Original Article

Emotional Intelligence and Academic Performance of Iranian Senior Dental Students

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Abstract

Background and Aim: Researchers believe that emotional intelligence (EI) is a better predictor of a person's success in life than intelligent quotient. The aim of the present study was to determine the relationship between the EI and academic performance of senior dental students.

Materials and Methods: This descriptive cross-sectional study evaluated all senior dental students (n=131) of Tehran University of Medical Sciences by census sampling. The Bar-On Emotional Quotient Inventory (EQI) was used to evaluate the EI. The score of the comprehensive basic science exam (CBSE), grade point average (GPA), point average of the tenth semester (PA-10), and point average of practical subjects of the tenth semester (PA-10P) were used to assess the students' academic status. Demographic characteristics of the students and their participation in life skill courses were recorded. In order to determine the relationship between the variables and subscales of EI, a backward linear regression model was adopted. The significance level was set at 0.05.

Results: The response rate was 80% (n=106, 69 females). A direct relationship was observed between the total EI score and PA-10P (P=0.019), while there was an inverse significant relationship between the total EI score and GPA (P=0.007). The total EI score had a significant relationship with participation in life skill courses (P=0.039). No relationship was observed between the total EI score and any of the demographic characteristics, CBSE score, or PA-10.

Conclusion: It seems that students with higher EI perform better in practical dental courses.

Key Words: Emotional Intelligence; Educational Status; Students, Dental

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Introduction

In the recent years, many researchers have concluded that cognitive intelligence cannot sufficiently determine the success, and various factors such as morality, talent, attitude, and behavior contribute to it [1-5]. Over a decade ago, Salovey and Mayer studied the reasons why many intelligent people were not successful in their life. Their research led to discovery of a subset of intelligence named emotional

intelligence (EI). EI, as a type of social intelligence, plays a more significant role in success than cognitive intelligence [2-6]. It involves the ability to screen one's own and other's emotions, making it possible to use this information to guide one's thinking and actions [7].

Educational experts and psychologists have highlighted the relationship of EI and students' academic performance. The relationship between EI and educational achievements has been evaluated in many countries. Many studies have reported a close relationship between EI and academic performance [6, 8-12]. However, studies exploring the role of EI in healthcare professionals, especially in dental settings, are rare. Dental students spend a major portion of their educational period in clinical settings. A vast majority of clinical competencies expected from dental students are covered by EI-related skills [10]. Communication skills, ethical awareness, patient management skills, empathy, ability to work in a multicultural environment, ability to cooperate with each other, and conducting a structured consultation are such skills that are pivotal for a good dental practice [10, 13].

Victoroff et al, and Hannah et al. assessed the relationship of EI and dental students' clinical performance, and suggested that EI might be a key predictor of the students' progress in their education [10, 13]. Azimi et al. reported a significant relationship between general emotional intelligence and patient satisfaction with dental treatments [14]. Some other studies have shown that dental students with a low EI suffer from more perceived stress [15-17]. Moreover, Prtido and Stafford described some EI subsets as predictors of overall academic, and clinical performance in dental hygiene students. They stated that the more attention to the development of EI, the more the improvement of academic and clinical performance would be [18].

Mentioning the importance of EI in academic performance, it would be promising to prevent the students' future educational problems by efficient planning to reduce deficiencies and develop the required capacities. EI can be improved throughout life through participation in related educational courses and learning the relevant skills.

The aim of the present study was to evaluate the relationship between dental students' academic performance and their EI measured by the Bar-On Standardized Emotional Quotient Inventory (EQI), a standardized psychometric questionnaire.

