

PERCEIVED DEPRESSION, ANXIETY AND STRESS AMONG SAUDI POSTGRADUATE ORTHODONTIC STUDENTS: A MULTI-INSTITUTIONAL SURVEY

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ABSTRACT

The aim of the study was to investigate three negative emotional states: depression, anxiety, and stress in Saudi postgraduate orthodontic students. A modified Depression Anxiety Stress Scale (DASS) questionnaire was sent electronically to eighty-four postgraduate orthodontic students in various years of two different programs (Master and Saudi Board in Orthodontics programs) in three dental schools of different regions in Saudi Arabia. Frequency distributions of the dependent variables were derived and comparisons were made by non-parametric tests. Regression analysis was carried out to evaluate the influence of the demographic (independent) variables on each emotional state. The scores for depression, anxiety and stress symptoms were 13.3 (± 5.7), 10.3 (± 4.8) and 21.3 (± 6.4) respectively. No differences were found in terms of gender and years of study of the respondents for the depression, anxiety, and stress scales. Married students and those older than 30 years were found to exhibit a lower level of anxiety symptoms than those who were single and thirty years old or younger. These results indicated a need for student-oriented programs to provide appropriate support to the students, with a special attention to single and young students.

Key Words: *Depression, anxiety, stress, orthodontic students, DASS.*

INTRODUCTION

Occupational stress can be defined as a state of physical and mental tension resulting from excessive demands or lack of resources.¹ Depression is defined according to the World Health Organization (WHO)² as a common mental disorder, characterized by sadness, loss of interest or pleasure, feelings of guilt or low self-worth, disturbed sleep or appetite, feelings of tiredness, and poor concentration. Anxiety is characterized by feelings of tension, worried thoughts and physical changes like increased blood pressure as defined by the American Psychological Association.³ Studies conducted in several countries, have demonstrated the omnipresence of stress, depression and anxiety among dental students,⁴⁻¹⁵ which has resulted in an increased interest in stress management programs for dentists.¹⁶ Many studies^{5,14,17,18} have demonstrated that the dental

students had the highest mean stress scores and the second lowest social support scores compared to other professional students.

Stress in the dental training environment is multifactorial, and several potential stressors have been identified, including time and scheduling pressures, the need to meet academic and clinical requirements, examination anxiety, grade competition, patient management (coming late or not showing up for appointments), litigation from patients, financial concerns, practice of clinical dentistry, career choices, age and gender.^{5,7,12,15,19} Social support has also been identified as a major stressor; social support refers to interpersonal relationships, whether emotional, informational or instrumental support (i.e. financial aid).¹³ Some researchers have investigated living arrangements and marital status as proxy measures of social support, suggesting that students who resided at home during term-time appeared to have some protection against stress.^{5,13,15} Mathias et al (2005) found that married dental professionals exhibited less depression and stress than those who were unmarried, divorced, or widowed.²⁰ Madhan et al (2012)¹⁹ found a suboptimal level of mental health among postgraduate orthodontic students in India, and highlighted the need for a more

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favorable academic environment. A study of seven European dental schools has shown that the level of emotional exhaustion was higher in dental students than in medical students.⁵ The study also found that general psychological distress and course-related stress levels were associated with the nature of the course and the immediate living conditions of the students. Another study, conducted in three European dental schools, identified several sources of stress in dental students, which included limited leisure time, examination anxiety, and adaptation to the clinical phase of dental education.⁷ In addition, a cross-sectional multinational survey of nine dental schools in seven countries found the student's emotional intelligence to be the most significant independent predictors of perceived stress.¹² These researchers and others found that those students who were satisfied with their decision to study dentistry were less likely to report perceived stress.^{4,6,10-12} Muirhead and Locker (2008)¹³ identified social support and proxy measures as significant predictors of dental school stress in Canadian dental students. Furthermore, another multi-country study in six European dental schools found that the main concern for dental students were self-efficacy beliefs, assigned workload, and performance pressure.²¹

