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Evaluation of Dental Students' Stress, Depression, and Anxiety in Different Educational Departments and the Related Factors

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Abstract

Aim: Dentistry is a stressful profession, and dental students are susceptible to different forms of stress and psychological pressures. Investigating the amount of this stress and knowing the sources that cause it, can help in creating a supportive and stress-reducing educational environment.

Methods: Fifty-nine senior dental students of Tehran Faculty of Dentistry participated in this cross-sectional descriptive study. The data was collected by DASS-21 questionnaire using a 4-scale measure. The total stress scores of the students were calculated at the clinical departments of the Dental School. The severity of depression, anxiety, and stress was calculated for the students. The comparison of the total stress scores at different departments was made by ANOVA, and the effect of demographic factors on predicting the stress scores was determined by linear regression analysis. pvalues <0.05 were considered as significant.

Results: Among the total participants, 72.9% (n=43) showed different levels of depression; 57.7% (n=34) had different levels of anxiety and 64.3% (n=38) exhibited different levels of stress. The total stress scores of the students were mostly reported in the endodontics (12.59, P<0.05) and oral medicine (9.2, P<0.05) departments, while the least total scores were found in the orthodontics (3.89, P<0.05) and oral and maxillofacial surgery (4.25, P<0.05) departments.

Conclusion: The senior dental students in Tehran University of Medical Sciences have high levels of depression, anxiety, and stress. The highest levels of stress were related to the departments of endodontics and oral medicine among the educational departments. It appears that dental students living away from their families and the students whose mothers have high educational levels require further support in this respect.

Keywords: Anxiety, Dentistry, Depression, Dental Students, Stress

Background

Dentistry is a stressful profession, and dental students are susceptible to different forms of stress and psychological pressures. It has been reported that dental students feel higher stress levels than medical students (1). The percentage of dental students with stress levels above the threshold in their last year of education has been reported up to 85% (2). Basudan et al. estimated the stress rates in dental students to be up to 54%, with 66% for anxiety (3). The American Psychological Association has defined stress as a feeling associated with tension, troubled and worried thoughts, and physical changes such as hypertension (3).

Various needs with unfavorable feedback, different sources of occupational stress, and the social environment have made dentistry a stressful profession (4-6). Problems with patients' treatment and the incidence of treatment complications contribute to stress and anxiety in dentists. On the other hand, young dentists and dental students with low professional experience need additional education and adequate time to bring their theoretical knowledge into practice. Also, they are afraid of making mistakes, and these factors might lead to serious psychiatric problems (5,7). In addition, proper treatment planning in dealing with

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anxious patients when limited time is available, engaging in potentially complicated interventions, the incidence of irreversible complications, such as tooth extraction, and possible conflicts such as conflicts with the department authorities or the patient's family members, could result in high levels of stress (8).

It has been reported that dental students experience higher stress levels as they approach the end of their studies at the university. Abu-Ghazaleh et al. reported a stress rate of 58% in first-year dental students, increasing to 85% in senior (last-year) students (9). Factors such as fear about poor job prospects in the future and students' unpreparedness to treat patients without assistance from professors are reasons for such stresses. However, some studies have reported maximum stresses of dental students in the third year of their studies, when they finish basic sciences and preclinical courses, enter the clinic, and deal with patients in person (9).

Different variables are related to stress in dental students, including sex, the educational year/level, marital status, financial status, how the student selected their major (based on personal interest or under pressure from the family or relatives), and the status of their accommodation (with family or in the dormitory) (3).

Significantly discrepant results have been reported in previous studies concerning the relationship between sex and stress, with some reporting no relationship between stress and sex (5,10) and some reporting a significant relationship between these variables (11,12). It appears that females manifest their stress more than males, while males try to hide their stress. Therefore, the manifested stress might not indicate the real stress levels in an individual. The present study aimed to determine stress levels in senior undergraduate dental students in different departments of the Dental School of the Tehran University of Medical Sciences, and relevant factors in the 2020-2021 educational year. Investigating the amount of this stress and knowing the sources that cause it, can help to create a supportive and stress-reducing educational environment.

Methods

Participant selection

This study was conducted as a descriptive cross-sectional study. To ascertain the sample size, the formula for calculating a proportion in a finite population was utilized. Given the anticipated proportion of the population (p=0.5), the desired level of precision (d=5%), and the Z-value for the desired confidence level (95% confidence level, Z=1.96), a total sample size of 55 students was determined to be appropriate for the study (n=sample size, N=population).

$$n = \frac{N \times Z^2 \times p \times (1-p)}{d^2 \times (N-1) + Z^2 \times p \times (1-p)}$$

Sixty-two senior dental undergraduate students at the Tehran University of Medical Sciences in Iran were invited to participate in this study in the 2020-2021 educational year. Of the 62 students, 59 students completed and handed in the questionnaires. The study protocol was approved by the research ethics committee of the Tehran University of Medical Sciences (Code: IR.TUMS.DENTISTRY.REC.1398.143). All participants participated in the study with informed consent.

