Resilience among the Undergraduate Students in a Medical College in Kolkata: A Cross-Sectional Study

Subhajoy Maitra[1], Sayeli Mitra[1], Archi Chandra[1], Aditi Aikat[2]

[1]Assistant Professor, [2]Professor, Jagannath Gupta Institute of Medical Sciences and Hospital, Kolkata, India

Correspondence: Dr. Subhajoy Maitra, Email: drsubhajoymaitra@gmail.scom

Abstract:

Introduction: Medical education is competitive, causing academic, clinical, and psychosocial stress, which contributes to rising depression and suicide rates among students. Resilience, the ability to cope with setbacks, serves as a stable protective factor against stress and burnout. **Objectives:** To estimate resilience among Undergraduate students of a Medical College in Kolkata and to determine the association of resilience with selected sociodemographic and academic variables. **Methods:** A facility-based observational study, cross-sectional in design, was conducted among 160 undergraduate students selected by stratified random sampling in a medical college of Kolkata. Sample size was calculated considering p=0.5, a precision of 7 %, design effect of 0.8 and considering 5% nonresponder rate. A predesigned, pre-validated structured questionnaire was used, comprising socio-demographic variables, the WHO 5 wellbeing score, and the Brief Resilience Scale. Association was calculated by the Chi-square test. Those having a significant association with them were taken for binary logistic regression. The value of p less than 0.05 was considered statistically significant. **Results:** Among 160 study participants, 33% had a low level of resilience. In multivariable logistic regression analysis, higher age [AOR 2.22(1.03-4.76)], having no problems in the family [AOR 2.44(1.07-5.56)], and having a good WHO five wellbeing score [AOR 2.7(1.23-5.88)], have higher odds of having adequate resilience. **Conclusion:** About one-third of the study participants (33%) had low resilience. Male sex, higher age, belonging to joint family, having no problem in the family, absence of any comorbidity and having good WHO 5 wellbeing score had higher odds of developing adequate resilience.

Keywords: Brief Resilience Scale, Burnout psychological, Burnout professional, Resilience psychological, Students

Introduction:

Resilience is the ability to cope with and recover from setbacks. Those facing adversity often show a remarkable capacity to regain normal functioning and overcome hardship. Resilience is a dynamic process at any level of functioning that encompasses the capacity by which these individuals adapt positively following adversity.[1] A resilient individual has strong coping skills, effectively uses resources, seeks help when needed, and finds ways to manage challenges. Resilience has both positive and negative aspects. The degree to which a person may be resilient varies greatly depending on their unique circumstances and the challenges they face.[2]

Medical education is highly competitive, exposing students to numerous academic, clinical, and

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psychosocial stressors. Key challenges include excessive workloads and the need to master complex information, leading to increased stress. Students compete for high grades in examinations, which increases anxiety, with fears of failure affecting their academic and professional futures. This combination of rigorous demands and peer competition necessitates effective coping strategies and support systems to foster students' overall well-being and success.[3]

Stress extends beyond undergraduate studies, affecting internships, postgraduate studies, and a physician's practical life.[4] First-year medical students experience higher stress levels due to the transition from school to college, while fourth-year students face new challenges where developing resilience becomes crucial.[5] About 77% of global suicides occur in developing countries, including India, according to the WHO.[6] Medical students have a higher risk of suicidal ideation and attempts compared to other academic professions and the general population.[7] A recent study conducted in India found that 19.6% of medical students had suicidal behaviour.[8] A recent Right to Information (RTI) response from the National Medical Commission (NMC) reveals a crisis in India's medical education: over the past five years, 1,166 medical students have dropped out, and 119 have tragically died by suicide.[9] A National Medical Commission (NMC) online survey reveals that 28% of undergraduate medical students and 15% of post-graduate students have mental health disorders, such as anxiety and depression.[10] Resilience is crucial for enhancing medical students' psychological health and reducing burnout during clinical training. It serves as a protective factor against stress. This study aimed to estimate resilience among undergraduate medical students in Kolkata and examine its association with various socio demographic and academic factors.

Methods:

An institution-based observation study, cross-sectional in design was conducted in a medical college in West Bengal over a period of 6 months from Dec 24 to May 25.

Study population: The study population was undergraduate medical students during the study period where the number of student enrolled in first, second, third and fourth year were 200, 180, 116 and 152 respectively.