Gender differences in depression symptoms have also been reported, with female students experiencing a higher level of psychological disturbances than males.^{8,12,15,19,22,23} This finding however, contradicts a number of previous studies that did not demonstrate any gender-derived differences in any psychological variable.^{5,14,24} While dental students' stress and psychological disturbances are well-recognized and reported in undergraduate students, such information is scarce among postgraduate dental students. Therefore, the purpose of the present study was to determine the degree of psychological disturbances and to assess the extent of three emotional states (stress, depression and anxiety) among postgraduate orthodontic residents in Saudi Arabia through a short version of the Depression Anxiety Stress Scale (DASS-21) questionnaire.²⁵

METHODOLOGY

A cross-sectional survey was conducted in three dental schools in different regions of Saudi Arabia; Riyadh (Central Region), Jeddah (Western Region), and Dammam (Eastern Region). The study population was Saudi postgraduate orthodontic students enrolled in two different postgraduate programs; a three-year program of Master of Science in Dentistry and Certificate of Specialty in Orthodontics, and the second a

five-year program called Saudi Specialty Certificate Program in Orthodontics (Saudi Board) conducted by Saudi Commission for Health Specialties. Both programs are approved and accredited by the Ministry of Higher Education and the Saudi Commission for Health Specialties.

Lovibond and Lovibond (1995)²⁵ shorter version of the Depression Anxiety Stress Scale (DASS-21) was utilized for the present study. The DASS-21 is a modified version of the original forty-two items survey (DASS-42). It is a set of three self-reported scales designed to measure the negative emotional states of depression, anxiety and stress in an individual.^{25,26} The DASS-21 has twenty one items, seven items for each emotional state, divided into subscales with similar contents. The Depression scale assesses dysphoria, hopelessness, devaluation of life, self-deprecation, lack of interest/involvement, anhedonia, and inertia. The Anxiety scale assesses autonomic arousal, skeletal muscle effects, situational anxiety, and subjective experience of anxious effect. The Stress scale assesses difficulty in relaxing, nervous arousal, susceptibility to agitation, irritable/over-reactive state and impatient.

Scores for Depression, Anxiety and Stress are calculated by summing the scores for the relevant items and then multiplied by two. The scale severity is interpreted as shown in Table 1. (The survey is available at www.psy.unsw.edu.au/dass). The DASS-21 questionnaire was sent electronically to 84 postgraduate orthodontic students in various years of the two postgraduate programs, along with an explanation of the purpose of the study and the research procedure. The students were asked to voluntarily complete the anonymous questionnaire.

The questionnaire had two sections. The first section recorded demographic details that included age, gender, name of the program, year of study (Master: I, II, and III) (Board I, II, III, IV, and V), marital status, and medical condition with history of any systemic disease, prolonged systemic medication, or serious life event the students may have experienced in the past six months. Those who responded positively to having experienced any of these situations were excluded from the study. The second section comprised of the DASS-21. The students were asked to rate various items on a scale of 0 (did not apply to me at all) to 3 (applied to me very much or most of the time).

Ethical approval of the study was obtained from Ethical Committee of College of Dentistry Research

Center (CDRC) at King Saud University. The survey was sent in the middle of an academic semester and closed at the end of the same semester (November-December, 2013). The data were tabulated and cross-checked. Data processing and analysis were carried out using the statistical package for social sciences (SPSS) software version # 20. Frequency distributions for gender, age group, marital status, program of study, and year of study were generated. Group comparisons (for gender, age, program of study, and marital status) were performed with the Mann-Whitney test, and comparisons based on year of study were carried out with Kruskal-Wallis test for each emotional state (depression, anxiety and stress). Finally, in order to evaluate the influence of the demographic variables independently on each effective state, a logistic regression analysis was carried out with the presence or absence of a moderate or higher level of the symptom entered as the dependent variable. Statistical significance was set at $p < 0.05$.

RESULTS

Seventy-nine questionnaires were returned completed electronically giving a 94% response rate. The mean age of the respondents was 32 (± 4) years with a median of 31 years; and range from 25 to 45 years. The demographic details of the participants are presented in Fig 1. Tables 2, 3 and 4, respectively summarize the mean, median, and standard deviation for the depression, anxiety, and stress scales according to gender, marital status, age, study program, and year (level) of the study.