Materials and Methods

The study was approved by the Research Ethics Committee of Tehran University of Medical Sciences (code: IR.TUMS.REC.1394.1624). In the present descriptive cross-sectional study, 131 senior dental students in the 5th and 6th years of a six-year undergraduate curriculum studying in Tehran University of Medical Sciences participated through census sampling. The questionnaires were distributed after an educational session and completed and collected in the same session. The purpose of the study was explained to the participants and they were assured about the confidentiality and anonymity of the data. Participation in the study was voluntarily. Informed consent was obtained from all participants in the beginning of the study. Demographic characteristics including age, gender, and marital status as well as previous participation in life skill courses were also recorded.

Questionnaire

To assess the EI, the EQI, a 133-item self-report measure (Bar-On 1997), was used as the main tool. It takes approximately 30 min to complete and provides an overall EI score as well as the score of 5 composite scales and 15 subscales [19]. The 90-item Persian version of the questionnaire was translated and standardized by Saatchi et al [20]. Each item is measured on a 5-point Likert scale from 1 to 5. The total EI score ranges from 90 to 450.

The EQI consists of five composite scales, including intrapersonal scale,iInterpersonal scale, stress management, adaptability, and general mood. Each composite scale covers some subscales as follows:

Intrapersonal: Self-regard, emotional self-awareness, assertiveness, independence, and

self-actualization

Interpersonal: Empathy, social responsibility, and interpersonal relationship

Stress management: Stress tolerance, impulse control

Adaptability: Reality-testing, flexibility, problem-solving;

General mood: Optimism, happiness

Assessment of academic performance

The dental curriculum of Tehran University of Medical Sciences consists of a 6-year undergraduate program. All students should pass a comprehensive basic science exam (CBSE) at the end of the fourth semester. Selection of dental students for clinical courses depends on passing this exam.

In the present study, to assess the students' academic status, the score of CBSE), grade point average (GPA of the first five years of education and point average of the tenth semester (PA-10) were used. Moreover, to evaluate the students' clinical performance, the point average of practical subjects of the tenth semester (PA-10P) was considered.

Statistical analysis

A backward linear regression model was applied to assess the relationship between demographic variables and academic performance and EI. P-values less than 0.05 were considered significant. Data were analyzed using SPSS 24 (SPSS Co., Chicago, IL, USA).

Results

A total of 106 senior dental students participated in this study (response rate=80%); of whom, 65% were females, 75.5% were single, and 7.5% reported previous participation in life skill courses. The mean age of the participants was 23.89±1.24 years.

Total EI score

The total EI score showed a significant relationship with GPA (p=0.007, ES= -0.37), PA-10P (p=0.019, ES= 0.32), and previous attendance in life skill courses (p=0.039, ES= 0.20). No other significant relationships were noted between the total EI score and other variables. Table 1 shows the results of linear regression model showing the role of demographic variables in EI subscales and total

EI score. Table 1 also presents the relationship between each subscale and different variables.

EI subscales score

The minimum and maximum total EI scores were 192.0 and 422.0, respectively (mean of 326.5±36.6). The minimum, maximum, and mean EI subscales are presented in Table 2.

Demographic characteristics: No significant relationship existed between the EI subscales and age or marital status. Compared with males, females acquired significantly higher scores in interpersonal relationship (P=0.02) and reality-testing subscales (P=0.01). Respondents with previous experience of participation in life skill courses obtained higher scores in empathy (P=0.00) and problem-solving (P=0.03) subscales.

CBSE score: No significant relationship was observed between the CBSE score and EI subscales.

GPA: A higher GPA was significantly associated with a higher score of happiness subscale (P=0.00). The relationship between higher GPA and lower scores of self-actualization (P=0.00, ES= -0.43), independence (P=0.00, ES= -0.41), and interpersonal relationship (P=0.02, ES= -0.24) subscales was also significant.

PA-10: No significant relationship was found between PA-10 and EI subscales.

