Original Article

Association between Emotional Intelligence and Perceived Stress in Undergraduate Dental Students

Norkhafizah Saddki, Noraini Sukerman, Dasmawati Mohamad

School of Dental Sciences, Universiti Sains Malaysia, Health Campus, 16150 Kubang Kerian, Kelantan, Malaysia

Abstract

Background: This study investigated the association of emotional intelligence (EI) and other factors with perceived stress (PS) in undergraduate dental students.

Methods: A total of 234 undergraduate dental students at the School of Dental Sciences, Universiti Sains Malaysia (USM), in the academic year of 2009/2010, participated in this cross-sectional study. Self-administered questionnaires, the Assessing Emotions Scale and the Perceived Stress Scale (PSS-10), were used to evaluate EI and PS, respectively.

Results: The mean EI score was 121.2 (SD 11.85). The scores were significantly higher in females than males, and in students who chose dentistry based on their own interest rather than in those who were motivated by others to study dentistry. The mean PSS-10 score was 21.2 (SD 5.08). Pearson correlation analysis indicated a significant inverse relationship between EI and PSS-10 scores (r = -0.337). Multi-variable regression analysis also indicated a significant negative linear association between EI and PSS-10 scores (b = -0.156, 95% CI: -0.207, -0.104). PSS-10 scores were significantly higher for students who were in the clinical years rather than the preclinical years.

Conclusions: This study of USM undergraduate dental students shows that a low EI, female sex, and being in the clinical years were significant predictors of PS.

Keywords: emotional intelligence, stress, students, dental

Introduction

Psychological stress is a subjective response to an environment that a person perceives as demanding or exceeding his/her adaptive capacity. Small doses of stress can be a useful motivating factor to help people respond to changes, face challenges, and complete tasks, but excessive stress can be destructive to physical and psychological health. The educational training for dentists can be highly demanding because dental students must excel academically, they need manual skills to perform clinical work, and they must have good interpersonal skills during interactions with patients.

Previous studies have reported negative impacts of stress on dental students. For example, stressed dental students may experience physical symptoms, such as migraine, intense fatigue, insomnia, lack of appetite and overeating, as well as psychological symptoms, such as uncontrollable anger, depression, and decreased ability to concentrate (1). Students who are excessively stressed may also engage in risky behaviours, such as smoking and use of alcohol and drugs (1). Thus, researchers have taken a great interest in stress among dental students, and a major focus is to identify factors associated with stress so that appropriate stress-management strategies can be developed. There is an increasing focus on one such factor—

emotional intelligence (EI)—which may provide a buffer to stress (2–4).

EI emerged as a psychological concept in the 1990s, that was defined as "the subset of social intelligence that involves the ability to monitor one's own and others' feelings and emotions, to discriminate among them and to use this information to guide one's thinking and actions" (5). Besides having an important role in stress management, a high EI is associated with other favourable outcomes in dental students, particularly success in academic and clinical performance. A study of undergraduate dental students at the Case Western Reserve University, Cleveland, showed that EI could be used to predict clinical performance (4, 6). At the Azad Medical Sciences University in Tehran, patients of dental students who had high EI were more satisfied with their treatments than patients of dental students with low EI (7). Another study of college students in the United States reported that a low EI was associated behaviours that had adverse effects on health (8).

The objectives of the present study are to determine the EI and perceived stress (PS) of undergraduate dental students at Universiti Sains Malaysia (USM), to investigate the association between EI and PS, and to identify other factors associated with PS.

Materials and Methods

Study setting and population

This cross-sectional study examined undergraduate dental students at the School of Dental Sciences, USM, in the academic year of 2009/2010. At the time of this study, the Doctor of Dental Surgery program was offered as a 5-year program, divided into three phases. Students learn about basic medical and dental sciences subjects in the first phase (year 1); they learn about pre-clinical medical and dental subjects in the second phase (year 2 and 3); and they learn about clinical dental practice, as well as go for medical and surgical postings for about 3 months, in the final phase (year 4 and 5). All teaching and learning activities are conducted in the English language.

