Med.Sci.Educ. (2015) 25:421–430
DOI 10.1007/s40670-015-0168-9

ORIGINAL RESEARCH

Medical Students With Higher Emotional Intelligence Were More Aware of Self-Anxiety and Scored Higher in Continuous Assessment: A Cross-Sectional Study

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Published online: 9 September 2015

Abstract
Introduction High emotional intelligence (EI) has been associated with good behaviour, better academic performance and improved empathy towards patients. This study examined the relationship between emotional intelligence, self-reported anxiety and academic performance among medical students in a public medical school in Malaysia.
Methods This was part of a larger cross-sectional study examining the association of EI and academic performance among medical students in a Malaysian medical school using the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT). Students answered a paper-based demographic questionnaire and completed the online MSCEIT. Independent predictors were identified using multivariable logistic regression.
Results A total of 159 (83 first year and 76 final year) medical students participated and provided complete data in this study (response rate of 64.4 %). There were significant differences between self-reported anxiety and the mean total EI score (p=0.029), Emotional Experiencing area score (p=0.037), Using Emotions branch score (p=0.053), Understanding Emotions branch score (p=0.046), Changes (p=0.015) and Pictures (p<0.0001) tasks scores. Students who answered "not sure" to the item "I feel anxious most of the time in this academic year" had lower means of the above mentioned EI scores and continuous assessment marks. Picture task score was an independent predictor of anxiety self-awareness (adjusted odds ratio 0.93 95 % confidence interval (CI) 0.89 to 0.96).
Conclusions Medical students with higher EI were more aware of their anxiety and performed better in continuous assessment compared to those with lower EI. However, medical students with higher emotional intelligence did not have lesser self-reported anxiety.

Keywords Emotional intelligence · Medical students · Anxiety · Educational achievements

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Introduction

Emotional disorders were prevalent among university students, including medical students [1–8]. Prevalence of emotional disorders in Asian medical schools and universities were about 50 % (Malaysia, Singapore, Japan and Turkey) [1–4, 8] compared to about 25 % in Western medical schools and universities (USA, Sweden and Israel) [5–7, 9]. Dyrbye, based on a survey of seven universities in the USA, reported that nearly 80 % of medical students had at least one form of emotional distress, and more than half (58 %) had three or more forms of distress [10].

Medical students with emotional disorders such as anxiety, chronic stress and depression experienced negative effects, including poor study performance, higher remedial or attrition rates, and higher risk of substance abuse, personality change and suicide [5, 11, 12]. However, many of these emotional disorders did not amount to clinical diagnoses that warrant pharmacological treatment [2]. Thus, many studies recommended non-pharmacological interventions for medical

students who suffered from emotional disorders. For example, educational classes or counselling for stress management, time management classes, cognitive behavioural therapy, benefits of reporting for self and others, peer monitoring etc. [13, 14]. However, in order for such pre-emptive measures to be effective, students need self-awareness of their own feelings. Khan reported that students in a Malaysian public university had low symptomatology knowledge of emotions or mental health literacy whereby only slightly more than half of the students could recognize symptoms of depression [15].

Emotional intelligence (EI) is a set of abilities that allow a person to perceive emotions in their surroundings. With higher EI, access, comprehension and generation of emotions within themselves are improved [16]. This assists their own thinking processes and betters their understanding of emotional meanings. Ultimately, reflective regulation of emotions results in both emotional and intellectual growth in the person [16]. According to the Mayer-Salovey-Caruso EI model, there are four branches of emotional intelligence [17]:

1. Perceiving emotions: The ability to perceive emotions in living and non-living subjects; this includes oneself, others, art, stories, music, etc.
2. Facilitating thought: The ability to generate and use emerging emotions appropriately to assist cognitive processes and communications with others.
3. Understanding emotions: The ability to understand and appreciate emotional meanings in life and relationship transitions.
4. Managing emotions: The ability to modulate feelings in oneself and others so as to promote personal understanding and growth.