Inclusion criteria: Those who had given written informed consent were included in the study. Exclusion criteria: Severely ill and hospitalised students were excluded from the study.

Sample size: Since the prevalence of resilience among medical students in this part of the world was not available after extensive literature search, for determining minimum sample size requirement for this study, prevalence of good resilience among medical students in India was considered as 50 %, i.e., p=0.5. Taking a precision of 7 %, design effect of 0.85 , and adding 5% non-responder, the final sample size was 160.

Sampling Technique: Stratified Random Sampling was used. Each professional year was considered to be a stratum. The number of participants from each stratum was proportional to stratum size. From each stratum, the required number of participants were selected by systematic random sampling.

Research Instrument: Pre-designed, pre-tested, structured questionnaire consisting of socio-demographic, personal, and academic variables. The second part contained the WHO-5 Wellbeing Index questionnaire[11] and the Brief Resilience Scale.[12] The WHO-5 is a self-report instrument measuring mental well-being. It contained five statements relating to the past two weeks. Each statement was rated on a 6-point scale, with higher scores indicating better mental well-being.[11] The total raw score, ranging from 0 to 25, was multiplied by 4 to give the final score, with 0 representing the worst imaginable well-being and 100 representing the best imaginable well-being. A percentage score below 50 (or a raw score below 13) was considered as the cut-off for poor mental well-being. The BRS was a 6-item scale designed to measure resilience.[13] Items 1, 3, and 5 were positively worded, and items 2, 4, and 6 were negatively worded.[12] An average score of

1.00-2.99 signified low resilience. A score between 3.00– 4.30 signified normal resilience, and a score of 4.31-5.00 signified high resilience. Academic performance satisfaction, and faculty support are measured by self-reported visual analogue score of range 1-10.

Variables: In this study, the outcome variable was resilience among medical students, and the predictor variables were selected sociodemographic, academic, and personal factors.

Data Collection Method: Informed written consent was taken from the study participant. The data collection was done by face-to-face interview using a predesigned pretested structured questionnaire.

Operational Definitions:

Categories of residence:

Urban- Urban areas are the towns (places with municipal corporation, municipal area committee, town committee, notified area committee and cantonment board), also all places having 5000 or more inhabitants, a density not less than 1000 persons per square mile or 390 per square kilometre, pronounced urban characteristics, and three forth of the adult male population employed in persuits other than agriculture.[14]

Rural- Rural areas are all places having less than 5000 inhabitants, a density is less than 1000 persons per square mile or 390 per square kilometre, and three forth of the adult male population employed in persuits agriculture.[14]

Smoking:

Never- An adult who has never smoked, or who has smoked less than 100 cigarettes in his or her lifetime.[15]

Current users- The individual is currently smoking, which can be daily or non-daily (on occasion).[15]

Used in past- An adult who has smoked at least 100 cigarettes in his or her lifetime, but who had quit smoking at the time of interview.[15]

In this study 'never' and 'used in past' have been clubbed together as 'others'

Alcohol intake:

Never- The "Non-drinker" / "Current non-drinker" definitions include people who do not drink at present[16]

Current users- An individual who consumed at least one alcoholic drink within past one month[16]

Used in past- A past alcohol user is a person who had consumed alcoholic beverages previously but does not currently consume alcohol (i.e. no recent use).[16]

In this study 'never' and 'used in past' have been clubbed together as 'others'

Substance use:

Never- An individual who does not engage in the use of narcotic substances, such as opioids or other controlled substances, either currently or in the past.[17]

Current users-use within the past 12 months[17]

Used in past- use more than 12 months ago[17]

Statistical Analysis: Data analysis was done with the help of SPSS software (IBM version 16)[18]and Microsoft Excel 365. Continuous type variables were described by Mean with Standard Deviation (SD) or median with Interquartile Range(IQR). Categorical Variables were expressed as numbers and percentages. Binary logistic regression was done to find out the adjusted and unadjusted odds ratios. The significance level of the association was taken to be < 0.05. Ethical Clearance: This study was conducted after ethical clearance from the institutional ethical committee.

