Medical Science

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Emotional intelligence and stress coping mechanisms among dental students in Riyadh, Saudi Arabia

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ABSTRACT

Background: Dental education and practice have been considered as one of the most challenging and stressful fields. The type of stressors and stress perception methods in the dental academic environment varies depending on multiple factors. *Methods:* The level of emotional intelligence to stress coping strategies among clinical-year dental students in Riyadh was evaluated using a cross-sectional questionnaire with four sections, i.e., the demographic data, Emotional intelligence scale (BEIS-10), Perceived stress scale (PSS-10), and Brief COPE scale. *Results:* The analysis of the 291 responses showed that students who were not able to regulate their own emotions were more likely to have a higher level of perceived stress. Students who were better at regulating others' emotions rely on planning for stress coping. Finally, students who could utilize their own emotions use positive reframing, planning, and religion as their mechanism of coping. *Conclusions:* There were significant differences in the perceived stress levels between males and females despite minor differences in emotional intelligence levels. There is a significant correlation between stress coping strategies with stress level and emotional intelligence.

Keywords: BEIS-10, Brief COPE, Dental students, Emotional Intelligence, Perceived stress, Stress coping mechanisms, Riyadh

1. INTRODUCTION

Dental education and practice have been acknowledged as one of the most difficult, and exasperating fields. It is essential for dental students to experience extensive and substantial preclinical, clinical, and interpersonal skills; including the necessity for training to acquire an abundant amount of knowledge, and problem-solving skills (Plasschaert et al., 2005). A previous study has shown that dental students undergo more stress than medical students due to high competition among students and increased workload,

and possibly receiving inconsistent feedback and unjustified criticism from faculty members (Murphy et al., 2009).

In recent years, educationists have been focusing on understanding stress and stressors among dental students within their educational environment. Previously published studies have identified stressors and their consequences during different stages of dental training (Humphris et al., 2002; Grandy et al., 1989). The level of stress induced by different stressors varies depending on the psychological makeup, stage of training, curricular aspects, institutional factors, and several other non-academic factors (Pöhlmann et al., 2005; Ersan et al., 2017). Individuals' personality, emotional intelligence, and social support exceedingly impact stress perception in dental academic environments (Kumar et al., 2009; Bradley et al., 1989; Naidoo and Pau, 2008; Pau et al., 2007; Yap et al., 1996). Furthermore, it is the dentist's duty to be competent to understand and comprehend the patient's behavior and emotions to apply a unique individualized approach while treating the patients (Becker et al., 2006).

Research focusing on Emotional Intelligence (EI) over the previous years have shown that EI may be conceptualized in terms of perception, appraisal, and expression of emotions; emotional facilitation of thinking; understanding, scrutinizing, and enrolling emotional knowledge; and reflective regulation of emotions (Pöhlmann et al., 2005). Thus, it is predicted and obvious that dental students with high EI can cope better with the stressors in the dental training environment and report less perceived stress (PS) (Murphy et al., 2009). PS measurements are often used to examine relationships between stress and health within behavioral medicine research (Al-Sowygh, 2013).

Earlier studies only focused on either EI and PS, sources of stress or the coping strategies in the dental environment as separate entities, which is considered as a limitation. A previous study done in Riyadh utilized a thorough variable type of instrument that evaluated perceived stress, academic distress, and coping mechanisms among students in the first to the fifth year of academic level (Al-Sowygh, 2013). However, their findings may not reflect the general trend in other national or regional institutions. It is reasonable that the students in clinical years are facing much more stress than pre-clinical academic years due to the need to complete the requirements as well as deal with patients. Therefore, we aimed to evaluate if the level of emotional intelligence has an effect on the stress coping strategies among clinical year dental students.