The concept of EI was popularized by psychologist turned journalist Daniel Goleman in a trade book published in 1995 [18]. Unfortunately, while the publication of this book created worldwide interest in the idea, the book's broad approach to EI and its extravagant claims generated a wide variety of models purporting to represent EI. However, recent researches on EI have helped to clarify some of the confusion regarding what EI is, how to measure it and what it predicts. The effect of EI has been studied from primary schools to universities: in adolescent social behaviour, in college academic performance and in business organizational leadership and behaviour [19–21]. Due to the centrality of the doctor-patient relationship which requires good interpersonal and communication skills [22], the role of EI in medical education and physician training may play an important role [23, 24]. A review reported that emotion skills training in medical schools consistently improves empathy and increases expressed empathy during medical consultations [25]. However, previous studies examining the concept of EI within the framework of medical education were limited by the lack of availability of valid measures of EI [26].

In addition, only a few studies looked into the effect of anxiety awareness on medical students' academic performance. Therefore, the research question for this study is: do first-year and final-year medical students who self-report experiencing significant anxiety versus those not reporting anxiety have different academic performance and levels of EI? We examined the relationship of self-reported anxiety and EI among first- and final-year medical students using the ability-based Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT). This EI test differs from many self-report measures which measure constructs such as mood, optimism and motivation [27]. This study may inform medical school personnel of a potential need for a preventive program of emotional training for medical students [28–30].

Methods

This study was approved by the Universiti Putra Malaysia (UPM) Medical Research Ethics Committee. This was part of a study on the effect of emotional intelligence on academic performance [31] using the same cohort of participants.

Participants

The participants were the first- and final-year (a total of 247) UPM undergraduate medical students aged 18 years or older. Medical students come from pre-university or matriculation courses in high schools. In the first year, medical students are generally about 20 years old. Almost all medical programmes in Malaysia last for 5 years, and in UPM early clinical experience begins in the second year. Both the first- and final-year medical students faced relatively stressful periods in medical school [1, 2]. As such, the feeling of anxiety would presumably be more prevalent amongst these groups. Participation in this study was on a voluntary basis. However, students with present or past history of psychiatric disorders were advised against participating in the study because these conditions may impair emotional ability and outliers may have skewed our results. In addition, we wanted to examine the normal range of anxiety in a medical school environment.

Setting

The first- and final-year medical students were invited to participate after a briefing on the study was provided in their respective classes in the second semester. Students who agreed to participate returned the signed consent form and were scheduled in batches to the medical faculty's computer laboratories to answer the online MSCEIT.

Study Variables

The socio-demographic variables included in the study were presented in a one-page questionnaire form on paper. The items included age, gender, ethnicity, total monthly income of all family members and having a doctor in the family. A series of questions examined self-perceived support from the family in pursuing the study of medicine, perceived decision to study in medicine as due either to the family's intention or a self-directed choice, extent of social life with others and friends while in the campus, enjoyment in studying medicine, having anxiety (feeling of distress and overwhelmed) most of the time in this academic year and religiosity. Further details on these variables had been described elsewhere [31]. These variables were chosen for their possible effect on academic performance in medical schools based on past literature, personal communication with local experienced academic staff and our own past experience with the students. [32, 33].

The questionnaires were in English and pilot tested with 12 fourth-year medical students, and minor modifications were made to increase clarity. On the item of self-reported anxiety, the medical students assured us on the clarity of meaning and its implication on each of the possible responses.

Academic Performance

Academic performance was measured by the total continuous assessment (CA) and the final examination (FE) marks. These are important objective summative assessments that would decide whether the medical students would progress to the next stages. The first-year continuous assessment comprised the average percentage of the total five end-of-package examinations, which are package 1: cell and excitable tissue, general anatomy and embryology; package 2: molecular basis of medicine, general and biochemical pharmacology, gene expression, human genetics; package 3: general pathology, immunology, haematology; package 4: medical microbiology, medical parasitology and entomology; package 5: cardiovascular, respiratory and urinary systems. The final examination marks for the first year was the end-of-package 6 examination, which includes alimentary system, nutrition and metabolism. The final-year continuous assessment comprised the average percentage of the total six surgical and medical postings, which are the general surgery, orthopaedic, obstetrics and gynaecology, general medicine, paediatric and psychiatry. Final examination marks for final-year students were the aggregate percentage of the Professional Examination III, which consists of multiple choice questions, modified essay questions, objective structured clinical examination, long-case and short-case clinical examinations [34].