Results :

Table 1 shows the distribution of study participants according to socio demographic characteristics and its association with adequate resilience. The mean age of the study participants was 21.28 years (± 1.87), and more than half of them were male. The majority of the study subjects were Hindu by religion and from an urban residence background. About three-fourths of the study participants used to live inside the campus of the medical college campus. The median per capita monthly income was Rs 30625 (IQR 16166, 50000). About 11.2% participants had per capita monthly income below Rs 10000, 18.8% between Rs 10001 to Rs 20000, 20%

Table 1: Distribution of study participants according to socio demographic characteristics and its association with adequate resilience (N=160)

Variables	Frequency n (%)	Adequate resilience n (%)	Crude Odds Ratio (95%CI)	X^2p value
Age (in completed years)				
>Median	69 (43.1)	53 (76.8)	2.27 (1.13-4.56)	5.41, 0.02
≤ Median	91 (56.9)	54 (59.3)	1	
Gender				
Male	85 (53.1)	63 (74.1)	2.02 (1.03-3.94)	4.294, 0.038
Female	75 (46.9)	44 (58.7)	1	
Religion				
Hindu	147 (91.9)	99 (67.3)	1.29 (0.41-4.15)	0.19, 0.67
Others	13 (8.1)	8 (61.5)	1	
Permanent Residence				
Rural	27 (16.9)	19 (70.4)	1.21 (0.49-2.99)	0.17, 0.67
Urban	133 (83.1)	88 (66.2)	1	
Type of present residence				
Days Scholar	27 (16.9)	18 (66.7)	0.98 (0.41-2.37)	0.01, 0.98
In campus	133 (83.1)	89 (66.9)	1	
Family type				
Joint	35 (21.9)	29 (82.9)	2.91 (1.13-7.56)	5.17, 0.02
Nuclear	125 (78.1)	78 (62.4)	2	

between Rs 20001 to Rs 30000, 20% between Rs 30001 to 40000 and the rest that is about 30% of the participants had per capita monthly income above Rs 40000.

Table 2 shows the distribution of study participants according to socio personal and academic characteristics and its association with adequate resilience Most of the study participants were not involved in any kind of substance use. However 3(1.9%) participants reported as current users of narcotics and 2 (1.2%) had past history of narcotics usage. Among the families of the study participants, 15.6 % of the families had debt or a loan. Comorbidity was present among 11.3 % of the study participants, and allergic disorder was the most common comorbidity. About 80(50%) participants were involved in outdoor sports, workout in gymnasiums, dance etc for about 1 to 3 days per week, another 40(25%) participants reported working out 4 to 7 days per week, while the remaining 25% said they were not involved in any of these activities. The majority of them that is 137 (85.6%) had joined MBBS because of their personal choice, and about one-third of them that is 50 students (31.3%) had a history of failure in at least one exam in the course curriculum. The median self-perceived academic satisfaction score was 6(IQR 5,8), and the median of self-reported faculty support score was 7(IQR 5,8). Among the study participants, the median WHO 5 Well-being Index score was 14(IQR 9,18), and more than one-third of the study participants belonged to the poor category of the WHO 5 Well-being Index score.

The median Brief Resilience Score was 3 (IQR 2.8, 3.3) with a minimum score of 1.17 and the maximum score of 5.0. Resilience was categorised according to the Brief Score.[12] An average score of 1.00-2.99 signified low resilience. A score between 3.00– 4.30 signified normal resilience, and a score of 4.31-5.00 signified high resilience. In our study, about one-third of the study participants (33%) had low resilience, 64% had normal resilience and only 3% had high resilience score.

Table 2: Distribution of study participants according to personal and academic characteristics and their association with adequate resilience (N=160)

