

Original Research Article

# A Comparative Study of Emotional Intelligence and Stress, Depression, Anxiety between Medical and Engineering Students

Mrs. Alka D. Gore<sup>1</sup>, Dr. Vinayak A. Jadhav<sup>2,3</sup>, Mervin Israel<sup>3</sup>,  
Dr. Vivek B. Waghchavre<sup>4</sup>, Dr. Girish B. Dhumale<sup>5</sup>

<sup>1</sup>Assistant Professor in Statistics, <sup>2</sup>Associate Professor, <sup>3</sup>M.B.B.S. student, <sup>4</sup>Assistant Professor,  
<sup>5</sup>Professor and HOD,

Department of Community Medicine, Bharati Vidyapeeth Deemed to be University Medical College &  
Hospital, Sangli.

<sup>2</sup>New Science College, Nanded, Maharashtra, India.

Corresponding Author: Mrs. Alka D. Gore

## ABSTRACT

**Background:** Medical and engineering students are exposed to different levels and situations of stress, depression and anxiety. This study was planned to compare the Emotional Intelligence and its relation with stress, anxiety and depression among these students.

**Material and methodology:** A cross-sectional study was conducted among medical and engineering students studying in the Sangli-Miraj-Kupwad corporation area. Data was collected by using Pre-designed, pre-tested and validated self-administered questionnaire, given by TEIQ and Dass-21 scale. Chi-square test and GLM were applied for analysis with SPSS-22,

**Results:** Medical students were having significantly better emotional intelligence and higher stress, depression and anxiety than engineering students ( $p < 0.05$ ).

A significant association was found between emotional intelligence and stress, depression and anxiety as well as some socio-demographic factors. Data was analysed by applying GLM, and when interaction of stress, depression and anxiety together used as independent variables, EI was found significantly dependent. ( $F = 2.299$ ,  $p = 0.000$ ).

**Conclusion:** Medical students had significantly higher emotional intelligence. A substantial number of students showed presence of stress, depression and anxiety. Emotional intelligence and stress, depression, anxiety was significantly associated.

**Key words:** Emotional Intelligence, Medical and Engineering Students, Stress, Depression, Anxiety

## INTRODUCTION

Emotional intelligence (EI) refers to the ability to perceive, control and evaluate emotions. It is a psychological characteristic, which describes how effectively an individual identifies, understands, and regulates emotions and then uses them in problem solving and decision making.<sup>[1]</sup> A person with good understanding of own emotions, has a high chance of having good social relationship with others.<sup>[2,3]</sup> People, high in EI are

expected to progress more quickly. Researchers have found that even more than IQ, emotional awareness and abilities to handle feelings will determine success and happiness in all walks of life, including family relationships.<sup>[4,5]</sup>

British psychologist K. V. Petrides proposed a conceptual distinction between the ability-based model and a trait based model of EI. Trait EI is usually measured using self-report questionnaires and has stronger relationships with personality.

Stress, anxiety and depression are important and regular occurrences in college going students. In the current competitive environment, students are highly required to develop their right attitude and EI towards unseen complexities of life and to perform multiple roles with efficiency and effectiveness. EI is a subset of social intelligence with the ability to understand and monitor one's own feelings and that of others too. It allows a student to extract the required data for his academic achievement, as well as acquire and maintain social efficiency and effectiveness. Studies have revealed that emotional intelligence has a significant correlation with academic achievements.<sup>[6]</sup>

Trait EI and perceived stress are correlated with Each other. Excessive stress results in increased prevalence of psychological problems like depression, anxiety, substance abuse and suicide ideation.<sup>[7,8]</sup> The reasons of its occurrence may include an abrupt change from high school, separation from home, greater academic demands, being independent in a new environment, changes in family relations, changes as well as demands in social life and exposure to new people. Although some source of stress is necessary for personal growth to occur, the amount of stress can overwhelm a student and affect the ability to cope.<sup>[9]</sup>