The Emotional Intelligence Assessment

The MSCEIT is designed to be an ability-based EI instrument measuring the four branches of the EI model of Mayer and Salovey for adults aged 18 years and older [17, 35]. MSCEIT tests participants various tasks that are thought to use the four abilities of EI. In contrast to self-report measures of EI, MSCEIT has demonstrated less overlap with personality traits [36, 37]. MSCEIT appears to be both content and structurally valid, besides showing discriminate validity from measures of analytic intelligence and many personality constructs, although alternative factor structures have been found [17]. MSCEIT consists of 141 items and takes 30–45 min to complete and will generate 15 scores (see Fig. 1): Total EI score (TOT), two Area scores (EXP: emotional experiencing, REA: emotional reasoning), four Branch scores (B1: perceiving emotion, B2: using emotion, B3: understanding emotion, B4: managing emotion) and eight Task scores (A: faces, B: facilitation, C: changes, D: emotion management. E: pictures, F: sensation, G: blends, H: social management). A and E contributed to B1, B and F contributed to B2, C and G to

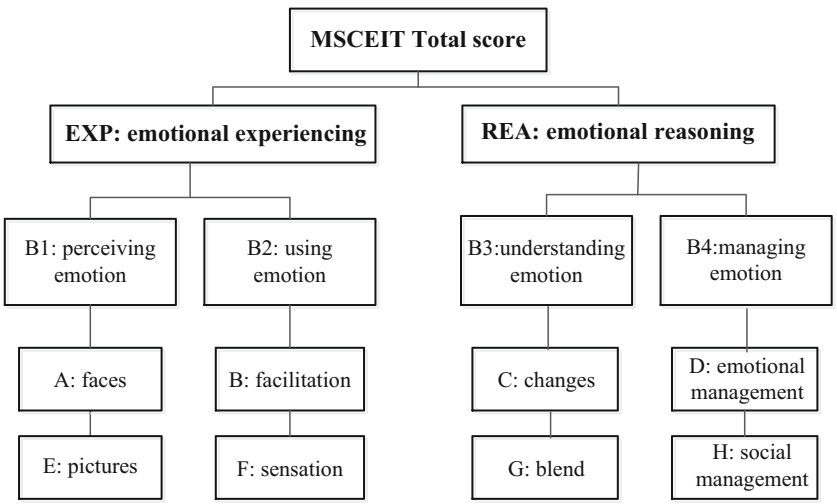


Fig. 1 The MSCEIT scores

B3, and D and H to B4. B1 and B2 contributed to EXP, while B3 and B4 to REA. We used an expert consensus scoring key since we view EI as an ability. Further description of MSCEIT could be found in other publications [31, 35, 38].

The MSCEIT was administered in English, which is not the native language of many of the participants. Therefore, we constructed a glossary of some of the more difficult vocabulary words explaining them with simpler English words and/or synonyms.

Statistical Analyses

Sample size calculation for *t* tests (two tails) with G*Power software version 3.1.2, with estimated effect size of 0.5 with 95 % confidence interval and 80 % power (1-β) is 128 [19, 21]. Potential determinants from the questionnaire items on self-report anxiety were collapsed into three categories: positive (very good and good, very agree and agree, very satisfied and satisfied), unsure and negative (very poor and poor, very disagree and disagree, very unsatisfied and unsatisfied).

Independent variables were the demographic data and the MSCEIT scores while the dependent variable was the student's self-report anxiety. We also looked into the association between self-report anxiety and the academic performance, the CA and FE for both the first- and final-year medical students. Further analyses on each year medical students' academic performances and their determinants had been reported elsewhere [31]. The continuous variables were tested for statistical significance using ANOVA (analysis of variance) while the chi-square test was employed for categorical variables. Tests of significance were two-tailed, and a p value of less than 0.05 was considered as statistically significant at a 95 % confidence interval.