Variables	Frequency n (%)	Adequate resilience n (%)	Crude Odds Ratio (95%CI)	X^2 value p value
Smoking				
Current Users	13 (8.1)	10 (76.9)	0.58 (0.15-2.21)	0.65, 0.42
Others	147 (91.9)	97 (66)	1	
Alcohol				
Never	145 (90.6)	97 (66.9)	1.01 (0.33-3.12)	0.1, 0.96
Current Users	15 (9.4)	10 (66.7)	1	
Presence of problem in the family				
No	123 (76.9)	89 (72.9)	2.99 (1.41-6.36)	8.56, 0.03
Yes	37 (23.1)	18 (47.4)	1	
Presence of comorbidity				
No	142 (88.7)	97 (68.3)	2.91 (1.13-7.54)	5.17, 0.02
Yes	18 (11.3)	10 (55.6)	1	
In a Committed relationship				
No	111 (69.3)	73 (65.8)	0.84 (0.41-1.74)	0.21, 0.65
Yes	49 (30.7)	34 (69.4)	1	
Reason behind joining MBBS				
Choice of others	23 (14.4)	15 (65.2)	0.91 (0.36-2.32)	0.33, 0.85
Personal choice	137 (85.6)	92 (67.2)	1	
Academic year				
First & second	93 (58.1)	58 (62.4)	0.61 (0.31-1.21)	2.03, 0.153
Third & fourth	67 (41.9)	49 (73.1)	1	
History of failure in any exam of course curriculum				
No	110 (68.7)	70 (63.6)	0.62 (0.29-1.29)	1.67, 0.19
Yes	50 (31.3)	37 (74.0)	1	
Academic Satisfaction Score				
> median	78 (48.7)	58 (74.4)	1.95 (0.99-3.83)	3.85, 0.05
≤ median	82 (51.3)	49 (59.8)	1	
Faculty support score				
> median	56 (35.0)	39 (69.6)	1.21 (0.61-2.44)	0.29, 0.58
≤ median	104 (65.0)	68 (65.4)	1	
WHO's Five Well-Being Score				
Good	100 (62.5)	77 (77.0)	3.35 (1.68-6.66)	12.34, <0.01
Poor	60 (37.5)	30 (50.0)	1	

Bivariate analysis showed that there were higher odds of some sociodemographic, personal, and academic variables in developing adequate resilience, i.e., normal and high resilience. Those factors were male gender OR 2.02 (1.03-3.94), higher age OR 2.27 (CI 1.13 -4.56), belonging to joint family OR 2.91 (CI 1.13-7.56), having no problem in the family OR 2.99(CI 1.41-6.36), absence of any comorbidity OR 2.91(CI 1.13-7.54) and having good WHO 5 wellbeing score OR 3.35(CI 1.68-6.66).

In Table 3, all significant and biologically plausible variables found in the univariate model (at $p<0.2$) were put in the final multivariable logistic regression model. In multivariable logistic regression analysis, three variables were found to be independent predictors for having adequate resilience after controlling for possible confounders. Those having a higher age were 2.22 times to develop adequate resilience [AOR 2.22 (1.03-4.76)] compared to those having an age below the median. Participants having no problem in family were 2.44

Table 3: Binary Logistic Regression showing association of selected variables with adequate resilience (n=160)

Variables	Crude Odds Ratio (95% CI)	P value	AOR(95% CI)	P value
Gender				
Male	2.02 (1.03-3.94)	0.03	1.26 (0.59-2.75)	0.54
Female	1		1	
Age				
>Median	2.27 (1.13-4.56)	0.02	2.22 (1.03-4.76)	0.04
≤Median	1		1	
Family				
Joint	2.91 (1.13-7.56)	0.02	2.56 (0.92-7.14)	0.07
Nuclear	1		1	
Problem in the family				
No	2.99 (1.41-6.36)	0.003	2.44 (1.07-5.56)	0.03
Yes	1		1	
Comorbidity				
No	2.91 (1.13-7.54)	0.02	0.75 (0.24-2.33)	0.6
Yes	1		1	
Academic environment score				
>Median	1.95 (0.99-3.83)	0.05	0.62 (0.29-1.33)	0.22
≤Median	1		1	
WHO 5 Well-being score				
Good	3.35 (1.68-6.66)	<0.01	2.7 (1.23-5.88)	0.01
Poor	1		1	

Note. Cox & Snell R square – 0.17, Nagelkerke R Square – 0.23, Horseman Lemeshow test – p=0.31 (x^2 9.98, df-8)

times to develop adequate resilience [AOR 2.44 (1.07-5.56)]. Participants having a good WHO 5 wellbeing score were 2.7 times to develop adequate resilience [AOR 2.7 (1.23–5.88)]. In this model, 17 % of the variance (Cox & Snell R Square value= 0.17) and 23 % (Nagelkerke R Square= 0.23) of the dependent variable was explained by the independent variables. Goodness of fit was present in this model, Hosmer and Lemeshow test (X^2=9.98, df-8, p–0.31).

Discussion

This study was planned to determine the resilience among undergraduate medical students and also characterize the relationships between several different demographics, academic and personal factors, with resilience. The male resilience score was higher than the female resilience score in our study. This finding is consistent with the study by Peng et al in China.[19] Houpy et al[20] in their study in the United States also found similar results. In a study done by Wang et al among medical students, resilience uni-directionally and positively predicted life satisfaction, while academic burnout uni-directionally and negatively predicted life satisfaction.[21] Similar to current study, 74.5 % of the study participants who had higher academic satisfaction scores had adequate resilience in comparison to 59.8 % who had a less than median academic satisfaction score.

