

## A study analyzing the relationship of emotional intelligence to academic success assessment and stress, depression, anxiety of medical students

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**Received:** 31<sup>st</sup> August 2020; **Accepted:** 25<sup>th</sup> June 2021; **Published:** 01<sup>st</sup> July 2021

**Abstract:** *Background:* In the life of medical students, while taking the education or doing clinical practice, Intelligence Quotient as well as Emotional Intelligence, both are important to achieve higher skills as well as to improve doctor-patient relationships. This study was conducted to find relation between Emotional Intelligence with Academic Success Assessment as well as with stress, depression and anxiety. *Methodology:* A cross-sectional study was conducted in a medical college. A questionnaire was used to collect data, which is divided into four sections: socio-demographic factors, Emotional Intelligence trait questionnaire, DASS scale and the Academic Success Assessment questionnaire. ANOVA and Tukey's post-hoc test, Chi-square test, Fisher's exact test and binary logistic regression were applied using SPSS-22 for statistical analysis. *Results:* Stress and depression are significantly associated factors for emotional intelligence. EI, stress, depression and anxiety scores are significantly higher in students having personal and academic issues, or those with disturbed routine. According to different logistic models, the log of the odds of a student being stressed, depressed and having anxiety was positively and significantly related to EI. *Conclusion:* EI is an important significant factor in the academic life of medical students. EI scores were significantly higher in the students having stress, depression or anxiety.

**Keywords:** Academic Success Assessment, DASS, Emotional Intelligence, Medical Students.

### Introduction

Students' academic life is dependent on many factors like IQ, socio-economic status, interpersonal and intrapersonal relationships, motivations, adaptability, moods, stress management skills together with emotional intelligence (EI) [1-2]. To increase the odds of achieving academic goals and to enjoy the college life, students have to adjust with their friends, college and existing campus environment. There is a relationship between emotional intelligence and academic performance [1-3]. Nowadays, emotional intelligence has become a very interesting topic for research in various fields, including education, management, psychology, etc. In the medical field, Intelligence Quotient (IQ) is considered as one of the most important predictors for achieving academic goals; but EI and its different facets are even more important than IQ [4], Great psychologists, Peter Salovey

and John Mayer were the first to define the concept of EI in 1990, as 'the ability to cope with one's emotions'[5-6]. In 1998, a psychologist Daniel Golman defined it as 'the ability of managing one's feelings so that they are expressed appropriately and effectively, enabling people to work together smoothly towards their common goals' [7].

EI helps us to assess the situation, regulate the thinking process and facilitates us to act rightly in an appropriate way, which ultimately aids in achieving the academic goal [8]. People with higher levels of EI can identify themselves, their requirements, strengths, and limitations better and manage to control themselves and perform better academically [9-10]. Classroom climate and academic achievement are found to be having significant relationships with EI [11].

Students with higher EI levels seem to be more positive at different stages of life. Medical students have to daily interact with patients and their relatives sympathetically, caringly and with brotherly love. The students with higher EI can manage all these issues more efficiently. This study was conducted to find out the students with lower levels of EI and higher levels of stress, depression and anxiety. In addition, to find the relationships of these factors within themselves and with academic success assessment of medical college students, study was conducted.

### Material and Methods

A cross-sectional study was conducted in a medical college of Sangli-Miraj-Kupwad Corporation, Maharashtra. A pilot study was conducted to validate the questionnaire and it was modified accordingly. All precautions were taken to maintain the confidentiality. The study period was from December 2018 to June 2019.

A pre-tested, self-administered questionnaire was developed with the help of published literature and experts from different fields, related to study. The questionnaire was divided into four sections. The first section covered socio-demographic factors such as age, gender, educational details, area of upbringing, parents' education and occupation, etc. The second section was regarding the Emotional Intelligence; Trait Questionnaire, given by K.V. Petrides. The third section included the short form of the Depression, Anxiety and Stress Scale (DASS-21), and the last section was Academic Success Assessment; concerning personal, academic and institutional issues faced by the students.