Multiple logistic regression with the enter method was used to examine the independent effect of EI on self-report anxiety. Univariable analyses were performed to identify the significant associated factors for multivariable analysis. MSCEIT scores were entered together sequentially from the overall total score, then the two Area scores, the four Branch scores and lastly the eight Task scores. Data was handled and analysed with PASW 21.0 (SPSS, Chicago, IL).

Results

A total of 159 medical students completed the questionnaire with a response rate of 64.4 %. They were 83 (out of 122 or 68.0 %) medical students in the first year and 76 (out of 125 or 60.8 %) in the final year (Table 1). The gender (female 69.2 %) and ethnic distribution (Malay 52.8 %, Chinese 38.4 %, Indian 6.3 % and others 2.5 %) were representative of the student population in terms of demographics [1]. About a quarter of the participants were unaware of the presence of anxiety. There were no significant differences between self-reported anxiety and many bio-demographic variables except for items on religiosity and perceived teacher quality (Table 1). A more detailed description on the demographics, MSCEIT and academic performance and their associations has been reported elsewhere [31].

Figure 2 shows that those medical students who were unsure of their feeling of anxiety scored significantly lower marks in CA (ANOVA: $F_{2,155}=4.95$, $p=0.008$) compared to those who were either anxious or not anxious. Table 2 (post-hoc Bonferroni multiple comparisons) shows that medical students who were unsure of anxiety achieved significantly lower CA marks compared to their classmates who reported that they were not anxious.

There were some significant differences between self-reported anxiety and the total EI score ($p=0.029$), EXP area score ($p=0.037$), B2 branch score ($p=0.053$), B3 branch score ($p=0.046$), C ($p=0.015$) and E ($p<0.0001$) tasks scores. Post-hoc Bonferroni multiple comparisons showed that students who answered "not sure" to the item "I feel anxious most of the time in this academic year" had significantly lower means on the abovementioned EI scores compared to their classmates who were either admitted to or denied of being anxious (Table 3).

Table 4 shows Pictures (E) task score and academic year were significant independent predictors of self-anxiety unawareness (Nagelkerke $R^2=0.23$). In other words, for every one-score increase in Pictures task has about 8 % (reciprocal of 0.926×100 %) decrease in odds of having anxiety unawareness.

Discussion

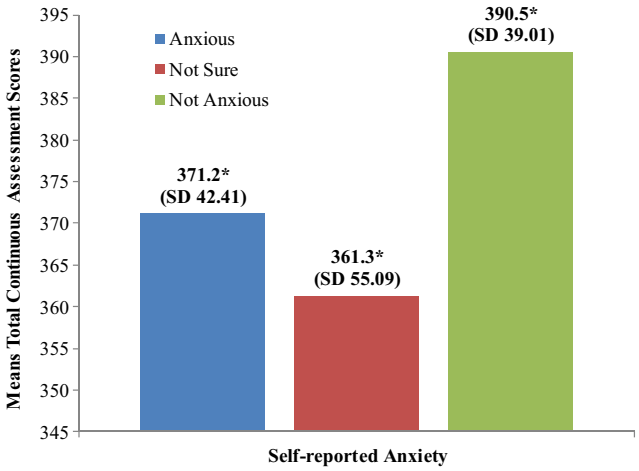
This study highlighted the significant relationship of emotional intelligence and the feeling of anxiety among medical students of multicultural backgrounds. We noticed that EI abilities had consistent relationships with self-reported anxiety, and self-reported anxiety had significant association with the overall continuous assessment but not the final examinations.