No inclusion and exclusion criteria were applied in this study. All 281 dental students in the academic year of 2009/2010 were eligible. Sample sizes for all objectives were calculated. The largest affordable sample size was yielded from the first objective to determine the EI

among USM dental students using the formula to estimate a single mean with a 95% confidence interval (CI). The standard deviation of the mean EI score was estimated at 14.9 (3). Sample sizes were calculated for various precision levels, and a sample size of 213 with a precision of 2.0 was selected. To account for a non-response rate of about 20%, a sample size of 256 was needed to adequately address all study objectives. No sampling method was applied and all 281 students were invited to participate in this study.

Research tools and data collection

Data were collected from two self-administered questionnaires, the Assessing Emotions Scale (AES) and the Perceived Stress Scale (PSS).

Schutte et al. (9) developed the AES to measure self-perceived EI based on the EI framework proposed by Salovey and Mayer (5). It was originally developed in English, but is now also available in other languages such as Hebrew, Polish, Swedish, and Turkish. This test has been used in many different population groups, including adolescents, college students, and adults from various professions including physicians, nurses, teachers, probation officers, and managers. The AES has 33 items that ask about a respondent's appraisal and expression of emotion in himself/herself and others, regulation of emotion in himself/herself and others, and utilisation of emotions in solving problems. This scale has good internal consistency and reliability, with Cronbach's alpha of 0.90, and has fair stability over time, with a 2-week test-retest reliability score of 0.78 (9).

In the AES, respondents are asked to rate themselves on the 33 items using a 5-point scale (1 = strongly disagree; 2 = somewhat disagree; 3 = neither agree nor disagree; 4 = somewhat agree; and 5 = strongly agree). Three of the items are negatively worded, so responses for these items were coded in reverse. The total score ranges from 33 to 165, with a higher score indicating a higher EI.

The PSS was developed by Cohen et al. (10) in the English language to measure non-specific self-appraised stress. It is one of the most widely used tools for measuring psychological stress, and has been translated into Japanese, Spanish, Turkish, Portuguese, Chinese, Thai, Arabic, Greek, and French. Its psychometric properties in different cultures are acceptable (11). The PSS is available in three versions: the original 14-item scale (PSS-14), a 10-item scale (PSS-10), and a 4-item scale (PSS-4). A previous

systematic review of the psychometric properties of the three PSS instruments concluded that PSS-10 was superior to PSS-14 and PSS-4 (11). The Cronbach's alpha and intra-class correlation coefficient of the PSS-10 was evaluated at more than 0.70 in all studies in which it was used (11).

The PSS-10 was used in the present study. This scale has six negatively stated and four positively stated items that assess the degree to which an individual perceives life as stressful. Responses were scored on a 5-point scale that ranges from 0 to 4 (0 = never; 1 = almost never; 2 = sometimes; 3 = fairly often; 4 = very often). Responses to the positively stated items were coded in reverse, and the scores were determined as the sum of all items. The total score ranges from 0 to 40, with a higher score indicating more stress.

The original English versions of both questionnaires were used, because all students were fully literate in the English language. We also collected data on the students' demographics (sex, ethnic group, and year of study), identity of the person who influenced their decision to study dentistry, their satisfaction with career choice, and use of professional help to manage stress. To increase the response rate, students were approached when they were in groups for lectures, seminars, or group discussions. There was no time limit for completion of the questionnaires, and all questionnaires were collected immediately upon completion.

Statistical Analysis

Data processing and analysis used IBM SPSS version 22.0. Descriptive statistics, such as mean and standard deviation (SD) for continuous variables, and frequency and percentage for categorical variables, were determined. An independent t-test was used to determine the relationship of socio-demographic characteristics with EI. The level of significance was set at 0.05. A scatter plot was generated to examine the relationship between EI and PSS-10 scores, and the Pearson's correlation coefficient was used to measure the strength of this relationship.