2. MATERIALS AND METHODS

This cross sectional study was conducted among senior dental students, studying in six different universities across Riyadh, Saudi Arabia. The data was collected between September and November, 2020. The ethical consent was obtained from King Abdullah International Medical Research Centre (KAIMRC) prior to the commencement of the study. All dental students in clinical years, ie. fifth and sixth academic years of dental training studying in six different universities across Riyadh were eligible and participated in the study. Dental students in preclinical years or other universities of Saudi Arabia were excluded from the study. Convenience sampling technique was used to collect the sample of 260 participants that was calculated based on 80% power, 95% confidence level, and 5% relative precision through a questionnaire that was distributed through social media platforms (Saddki et al., 2017; Ngamjarus et al., 2014).

The level of EI, PS, and the most preferred stress coping mechanism employed by the participants were evaluated using an electronic-based survey that comprised of three prevalidated questionnaires. Informed consent was taken from the participants prior to answering the survey. The questionnaire comprised of four sections viz;

(i) the demographic information of the participants viz. gender, academic year, the name of the university;

(ii) *Emotional intelligence scale (BEIS-10)* as developed by Davies et al., (2010) and considered as a modified and brief version of Assessing Emotional Scale (AES) that was developed by Schutte et al., (1998) (Davies et al., 2010; Schutte et al., 1998). BEIS-10 consists of ten items designed to assess an individual's self-reported emotional skills and abilities which measures and estimate adaptive interpersonal and intrapersonal emotional function. The scale utilizes five subscales consisting of two items each: (a) appraisal of own emotions (b) appraisal of others' emotions (c) regulation of own emotions (d) regulation of others' emotions, and (e) utilization of emotions using a 5-point Likert scoring system (1=strongly agree, 2=agree, 3=neutral, 4=disagree, and 5=strongly disagree) (Simmons and Leimann, 2013).

(iii) *Perceived stress scale, (PSS-10)* (Cohen and Williamson, 1988) which consists of 10 items inquires how unpredictable, uncomfortable, and stressful respondents find their current life situation on a 5-point (0 = Strongly disagree, 1 = Disagree, 2 = Neutral, 3 = Agree, 4 = Strongly agree), some of the questions will score reversibly (4 = Strongly disagree, 3 = Disagree, 2 = Neutral, 1 = Agree, 0 = Strongly agree). The total sum of scores can range between 0 and 40 in which the higher scores indicate higher stress levels. Moreover, scores that range from 0 to 13 inferred that participant has low stress, and moderately stressed would have 14 to 26 score, and 27 to 40 indicate high-stress level. The scale equates with different psychosocial measures such as depression, anxiety,

and perception of poor health along with decreased satisfaction with self, job, and life in general in the past month (Cohen and Williamson, 1988)

(iv) *Brief COPE scale* which consists of 28-items considering multiperspective range of strategies used for coping or regulating cognitions in response to stressors. There are 14 two-item subscales within the Brief COPE, rated on a scale from 1, I haven't been doing this at all, to 4, I've been doing this a lot and analyzed separately (Carver, 1997).

All variables were summarized and reported using descriptive statistics, and interval variables were summarized and reported in terms of mean and standard deviation. The data was cleaned, coded, and analyzed using JMP Pro 15.0 statistical software. Categorical variables such as gender were summarized and reported in frequency distribution. All interval variables were compared statistically using the Pearson correlation coefficient test and T-test, respectively. All statistical tests were declared significant at α level of 0.05 or less.