We observed that students who were not aware of their feeling of anxiety fared worse in CA when compared to students who were aware of their feeling or those who were not anxious. Absence of association between self-reported anxiety and FE was probably due to the nature of this variable itself which asked about a general feeling of being anxiety over the whole academic year instead of being specific to the time of the FE. The other reason for this lack of association between self-reported anxiety with final-year FE was that the FE was only partly cumulative (25 %) from the total end-of-posting assessments (the six surgical and medical postings) throughout year four and year five. Many other factors could have a

Table 1 Bio-demographics and self-reported anxiety

	Anxious	*n* (%) Not sure	Not anxious	χ^2	*P*
Academic year					
First-year	36 (43.4)	27 (32.5)	20 (24.1)	5.214	0.074
Final-year	34 (44.7)	14 (18.4)	28 (36.8)		
Total	70 (44.0)	41 (25.8)	48 (30.2)		
Gender					
Female	46 (41.8)	28 (25.5)	36 (32.7)	1.172	0.557
Male	24 (49.0)	13 (26.5)	12 (24.5)		
Total	70 (44.0)	41 (25.8)	48 (30.2)		
Ethnicity					
Malays	36 (42.9)	25 (29.8)	23 (27.4)	3.642	0.725
Chinese	27 (44.3)	13 (21.3)	21 (34.4)		
Indians	4 (40.0)	3 (30.0)	3 (30.0)		
Others	3 (75.0)	0	1 (25.0)		
Total	70 (44.0)	41 (25.8)	48 (30.2)		
Gross income					
Low (<2 K)	18 (40.9)	10 (22.7)	16 (36.4)	3.555	0.470
Middle	43 (44.8)	28 (29.2)	25 (26.0)		
High (>10 K)	9 (52.9)	2 (11.8)	6 (35.3)		
Total	70 (44.6)	40 (25.5)	47 (29.9)		
Family support					
Good	63 (42.9)	38 (25.9)	46 (31.3)	2.793	0.593
Not sure	5 (55.6)	3 (33.3)	1 (11.1)		
Poor	2 (66.7)	0	1 (33.3)		
Total	70 (44.0)	41 (25.8)	48 (30.2)		
Family intention in study					
Agree	7 (41.2)	4 (23.5)	6 (35.3)	7.211	0.125
Not sure	6 (30.0)	10 (50.0)	4 (20.0)		
Disagree	57 (46.7)	27 (22.1)	38 (31.1)		
Total	70 (44.0)	41 (25.8)	48 (30.2)		
Socialize					
Well	50 (41.7)	29 (24.2)	41 (34.2)	4.181	0.382
Not sure	19 (52.8)	11 (30.6)	6 (16.7)		
Not well	1 (33.3)	1 (33.3)	1 (33.3)		
Total	70 (44.0)	41 (25.8)	48 (30.2)		
Enjoy study					
Enjoy	46 (42.2)	23 (21.1)	40 (36.7)	8.656	0.070
Not sure	17 (45.9)	13 (35.1)	7 (18.9)		
Not enjoy	7 (53.8)	5 (38.5)	1 (7.7)		
Total	70 (44.0)	41 (25.8)	48 (30.2)		
I am a religious person					
Agree	54 (46.2)	25 (21.4)	38 (32.5)	12.250	*0.016*
Not sure	8 (36.4)	12 (54.5)	2 (9.1)		
Disagree	8 (42.1)	4 (21.1)	7 (36.8)		
Total	70 (44.3)	41 (25.9)	47 (29.7)		
Teaching facility					
Satisfied	52 (3.3)	29 (24.2)	39 (32.5)	7.235	0.124
Not sure	5 (38.5)	7 (53.8)	1 (7.7)		
Unsatisfied	13 (50.0)	5 (19.2)	8 (30.8)		
Total	70 (44.0)	41 (25.8)	48 (30.2)		
Teacher quality					
Satisfied	55 (43.7)	30 (23.8)	41 (32.5)	10.635	*0.031*
Not sure	3 (20.0)	8 (53.3)	4 (26.7)		
Unsatisfied	12 (66.7)	3 (16.7)	3 (16.7)		
Total	70 (44.0)	41 (25.8)	48 (30.2)		

The significant results at $P<0.05$ were in italics



*ANOVA:$F_{2,155}$= 4.95, p= 0.008

Fig. 2 Comparison of means total continuous assessment scores among the three categories of self-reported anxiety

more significant effect during the shorter period of FE compared to the repetitive CA. Thus, it was possible that the influence of anxiety on the FE was attenuated [32, 33]. However, the effects of self-reported anxiety on the CA and FE were not statistically significant when multivariable regression analyses included gender, ethnicity and the total MSCEIT score as reported in our earlier study [31].