Emotional intelligence plays a major role in the development as well as the regression of stress, anxiety and depression. As emotional intelligence helps one to understand how emotions work and to recognize emotions in one's self and others. Good emotional intelligence is usually accompanied by low levels of stress, anxiety and depression. Due to the understanding of emotions in one's self and in that of others, predictions can be made regarding different emotional situations, and how to manage as well as carry one's self during such situations.<sup>[10]</sup>

Several studies reported that medical, as well as engineering students tend to experience more stress due to the amount & complexity of material to be

learned. Student feels academic pressure and often experience fatigue. Important factor in medical students is the Acceptance of death and dying, which forms a key issue in coping with stress during the later years of medical studies. Similarly engineering students also require more skills regarding learning, functioning effectively at workplace and in such life situations, these people need to behave with more emotional intelligence than intelligence quotient to achieve cooperation from everyone at their workplace for attaining their goals. No doubt, IQ is important to get success in all stages of life, but with IQ, if a person has high EI, he can easily develop communication skill, time management, teamwork, leadership skills etc. The most important is if a person has high EI, he could minimize his stress and relatively anxiety and depression.<sup>[11]</sup>

Medical as well as engineering students are exposed to more stressful conditions, and are more likely to develop stress, depression or anxiety.<sup>[12,13]</sup> Studies in which EI and stress, anxiety, depression were compared are comparatively less. Hence, we performed a study designed to compare the EI and its relation with stress, anxiety and depression in medical and engineering college students.

## **MATERIAL AND METHODOLOGY**

A cross-sectional study was conducted amongst medical and engineering college students of Sangli- Miraj- Kupwad corporation area, Maharashtra state, India, from June 2015 to September 2016. Data collection was done using a pretested questionnaire. A pilot study was done to validate the questionnaire and the proforma was modified as necessary. Sampling was done by using Cluster random sampling method. Medical students studying in medical colleges formed one cluster of 487 students, and engineering students from Sangli-Miraj-Kupwad corporation area formed the other cluster, of 487 students. They were briefed about the study. Proforma were distributed and filled in

proforma were collected. All the willing medical and engineering students having signed the consent form were included in the study. Students absent at the time of study conductance, or who have witnessed death / divorce / any major tragedy in their family or close relationships, or suffering from any major long-term illness or disease, or having any addictions were not considered in the analysis.

Pre-designed, pre-tested and validated self-administered Questionnaire, given by TEIQ and Dass-21 scale for stress, depression, and anxiety were used.

#### **Permission and consent**

Required ethical clearance from the college and the university committees was obtained. After the requisite ethical clearance, permission was taken from the head of the concerned institutions and written consent from each student before the study was obtained.

#### **Study procedure:**

Consent form and summary of the research conveying highlights was supplied to every student. Questionnaire was provided to access the emotional intelligence, socio-demographic and other parameters of the study such as stress, depression and anxiety, to the students who are willing to participate in the study. Care was taken to establish strict confidentiality and maximum level of comfort while filling the questionnaire and evaluations.

**Data Collection:** The questionnaire consisted of three sections:

Section 1 consisted demographic variables. The demographics questionnaire contains 12 self-rated questions, which covers the various demographic characteristics of a college student. These are individual features, education, family background, religious status and economical status of the individual as well as their family.

Section 2 is a tool to measure and study emotional intelligence among various students. The tool used is an internationally validated questionnaire (The Trait Emotional Intelligence Questionnaire (TEIQue) - Scales). Various forms of the

TEIQue were constructed by the developer Dr. K. V. Petrides. The form used in this research was the TEIQue short-form questionnaire. TEIQue-Short Form questionnaire consisted of a 30-item questionnaire designed to measure global trait emotional intelligence (trait EI). The 30 questions mainly focus on 15 components of trait emotional intelligence.

In order to investigate appropriate college students' EI, the words in this questionnaire were revised. The items of the questionnaire were measured and scored on a seven-point Likert scale ranging from 1 strongly disagree to 7 strongly agree. Scoring was done by adding the total score of an individual and then percentage was taken. Then Students were grouped according to their emotional intelligence total scores into poor (<50%), average (50-75%) and good (>75%).

