Journal of Medical Education Development, 2017, Vol 10, No 26, 108-122
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Zanjan University of Medical Sciences

Evaluation of Depression, Anxiety, Stress levels and Stressors among Dental Students of Zanjan University of Medical Sciences in Academic Year of 2015-2016

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Article Info

Article Type:
Original Article

Article history:
Received 13 Jan 2017
Accepted 29 Apr 2017
Published 6 Sept 2017

Keywords:
Depression
Anxiety
Stress
Dental students

Abstract

***Background and Objective*:** Depression, anxiety and stress prevalence is one the most important problems among dental students. Due to psychiatric side effects among students, this study was conducted to determine the rate of depression, anxiety and stress in dental students of Zanjan University of Medical Science in academic year of 2015-2016.

***Material and Methods*:** This study with designing of cross sectional-description was done on 149 dental students. Sampling was done randomly and data were completed by questionnaires. In this research questionnaire DASS21 was used for investigating rate of depression, anxiety and stress and questionnaires DESQ was used for investigating stress source factors. Results were analyzed statistically by independent t-test and ANOVA.

Results: The present study showed that dental students had depression, anxiety and stress rates of 31.5%, 40.3% and 41.6%, respectively. There was no significant difference between depression, anxiety and stress in terms of gender and place of residence ($p > 0.05$). There was a significant difference between depression and stress level in terms of educational level ($p \leq 0.05$). The most important stress source factors from students' point of view were as follows: In educational field was fear of failing (57%), in clinical field was responsibilities for comprehensive patient care (36.2%), and in outside of university was living far from family (37.5%)

Conclusion: Regarding the prevalence of depression, anxiety and stress mentioned and the stressors present, it is recommended that authorities endeavor to decrease these factors and prepare a better educational atmosphere for students.

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This article is referenced as follows:

Mohebian M, Dadashi M, Motamed N, Safdarian E. Evaluation of Depression, Anxiety, Stress levels and Stressors among Dental Students of Zanjan University of Medical Sciences in Academic Year of 2015-2016. J Med Educ Dev. 2017; 10 (26) :60-71

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[DOR: 20.1001.1.22519521.1396.10.26.8.2]
[DOI: 10.29252/edcj.10.26.60]

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[DOR: 20.1001.1.22519521.1396.10.26.8.2]

[DOI: 10.29252/edcj.10.26.60]

Introduction

Dental education is a difficult and complicated process. During the six academic years, students of dentistry complete clinical and theoretical courses in order to acquire scientific, practical and interpersonal skills in accordance with the determined curriculum (1, 2). Dentistry students are exposed to the significant stressors relating to the educational environment, as well as the clinical stress associated with the nature of the occupations in dentistry. Extensive research has indicated that dentistry students undergo tremendous pressure during their academic years, which can affect their emotional, physical, and social status(2, 3). Students experiencing high levels of stress may lack self-esteem in managing their educational process (4). Familial and social factors can balance or change the response to stress (3, 5). Some of the main stressors in dentistry arise from time management, work pressure, controlling non-cooperative patients, and the technical nature of dentistry (6-8). Long-term stress adversely affects the thinking and learning abilities of individuals (9-11).

Admission to university and management of academic tasks may cause stress and anxiety in students, so that many students might be at the risk of developing psychological disorders, and any stressors can act as a catalyst for a panic attack. Young adults aged 17-25 years are at a high risk of developing mental illnesses (e.g., anxiety disorder), which are initially difficult to diagnose, and delayed diagnosis is often associated with long-term resistance to treatment and adverse outcomes (12). Delayed diagnosis and treatment of psychological disorders in students leads to academic failure, underachievement, and drop-outs. In addition, poor learning abilities or academic failure may decline educational progress and lower the self-confidence of dentistry students in the future.

According to the literature, prevalence of psychological problems (e.g., anxiety disorder) is on the rise among university students due to several factors, including separation from the family, increased financial issues associated with academic expenditures, demographic changes in student populations, and the obligation for employment in order to cover the expenses. Furthermore, numerous studies have concluded that the setting of dental education is stressful, threatening the mental health of the students (12, 13).