For the overall sample, the mean score of depression was 13.3 (± 5.7) Table 2. The mean scores for anxiety and stress symptoms were 10.3 (± 4.8) and 21.3 (± 6.4) respectively (Table 3 and 4). There was no significant statistical difference in terms of gender for the depression, anxiety, and stress scores. Married students and, those older than 30 years were found to exhibit a lower level of anxiety than those who were single

and thirty years or younger (9.72 vs 11.19 and 9.77 vs 11.13; $p = 0.020$ and 0.007) Table 3. However, no significant difference was found between these groups for the depression and stress scores (Tables 2 and 4). The students who were pursuing a Master of Science in Dentistry and Competency Certificate in Orthodontics had experienced a higher level of depression symptoms than those who were enrolled in a five-year Saudi Specialty Certificate Program in Orthodontics (14.26 vs 12.60, $p = 0.013$) Table 2. However, there was no significant difference between the students enrolled in both programs for the anxiety and stress scores (Tables 3 and 4).

The study found no significant difference between the students in various years of the programs for all three emotional states. The distribution of the sample according to the severity categories is shown in Fig 2. About six in ten (40.5%) of the participants had depression at mild levels, while more than half (51.9%) of the participants experienced stress at moderate levels. Very few participants exhibited depression, anxiety, and stress at extremely severe level (2.5%, 6.3%, and 2.5%, respectively).

The binary logistic regression analysis (Table 5) showed that both males and females, and students in each year of study similarly experienced the three emotional states from moderate to severe levels. Married students and those older than 30 years were less likely to show moderate or higher levels of anxiety symptoms (odds ratio = 0.37, 0.19, respectively, $p < 0.05$) than those who were single and thirty years of age or younger. Students who were pursuing a Master of Science in Dentistry were two times more likely to experience depression at moderate or higher levels than those who were enrolled in five-years Saudi Board Program (odds ratio = 2.05, $p < 0.05$).

DISCUSSION

Information is scarce in areas of depression, anxiety and stress among postgraduate dental students. The present study has fielded important information about the above stated emotional states in postgraduate students in orthodontics. It is hoped that the present study has provided base-line data for future comparisons, and development of support services for the postgraduate students.

Highest ranked stressors reported in dental students appear to be independent of the culture, teaching methods, dental program lengths, or the student's

TABLE 1: DASS SEVERITY RATINGS, AFTER MULTIPLYING SUMMED SCORES IN EACH CATEGORY BY TWO^{25,26}

Severity	Depression	Anxiety	Stress
Normal	0-9	0-7	0-14
Mild	10-13	8-9	15-18
Moderate	14-20	10-14	19-25
Severe	21-27	15-19	26-33
Extremely Severe	28+	20+	34+

TABLE 2. DESCRIPTIVE STATISTICS AND GROUP COMPARISONS (MANN-WHITNEY AND KRUSKAL-WALLIS TESTS) FOR DEPRESSION SCALE

Variable		Mean	95% CI	Median	SD	Sig. (P value)
Gender	Male	13.27	11.15-15.39	12	6.34	NS (0.44)
	Female	13.24	11.61-14.86	14	5.21	
Marital status	Married	13.09	11.47-14.70	13	5.50	NS (0.35)
	Unmarried	13.50	11.29-15.71	14	6.13	
Age	> 30 years	13.55	12.03-15.08	13	5.20	NS (0.16)
	≤ 30 years	12.81	10.47-15.16	12	6.49	
Study program	Master	14.26	12.55-16.58	14	6.34	(0.013)*
	Board	12.60	11.07-12.97	12	5.27	
Year of study	1st year	13.91	10.82-16.99	13	4.59	NS (0.85)
	2nd year	12.10	8.72-15.47	12	5.04	
	3rd year	14.11	12.19-16.02	13	4.93	
	4th year	13.91	9.71-18.11	12	6.23	
	5th year	11.50	8.04-14.96	12	4.14	
Overall sample	13.25	13.25	11.97-14.54	13	5.73	