Section 3 is an internationally validated and self-rated tool to measure and study stress, depression and anxiety; the DASS-21 (depression, anxiety, and stress scale).

The DASS-21 scales contains three components, which measure depression, anxiety and stress individually to give separate scores of each component. The three components contain 7 items each, divided into subscales with similar content. The depression component of the scale assesses aspects of depression such as, dysphoria, hopelessness, devaluation of life, self-deprecation, lack of interest / involvement, anhedonia and inertia.

The anxiety scale measures individual components of anxiety such as, autonomic arousal, skeletal muscle effects, situational anxiety, and subjective experience of anxious affect.

The stress component of the scale is sensitive to levels of chronic non-specific arousal. It assesses various aspects such as, difficulty in relaxing, nervous arousal, and being easily upset / agitated, irritable / over-reactive and impatient.

The scoring of the DASS -21 scale is done by calculating Scores for depression, anxiety and stress individually by summing

the scores for the relevant items of each of the three components. The rating of the questions was done as 0-Did not apply to me at all, to 3-Applied to me very much or most of the times.

The Scores on the DASS-21 was multiplied by 2 to calculate the final score according to the scoring instructions of the DASS-21. The final scores of the individual components were tabulated as follows-

Present/absent	Depression	Anxiety	Stress
Absent (No)	0-9	0-7	0-14
Present (Yes)	10+	8+	15+

**Statistical analysis:** It was done based on the results obtained, by using Microsoft Excel and SPSS-22. Chi-square test was applied to study association between different factors. Tables were added for more appropriate comparison and correlation between various parameters, as well as for comparison of parameters between medical and engineering students. Generalized linear model was applied.

### RESULTS AND OBSERVATIONS

Total 968 questionnaires of students, which were filled completely, out of 1000 were included in the study. Medical students were 487 (50.3%) and 481 (49.7%) were engineering students. The participating students belonged to the age of 19 – 23 years. Maximum students, 321(33.2%) belonged to the age 20 years, while only 55 (5.7%) belonged to age 23years. Mean and standard deviation (SD) of age of the participating students was 20.38 ±1.131 years. (Figure no. 1).

Overall male students 531 (54.9%) were more than female students 437 (45.1%). Male to female ratio of medical students was 1:0.57; whereas for the engineering students it was 1:1.18.

Out of total 968 students, 828 (85.54%) were having average emotional intelligence; but 6.92% were having poor. Students, having poor emotional

intelligence were more from engineering stream (39-58.21%) than from medical stream. Emotional Intelligence was significantly associated with stream in which they are studying. (Chi-square = 7.83, p = 0.02) Medical students were found to be having significantly better emotional intelligence than engineering students.

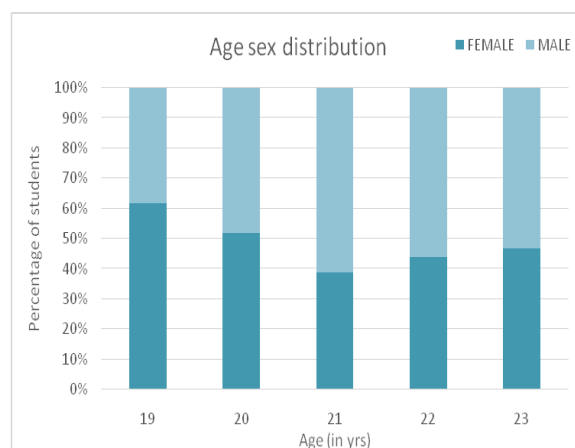


Chart 1: Age-Sex distribution of students

It was observed that a 493 (50.93%) students were stressed; out of which 219(44.42%) were engineering students and 274(55.58%) were medical students. Depression was present in 562(58.06%) students, of which medical students showed a larger number of depression 315(56.05%) than engineering students 247 (43.95%). Maximum number of students 776 (80.17%) were found to have anxiety, out which 355(45.75%) were engineering students and 421(54.25%) were medical students. Percentage of having stress, depression and anxiety is significantly higher in medical students. (Table 1)