By referring to different studies and discussing with the experts of emotional intelligence, it was decided that EI score less than 70 as low EI. DASS-21 has been validated as a screening tool by many researchers in a variety of socio-demographic conditions. Based on the score obtained from the DASS-21 guidelines, stress was classified as either absent (normal) or present [12]. Academic Success Assessment consists of problems related to each of the three issues, i.e. personal, academic and institutional. Participants were asked to mark, if they are facing any of the problems and if their routine is disturbed due to the problem. From the pilot study, the percentage of students who were not having any problems

regarding personal, academic, and institutional issues was 25.7%. By using statistical formula and considering a 5% level of significance and 5% absolute precision, the minimum sample size obtained was 294. Accordingly, 400 students were enrolled for the study by using the purposive sampling method.

Due care was taken to ensure that none of the participants were having any examination at least one week after the study. Complete privacy and a mental comfort zone were maintained for every student. The principal investigator explained the nature and purpose of the study in detail. The investigator was present while students were filling the questionnaire, and helped them if any of the students have difficulty regarding the language or the concept. All willing students above 18 years, who gave consent for participation in the study, were enrolled. After the duly filled questionnaire, the investigator collected all questionnaires and consent forms separately.

Data were analyzed using Statistical Package for the Social Sciences (SPSS) version 22 and Microsoft Excel. For the qualitative data, frequency and percentages were obtained. A chi-square test was applied to check the association of different factors with EI, stress, depression, and anxiety. Mean, S.D. and S.E.M were obtained for quantitative characteristics. ANOVA and Tukey's post hoc test was applied for comparison between means. Binary logistic regression was used to find out the significant predictor for stress, depression, and anxiety. Data from the pilot study were not included in the final analysis.

*Ethical consideration:* Approval was taken from the Institutional Ethical Committee. Permission for data collection was taken from the dean of the college and corresponding teachers of the class. All willing participant students were asked to fill the consent form and then according to inclusion criteria, students were considered in the study.

### Results

A total of 400 students were enrolled in the study; out of which, 351 students who had

completely filled the questionnaire were considered in the analysis. Out of 351, females were 191 (54.4%) and 160 (45.6%) were male. Students from rural areas were 71 (20.2%). Maximum (63.2%) students were living in the hostel; while others were living with their families, relatives, in a separate room, or as a paying guest. Nearly half (50.7%) of the students were having first birth order. 58.7% of students have brothers and 81.2% have sisters.

Students with lower EI were 298 (84.9%) (i.e. EI < 70%). The percentage of students having stress, depression and anxiety was 40.5%, 55.3% and 76.1% respectively. The percentage of students, who were having problems regarding personal, academic, or institutional issues was 95.72%, 86.32%, and 70.65% respectively.

EI was found to be significantly higher in females (36-67.92%), rural residents (16-30.19%), living with parents (22-23.20%) and the students, whose parents were not listening their problems. (( $\chi^2 = 7.555$ ,  $p = 0.023$ ), ( $\chi^2 = 10.356$ ,  $p = 0.035$ ), ( $\chi^2 = 13.116$ ,  $p = 0.011$ ) and ( $\chi^2 = 14.657$ ,  $p = 0.005$ ) respectively).

Stress ( $\chi^2 = 14.55$ ,  $p = 0.000$ ) and depression ( $\chi^2 = 5.339$ ,  $p = 0.021$ ) were significantly associated factors with EI. The students with stress and depression were having better EI. The students, who were having anxiety were emotionally more intelligent, but it was not significantly associated (Table 1).

