

# Association between Emotional Intelligence, Emotional State and Academic Performance of Undergraduate Medical Students in India: A Cross-Sectional Study

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## ABSTRACT

**Background:** People with higher Emotional Intelligence (EI) and Emotional States (ES) have better mental health and demonstrate enhanced leadership skills.

**Aim:** To assess association between emotional intelligence and emotional state on academic performance in undergraduate (UG) medical students across India.

**Methods:** Cross-sectional study conducted among UG medical students aged 18 to 30 years across medical colleges in India. Semi-structured questionnaires which included socio-demographic profile, academic performance, Schutte Self Report Emotional Intelligence Test (SSEIT), Perceived Stress Scale (PSS) and Patient Health Questionnaire-4 (PHQ-4).

**Results:** In this study, 342 participants participated and among them 56(16.4%), 186(54.4%) and 100(29.2%) had scored distinction, first and second class respectively and 114(33.33%), 109(31.87%) and 62(18.13%) were found to have anxiety, depression and stress respectively. There was negative association between EI scores with anxiety ( $p<0.001$ ), depression ( $p<0.001$ ) and stress ( $p<0.001$ ). There was no significant association between EI and academic performance. Poor psychological outcome was present in 156(45.61%) participants. Students who secured 2nd class had poor psychological outcome ( $p=0.014$ ) when compared with those who secured first class. Participants with low EI scores had poor psychological outcome ( $p=0.002$ ) in comparison to those who had strong EI scores.

**Conclusion:** Low EI scores were significantly associated with anxiety, depression, stress and poor psychological outcomes among medical students. Steps to improve EI and ES among medical students will help them to tackle adverse situation and prevent early burnout.

**Keywords:** Anxiety, depression, stress, emotional intelligence, medical students.

## INTRODUCTION

Life as a medical student is not an easy path to travel. Every day of a medical student is challenging, so as to find the balance between their academic requirements, studies, extra-curricular activities, social relationships and so on. Admission criteria of a medical college mostly depend on their

academic and cognitive success, but every individual differs in their emotional makeup which is reflective of their personal life experience, managing skills and core values and belief.<sup>1</sup> Amidst all this, it is essential for a medical student to perceive, use, understand, manage and handle emotions

which is collectively called as 'Emotional Intelligence' (EI).<sup>2,3</sup>

People with higher EI have better mental health, perform better at work and demonstrate enhanced leadership skills.<sup>4-8</sup> EI is also correlated with empathy that connects an individual to personal experiences and feelings of others.<sup>9</sup> EI was found to be the protective factor in relation with psychological distress. EI showed a negative correlation with depression, anxiety and stress which is together called as Emotional State (ES). Individuals who were screened positive for anxiety and depression exhibited lower EI.<sup>10</sup>

It is important to identify the factors that contribute the mental wellbeing of the medical students as well as their academic success. EI plays an important role in the academic performance of medical students and also during their professional life as health care professionals.<sup>4,11</sup> As budding doctors, it is necessary for medical students to have social skills to deal with the patients effectively and efficiently and have better stress management skills. There is a relationship between EI of health professionals and their empathy towards patient as well as their physiological and cognitive response to a given situation.<sup>9</sup>

There is a necessity to balance both EI and Intelligence Quotient (IQ) in students' learning activities to be successful both individually and professionally. Students with higher EI were found to have better interpretation of emotions which improved their performance during medical education and management of patients.<sup>6</sup> This shows that EI is equally important as IQ.

There was an association between emotional state and academic performance, where lower scores of negative emotions like depression and loneliness and higher scores of positive emotions were associated with poor and better academic performance respectively.<sup>12</sup> Also, medical students attending EI skills training programs were found to perform better.<sup>7,13</sup> Hence it is important to measure EI and ES among medical students and if required implement

measures to improve emotional well-being to ensure better academic performance, less stressful and mentally healthy life.