Data Collection

The data were collected using the DASS-21 questionnaire, designed and used by Lovibond et al. to evaluate and determine stress, anxiety, and depression (13). In addition, the questionnaire has been validated by Moradipanah et al. in Iran (14).

All the students signed informed consent forms to be included in the study. The variables of sex, accommodation status, how the major was selected, marital status, financial status, and parents' educational levels were recorded in an appendix to the main questionnaire. The DASS-21 questionnaire determined the subjects' emotional status regarding depression, anxiety, and stress. It consists of three domains of stress, anxiety, and depression, with seven items in each domain. The depression domain analyzes the feelings of restlessness and haplessness, decreased quality of life, anorexia, a lack of pleasure (anhedonia), and stagnation. The anxiety domain determines autonomous excitation, the effects on skeletal muscles, and situational anxiety. Finally, the domain of stress deals with mental excitement, disturbances in resting and relaxation, hyperexcitation, irritability, and impatience.

First, the students answered all 21 items of the DASS-21 questionnaire to determine their overall stress, anxiety, and depression. Then, seven items related to their stress in different departments were assessed to determine their stress levels in each educational department separately.

Scoring and conversion

The DASS-21 questionnaire consists of 21 questions with four choices of never, low,

moderate, and high, and its subscales are depression, anxiety, and stress. Each subscale has seven questions, and each individual final score is calculated by adding up the scores of the relevant questions, as shown in Table 1. The choices on the questionnaire have been selected in a manner to indicate all the subscales so that the subscales' scores can be converted to the complete DASS scale of 42 items by multiplying them by 2. This way, it is possible to directly compare the DASS-21 scores with complete DASS scores, making it possible to interpret the scores by referring to the available data for a comprehensive comparison. Since the DASS-21 scale is a short form of the main scale, the final score of each subscale was doubled (Table 1).

The frequencies and percentages of the participants' responses to the demographic questions, the 21 general questions on the DASS-21 questionnaire, and the questions on the stress subscale (7 questions) were separately calculated and reported for the different departments of the dental school (10 departments).

Statistical Analysis

Concerning the students' responses to the general questions on the DASS-21 questionnaire, the means and standard deviations of the overall scores of depression, anxiety, and stress were calculated and reported. By considering the students' scores in each subscale, the severity of scores was classified and reported. Concerning the students' responses to the questions on stress in different departments, the overall stress scores in all the departments were calculated and compared between the dependents with ANOVA. Pairwise comparisons were carried out between the departments using the independent t-test. Linear regression analysis was used to determine the effects of different parameters to predict stress scores in all the departments. A significance level of 0.05 was considered. Normality was checked using the Shapiro-Wilk test, which showed that the data followed normal distribution. Statistical analysis was done by the software SPSS 25.

Results

The demographic information of the samples participating in the study is presented in Table 2. Based on the students' responses to the 21 questions on the DASS-21 questionnaire, the mean and standard deviation of depression scores of the students was 13.49±8.3 (range: 0-40). The mean anxiety score was 9.93±7.01 (range: 0-28.0), and the mean stress score was 19.53±11.68 (range: 2.0-38).

Concerning the classification of depression, 16 students (27.1%) had a normal state, 15 (25.4%) had mild depression, 17 (28.8%) had moderate depression, 8 (13.6%) had severe depression, and 3 (5.1%) had very severe depression.

Conceding the classification of anxiety, 25 students (42.4%) exhibited a normal anxiety level, four (6.8%) had a mild level of anxiety, 15 (25.4%) had a moderate level of anxiety, six (10.2%) had severe anxiety, and 9 (15.3%) had very severe anxiety.

Concerning the classification of stress, 21 students (35.6%) had a normal level of stress, 10 (16.9%) had mild stress, 13 (22.0%) had moderate stress, 10 (16.9%) had severe stress, and 5 (8.5%) had a very high level of stress (Table 3).

The mean overall stress scores of the students in the Department of Pediatric Dentistry was 7.34±5.43, with 4.49±5.41 in the Department of Oromaxillofacial Radiology, 9.2±5.2 in the Department of Oral Medicine, 3.89±5.44 in the Department of Orthodontics, 5.12±5.54 in the Department of Oral and Maxillofacial Pathology, 7.2±5.66 in the Department of Prosthodontics, 5.92±5.42 in the Department of Periodontics, 4.25±4.88 in the Department of Maxillofacial Surgery, 12.59±6.72 in the Department of Endodontics, and 5.89±5.11 in the Department of Restorative Dentistry (Table 4). Based on the results of ANOVA, there were significant differences in the stress scores of the students between the different departments ($P<0.05$). Table 5 presents the results of two-by-two comparisons of the departments based on the means of the overall stress scores of the students.