The association between EI and PSS-10 scores was also determined with univariable and multivariable analysis, using simple linear regression and general linear regression analysis, respectively. The other independent variables were all categorical: year of study (pre-clinical vs. clinical), sex, person influencing career

choice, and satisfaction with career selection. Any variable with a P-value less than 0.25 in the univariate analysis or reported to be influential in previous studies was entered into the multivariate analysis (12). Variables for inclusion in the model were selected using the forward selection method. Following variable selection, all possible 2-way interactions and multicollinearity problems were checked. Model assumptions (normality, linearity, and homoscedasticity) and the presence of outliers were checked using plots of residuals.

Ethical considerations

The study protocol was approved by the USM Human Research Ethics Committee (USMKK/PPP/JEPeM/[224.4.(3.5)]). All students were informed about the purpose of the study and provided written informed consent. Explanations regarding the procedures for completing the questionnaires were also provided. The questionnaires were anonymous, and the confidentiality of study data was emphasised.

Results

Characteristics of students

We distributed the questionnaires to 281 students, and received complete responses from 234 students, giving a response rate of 83.3%. Table 1 shows the characteristics of the participating students. There were 56 males and 178 females, and the mean age was 22.2 years (SD 1.54). One hundred and forty-six students (62.5%) were in the preclinical years (year 1, 2, and 3) and the other 88 were in the clinical years (year 4 and 5). More than half of the students were from the Malay ethnic group (56.0%). More than half of them chose dentistry based on their own interests (69.2%), and the others were influenced by their parents (23.1%), or other people (7.7%) including siblings, relatives, friends, and teachers. Most students were satisfied with their decision to study dentistry (95.3%). Nine students (3.8%) admitted that they had sought professional assistance for management of stress, and seven of these students were female.

EI of students

The mean EI score was 121.1 (SD 11.85). Final year students had the highest mean EI score [125.0 (SD 14.57)], followed by first year

students [121.3 (SD 11.44)]. The mean EI score was 120.8 (SD 10.70) for third year students, 120.0 (SD 10.85) for second year students, and 118.3 (SD 10.44) for fourth year students. Table 2 shows the association between socio-demographic characteristics and EI. The mean EI score was significantly higher in females [122.0 (SD 11.57)] than males [118.5 (SD 12.42)], and in students who chose dentistry based on their own interest [123.1 (SD 10.81)] than in those inspired by others [116.9 (SD 13.01)]. There was no significant effect of other socio-demographic characteristics.

Perceived Stress (PS) of students

The mean PSS-10 score was 21.2 (SD 5.08). Fourth year students had the highest mean PSS-10 score [23.1 (SD 4.55)], followed by final year students [21.5 (SD 5.70)]. The PSS-10 scores were 21.0 (SD 3.87) in the third year, 20.6 (SD 6.11) in the first year, and 20.2 (SD 4.57) in the second year. Table 3 shows the association between socio-demographic characteristics and PSS-10 score. The mean PSS-10 score was significantly higher for students in the clinical years [22.2 (SD 5.25)] than in the pre-clinical years [20.6 (SD 4.90)], and in students whose career selection was not their own choice [22.5 (SD 4.90)] rather than their own choice [20.6 (SD 5.07)].

Correlation of EI and PSS-10 scores

A scatter plot shows the linear relationship between EI and PSS-10 scores, with a bivariate normal distribution (Figure 1). Pearson's correlation analysis showed that there was a significant linear correlation between EI and PSS-10 scores ($P < 0.001$), although the correlation was low ($r = -0.377$). The negative correlation coefficient value suggested an inverse relationship between the variables; students with

Table 1. Characteristics of participants ($n = 234$)

Variable	Frequency (%)
Year of study	
Year 1	46 (19.7)
Year 2	54 (23.1)
Year 3	46 (19.7)
Year 4	39 (16.6)
Year 5	49 (20.9)
Sex	
Male	56 (23.9)
Female	178 (76.1)
Ethnic group	
Malay	131 (56.0)
Chinese	94 (40.2)
Indian	6 (2.5)
Others	3 (1.3)
Dentistry was my own choice	
Yes	162 (69.2)
No	72 (30.8)
Satisfied with my choice	
Yes	223 (95.3)
No	11 (4.7)
Sought professional help to manage stress	
Yes	9 (3.8)
No	225 (96.2)