On extensive data search, we were not able to find research that looked into the association between EI, emotional state and academic performance of medical students. Hence, this study was conducted to assess the association between emotional intelligence, emotional state and academic performance of undergraduate medical students studying in medical colleges across India.

## **MATERIALS & METHODS**

This was a cross-sectional study conducted among undergraduate (UG) medical students aged 18 to 30 years and it was approved by Institutional Ethical Committee (IEC Study Ref No. 411/2021) at St. Johns Medical College (SJMC) on 11th November 2021. The level of low and high EI was between 22%-65% in previous studies and for our study the sample size was calculated considering the level of EI to be 50%.<sup>6,7</sup> The estimated sample size was 200. The study tool consisted of socio-demographic profile, academic performance and phase validated semi-structured questionnaires like Schutte Self Report Emotional Intelligence Test (SSEIT), Perceived Stress Scale (PSS) and Patient Health Questionnaire-4 (PHQ-4). The online survey forms were shared from November 2021 to January 2022.

The study questionnaire was circulated via google forms among medical undergraduates and an online written Informed Consent was obtained from all the study participants. We excluded students who had not consented and who had not completed the questionnaire. We received 342 consented responses and the same was analyzed.

The questionnaire consisted of the following: Socio-demographic profile which collected information on the basic demography of the participating individual like their age, sex including their year of medical school.

Academic profile where the percentage of marks scored by the medical students in the previous university exams. 75% and above was considered as distinction, 65-74.9% as

first class and 50-64.9% as second class respectively.

The Schutte Self Report Emotional Intelligence Test (SSEIT)<sup>14</sup> is a 33 item Likert scoring scale designed to measure an individual's EI. This questionnaire has reverse scoring for three questions. The scores between 70-99 were considered as low EI, 100-119 as competent EI and  $\geq 120$  as strong EI. This is an open access questionnaire.

Perceived Stress Scale (PSS)<sup>15</sup> is a 10-item questionnaire designed to assess stress. This questionnaire has reverse scoring for four questions. Scores ranges from 0-40 and scores  $\geq 27$  is considered as stress. Author had obtained permission to use the questionnaire.

Patient Health Questionnaire-4 (PHQ-4)<sup>16</sup> is 4-item screening questionnaire designed to measure anxiety and depression. The GAD scores of 0-2 is normal, 3-5 is mild, 6-8 is moderate and 9-12 is severe. A total score of  $\geq 3$  for first two questions is suggestive of anxiety and  $\geq 3$  for the last two questions is suggestive of depression.

For the purpose of analysis, poor psychological outcome was considered as presence of any of the emotional state which comprises anxiety, depression and stress.

## STATISTICAL ANALYSIS

The data was analysed using IBM Statistical Package for Social Sciences (SPSS) version 20.0. The data was analysed for frequencies, mean and standard deviation. Bivariate analysis was done to find association between emotional state (*i.e.*, anxiety, depression and stress), emotional intelligence and various independent variables including academic performance. Multiple logistic regression was done for factors with  $p < 0.05$  and adjusted odd's ratio with 95% confidence intervals were obtained

and  $p < 0.05$  was considered as statistically significant.

## RESULT

A total of 342 undergraduate medical students from India gave their consent to participate in this study and completed the questionnaire, out of which 128(37.4%) were males and 214(62.6%) were females. Most of the students were in the age group of 20-22 years (Mean age  $21.53 \pm 1.32$ ) and 107(31.3%) were in second year, 178(52%) in third year, 42(12.3%) in final year and 15 (4.4%) in their houseman/internship. When academic performance was considered, 100(29.2%) secured second class, 186(54.4%) secured first class and 56(16.4%) secured distinction. Participants from Karnataka 191(55.8%) were the highest followed by 59(17.3%) from North India, 59(17.3%) from Tamil Nadu and 33(9.6%) from Kerala. Demographic variables of the participants are presented in Table 1.