Based on the results of the regression analysis, the variables of sex ($P=0.66$), marital status ($P=0.15$), the reason for selecting dentistry as a major ($P=0.98$), financial status ($P=0.6$), and the father's educational level ($P=0.07$) did not significantly affect the total stress scores of the students in different departments of the dental school. However, the variables of accommodation status ($P=0.03$) and mother's educational level ($P=0.02$) significantly affected the stress scores of the students in different departments of the dental school (Table 6), with higher stress scores in students residing in dormitories (away from the family) than those living with their families (75.32 vs. 51.15). Students whose mothers had a bachelor's degree or higher degree had mean higher total stress scores than others in the educational departments.

Discussion

According to the results of the present study, 72.9% of the senior undergraduate dental students

in the Tehran University of Medical Sciences had different degrees of depression, 57.7% had different degrees of anxiety, and 64.3% had different degrees of stress. Higher rates of depression, anxiety, and stress have been reported in dental students than in the general population and age-matched students in other fields (15,16).

Vergara et al. reported anxiety, depression, and stress symptoms and signs in 37.4%, 56.6%, and 45.4% of dental students at de Cartagena University in Colombia, respectively (17). Akbari et al. reported that 32% of dental students at the Mashhad University of Medical Sciences had abnormal stress levels (18). All the studies above used the DASS-21 questionnaire. The stress, anxiety, and stress levels reported in the studies above are consistent with those in the present study, despite higher values in some cases in the present study.

Studies from the United Kingdom and Europe corroborate these trends, noting elevated stress among dental students (19, 20). Paradoxically, while dental students generally have higher IQs and theoretically better coping mechanisms, they also report losing self-confidence and resorting to maladaptive coping strategies (20). This underscores the complexity of the factors contributing to their mental health status. Cultural nuances and individual differences may further account for the variability across studies (5, 21-23).

Some studies on dental students in Iran have shown that these students have a moderate level of anxiety in the educational environment (24-26). The relative similarity of the results of studies on dental students in Iran might be attributed to the similarity between the educational systems in dental schools.

One plausible hypothesis for the heightened stress among dental students at Tehran University of Medical Sciences could be the myriad challenges these students encounter. These range from academic pressures, the intricate nature of clinical procedures, and evolving patient awareness about their rights, to additional responsibilities such as preparing a thesis and military obligations for male students. It is noteworthy that such stressors are multifaceted, extending beyond academics and into broader socio-cultural realms.

Differences in the stress, depression, and anxiety rates between the present study and other studies might be attributed to the use of different questionnaires and criteria, evaluation of students in different educational levels, or differences in the community evaluated. The present study was carried out on senior dental students at the Tehran University of Medical Sciences. However, other students have evaluated different students in different educational levels (9,27,28). Differences in the results of the present study and other studies could be explained by differences reported in stress levels at different educational levels (1, 29).

In the present study, the highest stress levels were recorded in the departments of endodontics, oral medicine, and pediatric dentistry with 12.59, 9.2, and 7.34, respectively, with the lowest stress in the departments of orthodontics, oral and maxillofacial surgery, and oral and maxillofacial radiology, with 3.89, 4.25, and 4.49. The stress levels in other departments, including oral and maxillofacial pathology, periodontics, and restorative dentistry, were between the values mentioned above.

Shahbazi Moghaddam et al. reported that the departments of endodontics and pediatric dentistry were the most stressful, respectively (30). A study by Zahiroddin et al. conducted in the Shahid Beheshti Dental School showed that the departments of endodontics and prosthodontics were the most stressful (31). It appears that the Department of Endodontics causes high stress levels in students due to the inherent difficulty of the clinical procedures. Moreover, because patients undergoing endodontic procedures experience pain, this causes stress in dental students. In the department of pediatrics, the greatest factor causing stress was the high requirement load, as well. In the department of prosthodontics, the main stressful factor in dental school is the unavailability of proper cases.

Consistent with the present study, a study conducted in three cities in Germany (32) indicated that endodontics was the most stressful department, with prosthodontics being a very difficult department. The possible differences could be attributed to differences in the educational structures of universities, the educational curricula, and the attitudes of professors toward students. In most cases, the student's anxiety levels in the departments of oral and maxillofacial radiology or periodontics were lower than in other departments, which could be attributed to a lack of serious interventions in patients or the easier educational material for exams. The inherent nature of the department should not be ignored in such evaluations.

In the present study, the lowest stress level was reported in the Department of Orthodontics. A major difference between orthodontics and other dental branches is that no simple technique is available in orthodontics that can be learned easily and used for all patients (such as Cl I tooth restorations or RCT of a tooth with one root canal

or partial prosthetic treatment). In addition, the aim of orthodontic education in undergraduate courses is not to provide adequate skills to render comprehensive dental treatments. Education in orthodontics aims to make the students acquainted with some discrepancies to treat simple anomalies.