Medical students who were unsure of their feelings of anxiety scored significantly lower in the total MCSEIT, Emotional Experiencing area score (ability to respond and use emotional information), Understanding Emotion (ability to name emotions) and Using Emotion (ability to use emotion to facilitate thought) branch scores, Changes (ability to understand inter-relatedness of emotions) and Pictures (expressed emotions in images or landscapes) task scores. However, we observed that only the Pictures task in the MSCEIT was a significant independent determinant of medical students who self-reported to be uncertain of their feeling of anxiety. In other words, the students who were poor at discerning emotional content within themselves in real life circumstances were also poor at indicating various emotions expressed by images or landscapes. It has been reported that task scores have a great deal of variability and have lower reliability compared to branch and total scores [17, 35]. However, with proper cautions, we are suggesting that although it is recommended that individual task scores not be reported, we do so with the Pictures Task in order to call attention to the possibility that the ability to read others' emotions may play a role in the lives of medical students. Future research using more robust and reliable measures on emotion perception could be undertaken to test this hypothesis.

Final-year medical students were more likely to be aware of anxiety compared to the first year which was in consistent with our earlier study showing that the final-year medical students scored higher in the MSCEIT especially in the Understanding Branch (*t* test 4.44, p=0.04) and the Changes task (*t*-test 6.89, p=0.01) [31]. This suggests that EI skills may increase as the students mature or as a consequence of the educational process in the medical school. This is speculative as our study was cross-sectional. Nevertheless, emotional intelligence might improve with age as a result of greater life experience with its varied and differentiated emotional content had been previously reported [39]. Similar prevalence of low level of mental health literacy was also reported among university students in another public university in Malaysia where about 20–25 % had poor or very poor knowledge of symptoms of depression [15]. The prevalence of emotional disorders was very similar compared to previous studies done in this medical school (41.9 %) and another private medical school (46.2 %) in this country that used the General Health Questionnaire (GHQ-12) [1, 2]. Our study concurred with Zaid [2] and Sherina [1] that first-year and final-year medical students were found to report high psychological distress, and a comparison between the groups showed that they were similarly anxious [31]. However, our study revealed that medical students who were more satisfied with teacher quality reported to be less anxious compared to those who were not satisfied (Table 1). This was parallel to the evidence that skilled clinical teachers and teaching were characterized by inspiring,

Table 2 Post-hoc Bonferroni multiple comparisons of self-reported anxiety and total continuous assessment scores

Self-reported anxiety[#]		Mean difference (I-J)	Std. error	*P*	95 % confidence interval	
					Lower bound	Upper bound
1.00	2.00	9.9019	8.9208	0.806	−11.689	31.492
	3.00	−19.3100	8.4345	0.070	−39.723	1.103
2.00	1.00	−9.9019	8.9208	0.806	−31.492	11.689
	3.00	−29.2119*	9.6355	*0.009*	−52.532	−5.892
3.00	1.00	19.3100	8.4345	0.070	−1.103	39.723
	2.00	29.2119*	9.6355	*0.009*	5.892	52.532

The significant results at P<0.05 were in italics

[#] 1=very agree/agree to having anxiety, 2=not sure, 3=disagree/very disagree to having anxiety.

*The mean difference is significant at the 0.05 level.