In general, dental students are more likely to suffer from stress and anxiety compared to the students of other medical and healthcare fields (6). Main indications of stress include distress, depression, anxiety,

and fatigue (14). Long-term stress adversely affects the physical, social, and career of students in the future, while disrupting their optimal training (15). Some studies have demonstrated that dental students are exposed to more stress compared to medical students (16). In addition, reports suggest that stress in university students might lead to the decline of academic performance and even suicide (17, 18). Students experiencing academic stress and anxiety may have unhealthy behaviors as well (19). Interestingly, despite the claim that dentistry is a stressful job, it is considered as a 'happy' job in somecommunities (20).

Materials and Methods

This cross-sectional descriptive study was conducted on 160 dental students, engaged in the education years 1-6 at Zanjan University of Medical Sciences, Iran. Participants were selected randomly, and 149 students completed the questionnaires. Sample size of the study was calculated based on the following formula:

$$n = \frac{Z^2_{1-\alpha/2} \times p \times (1-p)}{\delta^2}$$

$$\alpha = 0.05$$

$$p = 0.52$$

$$\delta = 1.5\,p \Rightarrow$$

$$n \approx 157 \ .53 = 160$$

Where α represents type I error, δ is the accuracy of the study, and P shows the ratio obtained from previous studies. In the present study, data were collected using two questionnaires. Prior to data collection, demographic characteristics of the participants were recorded. The first questionnaire was the Depression, Anxiety and Stress Scale (DASS-21), which was used to assess the level of depression, anxiety and stress in the participants. DASS-21 consists of 21 multiple-choice items (Not At All, Slightly, Moderately, and Extremely) and three subscales (depression, anxiety, and stress). Each subscale contains seven questions, and the final score of each subscale is obtained based on the total score of its questions (Table 1).

Table 1: Subscales, the related questions, cut off point and severity of each subscale

Severity	Depression Subscale (21-17-16-13-10-5-3)	Anxiety Subscale (20-19-15-9-7-4-2)	Stress subscale (18-14-12-11-8-6-1)
Normal	0-9	0-7	0-14
Minimal	10-13	8-9	15-18
Moderate	14-20	10-14	19-25
Sever	21-27	15-19	26-33
Very Sever	+28	+20	+33

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Since the DASS-21 used in the present study was the shortened version of the original scale, we doubled the final score of each subscale. In addition, based on the transcript of DASS-21 and the cut-off points specified in Table 2, participants were classified in terms of the severity of stress as normal, mild, moderate, severe, and very severe (Table 1).

DASS-21 was first developed by Lovibond *et al*. for measuring and evaluating the level of stress, anxiety and depression. In this scale, the alpha value was obtained in a normative sample of 717 individuals as follows: depression=0.81, anxiety=0.73, and stress=0.81 (21). This test has been validated by Sahebi *et al*. for the Iranian population. Moreover, the alpha value in DASS-21 has been reported to be 0.70 for depression, 0.66 for anxiety, and 0.76 for stress in 400 samples for the general population of Mashhad, Iran (22).

The second questionnaire used in the current research consisted of 29 five-choice items (non-related to stress, no stress, low stress, moderate stress, and severe stress), as well as contents to evaluate the dimensions relating to educational factors (12 items), clinical performance (10 items) and factors outside the educational setting (7 items). Additionally, the second questionnaire had one item on total stress-causing factors, which was used to determine the most important stressors for the dental students of Zanjan University of Medical Sciences. Of note, items in the second questionnaire were selected based on the questions in the previous studies in this regard (1, 23-26).