Table 2. Relationship of emotional intelligence with other characteristics (n = 234)

Variable	Emotional intelligence, mean (SD)	Mean difference (95% CI)	t statistic (df)	P-value
Year of study				
Preclinical year	120.6 (10.93)	-1.4 (-4.51, 1.80)	-0.85 (232)	0.398
Clinical year	122.0 (13.26)			
Sex				
Male	118.5 (12.42)	-3.5 (-7.09, 0.02)	-1.96 (232)	0.049
Female	122.0 (11.57)			
Ethnic group				
Malay	121.9 (12.19)	1.7 (-1.43, 4.72)	1.05 (232)	0.293
Others	120.2 (11.40)			
Dentistry was my own choice				
Yes	123.1 (10.81)	6.2 (2.96, 9.40)	3.79 (232)	< 0.001
No	116.9 (13.01)			
Satisfied with my choice				
Yes	121.2 (11.76)	1.6 (-5.63, 8.82)	0.43 (232)	0.665
No	119.6 (14.22)			

Table 3. Relationship of perceived stress with other characteristics (n = 234)

| Variable	Perceived stress, mean (SD)	Mean difference (95% CI)	t statistic (df)	P-value
Year of study				
Preclinical year	20.6 (4.90)	-1.6 (-2.93, -0.25)	-2.34 (232)	0.020
Clinical year	22.2 (5.25)			
Sex				
Male	20.2 (5.67)	-1.2 (-2.76, 0.30)	-1.58 (232)	0.115
Female	21.5 (4.86)			
Ethnic group				
Malay	21.3 (4.85)	0.2 (-1.13, 1.52)	0.29 (232)	0.773
Others	21.1 (5.39)			
Dentistry was my own choice				
Yes	20.6 (5.07)	-1.9 (-3.31, -0.51)	-2.68 (232)	0.008
No	22.5 (4.90)			
Satisfied with my choice				
Yes	21.1 (5.13)	-0.7 (-3.78, 2.41)	-0.44 (232)	0.664
No	21.8 (4.02)			
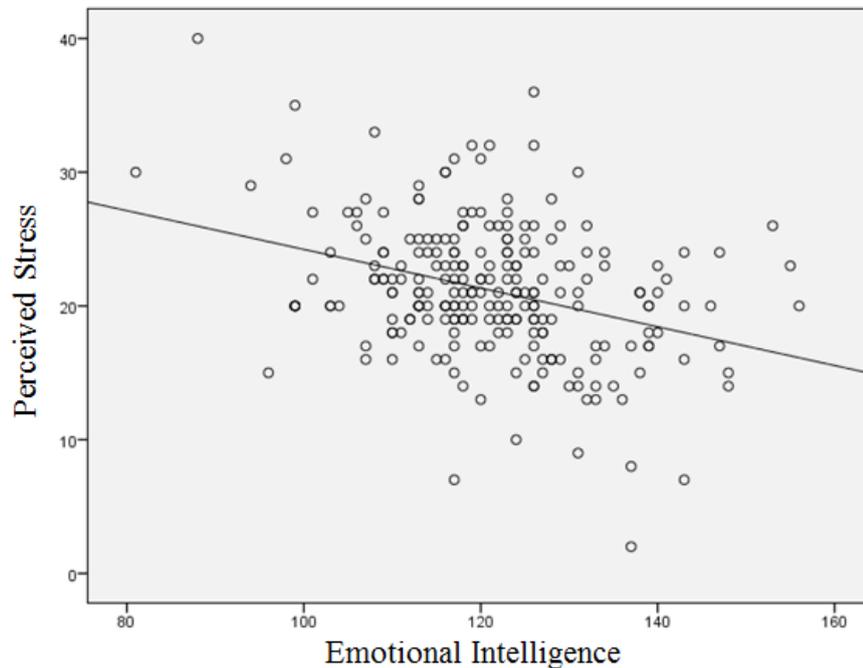
Figure 1. Correlation between EI and PSS-10 scores

higher EI score were more likely to report lower PSS-10 score.