Table 3 Post-hoc Bonferroni multiple comparisons of self-reported anxiety and EI scores

EI Scores	Feel anxious most of the time in this academic year[#]		Mean difference	Std. error	*P*	95 % confidence interval		Eta squared
						Lower bound	Upper bound	
Changes task score	1	2	7.36*	2.52	*0.012*	1.271	13.454	0.054
		3	3.58	2.44	0.437	−2.341	9.495	
	2	1	−7.36*	2.52	*0.012*	−13.454	−1.271	
		3	−3.79	2.76	0.518	−10.473	2.902	
Pictures task score	1	2	8.75*	2.22	*<0.0001*	3.384	14.119	0.100
		3	0.81	2.15	1.000	−4.405	6.025	
	2	1	−8.75*	2.22	*<0.0001*	−14.119	−3.384	
		3	−7.94*	2.43	*0.004*	−13.834	−2.050	
Using Emotion branch score	1	2	4.92	3.09	0.339	−2.551	12.394	0.038
		3	−3.33	3.00	0.807	−10.588	3.932	
	2	1	−4.92	3.09	0.339	−12.394	2.551	
		3	−8.25*	3.39	*0.048*	−16.452	−0.047	
Understanding Emotion branch score	1	2	5.85*	2.37	*0.044*	0.118	11.573	0.039
		3	3.04	2.30	0.565	−2.526	8.603	
	2	1	−5.85*	2.37	0.044	−11.573	−0.118	
		3	−2.81	2.60	0.845	−9.095	3.481	
Emotional Experiencing area score	1	2	6.66	2.78	0.054	−0.080	13.394	0.042
		3	−0.06	2.70	1.000	−6.609	6.482	
	2	1	−6.66	2.78	0.054	−13.394	0.080	
		3	−6.73	3.06	0.088	−14.117	0.676	
Total EI score	1	2	6.48*	2.48	*0.030*	0.474	12.484	0.045
		3	0.92	2.41	1.000	−4.915	6.754	
	2	1	−6.48*	2.48	*0.030*	−12.484	−0.474	
		3	−5.56	2.72	0.129	−12.152	1.033	

The significant results at $P<0.05$ were in italics

EI emotional intelligence

[#] 1=very agree/agree to having anxiety, 2=not sure, 3=disagree/very disagree to having anxiety.

*The mean difference is significant at the 0.05 level.

supporting, actively involving and communicating with students, and not student-benefiting with poorly prepared lectures of disorganized or confusing syllabi [40, 41]. On the contrary, it was possible that student anxiety contributed to cynicism and subsequently might affect students' relationship with their teachers [13]. A qualitative study is necessary to explore the actual cause of anxiety among these students.

This present study showed high associations between lack of awareness of anxiety and uncertainty of family support (33.3 %), intention in studying medicine (50.0 %), personal religiosity (54.5 %), satisfaction with the teaching facility (53.8 %) and teacher quality (53.3 %). The possible implications were that these students were not able to draw support, to motivate themselves, and to provide feedback to school authorities for advancement of their learning experience and academic performance. Absence of unawareness category in mental assessment scales for mental disorders or psychological distress in previous studies might have resulted in reports of no associations between these variables, as observed in this study [6, 42].

With the hectic and compact learning curriculum of a typical medical school, medical students experience lots of emotional distress and need effective coping skills. Without this ability to manage one's emotions, many dimensions of the learning and teaching activities, interpersonal relationships between classmates, and between self and teaching staff can be affected [1]. Abraham had proposed that emotional competencies (including self-control, resilience, social skills, conscientiousness, reliability, integrity and motivation) were essential characteristics of someone who could be successful in facing organization and environmental barriers [43]. Success in medical school depends on more than just cognitive academic ability but also the essential emotional skills and traits mentioned above [32, 44].

Due to the high prevalence of depression, stress and anxiety among the medical students, and the possible positive effect of EI on academic performance (CA) [4, 45, 46], it may be time to call for a prospective or an interventional study of emotional training programme in medical schools [25, 47].