Cronbach's alpha was used to verify the internal consistency of the second questionnaire, with the coefficient estimated at 0.78. Reliability of the questionnaire was evaluated in a pilot study on 20 participants at 10-day intervals, with the correlation-coefficients of 0.73-0.84. Moreover, comments of experts were applied in order to confirm the content validity of the questionnaire. To this end, 10 experts (PhD in clinical psychology, dentists, social physicians, and epidemiologists) were enquired about the relevance of the questionnaire items (response range: unnecessary, useful but unessential, essential). As a result, content validity ratio (CVR) was calculated using the Lawshe formula, and items with a CVR of less than 0.62 were eliminated from the questionnaire in accordance with the guidance of the panel of experts.

The second questionnaire was completed by the participants, who rated 29 stressors that they face within the score range of 1-5 (score 1: non-related to stress, score 2: stress-free, score 3: low stress, score 4: moderate stress, score 5: severe stress). Finally, using statistical methods, the most important stress-causing factors were

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determined based on the gender and admission year from the viewpoint of the students. Participation in the study was voluntary. Prior to enrollment, written informed consent was obtained from the participants, and all the collected data remained confidential.

Data analysis was performed by SPSS version 18 using descriptive statistics, including mean and standard deviation for continuous quantitative data, and percentage and frequency for qualitative nominal data. Obtained results were presented in tables and diagrams. Before data analysis, distribution of data was examined using the Kolmogorov-Smirnov test, and due to the lack of significance, normal parametric tests were used for data analysis, with the assumption of the dependency of data distribution. Thus, independent t-test was performed to compare the mean values between two groups.

If the Levene's test was significant, it was carried out with the assumption of the homogeneity of variance. Additionally, comparison of the means between the three groups was performed by one-way analysis of variance (ANOVA). If one-way ANOVA was significant, Tukey's post-hoc test would be used for the paired comparison of the groups. In this study, level of significance was 0.05 in all the statistical analyses.

Results

In total, 160 dental students at Zanjan University of Medical Sciences were randomly enrolled in the study, 149 of whom completed the questionnaire, and 11 participants did not cooperate. Among the students, 86 were female, and 63 were male with the mean age of 21.7±2.8 years.

According to the results, depression, anxiety and stress were observed in 31.5%, 40.3% and 41.6% of the students, respectively. In addition, 5.4%, 10.8% and 10% of the students had depression, anxiety and severe/very severe stress, respectively. While the prevalence of depression was higher by 9% in the male participants, the prevalence of stress was higher by 9% among the female participants. In the female students, prevalence rate of depression, anxiety and severe/very severe stress was 7.7%, 12.8% and 15.2%, respectively, while it was 6.4%, 8%, and 2.3%, respectively among the male students.

Findings of the present study indicated no significant difference in the levels of depression, anxiety and stress between the students in terms of gender (Table 2). In non-native students, level of stress was approximately 7% higher compared to the native students. In native students, prevalence rate of depression, anxiety and severe/very severe stress was estimated at 6.3%, 8.4% and 4.2%, respectively, while

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it was 5%, 11.8% and 12.9%, respectively among the non-native students. Our findings demonstrated no significant difference between the native and non-native groups in terms of depression, anxiety and stress (Table 3).

Table 2: Stress, anxiety, depression mean scores and independent t- test results in male and female groups

Mental Problem	Mean ± Standard deviation		P- value
	Male	Female	
Depression	7.47 ± 8.53	6.43±7	0.262
Anxiety	6.05± 6.4	6.61±7.2	0.309
Stress	7.56±12.4	8.42±14.94	0.156

Table 3: Stress, anxiety, depression mean scores and independent t- test results in native and non-native groups

Mental Problem	Mean ± Standard deviation		P- value
	Non native	native	
Depression	7.74±7.09	7.45±6.57	0.752
Anxiety	7.22±6.65	6.12±5.7	0.276
Stress	14±8.59	13.45±7.15	0.132

In clinical grade one, prevalence of depression was 20% and 18.5% higher compared to the basic sciences grade and clinical grade two, respectively. Rate of depression, anxiety and very severe/severe stress in the basic sciences grade was 1.7%, 6.6% and 6.7%, respectively, while it was 12.8%, 19.1% and 10.6% in clinical grade one, and 2.4%, 7.2% and 14.3% in clinical grade two, respectively. According to the results, there were significant differences between the three groups in terms of depression and stress levels ($P<0.05$), while no significant difference was observedintermsof anxiety betweenthe threeeducation levels ($P>0.05$) (Table4).