**Table 1: Demographic profile of the participants.**

Demographic variables	No of students
Sex	
Male	128(37.4%)
Female	214(62.6%)
Age (mean age $21.53 \pm 1.32$ )	
19-21 years	169(49.4%)
22-24 years	165(48.3%)
25-27 years	8(2.3%)
Year of study	
Second year	107(31.3%)
Third year	178(52%)
Final year	42(12.3%)
Internship	15(4.4%)
Previous exam scores	
Second class	100(29.2%)
First class	186(54.4%)
Distinction	56(16.4%)
State	
Karnataka	191(55.8%)
North India	59(17.3%)
Kerala	33(9.6%)
Tamil Nadu	59(17.3%)
Total	342(100%)

**Table 2: Association between anxiety with various demographic factors and EI**

Anxiety	Absent	Present	OR (95%CI)	p value
Total participants	228(66.67%)	114(33.33%)		
Age				
19-21 years	115 (50.4%)	54 (47.4%)	Reference	0.59
22-27 years	113 (49.6%)	60 (52.6%)	1.13 (0.72-1.77)	
Sex				
Male	90 (39.5%)	38 (33.3%)	Reference	0.27
Female	138 (60.5%)	76 (66.7%)	1.3 (0.81-2.09)	
Year				
2 <sup>nd</sup> year	68 (29.8%)	39 (34.2%)	Reference	0.21
3 <sup>rd</sup> year	126 (55.3%)	52 (45.6%)	0.72 (0.43-1.2)	
Final year and internship	34 (14.9%)	23 (20.2%)	1.18 (0.61-2.28)	
Academic				
2 <sup>nd</sup> class	62 (27.2%)	38 (33.3%)	1.5 (0.9-2.50)	0.18
1 <sup>st</sup> class	132 (57.9%)	54 (47.4%)	Reference	
distinction	34 (14.9%)	22 (19.3%)	1.6 (0.85-2.95)	
SSEIT				
Low	5 (2.2%)	13 (11.4%)	6.48 (2.21-18.95)	<0.001
Competent	71 (31.1%)	40 (35.1%)	1.40 (0.86-2.29)	
Strong	152 (66.7%)	61 (53.5%)	Reference	

**Table 3: Association between depression with various demographic factors and EI**

Depression	Absent	Present	OR(95%CI)	P value
Total no of participants	233(68.13%)	109(31.87%)		
Age				
19-21 years	110 (47.2%)	59 (54.1%)	Reference	0.23
22-27 years	123 (52.8%)	50 (45.9%)	0.76 (0.48-1.2)	
Sex				
male	78 (33.5%)	50 (45.9%)	Reference	0.027
female	155 (66.5%)	59 (54.1%)	0.59 (0.37-0.94)	
Year				
2 <sup>nd</sup> year	68 (29.2%)	39 (35.8%)	Reference	0.068
3 <sup>rd</sup> year	131 (56.2%)	47 (43.1%)	0.62 (0.37-1.05)	
Final year and internship	34 (14.6%)	23 (21.1%)	1.18 (0.61-2.28)	
Academic				
2 <sup>nd</sup> class	61 (26.2%)	39 (35.8%)	1.69 (1.01-2.83)	0.13
1 <sup>st</sup> class	135 (57.9%)	51 (46.8%)	Reference	
Distinction	37 (15.9%)	19 (17.4%)	1.35 (0.72-2.58)	
SSEIT				
Low	5 (2.1%)	13 (11.9%)	7.65 (2.61-22.47)	<0.001
Competent	69 (29.6%)	42 (38.5%)	1.79 (1.1-2.93)	
Strong	159 (68.2%)	54 (49.5%)	Reference	

To assess anxiety and depression among the medical students, PHQ-4 was used as a screening tool. Out of 342 participants, 114(33.33%) had anxiety and 109(31.87%) had depression. There was negative association between EI and anxiety ( $p<0.001$ ), where participants with low scores of EI were at 6.5 times higher risk to develop anxiety when compared with the participants strong scores of EI. There was no relationship between anxiety and other

demographic variables which is presented in Table 2.