**Table-1: Association of EI, Stress, Depression, and Anxiety with Different issues**

		<b>EI</b>	<b>Stress</b>	<b>Depression</b>	<b>Anxiety</b>
Personal issue	No Problem	0 (0%)	2 (1.40%)	6 (3.10%)	7 (2.60%)
	Problem	48 (15%)	132 (93.00%)	177 (91.20%)	245 (91.80%)
	Disturbed routine	5 (33.30%)	8 (5.60%)	11 (5.70%)	15 (5.60%)
		Fisher = 6.089, p = 0.04	$\chi^2 = 5.672$ P = 0.059	$\chi^2 = 3.397$ P = 0.183	Fisher = 11.854 P = 0.003
Academic issue	No Problem	6 (12.5%)	7 (4.90%)	26 (13.40%)	33 (12.40%)
	Problem	42 (14.5%)	127 (89.40%)	157 (80.90%)	221 (82.80%)
	Disturbed routine	5 (38.5%)	8 (5.60%)	11 (5.70%)	13 (4.90%)
		$\chi^2 = 5.874$ , p = 0.053	$\chi^2 = 17.078$ P = 0.000	$\chi^2 = 4.702$ P = 0.095	Fisher = 5.505 P = 0.064
Institutional issue	No Problem	13 (12.6%)	34 (23.90%)	53 (27.30%)	73 (27.30%)
	Problem	38 (16%)	103 (72.50%)	135 (69.60%)	184 (68.90%)
	Disturbed routine	2 (18.2%)	5 (3.50%)	6 (3.10%)	10 (3.70%)
		$\chi^2 = 5.874$ , p = 0.053	$\chi^2 = 3.373$ P = 0.185	$\chi^2 = 0.883$ P = 0.643	Fisher = 3.373 P = 0.204
Total		53 (15.1%)	142 (100.00%)	194 (100.00%)	267 (100.00%)

Out of total 351 students, 239 (68%) had written their academic scores. There was a low degree positive correlation between academic and EI score, Pearson's r (239) = 0.117, p = 0.07. In the Academic Success Assessment, the students, who were not having any personal, academic or institutional issues were 5%, 14%, and 30% respectively.

A comparison of mean and sd scores of EI, stress, depression, and anxiety was done within these three groups by using a one-way analysis of variance (ANOVA). The ANOVA of personal issues was not significant for EI: F (2, 348) = 2.474, p = 0.086; but significant for stress: F (2, 348) = 6.329, p = 0.002, depression: F (2, 348) = 4.415, p = 0.013, and

anxiety:  $F(2, 348) = 7.548, p = 0.001$ . It was found that the EI score of students was less when they had no personal issues ( $M = 118.60, SD = 18.08$ ) and large when they had some problems. Stress score was significantly higher in students,

having problems with personal issues and whose routine is disturbed due to these issues. Depression and Anxiety were found to be significantly more in students having problems, related to personal issues (Table 2).

**Table-2: Comparison of Personal issues and EI, stress, depression and anxiety**

	Personal issue	Mean ± Std. Deviation	95% Confidence Interval for Mean	Significance
EI score	No Problem (n = 15)	118.60 ± 18.29	(108.47, 128.73)	F = 2.474, p = 0.086
	Problem (n = 321)	129.57 ± 18.08	(127.58, 131.56)	
	Disturbed routine (n = 15)	127.47 ± 32.35	(109.55, 145.38)	
	Total (n = 351)	129.01 ± 18.95	(127.02, 131.00)	
Stress score	No Problem (n = 15)	8.13 ± 6.61	(4.47, 11.79)	F = 6.329, p = 0.002
	Problem (n = 321)	14.40 ± 8.22	(13.50, 15.30)	
	Disturbed routine (n = 15)	18.80 ± 11.58	(12.39, 25.21)	
	Total (n = 351)	14.32 ± 8.45	(13.43, 15.21)	
Anxiety score	No Problem (n = 15)	9.20 ± 8.68	(4.39, 14.01)	F = 7.548, p = 0.001
	Problem (n = 321)	13.12 ± 7.94	(12.24, 13.99)	
	Disturbed routine (n = 15)	20.13 ± 8.30	(15.54, 24.73)	
	Total (n = 351)	13.25 ± 8.13	(12.39, 14.10)	
Depression score	No Problem (n = 15)	9.47 ± 10.13	(3.86, 15.07)	F = 4.415 p = 0.013
	Problem (n = 321)	11.46 ± 8.45	(10.54, 12.39)	
	Disturbed routine (n = 15)	17.87 ± 11.43	(11.54, 24.19)	
	Total (n = 351)	11.65 ± 8.74	(10.73, 12.57)	