3. RESULTS

A total of 291 responses were received from male and female dental undergraduate students from 6 different colleges. 136 (46.74%) of the responses were male, while 155 (53.26%) of the responses were female. Out of these, 25 responses (8%) from 1st to 4th years dental students, were excluded from the study. The demographic distribution of the sample across the 6 different universities across Riyadh are presented in Figures 1-3.
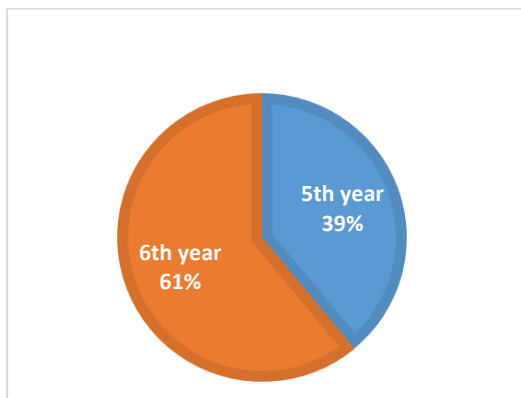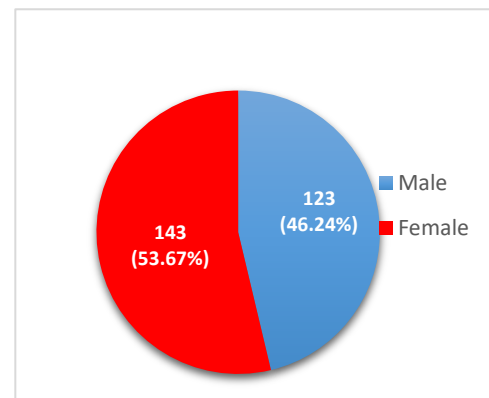

Figure 1 Academic Level of Participants

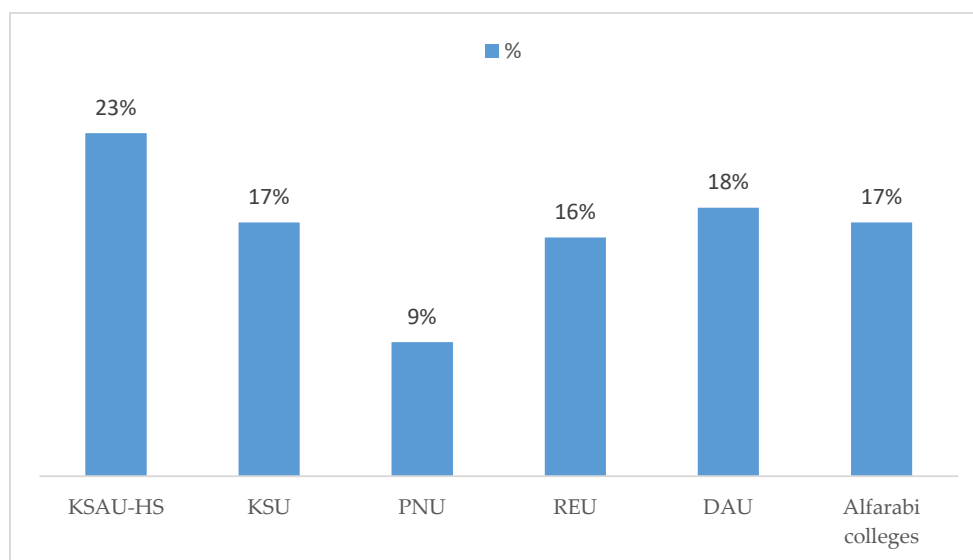**Figure 2** Gender Distribution

Figure 3 Distribution among Universities

Table 1 demonstrates the gender-based as well as the overall scores with regards to the EI, perceived stress, and coping strategies employed by dental students. The male dental students recognized and appraised their own emotions significantly better than female dental students. It is noteworthy that female dental students were better at judging and appraising other people's emotions slightly better than their male counterparts, however, they were also uncertain about controlling their own emotions

when compared to male students. Although the levels of perceived stress were higher among the female participants; they were able to properly utilize their own emotions during stressful situations better than male dental students.

Most of the dental students (65.79%) presented with moderate stress levels followed by high-stress level (25.94%). This study also revealed that male dental students relied on acceptance of the situation, humor, or positive reframing as means for coping with stress; while females coped with stress mainly by planning, followed by acceptance, or by relying on spiritual means (religion) (Table 1).