Association between EI and PS by univariate and multivariate regression analysis

Table 4 shows the results of simple and general linear regression analysis of the relationship between EI and PSS-10 scores. The univariate results indicate a significant linear inverse relationship ($P < 0.001$). In particular, a one unit increase in EI score was associated with a 0.145 unit decrease of PSS-10 score. The coefficient of determination (R^2) of this model was 0.114, indicating that it explains 11.4% of the variance. There were also significant associations between PS and year of study and person influencing career selection. Students in the clinical years have a mean PSS-10 score that is 1.591 units higher than those in the preclinical years. Students whose decision to study dentistry were influenced by others have a mean PSS-10 score that is 1.906 units higher than those who chose dentistry based on their own interests.

The multi-variable analysis indicates that EI score, year of study, and sex were significantly associated with PSS-10 score. The adjusted regression coefficient (b) for EI score was -0.156 (95% CI: -0.207, -0.104), that for year of study was 1.683 (95% CI: 0.431, 2.934), and that for sex was 1.620 (95% CI: 0.189, 3.050). Thus, the PSS-10 score is 0.156 units lower for each one unit increase in EI score, students in the clinical years have a PSS-10 score that is 1.683 units higher than those in the preclinical years, and females have a PSS-10 score that is 1.620 units higher than males. There were no significant two-way interactions between factors, there was no multicollinearity problem, and the preliminary final model had a good fit. The R^2 of the final model was 0.161, indicating that it explains 16.1% of the variance.

Table 4. Association between EI and PS by simple linear regression and general linear regression analysis ($n = 234$)

Variable	Simple Linear Regression			General Linear Regression			
	b	95% CI	*P*-value	Adjusted *b*	95% CI	*t*-statistics	*P*-value
EI score	-0.145	-0.197, -0.092	< 0.001	-0.156	-0.207, -0.104	-5.97	< 0.001
Year of study							
Preclinical year	Reference						
Clinical year	1.591	0.252, 2.929	0.020	1.683	0.431, 2.934	2.65	0.009
Sex							
Male	Reference						
Female	1.229	-0.301, 2.758	0.115	1.620	0.189, 3.050	2.23	0.027
Dentistry was my own choice							
Yes	Reference						
No	1.906	0.506, 3.306	0.008	–	–	–	–
Satisfied with my career choice							
Yes	Reference						
No	0.684	-2.414, 3.782	0.664	–	–	–	–

b: Crude regression coefficient; *Adjusted b*: Adjusted regression coefficient.
For the general linear regression model, $R^2 = 0.161$; the model has a good fit; model assumptions are met; there is no interaction between independent variables; and there is no multicollinearity problem.

Discussion

The dental students in this study had a relatively high level of stress, with a mean PSS-10 score of 21.2 (SD 5.08). This is greater than the mean PSS-10 score reported by Pau and Croucher (3) for 213 dental undergraduates at Barts and The London, Queen Mary's School of Medicine and Dentistry, University of London, in the United Kingdom which was 17.73 (SD 6.49). In addition, the mean PSS-10 score among our first-year students was also higher than previously reported for first-year dental students in England (16.2, 95% CI: 14.8–17.7), South Africa (18.0, 95% CI: 16.2–19.8), Australia (19.2, 95% CI: 16.5–21.9), the United States (16.5, 95% CI: 14.8–18.1), and Greece (17.0, 95% CI: 15.7–18.3) (2). Researchers of the multi-country study also remarked that the PSS-10 score of first year Malaysian dental students (21.7, 95% CI: 20.8–22.6) was significantly higher than for dental students from England and the United States,

the countries with the lowest PSS-10 scores (2). The findings from this study, and evidence from the literature, suggest that dental students in Malaysia experience more stress than those in other parts of the world.