**Table-3: Comparison of Academic issues and EI, stress, depression and anxiety**

	Academic issue	Mean ± Std. Deviation	95% Confidence Interval for Mean	Significance
EI score	No Problem (n = 47)	126.15 ± 19.28	(120.55, 131.74)	F = 0.66, p = 0.518
	Problem (n = 290)	129.52 ± 17.97	(127.44, 131.59)	
	Disturbed routine (n = 13)	128.31 ± 34.66	(107.36, 149.25)	
	Total (n = 351)	129.01 ± 18.95	(127.02, 131.00)	
Stress score	No Problem (n = 47)	9.79 ± 7.14	(7.69, 11.88)	F = 10.266, p = 0.000
	Problem (n = 290)	14.82 ± 8.31	(13.86, 15.78)	
	Disturbed routine (n = 13)	19.54 ± 10.14	(13.41, 25.66)	
	Total (n = 351)	14.32 ± 8.45	(13.43, 15.21)	
Anxiety Score	No Problem (n = 47)	11.21 ± 7.60	(9.00, 13.42)	F = 5.544, p = 0.004
	Problem (n = 290)	13.30 ± 8.15	(12.36, 14.25)	
	Disturbed routine (n = 13)	19.54 ± 6.59	(15.56, 23.52)	
	Total (n = 351)	13.25 ± 8.13	(12.39, 14.10)	
Depression score	No Problem (n = 47)	10.25 ± 8.01	(7.93, 12.57)	F = 5.252, p = 0.006
	Problem (n = 290)	11.56 ± 8.68	(10.56, 12.56)	
	Disturbed routine (n = 13)	18.92 ± 10.05	(12.85, 25.00)	
	Total (n = 351)	11.65 ± 8.74	(10.73, 12.57)	

Academic issues were not significantly related to EI; but significantly related with stress, depression and anxiety ( $p < 0.01$ ). The students, having no academic issues, had a low EI score and vice versa. Stress, depression and anxiety scores were significantly higher in the students, whose routine is disturbed due to academic issues and who have problems (Table 3).

There was no statistically significant difference in means of EI, stress, depression and anxiety of the students, who were not having any problem, having problems, and whose routine is disturbed due to institutional issues ( $p > 0.05$ ). These scores were less in the students who were not having problems regarding institutional issues (Table 4).

**Table-4: Comparison of Institutional issues and EI, stress, depression and anxiety**

	Institutional issue	Mean ± Std. Deviation	95% Confidence Interval for Mean	Significance
EI score	No Problem (n = 103)	127.55 ± 17.10	(124.21, 130.89)	F = 0.511, p = 0.6
	Problem (n =237)	129.72 ± 19.55	(127.22, 132.22)	
	Disturbed routine (n = 11)	127.36 ± 23.12	(111.83, 142.89)	
	Total (n = 351)	129.01 ± 18.95	(127.02, 131.00)	
Stress score	No Problem (n = 103)	13.14 ± 8.24	(11.52, 14.76)	F = 1.414, p = 0.245
	Problem (n =237)	14.80 ± 8.50	(13.71, 15.89)	
	Disturbed routine (n = 11)	14.91 ± 9.01	(8.86, 20.96)	
	Total (n = 351)	14.32 ± 8.45	(13.43, 15.21)	
Anxiety score	No Problem (n = 103)	11.96 ± 7.75	(10.45, 13.48)	F =2.029, p = 0.133
	Problem (n =237)	13.71 ± 8.35	(12.65, 14.78)	
	Disturbed routine (n = 11)	15.27 ± 5.68	(11.46, 19.09)	
	Total (n = 351)	13.25 ± 8.13	(12.39, 14.10)	
Depression score	No Problem (n = 103)	10.80 ± 8.80	(9.08, 12.52)	F = 0.72, p = 0.488
	Problem (n =237)	11.98 ± 8.67	(10.87, 13.09)	
	Disturbed routine (n = 11)	12.55 ± 9.92	(5.88, 19.21)	
	Total (n = 351)	11.65 ± 8.74	(10.73, 12.57)	