Table 1 Emotional intelligence, perceived stress levels, coping strategies in dental students

Emotional intelligence factors	Mean ± SD		
	Total	Male	Female
Appraisal of own emotion	7.87±1.64	8.09±1.47	7.67±1.75
Appraisal of others' emotions	7.66±1.65	7.54±1.83	7.76±1.49
Regulation of own emotions	6.92±1.42	7.09±1.44	6.77±1.38
Regulation of others' emotions	7.41±1.63	7.39±1.67	7.42±1.61
Utilization of emotions	8.14±1.33	8.00±1.38	8.26±1.27
Total perceived stress		22.04±5.94	23.49±7.30
Percieved Stress Levels	N	%	
Low stress	22	8.27%	
Moderate stress	175	65.79%	
High stress	69	25.94%	
Coping mechanisms	Total	Male	Female
Self-distraction	5.44 ± 1.52	5.41 ± 1.55	5.48±1.67
Active coping	5.55 ± 1.88	5.37 ± 1.53	5.70±1.59
Denial	3.88 ± 1.70	3.77 ± 1.84	3.97±1.91
Substance use	3.38 ± 1.40	3.93±1.71	2.90±1.54
Emotional support	4.18 ± 1.82	4.26±1.41	4.12±1.39
Use of Informational support	4.88 ± 1.82	4.67±1.76	5.06±1.86
Behavioral disengagement	3.88 ± 1.61	3.83±1.65	3.92±1.58
Venting	4.99 ± 1.55	4.69±1.66	5.26±1.41
Positive reframing	5.60 ± 1.48	5.43±1.36	5.74±1.57
Planning	5.56 ± 1.86	5.18±1.87	5.90±1.79
Humor	5.22 ± 2.05	5.48±2.01	5.00±2.06
Acceptance	5.70 ± 1.65	5.49±1.79	5.88±1.50
Religion	5.54 ± 1.93	5.28±1.91	5.76±1.93
Self-blame	4.96 ± 1.87	4.67±1.78	5.21±1.92

Perceived stress level (as a continuous variable) was considered a dependent variable and dimensions of emotional intelligence with adjustment for baseline information as independent variables in the bivariate analysis of variance. The analysis showed that there were significant values between PS and appraisal of own emotions, appraisal of other emotions, and regulation of own emotions but the values were negligible except for students who were unable to regulate their own emotions presented with a higher level of PS (Table 2). There was a statistically significant correlation between denial, behavioral disengagement, venting, and self-blame when employed as stress coping mechanisms and moderate levels of perceived stress (Table 3).

Table 2 Correlation between emotional intelligence and perceived stress

Perceived stress		Mean ± SD	P value	r correlation
22.82±6.74	Appraisal of own emotions	7.87±1.64	0.0182	-0.1447
	Appraisal of others' emotions	7.66±1.65	0.0047	-0.17264
	Regulations of own emotions'	6.92±1.42	<0.0001	-0.37016
	Regulations of others' emotions	7.41±1.63	0.3266	-0.06038
	Utilization of emotions	8.14±1.33	0.2991	-0.0639

Table 3 Correlation between Perceived stress and stress coping mechanism

Perceived stress		Mean ± SD	p	r
22.82±6.74	Self-distraction	5.44 ± 1.61	0.6429	0.028559
	Active coping	5.55 ± 1.52	0.2121	-0.7675
	Denial	3.88 ± 1.88	< 0.0001	0.320068
	Substance use	3.38 ± 1.70	0.0572	0.116747
	Emotional support	4.18 ± 1.40	0.0215	0.140894
	Informational support	4.88 ± 1.82	0.2582	0.069575
	Behavioral disengagement	3.88 ± 1.61	<0.0001	0.26998
	Venting	4.99 ± 1.55	< 0.0001	0.243297
	Positive reframing	5.60 ± 1.48	0.4785	-0.4364
	Planning	5.56 ± 1.86	0.3809	0.05394
	Humor	5.22 ± 2.05	0.3981	-0.05203
	Acceptance	5.70 ± 1.65	0.3281	-0.06019
	Religion	5.54 ± 1.93	0.8429	-0.01221
	Self-blame	4.96 ± 1.87	< 0.0001	0.455986