Table 4: Stress, anxiety and depression mean scores and independent t- test results in the Fifth and sixth years basic sciences, clinical course 1 and clinical course 2

Mental Problem	Mean ± Standard deviation			P- value
	Clinical course 2 (5th. and 6th years)	Clinical course 1 (3th. and 4th years)	Basic Science (1th. and 2th years)	
Depression	6.54±6.95	8.18±10.29	5.42±6.06	0.014
Anxiety	5.48±6.38	7.75±8.38	5.58±6.03	0.392
Stress	7.85±15.21	7.83±15.31	8.24±11.83	0.035

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From the viewpoint of the students in the present research, the most important stressors were the fear of failing exams (educational aspect) (57%), responsibility of patient treatment and avoiding injury (clinical aspect) (36.2%), and distance from the family (external factors) (37.5%). From the viewpoint of female students, the most significant stressors were the fear of failing exams (educational aspect) (58.1%), responsibility of patient treatment and avoiding injury (clinical aspect) (40.7%), and distance from the family (external factors) (41.8%). According to the male students, the most important stressors were the fear of failing exams (educational aspect) (55.5%), responsibility of patient treatment and avoiding injury (clinical aspect) (30.1%), and job insecurity in the future (external factors) (52.4%). From the viewpoint of native students, the most significant stressors included the fear of failing exams (educational aspect) (64.6%), lack of patient cooperation during and after the treatment process and conflicts in the teaching methods used by the faculty members of a department (clinical aspect) (45.8%), and problems associated with social behaviors (external factors) (35.4%). From the viewpoint of non-native students, the most important stressors were the level of desirable performance in the presented courses (educational aspect) (43.2%), responsibility of patient treatment and avoiding injury (clinical aspect) (32.6%), and distance from the family (external factors) (54.5%).

In the perspective of the students of basic sciences, the most important stressors were the fear of failing exams (educational aspect) (75%) and distance from the family (external factors) (46.7%). From the viewpoint of the students in clinical grade one, the most significant stressors were the discrimination between students by professors (educational aspect) (63.8%) and distance from the family (external factors) (34%). According to the students of clinical grade two, the most important stressors included the heavy workload in the faculty and lack of sufficient time (educational aspect) (74.1%) and distance from the family (external factors) (47.7%). With regard to the clinical aspect, students of clinical grade one believed the most important stressors to be the dissatisfaction with the cooperation of nurses in the section, responsibility of patient treatment and avoiding injury, and lack of confidence in performing clinical tasks (61.7%). Furthermore, students of clinical grade two believed the most significant stressors to be the dissatisfaction with the evaluation of clinical performance by the professors (54.8%).

Discussion

Results of the present study indicated that

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the level of depression, anxiety and stress in dentistry students was 31.5%, 40.3% and 41.6%, respectively. Rate of depression, anxiety and severe/very severe stress in the students was 5.4%, 10.8% and 10%, respectively. According to Saroukhani *et al*., overall prevalence rate of depression among the Iranian students is 33% (27).

In line with our findings, Nosoohi *et al*. reported severe stress in 8% of dental students, while moderate stress was observed in 16% of the students (24). In a study conducted to determine the prevalence of stress among the students of four medical schools in Tehran (Iran) in 2007, prevalence of stress was estimated at 40.7% (28), which is consistent with the results of the present study. In addition, our findings suggested that the level of depression and stress in the students of clinical grade one (3rd and 4th year) was significantly higher compared to students of basic sciences and clinical grade two (5th and 6th year).

In another research conducted in 2007 on the dentistry students of the University of Fiji, stress level was higher in the third-year students, followed by fourth- and fifth-year students (29). Similar to the current research, students of the University of Fiji can start their medical practice in clinics in the third year of their studies. Moreover, in Madrid Medical University of Spain, where dental students are allowed to work in clinics in the third year of their studies, the highest stress level was observed in third-year students, while the fifth-year students had the lowest stress level (30).