Three different binary logistic regression models were applied to find the relationship for stress, depression, and anxiety by using four predictors for each model as EI, personal issues, academic issues, and institutional issues. The result showed that:

$$\text{Predicted logit of (stress)} = (-4.309) + 0.017*EI + 0.193*Personal\ issue + 0.687*Academic\ issue + 0.032*Institutional\ issue$$

$$\text{Predicted logit of (depression)} = (-2.251) + 0.014*EI + 0.354*Personal\ issue + 0.687*Academic\ issue + 0.032*Institutional\ issue$$

$$\text{Predicted logit of (anxiety)} = (-2.435) + 0.016*EI + 0.695*Personal\ issue + 0.002*Academic\ issue + 0.122*Institutional\ issue$$

According to the models, the log of the odds of a student being stressed, depressed and having anxiety was positively and significantly related to EI ( $p < 0.05$ ). The stress of a student is related positively and significantly to academic issues and anxiety with personal issues. In other words, stress, depression, and anxiety were higher in students, who were having a higher EI score (Table 5).

<b>Table-5: Binary logistic regression analysis of stress, depression and anxiety with EI and personal, academic and institutional issues</b>								
<b>Variable(s) entered- EI, Personal issue, Academic issue, Institutional issue.</b>								
	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
<b>Overall Percentage: 62.7, Dependent variable: Stress</b>								
EI	0.017	0.006	7.91	1	0.005	1.017	1.005	1.03
Personal issue	0.193	0.338	0.326	1	0.568	1.213	0.625	2.351
Academic issue	0.687	0.219	9.844	1	0.002	1.988	1.294	3.053
Institutional issue	0.032	0.129	0.061	1	0.804	1.032	0.802	1.328
Constant	-4.309	1.033	17.408	1	0	0.013		
<b>Overall Percentage: 55.6, Dependent variable: Depression</b>								
EI	0.014	0.006	5.236	1	0.022	1.014	1.002	1.025
Personal issue	0.354	0.271	1.699	1	0.192	1.424	0.837	2.424
Academic issue	-0.034	0.174	0.038	1	0.845	0.967	0.687	1.359
Institutional issue	0.061	0.122	0.246	1	0.62	1.063	0.836	1.351
Constant	-2.251	0.882	6.508	1	0.011	0.105		
<b>Overall Percentage: 76.6, Dependent variable: Anxiety</b>								
EI	0.016	0.007	5.236	1	0.022	1.016	1.002	1.031
Personal issue	0.695	0.289	5.78	1	0.016	2.003	1.137	3.529
Academic issue	0.002	0.202	0	1	0.992	1.002	0.675	1.488
Institutional issue	0.122	0.141	0.744	1	0.389	1.129	0.857	1.488
Constant	-2.435	1.02	5.698	1	0.017	0.088		

### Discussion

Now days, attention to the role of emotional and social skills in academic achievements has been increased. In our study, EI was significantly associated with some of the socio-demographic characteristics, like gender, residence, staying with parents and with parents hearing out their problems or not. Female students, rural residents, and those living with their parents were having higher EI. In the study, 2.3% of students mentioned that parents were not hearing out the problems and 39.6% mentioned that they hear out sometimes. Neha Taneja (2018) in her study noted conflict with parents is 7.5% [13]. The students, who admitted that their parents were not listening or not giving them time, were having a high level of EI. Higher EI skills help to manage self-behavior, and self-awareness.