Table 4 describes the correlation between the EI parameters and the stress coping mechanisms. Active coping and acceptance were the most commonly employed stress coping strategies employed by the subjects within the majority of EI parameters. Although there was a negligible correlation, participants who were better at the appraisal of their own emotions employed active coping, positive reframing, and self-blame as coping strategies. There are significant values between appraisal of others' emotions and self-distraction, coping actively, distructive practices like substance use, use of informational support, behavioral disengagement, planning, and acceptance, but all these values have a negligible correlation.

There are significant values between regulations of others' emotions and self-distraction, active coping, behavioral disengagement, positive reframing, acceptance, and religion, but all these values have a negligible correlation; except the students who were better at regulating others' emotions, preferred planning as stress-coping mechanism. Finally, there are significant values between utilization of emotions and self-distraction, active coping, informational support, positive reframing, planning, accepting the situation,venting, and religion. Students who mostly utilized their own emotions employed positive reframing, planning and religion as their mechanism of coping (Table 4).

Table 4 Correlation between Emotional intelligence and stress coping mechanism

BEIS-10 Mean ± SD	Stress coping mechanism	Mean ± SD	p value	r
Appraisal of own emotions 7.87±1.64	Self-distraction	5.44±1.61	0.6926	0.02435
	Active coping	5.55±1.52	0.0054	0.170214
	Denial	3.88±1.88	0.2470	-0.07122
	Substance use	3.38±1.70	0.6777	0.025598
	Emotional support	4.18±1.40	0.3325	0.059644
	Informational support	4.88±1.82	0.2960	0.064309
	Behavioral disengagement	3.88±1.61	0.2460	-0.07137
	Venting	4.99±1.55	0.6456	-0.02833
	Positive reframing	5.60±1.48	0.0145	0.149723
	Planning	5.56±1.86	0.8538	0.011349
	Humor	5.22±2.05	0.9051	0.007343
	Acceptance	5.70±1.65	0.7554	0.01919
	Religion	5.54±1.93	0.1206	0.095405
	Self-blame	4.96±1.87	0.0042	-0.17506
Appraisal of others' emotions 7.66±1.65	Self-distraction	5.44±1.61	0.0270	0.135607
	Active coping	5.55±1.52	0.0150	0.14894
	Denial	3.88±1.88	0.8617	-0.01073
	Substance use	3.38±1.70	<0.0001	-0.26962
	Emotional support	4.18±1.40	0.7191	0.02215
	Informational support	4.88±1.82	0.0068	0.165586
	Behavioral disengagement	3.88±1.61	0.0364	-0.12835
	Venting	4.99±1.55	0.4942	0.042094
	Positive reframing	5.60±1.48	0.3438	0.058267
	Planning	5.56±1.86	0.0050	0.171481
	Humor	5.22±2.05	0.4364	-0.04792
	Acceptance	5.70±1.65	0.0044	0.174002
	Religion	5.54±1.93	0.0002	0.226752
	Self-blame	4.96±1.87	0.6258	0.030038
Regulation of own emotions 6.92±1.42	Self-distraction	5.44±1.61	0.0259	0.136607
	Active coping	5.55±1.52	< 0.0001	0.295811
	Denial	3.88±1.88	0.5857	-0.03357
	Substance use	3.38±1.70	0.4352	-0.04804
	Emotional support	4.18±1.40	0.0822	0.106761
	Informational support	4.88±1.82	0.0939	0.102913
	Behavioral disengagement	3.88±1.61	0.0183	-0.14462
	Venting	4.99±1.55	0.3015	-0.06359
	Positive reframing	5.60±1.48	0.0016	0.19287
	Planning	5.56±1.86	0.0786	0.108036
	Humor	5.22±2.05	0.0570	0.116841
	Acceptance	5.70±1.65	0.0345	0.128684