Significant association was found among depression, anxiety and stress with emotional intelligence. The students, having stress, depression and anxiety were having good EI; whereas the students, who were normal, were possessing poor emotional intelligence score. (Table 2)

**Table 1: Table showing the distribution of medical and engineering students according to different categories of Emotional Intelligence, Depression, Anxiety and Stress.**

	Stream		Total	Significance
	ENGINEERING	MEDICAL		
<b>Emotional Intelligence</b>				
Poor	39 (58.21%)	28 (41.79%)	67 (100%)	Chi-square = 7.830, p = 0.020
Average	416 (50.24%)	412 (49.76%)	828 (100%)	
Good	26 (35.62%)	47 (64.38%)	73 (100%)	
<b>Stress</b>				
No	262 (55.16%)	213 (44.84%)	475 (100%)	Chi-square = 11.154, p = 0.001
Yes	219 (44.42%)	274 (55.58%)	493 (100%)	
<b>Depression</b>				
No	234 (57.64%)	172 (42.36%)	406 (100%)	Chi-square = 17.659, p = 0.000
Yes	247 (43.95%)	315 (56.05%)	562 (100%)	
<b>Anxiety</b>				
No	126 (65.63%)	66 (34.38%)	192 (100%)	Chi-square = 24.327, p = 0.000
Yes	355 (45.75%)	421 (54.25%)	776 (100%)	
Total	481 (49.69%)	487 (50.31%)	968 (100%)	

**Table 2: Association of Depression, anxiety and Stress with Emotional Intelligence.**

		Emotional Intelligence			Total	Significance
		Poor	Average	Good		
Stress	No	43 (9.05%)	402 (84.63%)	30 (6.32%)	475 (100%)	Chi-square = 8.067, p = 0.018
	Yes	24 (4.87%)	426 (86.41%)	43 (8.72%)	493 (100%)	
Depression	No	38 (9.36%)	347 (85.47%)	21 (5.17%)	406 (100%)	Chi-square = 11.21, p = 0.004
	Yes	29 (5.16%)	481 (85.59%)	52 (9.25%)	562 (100%)	
Anxiety	No	23 (11.98%)	160 (83.33%)	9 (4.69%)	192 (100%)	Chi-square = 11.574, p = 0.003
	Yes	44 (5.67%)	668 (86.08%)	64 (8.25%)	776 (100%)	
Total		67 (6.92%)	828 (85.54%)	73 (7.54%)	968 (100%)	

**Table 3 Association of emotional intelligence, stress and depression with Socio - demographic factors.**

Emotional Intelligence		Poor	Average	Good	Significance
Age	19	14 (5.79%)	218 (90.08%)	10 (4.13%)	Chi-square = 32.720, p = 0.000
	20	21 (6.54%)	274 (85.36%)	26 (8.10%)	
	21	21 (8.30%)	219 (86.56%)	13 (5.14%)	
	22	5 (5.15%)	81 (83.51%)	11 (11.34%)	
	23	6 (10.91%)	36 (65.45%)	13 (23.64%)	
Gender	Female	20 (4.58%)	380 (89.96%)	37 (8.47%)	Chi-square = 7.421, p = 0.024
	Male	47 (8.85%)	448 (84.37%)	36 (6.78%)	
Residence	Rural	25 (9.16%)	215 (78.75%)	33 (12.09%)	Chi-square = 18.626, p = 0.001
	Semi Urban	9 (10.84%)	70 (84.34%)	4 (4.82%)	
	Urban	33 (5.39%)	543 (88.73%)	36 (5.88%)	
Type of family	Joint	17 (6.61%)	208 (80.93%)	32 (12.45%)	Chi-square = 12.1, p = 0.002
	Nuclear	50 (7.30%)	620 (87.2%)	41 (5.77%)	
Total		67(6.92%)	828(85.54%)	73(7.54%)	

There is statistically significant association of EI with age, gender, residence and type of family. Good EI was found in the students with larger age (23.64%), and in females (8.47%). Students living in semi urban areas (10.84%) and nuclear family members (7.30%) were tend to have lower score of EI. (Table: 3)