In the London Medical and Dental School, the highest stress level was reported in the dental students who had just started their practice in clinics (31). In the study by Akbari *et al*., the highest level of stress was observed in the students entering the clinic in the fourth year of their studies (32). It seems that starting to work in clinics can be a major stress-causing factor in dentistry students. Consistently, findings of Dalband & Farhadi Nasab (33) and Ramazani & Nazari (34) showed that fourth-year students had comparatively higher stress level. Furthermore, in the study by Kazimzadeh and Bakhshi, third-year students were observed to have higher stress (35), which is in congruence with the results obtained by Al-Sowgh (36) and Peker *et al*., who reported a significant difference in the level of stress in terms of the academic year (37). In this regard, findings of Amini *et al*. also indicated that third-year students experienced higher levels of stress (3).

Clinical grade one is when students are first involved in the management of patients and must apply their theoretical knowledge to the treatment of patients.

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Malpractice stress and the occurrence of the associated events add to the stress of students. Persistent stresses in students, arisen from not meeting the expectations of professors, could lead to depression in students. Recent advent of discussions regarding patient rights and familiarity of patients with many clinical concepts could also be an intensifier of stress and depression in the students of medicine.

Certainly, increased public health literacy through accessing various information and communication technologies has raised public awareness on the rights of community members, which is associated with higher expectations in this regard. In clinical grade two (fifth and sixth year), students acquire the necessary skills by further engagement in patient management, which greatly reduces their stress and depression.

Results of the present study demonstrated a higher level of depression in the male dentistry students, as well as the higher stress level in the female dentistry students; however, this difference was not considered statistically significant. Similarly, findings of Sarokhani *et al*. showed that the rate of depression is not significantly different between male and female students (27). Of note, some studies have suggested that depression is more prevalent in female students compared to male students (38). In the study by Akbari *et al*., level of stress was reported to be higher in female students compared to male students, while the difference in this regard was not significant (32).

In a research conducted in 2006 on the dental students at the University of Kabangsaan Malaysia, rate of stress was higher in the female students compared to the male students, while the difference was not considered significant (39); this is consistent with the results of the present study. In addition, Health *et al*. reported that the stress level was higher in female students compared to male students (40). This finding is in line with the studies by Sugiura *et al*. (41), which was performed on Japanese dental students, and Dalband & Farhadi Nasab (33), which was conducted on students in Hamedan (Iran), suggesting higher stress levels in women. According to the research by Shahravan *et al*., female students experienced higher stress levels; unlike our study, they reported a significant association between the mean score of stress and gender (42). Moreover, results of the mentioned study indicated that vulnerability and feeling more pressured to succeed were the main causes of stress among the female students.

In the present study, levels of depression, anxiety and stress were evaluated among students in terms of nativity, and the

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results showed no significant differences in this regard. Although it was anticipated that the rate of depression, anxiety and stress would be higher in non-native students due to distance from friends/family or entering a new environment in the university, our findings suggested no significant differences in this regard. In the study by Shahravan *et al*., no significant association was observed between the place of residence and stress level (42), which is consistent with the results obtained by Ramazani and Nazari (34). On the other hand, in the study by Sedky, stress level was reported to be higher in the students who were far from their parents (43). This could be due to the relatively large number of non-native students in Zanjan University of Medical Sciences.

Results of the current research indicated that from the viewpoint of the students, the most important stressor was the fear of failing exams (educational aspect). In the study by Divaris *et al*., which was conducted on Colombian students, fear of failing exams was also the most significant stress-causing factor for the participants (44). Furthermore, Fonseca *et al*. mentioned the fear of failing exams as one of the most common stressors for the dental students in Chile and Argentina (45). It is predicted that in the educational aspect, completing courses successfully is of paramount importance to students. Since the students of these grades (dentistry, medicine and pharmacy) have performed greatly in high school, they might perceive the experience of falling exams very unpleasant.