	Religion	5.54±1.93	0.0017	0.191056
	Self-blame	4.96±1.87	0.0674	-0.11231
Regulation of others' emotions 7.41±1.63	Self-distraction	5.44±1.61	0.0004	0.214108
	Active coping	5.55±1.52	< 0.0001	0.270201
	Denial	3.88±1.88	0.0009	0.203198
	Substance use	3.38±1.70	0.0119	-0.26935
	Emotional support	4.18±1.40	0.0089	0.160009
	Informational support	4.88±1.82	0.0006	0.209352
	Behavioral disengagement	3.88±1.61	0.0812	-0.10711
	Venting	4.99±1.55	0.0073	0.164112
	Positive reframing	5.60±1.48	< 0.0001	0.266555
	Planning	5.56±1.86	< 0.0001	0.41296
	Humor	5.22±2.05	0.4016	0.051634
	Acceptance	5.70±1.65	<0.0001	0.289163
	Religion	5.54±1.93	<0.0001	0.246214
	Self-blame	4.96±1.87	0.0022	0.186604
Utilization of emotions 8.14±1.33	Self-distraction	5.44±1.61	< 0.0001	0.202472
	Active coping	5.55±1.52	< 0.0001	0.248132
	Denial	3.88±1.88	0.0588	0.116016
	Substance use	3.38±1.70	0.0525	-0.11904
	Emotional support	4.18±1.40	0.0899	0.104198
	Informational support	4.88±1.82	0.0003	0.219592
	Behavioral disengagement	3.88±1.61	0.8311	0.013141
	Venting	4.99±1.55	0.0007	0.207367
	Positive reframing	5.60±1.48	< 0.0001	0.303748
	Planning	5.56±1.86	< 0.0001	0.32791
	Humor	5.22±2.05	0.7729	0.017775
	Acceptance	5.70±1.65	< 0.0001	0.258873
	Religion	5.54±1.93	< 0.0001	0.375248
	Self-blame	4.96±1.87	0.8315	-0.01311

4. DISCUSSION

Dental schools are recognized as stressful learning environments as it involves the acquirement of multifarious skills such as academic, clinical, and interpersonal skills. In this cross-sectional study, we evaluated and compared the level of perceived stress, the emotional intelligence approach, and the commonly employed stress coping mechanism among senior dental students studying in all six dental colleges across Riyadh. In comparison to other studies that were conducted in Riyadh, our study was the only one with a randomized sample that was collected from multiple dental schools across Riyadh. The clinical years (i.e. the 5th and 6th year) is contemplated to be the most stressful years in the dental academia. Majority of our study participants presented with moderate to high-stress levels (Table 1). Clinical requirements were found to be the most significant stressor among senior dental students (Al-Sowygh, 2013).

The mean level of PS among our participants was found to be 22.82±6.82 (Table 2) which is greater than the findings reported in studies conducted internationally (Pau et al., 2007; Saddki et al., 2017) indicating that dental students in Riyadh probably experience more stress than in other parts of the world. Although the data collection was done at the beginning of the academic year, the high level of perceived stress could also be attributed to the uncertainties associated with patient management as well as the fear of getting infected amidst the COVID-19 pandemic. Although statistically insignificant, the female dental students demonstrated

higher stress levels (23.49±7.30), in comparison male dental students (22.04+5.94), Table 1 is similar to the findings of the study conducted on dental students in Malaysia (Saddki et al., 2017) as well as in Saudi Arabia (Al-Sowygh, 2013).