Table 4 Multivariate logistic regression used enter method conducted for anxiety unawareness, $n=154$

	Had anxiety and no anxiety (0) Unsure of anxiety (1)		*P* value
	OR	95 % CI	
Pictures task score	0.926	0.890, 0.963	<0.0001
Academic year			
First year	0	–	–
Final year	0.385	0.168, 0.885	*0.025*
Family income			
Low	0	–	–
Middle	1.628	0.652, 4.069	0.297
High	0.456	0.078, 2.650	0.381
Doctor in family			
Yes	0	–	–
No	0.802	0.303, 2.123	0.657
Not sure	1.312	0.137, 12.529	0.814

The significant results at $P<0.05$ were in italics

Firdaus reported that general self-efficacy (GSE) had a positive mediating effect on depression and quality of life in medical and health sciences students [45]. The GSE scale assesses the coping and adaptation abilities in the face of life challenges. In addition to other suggested strategies, such as cognitive behavioral therapy, stress management, peer monitoring and benefits of reporting of oneself and others, we believe emotional training could be a crucial interventional component in helping medical students to cope with emotional distress. The students have to be first helped to recognize and understand their emotions before managing their emotion. EI would greatly enhance other self-regulating strategies that follow because EI can impart the ability to verify the severity of symptoms, which were highly associated with subjective appraisal of the stressors. Leão reported that only a small portion of the final-year medical students in São Paulo Medical School with anxiety (21 %), depression (32 %) and poor quality of life (15 %) recognized emotional needs [48]. Conversely, doctors with better developed emotional intelligence skills have been shown to be more capable in providing better quality of patient-centred care [49], to cope better with a highly demanding professional career, and even to lead a more fulfilled and happy life as an individual [30, 50, 51]. The effect of such training would enable the student to acquire and develop the emotional intelligence that will not only improve their experience of the teaching and learning activities [52] but also improve the students' academic performance, in terms of examination marks.

There were a few limitations of this study. Given that respondents volunteered for this study, the results may not be representative of the population of medical students. As in any voluntary study, selection bias could play a role; those non-participating students could be less motivated or discouraged with their already poor academic achievement. We recognize the low reliability of the MSCEIT task score taken by itself in previous studies and statistical analyses. However, owing to its prevalent relationships in our study and analyses, we decided to report them in hoping that it could lead to future studies of this aspect of EI, which hopefully could result in a more balanced and carefully planned medical curriculum. Self-report anxiety is used in this study although it is increasingly being recognized that self-report measurement can be unreliable [53], but we believe it is less so when measuring psychosocial variables [54]. The neutral choice such as "not sure" in our study can be interpreted in a variety of ways; although selecting "not sure", the students may also indicate "maybe" i.e. variable anxiety, as in "sometimes I am anxious, sometimes I'm not". However, with the findings in this study that are consistent with our previous study [31] and having identifiable constructs that could explain the association of the variables, we take it as a stable measure. The sample size for some analyses could have been inadequate for powerful analyses such as Indian ethnicity, poor family support, not socializing well on campus and not enjoy studying in medicine. Lastly, some items in the MSCEIT use scenarios surrounding family or personal issues which could be unfamiliar or strange to the students. We could not pilot test the MSCEIT with medical students before the study because the test was purchased, and to be used as on online test, charged per usage. However, two of the investigators were allowed the access to the MSCEIT and after the test decided to come out with a list more difficult words to help the students-respondents. One of the investigators was always around during the computer laboratory sessions for the medical students to complete the online MSCEIT, and we noted that only occasional queries were raised by some students on vocabulary.

Conclusion

Medical students with less emotional intelligence were largely unaware of their anxiety, and this was associated with lower academic performance in continuous assessment. However, medical students who were more emotionally intelligent did not report less anxiety.

Acknowledgments This work was supported by Research University Grant Scheme (RUGS) grant number 04-02-10-0942RU. We would like to acknowledge the dean of the Faculty of Medicine and Health Sciences in UPM for her permission and support in conducting this study. We are grateful to Lee Yew Kong for his English editing services. We want to thank all the participating medical students in Universiti Putra Malaysia; without your cooperation, this study was impossible. We thank David Caruso for his comments on the manuscript.

Conflict of Interest The authors declare that they have no competing interests.

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