PA-10P: There was a significant relationship between a higher PA-10P score and higher scores of independence (P=0.00), self-actualization (P=0.00), and happiness (P=0.00) subscales (Table 1)

Discussion

The present study investigated the relationship between the dental students' academic performance and their EI. The findings showed a direct relationship between the total EI score and PA-10P, while the total EI score and GPA of students had a significant inverse relationship. Moreover, the students' total EI score had a significant relationship with participation in life skill courses. Moreover, no relationship was observed between the total EI score and demographic characteristics, CBSE score, or PA-10.

Since medical graduates are mainly responsible

Table 1. Results of linear regression model showing the role of demographic variables in EI subscales and total EI score in a group of Iranian senior dental students (n=106)

-		Variables P-value† (Standardized coefficient)							
		Age	**Gender**	**Marital status**	**Previous attending in life skills courses**	**CBSE score**	**GPA**	**PA-10**	**PA-10P**
1	Self-Regard	0.88 (-0.02)	0.99 (0.00)	0.79 (-0.3)	0.26 (0.11)	0.15 (-0.15)	0.43 (-0.08)	0.70 (0.04)	0.62 (0.05)
2	Emotional Self-Awareness	0.96 (0.01)	0.55 (0.06)	0.32 (0.10)	0.10 (0.16)	0.80 (0.03)	0.70 (0.04)	0.21 (0.13)	0.11 (0.16)
3	Assertiveness	0.88 (-0.02)	0.99 (0.00)	0.79 (-0.03)	0.30 (0.11)	0.15 (-0.15)	0.43 (-0.08)	0.70 (0.04)	0.62 (0.05)
4	Independence	0.44 (0.08)	0.90 (-0.01)	0.48 (0.07)	0.65 (0.05)	0.80 (0.03)	0.00* (-0.41)	0.84 (0.02)	0.00* (0.41)
5	Self-Actualization	0.50 (0.08)	0.80 (-0.3)	0.70 (0.05)	0.07 (0.17)	0.63 (0.05)	0.00* (-0.43)	0.82 (0.02)	0.00* (0.42)
6	Empathy	0.51 (-0.07)	0.20 (0.13)	0.40 (0.09)	0.00* (0.28)	0.86 (0.02)	0.08 (-0.17)	0.87 (-0.02)	0.86 (0.02)
7	Social Responsibility	0.64 (-0.5)	0.07 (0.18)	0.28 (-0.11)	0.09 (0.17)	0.22 (0.13)	0.86 (-0.02)	0.08 (-0.37)	0.07 (0.38)
8	Interpersonal Relationship	0.59 (0.06)	0.02* (0.23)	0.42 (-0.08)	0.20 (0.13)	0.93 (-0.01)	0.02* (-0.24)	0.30 (0.10)	0.23 (0.12)
9	Stress Tolerance	0.61 (0.05)	0.19 (-0.13)	0.89 (0.01)	0.10 (0.16)	0.49 (-0.07)	0.12 (0.16)	0.24 (0.12)	0.10 (-0.16)
10	Impulse Control	0.85 (0.02)	0.65 (0.05)	0.22 (0.12)	0.33 (0.10)	0.07 (0.29)	0.05 (-0.40)	0.38 (-0.09)	0.07 (0.28)
11	Reality-Testing	0.87 (-0.02)	0.01* (0.28)	0.35 (0.09)	0.10 (0.16)	0.70 (0.04)	0.69 (0.04)	0.36 (0.09)	0.24 (0.12)
12	Flexibility	0.38 (0.09)	0.33 (0.10)	0.80 (-0.03)	0.26 (0.11)	0.92 (-0.01)	0.33 -(0.10)	0.93 (-0.01)	0.60 (-0.05)
13	Problem-Solving	0.55 (-0.06)	0.56 (-0.06)	0.20 (0.13)	0.03* (0.22)	0.73 (-0.04)	0.73 (-0.03)	0.96 (-0.01)	0.51 (0.07)
14	Optimism	0.97 (-0.00)	0.43 (-0.08)	0.66 (-0.05)	0.08 (0.17)	0.95 (0.01)	0.08 (-0.24)	0.54 (0.06)	0.06 (0.27)
15	Happiness	0.91 (-0.01)	0.40 (0.09)	0.80 (0.03)	0.44 (0.08)	0.44 (0.08)	0.00* (0.56)	0.27 (0.11)	0.00* (0.47)
Total EI score		0.95 (-0.01)	0.60 (0.05)	0.58 (0.06)	0.039* (0.20)	0.54 (0.06)	0.01* (-0.37)	0.79 (0.03)	0.02* (0.32)