Our comparison of students in different years of study indicated that fourth year students who just started their clinical training had the most stress. These results agree with other studies which also showed that students in the transition year from preclinical to clinical training had the most stress (13, 14). This is possibly due to the apprehension of performing clinical procedures on actual patients, in addition to pressures related to patient management, including the need to build a rapport and to set patients at ease.

We also found a significant inverse relationship between EI and PSS-10 scores among the students in this study. This agrees with the results of previous studies that suggested a link between EI and PS in dental students (2, 3, 15). EI is the ability to appraise

emotional information and use it to manage emotional problems in a positive manner to guide thinking and behaviour (5). The ability to solve conflicts in a timely and appropriate manner can help an individual stay calm in stressful situations. A qualitative study of dental students at a dental teaching hospital in the United Kingdom reported that students with high EI were more likely to constructively reflect upon and appraise their emotions, demonstrate social and interpersonal skills in coping with stress, and manage their time during unexpected events (16). Nevertheless, the correlation coefficient of the association between EI and PSS-10 scores in our study was low, as in other studies (2, 3).

There was a significant negative linear association between EI and PS among the students in this study. Interestingly, we also found that fourth year students, who had the highest PS scores, also had the lowest EI scores. Our multi-variable analysis indicated that EI remained a significant predictor of PS, regardless of sex, year of study, reason for the decision to study dentistry, and satisfaction with career choice. Our findings thus substantiate results of the multi-country study by Pau et al. (2) who found a similar relationship between EI and PS, and highlight the important role of EI as a buffer against stress. In view of these findings, we recommend implementation of training programs that develop and enhance the EI of dental students. This training could be part of the academic curriculum, and should be a continuous process, instead of a single exercise, because EI can grow and develop over time and can be learned and improved with practice (17).

Students who decided to study dentistry because of their own interest in the field have significantly higher EI scores than those whose career decisions were influenced by others. This might be because students with an individual interest in dentistry have a greater sense of responsibility, and are therefore better able to manage their emotions. Concurrently, students who chose dentistry based on their own interest have significantly lower PSS-10 scores than those whose decisions were influenced by others. These results are consistent with those of Acharya (18), who examined undergraduate dental students at the Bapuji Dental College and Hospital in Davangere, Karnataka State, India. These previous results indicated that students whose entry into dental school was determined by parental pressure were more likely to report high PS than those who joined of their own accord

(18). Additional studies reported greater stress in students whose first choice of study was not dentistry, relative to those whose first choice was dentistry (19, 20). These findings lend support to the current practices of admission to the USM, which prefers candidates who select dentistry as their first career choice and who choose dentistry based on their own interest in this discipline.

The results of this study also show that students in the clinical years were significantly more stressed than those in the pre-clinical years. Besides clinical work and patient management, students in the clinical years need to complete academic requirements and fulfil other pre-requisites before the final exit examination. Evidence from the literature supports the association between PS and years of study (13, 20). The factors associated with PS in dental students during the clinical phase are mainly related to academics such as examinations and grades, workload, and fear of failing, followed by clinical factors such as dealing with difficult or uncooperative patients, performing invasive clinical procedures, and completing clinical requirements (1).

We found that female dental students have significantly higher PSS-10 scores than males, in agreement with findings reported for undergraduate dental students in other institutions and countries (2, 3, 14). Another study of medical students also reported that females had more stress than males (21). Additionally, seven of the nine students in our study who sought professional help for stress were female. Thus, our results corroborate earlier reports that women are more likely to seek help for psychological problems, and are more likely to use mental health services (22).