In the present study, sex had no role in predicting students' stress levels in all the clinical departments in the Dental School of the Tehran University of Medical Sciences. Jowkar et al. reported higher stress levels in female dental students at the Shiraz University of Medical Sciences (27). In addition, Halboub et al. reported sex as one of the important factors in predicting stress in the dental environment in Yemeni dental students (33, 38), which is different from the present study (28,34).

The reason for a higher level of stress in female students could be related to cultural roles or their feeling of greater pressure to achieve success. These findings might be attributed to differences in the supporting networks between male and female students, a lack of expression of worries, and differences in evaluating real stress and stress reaction (23,25,35). Mohebian et al. reported no significant difference in depression, anxiety, and stress between male and female students in a study on dental students at the Zanjan University of Medical Sciences (36). In addition, Akbari et al. reported similar stress levels in dental students at the Mashhad University of Medical Sciences (18). The two studies above are consistent with the present study.

In the present study, marital status did not affect the prediction of stress levels in dental students in the entire departments of the dental school. Ramazani and Nazari evaluated the stress levels in dental students at the Zahedan University of Medical Sciences and reported no significant relationship between marital status and stress levels (37). However, Halouts et al. studied undergraduate students at Jazan University in Saudi Arabia and reported higher stress levels in married students than others, which is different from the present study (38). Narlmani et al. reported no significant difference in stress levels between single and married dental students in the Ardebil University of Medical Sciences (39).

Some researchers believe that marriage and bringing up children during university studies could be a significant factor for stress in students (40,41), i.e., having a child or children and the relevant responsibilities could decrease the time dedicated to completing the educational requirements. Interestingly, in contrast, some believe that being single is a factor for stress (42). The discrepancies in the results might be attributed to differences in family conditions, the financial and spiritual support of the married children by parents, and the culture of the society (43).

In the present study, choosing dentistry with or without being interested in it did not affect the prediction of students' stress levels, consistent with previous studies (24,37). However, Busadan et al. reported that the method to choose the major was a factor related to stress levels in dental students at Malek Saad University in Saudi Arabia (3). Tangade et al. reported that dental students in India, who had selected the major based on personal interest exhibited lower stress levels than students who had selected it under the pressure of family and friends (1). It has been reported that students who enter the dental field based on personal interest experience lower stress levels (23). These individuals may have a higher adaptation ability in the face of stress, which was not a finding of this study.

In the present study, the student's financial status did not affect the prediction of stress levels in all the clinical departments of the dental school. Busadan et al. evaluated the depression, anxiety, and stress levels of dental students at Malek Saad University in Saudi Arabia and reported no significant effect of financial issues on stress levels (3). However, Tangade et al. reported that financial problems were one of the most important factors in increased stress in faculty students at the Kothiwal Research Center in India (1).

Remarkably, the living situation of students was a significant predictor of stress. Those living in dormitories experienced more stress than their counterparts living with families. This might underscore the mental toll of adapting to independent living and coping with the challenges of managing household responsibilities while juggling demanding academic commitments. Such findings resonate with some prior research (5, 29, 28), but contrast with others (44), emphasizing the multifaceted nature of stress determinants.

In the present study, mothers' educational levels had a significant role in predicting students' stress levels in all the departments. The highest stress levels were recorded in students whose mothers had a bachelor's degree or higher degree. Previous studies have not evaluated the effects of parents' educational levels on dental students' stress levels. However, it appears one of the relevant factors in this respect is the higher expectations of mothers with high educational levels, making the students stressed to meet the expectations. However, further studies are necessary in this respect.

Limitations and strengths

While the insights gleaned from this study are illuminating, it is paramount to interpret the findings cautiously, considering potential limitations. It is vital to recognize the study's cross-sectional nature, the potential influence of cultural factors, and the distinctiveness of the Tehran University of Medical Sciences, which might limit the generalizability of the results. Furthermore, although comparisons were made with various other studies, differences in methodologies, populations studied, and cultural contexts may impact the direct comparability of results.

Despite the mentioned limitations, this study provides a view of the psychological state of students, which should be considered along with their educational status, which is often neglected. Especially in educational departments where higher levels of stress have been observed, supportive educational programs should be implemented so that students can learn dental skills in a more relaxed environment.

Conclusion

The senior dental students at the Tehran University of Medical Sciences have high levels of depression, anxiety, and stress. The highest levels of stress were related to the departments of endodontics and oral medicine among the different departments. It appears that senior dental students living away from their families and the students whose mothers have high educational levels require further support in this respect.

Conflicts of interest: None to declare.

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