Emotional intelligence, a relatively new concept, is the ability to understand, use, and manage your own emotions in positive ways to communicate effectively, palliate stress, empathize with others, survive challenges, and alleviate conflict. Emotional intelligence helps an individual build solid relationships, achieve at school, and work, and accomplish career and personal goals, and it can also assist the individual to connect with feelings, effectuate intention into action, and make crucial decisions. In this study, the *BEIS-10* was used to evaluate emotional intelligence which is a brief 10- item instrument developed by Davis et al., (2010) to assess an individual's self-reported emotional skills and abilities. *BEIS-10* measures adaptive and intrapersonal emotional functioning. Most of the scientific literature focusing on the emotional intelligence of dental students advocated the use of AES by Schutt et al., (1998). The *BEIS -10* is considered as a valid and reliable tool where brevity is important.

A coping mechanism is a psychological strategy or adaptation that a person relies on to manage stress. Occasionally, coping mechanisms are voluntary choices, while other times an individual may be unaware that they are using them. To evaluate stress coping mechanisms employed by dental students, the Brief COPE was used which is a 28-item multidimensional measure of strategies used for coping or regulating cognitions in response to stressors (Carver, 1997). According to Pau et al., (2007) there was a correlation between EI and PS among dental students by using *PSS-10* as an instrument. The mean *PSS-10* score was noted to be inversely related to emotional intelligence scores. Since there were no studies that used *BEIS-10* as an emotional intelligence scale, we compared our result with a study that was done or conducted on nursing practitioners in Iraq which showed a higher level of perceived stress among nurses who were not able to regulate their own emotions (Yousif et al., 2019).

Self-reflection and appraisal social and interpersonal methods of stress coping are most likely to be embraced by students with higher emotional intelligence scores. Conversely, the students with low emotional intelligence were more likely to get involved in health-damaging behavior (e.g. tobacco use, overeating) as a strategy of stress coping (Pau et al., 2007). Our results demonstrated that male and female senior dental students who have higher scores in the five subscales of the *BEIS-10* scale tend to cope with stress mainly by actively coping and accepting the situation (Table 3). Male students were more capable to appraise their emotions while female students were better at utilizing their emotions (Table 1). Students that are better at utilizing their own emotions tend to cope with stress by religion, followed by planning and finally positive reframing.

In our study the levels of stress among senior dental students were in the moderate range (Table 1), moreover, students under stress relied on self-blame, followed by denial. In a recent study by Al-Sowegh (2013), dental students with increased levels of stress relied on the self-distraction, denial, behavioral disengagement, venting, humor, self-blame, positive reframing; compared to our study where students who have elevated stress coped mainly by means of denial, and self-blame.

Limitations

Although the data of this study were collected from both governmental and private dental colleges, it did not go through a detailed statistical evaluation to compare the difference between the two sectors. There is a possibility that the stress levels among governmental educational institution dental students' may be slightly lower than those in the private sector as they do not have the financial burden of paying college tuition. Furthermore, academic performance and GPA may also play a major role in students' mentality because it might have an impact on stress, but unfortunately, it was not included in this study.

5. CONCLUSION

Emotional intelligence, perceived stress, and coping mechanism can be assessed and evaluated using specified pre-validated scales. The result can differ from one student to another depending on the clinical year, experience and gender. Previous studies showed that dental students have higher stress compared to other medical field students. There was a major difference between males and females in regard of perceived stress and a minor difference in emotional intelligence. There is a significant correlation between stress coping strategies with stress level and emotional intelligence, it was also found that students rely on certain coping modalities more than other types to overcome stress. There are different scales to assessments, it is better to use the shortest and most efficient scales to grab the attention of participants and avoid the possibility of having a long and tiring questionnaire.

Abbreviation

EI: Emotional Intelligence. PS: Perceived Stress. BEIS-10: Brief emotional intelligence scale-10. PSS: Percieved Stress Scale. Brief COPE: Brief (Coping Orientation to Problems Experienced). KAIMRC: King Abdullah International Medical Research Center. KSAU-HS: King Saud bin Abdulaziz University for Health Sciences. KSU: King Saud University. PNU: Princess Nora University.

REU: Riyadh Elm University. DAU: Dar Al Uloom University. COVID-19: coronavirus disease of 2019. GPA: Grade Percentage Average.

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