**Table: 4 Association of stress and depression with Socio - demographic factors.**

	Stress		Depression		Anxiety	
	Yes	No	Yes	No	Yes	No
19	136 (56.20%)	106 (43.80%)	120 (49.59%)	122 (50.41%)	65 (26.86%)	177 (73.14%)
20	172 (53.58%)	149 (46.42%)	145 (45.17%)	176 (54.83%)	55 (17.13%)	266 (82.87%)
21	119 (47.04%)	134 (52.96%)	101 (39.92%)	152 (60.08%)	56 (22.13%)	197 (77.87%)
22	36 (37.11%)	61 (62.89%)	30 (30.93%)	67 (69.07%)	12 (12.37%)	85 (87.63%)
23	12 (21.82%)	43 (78.18%)	10 (18.18%)	45 (81.82%)	4 (7.27%)	51 (92.73%)
	Chi-Square = 29.848, P = 0.000		Chi-square = 25.191, p = 0.000		Chi-square = 18.681, p = 0.001	
Female	217 (49.66%)	220 (50.34%)	169 (38.67%)	268 (61.33%)	81 (18.54%)	356 (81.46%)
Male	258 (48.49%)	273 (51.41%)	237 (44.63%)	294 (55.37%)	111 (20.90%)	420 (79.10%)
	Chi-Square = 0.110, P = 0.741		Chi-square = 3.497, p = 0.061		Chi-square = 0.846, p = 0.358	
Rural	119 (43.59%)	154 (56.41%)	93 (34.07%)	180 (65.93%)	42 (15.38%)	231 (86.42%)
Semi Urban	47 (56.63%)	36 (43.37%)	38 (45.78%)	45 (54.22%)	23 (27.71%)	60 (72.29%)
Urban	309 (50.49%)	303 (49.51%)	275 (44.93%)	337 (55.07%)	127 (20.75%)	485 (79.25%)
	Chi-Square = 5.671, P = 0.059		Chi-square = 9.708, p = 0.008		Chi-square = 6.962, p = 0.031	
Joint	113 (43.97%)	144 (56.03%)	92 (35.80%)	165 (64.20%)	54 (21.01%)	203 (78.99%)
Nuclear	362 (50.91%)	349 (49.09%)	314 (44.16%)	397 (55.84%)	138 (19.41%)	573 (80.59%)
	Chi-Square = 3.644, P = 0.056		Chi-square = 5.425, p = 0.02		Chi-square = 0.305, p = 0.581	
Total	475(49.07%)	493(50.93%)	406(41.94%)	562(58.06%)	192(19.83%)	776(80.17%)

There was significant relationship with various socio-demographic factors and stress, depression and anxiety. Nearly half (49.07%) of students have Stress, 41.94% have depression and only 19.83% anxiety. These factors were significantly dependent on age, residence and type of family. We found these factors were more in students with minimum age, living in semi-urban areas and having nuclear families. (Anxiety was more in joint family members) Stress, depression and anxiety were independent of gender. (Table: 4)

Correlation coefficient of emotional intelligence with depression, anxiety and stress was highly significant, but low degree positive. (Spearman's rho of emotional

intelligence score with: stress 0.257, depression 0.232 and with anxiety 0.225)

Data was analysed by applying Generalized Linear Model, considering EI as dependent factor and stream (Fixed factor), stress, depression and anxiety (co-variates) as independent factors. There is highly significant dependence of EI on stream, in which students are studying (F= 11.628, p = 0.001), but such significant dependence was not found regarding stress, depression and anxiety. When interaction of all these factors, i.e. stream, stress, depression and anxiety together used as independent variables, EI was found significantly dependent on this interaction. (F= 2.299, p = 0.000) (Table 5)

**Table 5: Generalized linear model**

Tests of Between-Subjects Effects					
Dependent Variable: Emotional Intelligence score					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	58123.211a	89	653.07	2.299	0.000
Intercept	4749822.566	1	4749822.566	16723.44	0.000
Stream * Stress * Anxiety * Depression	58123.211	89	653.07	2.299	0.000
Error	249371.152	878	284.022		
Total	16586453	968			
Corrected Total	307494.363	967			

a R Squared = .189 (Adjusted R Squared = .107)

