interventions have been shown to improve mental health outcomes, as demonstrated in a systematic review by Joyce et al, which emphasized the importance of institutional strategies over individual-level interventions alone.¹⁸

Evidence from wellness-focused interventions further underscores the need for institutional action. Drolet and Rodgers demonstrated that comprehensive medical student wellness programmes can significantly improve student well-being and coping.¹⁹ Similarly, Slavin et al reported that curricular reforms to improve student mental health led to reduced stress and improved psychological outcomes.²⁰

The importance of promoting mental health and resilience in educational and occupational settings has also been emphasized by the World Health Organization, which advocates preventive strategies, supportive environments, and early interventions to strengthen resilience and well-being.²¹

Overall, the present study contributes to the limited South Indian literature on resilience among medical students by showing that a substantial proportion exhibit low resilience, even in the absence of strong socio-demographic predictors. These findings underscore the need for universal, institution-wide resilience-building strategies rather than targeted interventions based solely on demographic characteristics.

Limitations

The cross-sectional design limits causal inference regarding the association between socio-demographic factors and resilience. The study was conducted at a single medical college, which may limit generalizability. Additionally, resilience was assessed using self-reported measures, which may be subject to reporting bias.

CONCLUSION

Overall, the findings indicate that while most medical students have average coping ability for academic and personal stressors, a substantial proportion exhibit low resilience, underscoring the need for targeted resilience-building interventions within the medical education framework.

Most medical students in this study demonstrated moderate to high resilience. Although some groups had higher proportions of low resilience, no statistically significant

association with socio-demographic factors was found. These findings underscore the need for institutional initiatives to strengthen resilience among all medical students.

Recommendations

Resilience is increasingly recognised in public health and medical education as a malleable quality that can be strengthened through organised interventions such as wellness campaigns, mentorship programs, stress-reduction courses, and curriculum changes.

Incorporating resilience-building programs into the competency-based medical education curriculum may help improve students' coping skills. Establishing robust mentorship systems, providing access to mental health support services, and conducting regular well-being assessments can further enhance student resilience. Future multicentric, longitudinal studies are recommended to explore determinants of resilience over time.

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