A negative correlation was observed between EI and depression ( $p<0.001$ ), where low scores of EI were at 7 times higher risk to have depression. There was a significant relationship between depression and sex ( $p=0.027$ ) where females were less depressed when compared to males ( $CI=0.37-0.94$ ). There was no association between depression and various demographic variables as shown in Table 3.

**Table 4: Association between stress and various demographic factors and EI**

Stress	Absent	Present	OR (95%CI)	p value
Total no of participants	280(81.87%)	62(18.13%)		
Age				
19-21 years	137(48.9%)	32(51.6%)	Reference	0.7
22-27 years	143(51.1%)	30(48.4%)	0.9 (0.52-1.56)	
Sex				
Male	107(38.2%)	21(33.9%)	Reference	0.52
Female	173(61.8%)	41(66.1%)	1.2 (0.68-2.15)	
Year of study				
2 <sup>nd</sup> year	84(30.0%)	23(37.1%)	Reference	0.21
3 <sup>rd</sup> year	152(54.3)	26(41.9%)	0.62 (0.34-1.16)	
Final year and internship	44(15.7%)	13(21%)	1.08 (0.5-2.33)	
Academic				
2 <sup>nd</sup> class	81(28.9%)	19(30.6%)	0.98 (0.53-1.81)	0.49
1 <sup>st</sup> class	150(53.6%)	36(58.1%)	Reference	
Distinction	49(17.5%)	7(11.3%)	0.6 (0.25-1.42)	
Emotional Intelligence scores				
Low	3(1.1%)	15(24.2%)	41.3 (11.11-153.53)	<0.001
Competent	87(31.1%)	24(38.7%)	2.28 (1.21-4.26)	
Strong	190(67.9%)	23(37.1%)	Reference	

To assess stress, PSS questionnaire was used. Table 4 shows that among 342 participants, 62(18.12%) had stress. There was negative association between EI and stress ( $p < 0.001$ ) where students with low scores of EI were 41

times likely to have stress in comparison with those who had higher scores of EI. No correlation was observed between stress and other demographic variables as shown in Table 4.

**Table 5: Association between EI and various demographic variables**

Emotional intelligence	Low	Competent	Strong	p value
No of participants	18(5.3%)	111(32.5%)	213(62.3%)	
Age				
19-21 years	10(55.6%)	55(49.5%)	104(48.8%)	0.86
22-27 years	8(44.4%)	56(50.5%)	109(51.2%)	
Sex				
Male	10(55.6%)	42(37.8%)	76(35.7%)	0.25
Female	8(44.4%)	69(62.2%)	137(64.3%)	
Year				
2 <sup>nd</sup> year	6(33.3%)	32(28.8%)	69(32.4%)	0.15
3 <sup>rd</sup> year	6(33.3%)	65(58.6%)	107(50.2%)	
Final year and internship	6(33.3%)	14(12.6%)	37(17.4%)	
Academic				
2 <sup>nd</sup> class	7(38.9%)	28(25.2%)	65(30.5%)	0.54
1 <sup>st</sup> class	10(55.6%)	62(55.9%)	114(53.5%)	
Distinction	1(5.6%)	21(18.9%)	34(16%)	

Using SSEIT, participants' EI was assessed and categorized as participants with Low, Competent and Strong EI. 18(5.3%), 111(32.5%), 213(62.3%) participants had

low, competent and strong EI respectively. There was no association between EI and academic performance and various demographic variables as shown in Table 5.