† **Backward linear regression**
* **P<0.05**

Table 2. EI subscale scores in a group of Iranian senior dental students (n=106)

Composite scales	Subscales	Mean± SD	Minimum	Maximum
Intrapersonal	Self-Regard	22.94±3.79	12.0	30.0
	Emotional Self-Awareness	21.78±3.55	12.0	30.0
	Assertiveness	19.81±4.0	8.0	29.0
	Independence	21.85±4.10	9.0	29.0
	Self-Actualization	23.05±3.43	10.0	30.0
Interpersonal	Empathy	24.06±2.76	16.0	30.0
	Social Responsibility	19.32±3.27	15.0	30.0
	Interpersonal Relationship	22.66±3.18	12.0	29.0
Stress management	Stress Tolerance	19.08±4.28	8.0	30.0
	Impulse Control	18.95±4.89	7.0	29.0
Adaptability	Reality-Testing	20.37±3.32	11.0	28.0
	Flexibility	24.19±3.03	15.0	30.0
	Problem-Solving	22.57±2.82	16.0	30.0
General mood	Optimism	22.26±3.84	9.0	29.0
	Happiness	23.18±4.37	7.0	30.0

for the community health, their academic performance is of great importance. If the medical education system is inefficient, a great deal of the country's budget will be wasted every year and the manpower remains useless. Inattention to the factors related to medical students' academic performance will result in a gradual decline in the scientific level and competency of medical professionals. Thus, determining factors that promote the academic performance of medical students has been the main objective of many studies [3, 4, 11, 21, 22]. Because of the nature of dentistry, academic success in this discipline covers extensive aspects, and high scores in theoretical subjects do not determine a dental student's academic success. Various studies have used a range of variables as indicators of medical and dental students' academic performance [6, 9, 10, 13, 21, 23-25]. In the present study, the score of the CBSE, and PA-10P, as well as the GPA were considered to assess different aspects of dental

students' academic performance. Simultaneous use of various indicators for establishing dental students' academic performance was one of the study strengths.

In the present study, students who had higher EI scores were more successful in practical aspects of dental education. The PA-10P was used as an indicator of the practical performance of dental students. In a similar study on medical students, Stratton et al. applied an objective structured clinical examination-type encounter and obtained the same results; i.e. different subscales of EI showed a significant direct relationship with practical performance [9]. To assess the clinical performance, Victoroff et al. considered the mean grade assigned by clinical preceptors representing an overall assessment of a student's clinical performance. They concluded that EI might be an important predictor of clinical performance [10]. Similarly, Prtido and Stafford found that EI scores had significant

associations with and were a significant predictor of both clinical and academic success of dental hygiene students [18]. Since dental education is a dynamic, complex, and stressful process, students with higher EI cope better with stressors in the dental environment, leading to their success in clinical performance [15,17].

Regarding the variable of "previous attendance in life skill courses", although a few students had such an experience (7.5%), a strong correlation was seen between this variable and the total EI score as well as empathy, and problem-solving subscales. These relationships confirm that EI is an ability that can be taught, learned, and changed and should be a main concern in medical education to improve communication skills in professional future [26]. However, the effect of some confounding factors should be noticed; for instance, students with higher EI scores may have a higher tendency to attend life skill courses. More definite conclusion on the possible causal relationship between EI and attendance in life skill courses needs more specific studies. Designing and implementation of an interventional study would be helpful in this regard.