## DISCUSSION

We performed a study to compare EI and its relation with stress, anxiety and depression in medical and engineering college students. Being happy, strong, confident and aware is emotionally intelligent. People having healthy EI, can easily control self-emotions and behavior as well as others. Only Intellectual Intelligence (IQ) is not sufficient to become successful in the life. IQ helps to get academic success into college, but one's Emotional Intelligence will help to manage the stress and even emotions. We need to tackle any situation by applying both these intelligences accordingly; while facing final exams, dealing with patients or even when we stuck in difficult situations in the life. We may lose control over the emotions and the ability to act thoughtfully and appropriately, when we become over stressed; but if our EI is better, we can handle even a tough situation.

We found that medical students were having significantly good/ healthy emotional intelligence than engineering students. The majority of the students, 828 (85.54%) had average EI. Only a small group 40 (6.40%) students was found to have good EI of the total participants. There was a considerable lack of good emotional intelligence between both the medical as well as engineering students, while engineering students showed overall less emotional intelligence than medical students. The student patient relationship seen in medical students exposes them to various disease states and interactions with the sick and distressed patients or to their relatives, which may have an impact on them in the long run and may be a positive

influencing factor, for increased emotional intelligence.

The results were similar to earlier studies done by Shifa Zareena and Santhakumari V.B on emotional intelligence and personality quotient of medical and engineering students, in which it was observed that medical students had higher emotional intelligence than engineering students.<sup>[9]</sup>

Half of the students 493(50.92%), who were found to be stressed, and succumbed to stressful situations maximum of them 274 (55.58%) were medical students, while remaining were of the engineering college. Thus, indicating that overall students could not cope up with stress and stressful situations in the right manner. The transitions from high school to college or the pressure of the increased academic burden may be some of the influencing factors. These results were comparable to studies carried by Sara B.O and Christina C.R which also showed high levels of stress in majority of students. They concluded that high levels of concern about academic performance was the main influencing factor.<sup>[14]</sup>

While on comparison between medical and engineering students, from the obtained data, the medical students seemed to be slightly more stressed than the engineering students, which were comparable to studies done by Waghachavare V et al. on associating stress with socio-demographic factors, stress was significantly dependent on Age, Gender, Residence, Type of family and Family members. Stress is more in students with age23, females, living in rural areas, having joint families with high number of family members.<sup>[15]</sup> On analysis of depression

among students, it was observed that majority of the students 562 (58.06%) from both medical and engineering colleges having depression. Medical college students (56.05%), have significantly high depression than engineering students. These results were comparable to studies done by Modi K et al. depression was also influenced by characters such as, more age, females, rural residents, living in joint families with more members.<sup>[16]</sup>

Anxiety was also observed to be significantly more in medical students. We found Stress, depression and Anxiety were significantly associated with emotional intelligence and socio-demographic characteristics.

A significant relationship between age and emotional intelligence was observed, in which emotional intelligence was increased with age. The maturity and experience that comes with age may be the reason. The study examined that there was a significant difference in emotional intelligence based on gender. In other words, girls had significantly higher emotional intelligence than boys. Students living in a rural area, and coming from a joint family with higher number of members have a good EI and significant association. These results were in comparison with a study done by Atefeh Hosseini and T.V. Ananda rao.<sup>[17]</sup>

In the study, we found that emotional intelligence is significantly and positively correlated with depression, anxiety and stress. Ying, Ming and Ling also found a significant positive correlation, but only among different factors of EI. They have not considered the correlation with stress, depression and anxiety.<sup>[18]</sup> Students can achieve better EI to lower down stress, depression and anxiety and even to achieve an academic success. Ogundokun found that emotional intelligence is mildly associated with academic achievements.<sup>[19]</sup>

In short, emotional intelligence score of medical and engineering students is significantly associated with the stream in

which they are studying, stress, depression and anxiety.

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