**Table 6: Multiple logistic regression of factors associated with Emotional states**

Factor	Good psychological outcome	Poor psychological outcome	Univariate		Multivariate	
			Crude OR (95%CI)	P value	Adjusted OR	P value

No of participants	186(54.38%)	156(45.61%)				
Age						
19-21 years	92(49.5%)	77(49.4%)	Ref	0.98		
22-27 years	94(50.5%)	79(50.6%)	1(0.65-1.54)			
Sex						
Male	67(36%)	61(39.1%)	ref	0.56		
Female	119(64%)	95(60.9%)	0.88(0.57-1.36)			
Year of study						
2 <sup>nd</sup> year	53(28.5%)	54(34.6%)	ref	0.13		
3 <sup>rd</sup> year	106(57%)	72(46.2%)	0.67(0.41-1.08)			
Final year and internship	27(14.5%)	30(19.2%)	1.1(0.57-2.07)			
Academic						
2 <sup>nd</sup> class	45 (24.2%)	55 (35.3%)	1.85(1.13-3.02)	0.044	1.88(1.14-3.11)	0.014
1 <sup>st</sup> class	112 (60.2%)	74 (47.4%)	ref		ref	
Distinction	29 (15.6%)	27 (17.3%)	1.41(0.77-2.57)		1.5(0.81-2.75)	0.193
Emotional Intelligence scores						
Low	3 (1.6%)	15 (9.6%)	7.24(2.03-25.77)	0.002	7.44(2.07-26.73)	0.002
Competent	57 (30.6%)	54 (34.6%)	1.37(0.86-2.18)		1.41(0.88-2.25)	0.149
Strong	126 (67.7%)	87 (55.8%)	ref		ref	

Among 342 participants, 156(45.61%) had poor psychological outcome. Participants who secured 2<sup>nd</sup> class had 2 times poor psychological outcome (p=0.014) when compared with those who secured first class. Psychological outcome of the participants who secured distinction was not significant (CI 0.81-2.75). Participants with low scores of EI had 7 times poor psychological outcome (p=0.002) in comparison to those who had strong EI. Psychological outcome of the participants with competent EI was not significant (CI 0.88- 2.25) as shown in Table 6.

## DISCUSSION

In our study, female participants were higher when compared to males, probably because females were more interested to participate and due to ‘feminization’ of medicine *i.e.*, a major proportion of medical students are females. According to the study conducted by Anthony Kenneth, females attending

medical entrance examination were higher when compared to males and there was a significant gender gap, in contrast to engineering students where males attempting engineering entrance exam were higher.<sup>17</sup>

By second and third year the students would have adjusted to medical school and probably have more free time when compared to final year and internship, therefore participation of second- and third-year students were higher in our study. Participants in the age group between 20 and 22 years were higher which coincides with the second and third year of medical course.

Since medical exams are relatively harder, students securing distinction is less but students securing first class was high when compared overall may be because of consistency in studies and clinical knowledge. There is no correlation between academic performance and personality according to a study conducted among Iranian medical students during preclinical

stage where non cognitive and demographic characteristics has a less role in performance.<sup>18</sup>

The online form might have been circulated more among the medical students studying in south Indian states and more so among students studying in Karnataka.

In this study, females were less depressed when compared to males ( $p < 0.027$ ) which is contrary to other studies conducted. One of the studies evaluated the global prevalence of depression among medical students and it showed females were more depressed.<sup>19-22</sup>

One of the factors associated with depression is female gender.<sup>23</sup> Most of the studies showed that females were more depressed when compared to males<sup>22,24</sup> and gender inequality plays a significant role in the discrepancy found in the depression, in which females were found to have more depression than male.<sup>20</sup>

There was significant association between EI scores with anxiety ( $p < 0.001$ ) and depression ( $p < 0.001$ ) and participants with low EI were at 6.5- and 7-times higher risk to have anxiety and depression respectively when compared with the students with competent EI scores. Medical students experience greater incidences of anxiety, depression when compared to others. A study was conducted in Portuguese to assess anxiety and depression among medical and non medical students where medical students had more symptoms of anxiety ( $p < 0.034$ ).<sup>24</sup>

In this study there was correlation between stress and EI ( $p < 0.001$ ), where participants with low scores of EI were at 42 times higher risk to develop stress. Another study showed similar report that the subjects with higher EI had less stress.<sup>25</sup>

There was no association between EI and other demographic variables like age, sex, year of study and academic performance in our study. Studies showed that EI would increase with age<sup>26-28</sup> and experience and in this study, no such observation was seen.