Medical studies are considered tiring and stressful [13-15]. Stress (40%), depression (55%) and anxiety (76%), were found to be important

attributes associated with EI. In several studies, the stress level of medical students ranged from 25%-90% [16-18]. Ibrahim MB (2015) found 57% of depression and 44% of anxiety in their study [19]. In a systematic review of 44 studies done by Sarkar S. et al (2017), they found the pooled percentages of stress, depression and anxiety as 51.3, 39.2 and 34.5 [13]. Another systematic review of 183 studies prevalence of depression among medical students was 27% [16-17]. In our study, the percentage of students having anxiety was larger. It may be due to the use of different tools or may be due to differences in geographical location. Large number of medical students were having either stress, depression or anxiety.

Over the last few years, in the area of academic achievements, much attention was given towards the role of emotional and social skills together with intelligence skills.

Academic performance means not only the examination scores but also different co-curricular activities. Medical students handle their stress, depression and/or anxiety levels, as well as personal, academic and institutional issues as they have better EI levels. Maximum (85%) students were having lower EI and 109 (31%) students were suffering from all the stress, depression and anxiety. With the help of EI trainers, EI can be developed; so that these students will be made less stressed and more successful in their academic achievements. The students, who were having some problems or whose routine is disturbed related to personal, academic or institutional issues were having a higher level of EI. EI was a significant predictor for stress, depression, and anxiety.

Personal issues were having significant importance to develop stress and anxiety. EI and different issues of academic success assessment showing significant but low degree positive correlation with their academic scores. Different authors reported a significant positive correlation between students' performance and EI [20-21]. The students having problematic issues have a lower EI. Regarding personal issues, academic issues and institutional issues only 2%, 5% and 20% of students respectively don't have any problems. The remaining all students have problems and their routine is disturbed due to these issues. The EI score of these students is significantly associated with personal and academic issues ( $p = 0.028$  &  $p = 0.006$ ).

The open-ended questions were asked at the end of all academic issues; so that students can comment and review their own responses. Students having problems regarding personal issues admitted that they have high expectations and lack of self-confidence about themselves. Concentration, teaching and language problems, class environment and learning aids were some of the important academic issues given by students. Students expect guidance for their further studies right from the undergraduate level. For medical students, lecture/ clinical posting hours start early from 8.00 am up to 5.00 pm. Some of the students mentioned that they feel sleepy and their schedule is disturbed due to their relationships. Most of the students cannot understand the ongoing lecture or practical or demo.

## Conclusions

Emotional intelligence is an important significant factor in the academic life of medical students. EI scores were significantly higher in the students having stress, depression, or anxiety. Stress and depression are the two important and significantly associated factors for emotional intelligence. There was a low degree positive correlation between academic score and EI score. Emotional intelligence, stress, depression and anxiety scores are significantly higher in students, who have personal issues and academic issues or whose routine is disturbed with these issues. According to different logistic models used in the study, the log of the odds of a student being stressed, depressed and having anxiety was positively and significantly related to EI.

When a person can understand his own as well as someone else's emotions, he can become more attached to that person as a human being. He can expand his views regarding that person which is in fact a need of a medical student. By achieving higher emotional intelligence, a doctor can handle all situations effectively. Universities should offer emotional intelligence classes for medical students, to increase their emotional intelligence level and tackle stress, depression and anxiety. There is a need for such multicentric studies by considering the same methodology.

*Limitations of the Study:* We considered a purposive sampling design in the study. The random sampling method may increase the internal validity.

*Future directions of the study:* As this article is a part of a Ph.D. thesis, it has a smaller sample size; with a large sample size and considering the advanced statistical technics; like data mining, will be helpful to find the relations between different characters.

## Acknowledgement

The authors express their gratitude towards all medical students, for participation, cooperation and enabling their valuable time for filling the questionnaire even in their busy hours.

**Financial Support and sponsorship:** Nil

**Conflicts of interest:** There are no conflicts of interest.

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**Cite this article as:** Gore AD and Jadhav VA. A study analyzing the relationship of emotional intelligence to academic success assessment and stress, depression, anxiety of medical students. *Al Ameen J Med Sci* 2021; 14(3):217-224.

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