From the clinical aspect, the responsibility for patient treatment and avoiding injury was observed to be a major concern among our participants. In the study by Nosoohi *et al*., the most important stress-causing factor was the completion of the reported requirements (24), which contradicted the results of the current research. On the other hand, in a study by Abu Ghazaleh in this regard, failure to complete the requirements was reported to be the most important stressor among students (23). This discrepancy might be due to the differences in the faculty and individual parameters.

As mentioned earlier, familiarity of patients with many clinical concepts and raised health literacy of the society have increased the expectations from healthcare providers, including dentists, thereby intensifying the stress and concern among these students.

According to the results of the present study, distance from the family was the most important stressor in terms of external factors from the viewpoint of students. In this regard, Klink *et al*. reported a significant association between

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family support and the ability of students to overcome obstacles and undertake academic assignments (46). Family environment is a hearth, which helps the family members manage each other's problems. Disturbance is an inseparable part of human life, and it is remarkably important to manage disturbances without falling apart by considering alternatives. Certainly, family can play a decisive role in the management of disturbances and other issues.

In terms of gender, job insecurity in the future was the most important stressor in the perspective of the male students in the current research (external factors). This finding was not unexpected because, based on the prevailing culture in the country, the provision of economic costs is the responsibility of men although this pattern is changing with time.

From the viewpoint of non-native students in students, the most important stressor was distance from the family (external factors). Although the hometown of these students was not very far from their university, this factor was observed to affect their level of stress.

According to the students of clinical grade one, the most significant stressor was the discrimination between students by professors (educational aspect). In a study in this regard, Al-Omari *et al*. also claimed that discrimination between students was one of the most important stressors among dental students (47). It should be noted that in a very broad sense, injustice and discrimination could adversely influence the health of individuals, and this pattern can also be extended to the discussions on educational topics.

Results of the present study indicated that the effect of educational factors on the stress and anxiety of dental students was more significant compared to the other stressors (clinical aspect and external factors). This is in line with the study by Akbari *et al*., who also claimed that academic stressors were significantly more important in developing stress than non-academic factors (32). To justify this finding, it could be stated that the most important concern of students during the academic years is generally to succeed in their educational plans. Although clinical factors were ranked second among the other stressors, these factors mostly emerged in the students of clinical grade one, while educational factors are considered important throughout the academic years.

Conclusion

According to the results, depression, anxiety and stress were not statistically significant among the dental students at Zanjan University of Medical Sciences in terms of gender and place of residence,

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while the rate of depression and stress was significantly different in the students in terms of the academic year. Moreover, no statistically significant difference was observed among the students in terms of anxiety. The most important stressors from the viewpoint of students were the fear of failing exams (educational aspect), responsibility of patient treatment and avoiding injury (clinical aspect), and distance from the family (external factors).

One of the limitation of the study was lack of cooperation by some students in completing the questionnaires. Questionnaires used in the present mainly assessed the manifestations of depression, anxiety and stress, which cannot confirm the disease diagnosis. Since the study design was cross-sectional, incidence of the disease could not be measured, and the findings represent the estimated frequency and prevalence of the associated clinical manifestations. Therefore, it is recommended that prospective investigations be performed to estimate the incidence of depression, anxiety and stress during education at different grades.

Persistent psychological counseling must be considered for dental students, especially in the first clinical grade (third and fourth year). Self-confidence of students in fulfilling the required practical tasks can be enhanced by professors. As such, professors and faculty members should attempt to eliminate the dilemmas regarding the discrimination between students. Psychological counseling is carried out in order to deal with depression in male students and stress in female students.

Acknowledgments

This article was extracted from a doctoral dissertation in dentistry, entitled the "Examination of Depression, Anxiety and Stress in the Dental Students of Zanjan University of Medical Sciences in the Academic Year 2015-2016", which was approved at Zanjan University of Medical Sciences November 30, 2015 (code: ZUMS.REC.1394.229). Hereby, we extend our gratitude to all the participants for assisting us in this research project.

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