In our study, there was no significant association between sex and EI and the same was observed in this study.<sup>26</sup> However a study showed that males had better EI when

compared to females<sup>29</sup> and another study showed that the females had higher EI.<sup>6</sup>

This study shows no relationship between EI and different year of study. However, according to a study, final year students had higher EI as compared to second year medical students studying at London medical college.<sup>30</sup>

There was no correlation between EI and academic performance, and similar finding was observed in this study<sup>25</sup> whereas another study showed a positive association between EI and academic achievement.<sup>31</sup> There is link between EI and personality and hence its effect on academic performance may vary depending on subjects' EI.<sup>32</sup>

For multiple logistic regression, participants having either anxiety, depression or stress or any two of them or having all three were considered to have poor psychological outcome. Participants who secured 2<sup>nd</sup> class had twice the higher risk to develop poor psychological outcome ( $p = 0.014$ ) when compared with those who secured first class. Study conducted among medical students in Saudi Arabia did not find any association between academic performance and psychological outcome.<sup>33</sup>

Our study shows that there was association between EI and emotional states like anxiety, depression and stress. Participants with low scores of EI had 7 times poor psychological outcome ( $p = 0.002$ ) in comparison to those who had strong EI. Psychological outcome of the participants with competent EI was not significant (CI 0.88- 2.25). Study conducted among osteopathic medical college students and veterinary medicine students in US showed that there was negative correlation between EI and stress, anxiety and depression.<sup>10</sup> Positive correlation was seen between EI and happiness in a study conducted among medical students studying in Shiraj Medical School.<sup>34</sup> So the inference drawn is that lower EI is associated with poor psychological outcome.

## **CONCLUSION**

A negative correlation was observed between EI and emotional state and females were less

depressed as compared to males. Students who secured 2nd class were at twice the higher risk for developing poor psychological outcome. Similarly, participants with low scores of EI were at 7 times higher risk to develop poor psychological outcome. One of the causes for recent rise in dispute and violence in medical field may be reduction in EI. As Medical profession is a stressful environment and is challenging every day, EI helps to manage emotions and helps to perform tasks efficiently even during critical situations.<sup>35</sup> Hence improving EI and ES among medical students will help to mould the next generation of doctors to tackle adverse situation both in their personal and professional life and prevent early burnout.

### Key messages

Medical training should also incorporate EI training sessions for the medical students. Improvement in the EI would lead to better mental health which is required for every individual. Regular counselling sessions to recognise students with poor psychological status since EI and ES are inversely related. Higher EI in medical students would result in good and efficient future physicians which in turn will build a stronger health care system.

### Recommendation

The five key components of EI are self-awareness, self-regulation, motivation, empathy and social skills. Communication, empathy, ethical values along with knowledge and clinical skill play an important role in physicians' life. Hence EI plays a crucial role in shaping professionalism and a successful career. EI has not been given significant importance as IQ. Therefore, EI should be given equal importance as IQ and conduct training sessions and workshops to improve EI among medical students and would help them in boosting better emotional states and mental health. Hence the training should start from the time as medical students to build better emotions and provide optimum patient care in future.<sup>35</sup> Regular screening should be

carried out to identify poor ES among medical students and take suitable interventions.<sup>22</sup>

It is also essential to improve ES through psychiatric or psychological follow-up among medical students which would also help them perform better academically.<sup>24</sup>

It is essential to address these issues among the medical students and include extra-curricular activities with the curriculum and take measures to improve their EI state for a healthy mental state and better outcome as physicians in future, as studies have observed that including extracurricular activities like sports and dance with the curriculum will increase EI by raising awareness on one's own emotions<sup>26</sup>

### Limitation

EI, anxiety, depression, stress and academic scores were self-reported by the participants. There could have been over or under reporting of the emotions and academic performance. PHQ-4 is a screening tool to assess depression and anxiety and is not a diagnostic tool.

### Declaration by Authors

**Ethical Approval:** Approved

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