Although many studies have examined sex differences in stress, stress responses, and stress-related health problems, much remains unknown. The female students in our study were more stressed than the males, despite having higher EI scores, even though EI score was a significant negative predictor of PSS-10 score. Similarly, female dental students in the United Kingdom also had higher PS and EI scores than males, although PS and EI scores were also negatively associated in that study (3). Other studies of similar and different populations reported similar findings (6, 9, 23, 24). On the contrary, male dental students at Azad Medical Sciences University in Tehran, Iran had higher EI than females (7), and some other studies found no significant difference of EI scores in female and male students (2, 15). The influence

of socio-demographic factors on EI, such as age and cultural setting, and the failure to control for these variables, may explain these inconsistent findings (25).

This study highlights the role of EI as an independent predictor of PS. However, our general linear regression model explained only 16% of the variance in PSS-10 score. This means that factors which we did not measure must account for 84% of the variance in the PSS-10 score. Another limitation of this study is that our respondents were students who attended classes during the data collection period. A total of 47 students (16.7%) were not in their classes or sessions when the questionnaires were distributed, and it was not possible to follow-up these students due to the anonymous nature of data collection. Failure to obtain information from the absentees may have led to non-response bias, because the absentees may include students who purposely skipped classes due to stress or were on medical leave due to symptoms of stress, such as migraine or fatigue.

Conclusions

The dental students in this study had greater PS scores measured using the PSS-10 than dental students from other parts of the world (2, 3). We also found a significant inverse linear relationship between EI and PSS-10 scores. Besides EI, year of study and sex were also significant predictors of PS score. Further research is needed to investigate the role of other factors that may influence stress, such as personality type, cultural background, social support, and spiritual or religious beliefs. It is important to identify factors that can modify stress so that appropriate interventions can be developed and implemented. The results of the present study suggest that strategies which increase a dental student's EI may also help to reduce stress.

Acknowledgement

Conflict of Interest

Funds

Authors' Contributions

Conception and design: NKS, NS, DM
Analysis and interpretation of the data: NKS, NS, DM
Drafting of the article: NKS, NS
Critical revision of the article for important intellectual content: NKS, NS, DM
Final approval of the article: NKS, NS, DM
Statistical expertise: NKS
Collection and assembly of data: NS

Correspondence

Dr Norkhafizah Saddki,
BDS, MCommMed (Oral Health)
School of Dental Sciences,
Universiti Sains Malaysia, Health Campus,
16150 Kubang Kerian, Kelantan, Malaysia.
Tel: 609 7675804
Fax: 609 7675505
E-mail: fizah@usm.my

References

1. Elani HW, Allison PJ, Kumar RA, Mancini L, Lambrou A, Bedos C. A systematic review of stress in dental students. *J Dent Educ.* 2014;**78(2)**:226–242.

2. Pau A, Rowland ML, Naidoo S, Abdul Kadir R, Makrynika E, Moraru R, et al. Emotional intelligence and perceived stress in dental undergraduates: a multinational survey. *J Dent Educ.* 2007;**71(2)**:197–204.

3. Pau A, Croucher R. Emotional intelligence and perceived stress in dental undergraduates. *J Dent Educ.* 2003;**67(9)**:1023–1028.

4. Victoroff KZ, Boyatzis RE. What is the relationship between emotional intelligence and dental student clinical performance? *J Dent Educ.* 2013;**77(4)**:416–426.

5. Salovey P, Mayer JD. Emotional intelligence. *Imagin, Cogn, and Pers*. 1990;**9**:185–211.

6. Kumar A, Puranik MP, Sowmya KR. Association between dental students' emotional intelligence and academic performance: A study at six dental colleges in India. *J Dent Educ*. 2016;**80(5)**:526–532.

7. Azimi S, AsgharNejad Farid AA, Kharazi Fard MJ, Khoei N. Emotional intelligence of dental students and patient satisfaction. *Eur J Dent Educ*. 2010;**14(3)**:129–132. https://dx.doi.org/10.1212/WNL.66.10_suppl_4.S2410.1111/j.1600-0579.2009. 00596.x.

8. Rivers SE, Brackett MA, Omori M, Sickler C. Emotion skills as a protective factor for risky behaviors among college students. *J Coll Stud Dev*. 2013; **54(2)**:172–183. https://dx.doi.org/10.1353/csd.2013.0012.