In the present study, GPA was used as one of the most common variables to determine the students' educational status. The findings showed an inverse relationship between the total EI score and GPA, i.e. students with higher total EI scores had a lower GPA. A similar relationship was noted between a number of EI subscales and GPA. The more prominent role of theoretical courses (116.5 credits) than practical courses (73.5 credits) in GPA until the end of the 10th semester confirms the finding that those with better scores in practical courses have better EI scores, while their total GPA is lower.

Chew et al, [6] Victoroff et al, [10] and Wijekoon et al. [21] reported a direct relationship between the medical students' EI and their academic performance. However, Parker et al, [8] Chinipardaz et al, [27] and Carr [28] found no relationship between EI and academic success. Structural educational differences,

conditions of admission in medical or dental schools, different evaluation measures for academic performance, and local and cultural diversities between the countries may explain such different findings.

It is notable that we found an inverse relationship between the total EI score and GPA and a direct relationship between the total EI score and PA-10P. This may be due to the method used for assessing and scoring the student's clinical performance. Some studies have found it to be a challenging point. Ranney et al. suggested a number of measures as indicators of clinical performance, such as dental admission/aptitude testing, perceptual ability and manual dexterity tests, interview, and personality profiles, which should be used based on their values and respective utilities. They suggested that these measures should be periodically validated [29].

In the present study, an inverse relationship was found between the dental students' GPA and some EI subscales, such as interpersonal relationship, which may be due to the fact that building an effective relationship with others needs time, and therefore the students have less time for educational activities. Epstein and Hundert reported that faculty ratings by evaluators are often subject to biases related to individual characteristics such as race and sex, which, in turn, can be influenced by EI [30]. In other words, obtaining better scores by students with a higher EI is not merely related to their better clinical performance, but is also associated with EI-related skills. Therefore, assessing students using checklists by more than one blind tutor is suggested to reduce the impact of EI on clinical scores.

The study findings indicated a direct relationship between gender and interpersonal relationship and reality-testing subscales, as females scored higher in these two subscales. However, no relationship was detected between gender and the total EI score. In other words, males and females had an equal EI in dealing with everyday problems. The latter finding is in accordance with the results of studies by Mahdizadeh et al, [31] Azimi et al, [14] and Bhasakar et al [32]. However, Carr [28]

reported that males had a higher EI, and Pau and Croucher [15] and Wijekoon et al. [21] concluded that females had a higher EI. These differences may be related to cultural differences in various countries.

Different studies have used various EI measurement tools such as the Social Skills Inventory [13], Bar-On EQI [14, 24, 25], the EI scale by Schutte et al, [15-17, 33], and Mayer–Salovey–Caruso Emotional Intelligence Test [28]. In the present study, the standardized Persian version of the Bar-On EQI with 133 items was used for EI measurement. This self-reported questionnaire provides an estimate of emotional and social intelligence, and is suitable for individuals 17 years of age and older [19].

Like any other study using self-reported questionnaires, our participants tended to respond according to the social norms, which is referred to as social desirability. It might have an effect on the responses and the results most likely represent an optimistic estimation of the actual situation [34-35]. Moreover, the students' false assessment of their own EI capability could be the reason for the reverse correlation between the GPA and total EI score. Another limitation of our study was that the data collection was done in a single dental school; thus, the results should be interoperated cautiously as a pilot study in this regard. However, this dental school is the first and oldest dental school in the country and is the first choice of many of the top students.

Conclusion

According to the findings of our study, it seems that students with higher emotional intelligence perform better in clinical and practical modules of the dental course. Moreover, the total EI score had a significant relationship with participation in life skill courses. These relationships confirm that EI is learnable. It can be concluded that holding some life skill courses for dental students may improve their EI competencies, and result in more academic success. Moreover, it seems that different methods of assessment should be used for valid and reliable evaluation of the students' academic performance.

Acknowledgements

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