Resilience was found to be a positive predictor of life satisfaction among medical students. In our study, participants having a good WHO-5 well-being score had 2.7 times higher odds of developing adequate resilience [AOR 2.7(1.23-5.88)]. This finding was consistent with the result of a six-year longitudinal study by Shek and Liang, which found that resilience was a significant positive predictor of life satisfaction, but the sample in this study was Chinese adolescents.[22] In another study by Chow et al,[22] self-reported resilience emerged as a

significant predictor of perceived well-being (regression coefficient B = 0.259; p < .001).[23] The findings are consistent with the findings of our study. Participants having good WHO 5 well-being score were having higher resilience score.

In a study by Lee et al[24] better interpersonal relationships were related to higher levels of resilience, which were related to fewer depressive symptoms. Chung et al.[25] in their study also found that living with a single parent was associated with lower resilience, which in turn was associated with higher levels of depression. The presence of problems in the family has an impact on the development of resilience. In this study, those who didn't have any problems in the family had 2.44 times higher odds of developing adequate resilience [AOR 2.44(1.07-5.56)]. Researchers believed that age is the decisive factor of emotional ability and resilience and found that both will increase with age. In a study done by lubili et at,[26] compared to the reference sample, medical students in their first year of study showed significantly lower values for resilience (p < 0.01). Current study did not find any association between resilience score with the year of study of the study participants, but the higher age group shows better resilience. In present study, those having an age greater than the median had 2.22 times higher odds of developing adequate resilience [AOR 2.22(1.03-4.76)]. Many studies in the past tried to find out the relationship between resilience and chronic illness. As per systematic reviews tudying resilience in different chronic diseases, found an inverse association between resilience and HbA1c levels (glycosylated haemoglobin level) in diabetes, the degree of depression in patients with hepatitis C, and the levels of activity of the disease in ankylosing spondylitis (BASDAI-ankylosing spondylitis activity index), respectively, which makes us think that the capacity of resilience may have had an influence on the progression of illness.[27] The higher the resilience, the lower the vulnerability and risk of illness. An individual with a chronic illness may have different coping. Problem-solving solving coping, and emotional coping may benefit the individual. Whereas avoidance coping may be due to low resilience. In our study, participants without any chronic illness had higher odds [OR 2.91(1.13-7.54)] of developing adequate resilience.

In a study done by Sahar and Muzaffar the majority of participants belonging to joint families had higher rates of good social adjustment(38%)and greater resilience (17%), compared to those in nuclear families, where only 21% reported good social adjustment and 13% reported high resilience.[28] In another study, adolescents in joint families appeared to exhibit greater personal adequacy, interpersonal adequacy, social adequacy, and consequently, higher social maturity when compared to adolescents from nuclear families.[29] Similar findings in our study, where participants belonging to the joint family had a higher level of resilience [OR 2.91(1.13-7.56)]

Studies show that the prevalence of depression and other mental disorders is higher among medical students.[30] There has been a notable increase in dropout and suicide rates among medical students.[31] Consequently, a targeted intervention is necessary for this population.

Conclusion:

In present study, about one-third of the study participants (33%) had low resilience. Male gender, higher age, belonging to joint family, having no problem in the family, absence of any comorbidity and having good WHO 5 wellbeing score had higher odds of developing adequate resilience, i.e., normal and high resilience. In multivariable logistic regression analysis, three variables - higher age, participants having no problem in family and having a good WHO 5 wellbeing score were found to be independent predictors for having adequate resilience.

Strength and Limitation:

Use of a validated study tool among the target participants is the strength of this study. There are some limitations to current study. A study was conducted at a single medical school, and this could limit the external validity of the results. Due to non-response, selection bias may be present. The timing of the study may influence the response of the participants. Responses may have been different had the study been conducted at a different time of year.

Recommendation:

Findings suggest a need for further resilience training for clinical medical students and guide the development of educational interventions. More curricula promoting medical student resilience are needed, specifically focused on skills to help students cope with difficult situations. NMC has launched the mentor-mentee program to enhance student welfare and academic performance, promote participation in co-curricular activities, and foster a supportive learning environment. [32] This initiative encourages building resilience along with counselling and peer support.

Declaration

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