9. Schutte NS, Malouff JM, Hall LE, Haggerty DJ, Cooper JT, Golden CJ, et al. Development and validation of a measure of emotional intelligence. *Pers Individ Dif*. 1998;**25(2)**:167–177.

10. Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. *J Health Soc Behav*. 1983;**24(4)**:385–396.

11. Lee EH. Review of the psychometric evidence of the perceived stress scale. *Asian Nurs Res (Korean Soc Nurs Sci)*. 2012;**6(4)**:121–127. https://dx.doi.org/10.1016/j.anr.2012.08.004.

12. Bursac Z, Gauss CH, Williams DK, Hosmer DW. Purposeful selection of variables in logistic regression. *Source Code Biol Med*. 2008;**3**:17. https://dx.doi.org/10.1186/751-0473-3-17.

13. Al-Sowygh ZH. Academic distress, perceived stress and coping strategies among dental students in Saudi Arabia. *Saudi Dent J*. 2013;**25(3)**:97–105. https://dx.doi.org/10.1016/j.sdentj.2013.05.002.

14. Polychronopoulou A, Divaris K. A longitudinal study of Greek dental students' perceived sources of stress. *J Dent Educ*. 2010;**74(5)**:524–530.

15. Birks Y, McKendree J, Watt I. Emotional intelligence and perceived stress in healthcare students: a multi-institutional, multi-professional survey. *BMC Med Educ*. 2009;**9**:61. https://dx.doi.org/10.1186/1472-6920-9-61.

16. Pau AK, Croucher R, Sohanpal R, Muirhead V, Seymour K. Emotional intelligence and stress coping in dental undergraduates—a qualitative study. *Br Dent J*. 2004;**197(4)**:205–209.

17. Fletcher I, Leadbetter P, Curran A, O'Sullivan H. A pilot study assessing emotional intelligence training and communication skills with 3rd year medical students. *Patient Educ Couns*. 2009;**76(3)**:376–379. https://dx.doi.org/10.1016/j.pec.2009.07.019.

18. Acharya S. Factors affecting stress among Indian dental students. *J Dent Educ*. 2003;**67(10)**:1140–1148.

19. Sugiura G, Shinada K, Kawaguchi Y. Psychological well-being and perceptions of stress amongst Japanese dental students. *Eur J Dent Educ*. 2005;**9(1)**:17–25.

20. Uraz A, Tocak YS, Yozgatligil C, Cetiner S, Bal B. Psychological well-being, health, and stress sources in Turkish dental students. *J Dent Educ*. 2013;**77(10)**:1345–1355.

21. Shah M, Hasan S, Malik S, Sreeramareddy CT. Perceived stress, sources and severity of stress among medical undergraduates in a Pakistani medical school. *BMC Med Educ*. 2010;**10**:2. https://dx.doi.org/10.1186/472-6920-10-2.

22. leury MJ, Ngui AN, Bamvita JM, Grenier G, Caron J. Predictors of healthcare service utilization for mental health reasons. *Int J Environ Res Public Health*. 2014;**11(10)**:10559–10586. https://dx.doi.org/10.3390/ijerph111010559.

23. Arora S, Ashrafian H, Davis R, Athanasiou T, Darzi A, Sevdalis N. Emotional intelligence in medicine: a systematic review through the context of the ACGME competencies. *Med Educ*. 2010; **44(8)**:749–764. https://dx.doi.org/10.1111/j.1365- 2923.2010.03709.x.

24. Hasegawa Y, Ninomiya K, Fujii K, Sekimoto T. Emotional intelligence score and performance of dental undergraduates. *Odontology*. 2016;**104(3)**:397–401. https://dx.doi.org/10.1007/s10266-015-0219-0.

25. Fernández-Berrocal P, Cabello R, Castillo R, Extremera N. Gender differences in emotional intelligence: The mediating effect of age. *Behavioral Psychology*. 2012;**20(1)**:77–89.