CI= Confidence Interval; SD= Standard Deviation; Sig= approximate significance; NS= Non significant; *p< 0.05

TABLE 3. DESCRIPTIVE STATISTICS AND GROUP COMPARISONS (MANN-WHITNEY AND KRUSKAL-WALLIS TESTS) FOR ANXIETY SCALE

Variable		Mean	95% CI	Median	SD	Sig. (P value)
Gender	Male	9.92	8.05-11.79	9	5.61	NS (0.12)
	Female	10.67	9.40-11.93	10	4.05	
Marital status	Married	9.72	8.98-10.56	9	4.78	(0.020)*
	Unmarried	11.19	10.49-12.93	11	4.84	
Age	> 30 years	9.77	8.39-10.14	9	4.68	(0.007)*
	≤ 30 years	11.13	10.32-12.39	11	5.00	
Study program	Master	10.48	8.63-12.34	10	5.05	NS (0.82)
	Board	10.21	8.84-11.58	9	4.72	
Year of study	1st year	10.36	7.39-13.34	9	4.43	NS (0.71)
	2nd year	10.52	8.43-12.62	10	4.60	
	3rd year	10.57	8.51-12.63	9	5.30	
	4th year	10.82	6.89-14.74	9	5.84	
	5th year	8.13	5.87-10.38	8.5	2.70	
Overall sample		10.32	9.24-11.40	9	4.83	

CI= Confidence Interval; SD= Standard Deviation; Sig= approximate significance; NS= Non significant; *p< 0.05

TABLE 4: DESCRIPTIVE STATISTICS AND GROUP COMPARISONS (MANN-WHITNEY AND KRUSKAL-WALLIS TESTS) FOR STRESS SCALE

Variable		Mean	95% CI	Median	SD	Sig. (P value)
Gender	Male	20.68	18.75-22.60	21	5.77	NS (0.14)
	Female	21.83	19.68-23.99	23	6.92	
Marital status	Married	21.62	20.02-23.21	23	5.44	NS (0.77)
	Unmarried	20.81	18.05-23.57	22	7.66	
Age	> 30 years	21.94	20.26-23.61	23	5.72	NS (0.29)
	≤ 30 years	20.34	17.72-22.97	21	7.27	
Study program	Master	20.58	18.38-22.78	22	5.99	NS (0.20)
	Board	21.75	19.82-23.68	23	6.66	
Year of study	1st year	22.00	17.56-26.44	24	6.60	NS (0.56)
	2nd year	18.38	14.63-22.13	20	8.24	
	3rd year	21.46	19.71-23.22	22	4.53	
	4th year	24.73	21.34-28.11	24	5.04	
	5th year	22.63	17.51-27.74	23	6.12	
Overall sample		21.29	19.86-22.72	22	6.40	

CI= Confidence Interval; SD=Standard Deviation; Sig= Approximate significance; NS=Non significant; *p< 0.05

TABLE 5: BINARY LOGISTIC REGRESSION ANALYSIS FOR MODERATE OR HIGHER SEVERITY OF SYMPTOMS

Scale (dependent)	Variable (independent)	B	SE	Odds Ratio	Sig.	R ²
Depression	Female	1.02	0.55	1.42	NS	0.164
	Married	-0.99	0.59	0.76	NS	
	Age > 30 years	1.13	0.73	0.56	NS	
	Master	0.72	0.59	2.05	*	
	Program	1.73	0.27	0.32	NS	
	1st year	1.47	0.78	1.23	NS	
	2nd year	1.63	0.97	0.73	NS	
	3rd year	0.97	0.56	0.86	NS	
Anxiety	Female	1.04	0.54	0.57	NS	0.175
	Married	-0.78	0.58	0.37	*	
	Age > 30 years	0.96	0.74	0.19	NS	
	Master	0.40	0.59	0.86	NS	
	Program	1.79	0.27	1.22	NS	
	1st year	2.16	0.87	0.52	NS	
	2nd year	1.58	0.66	0.98	NS	
	3rd year	0.91	0.45	0.55	NS	
Stress	Female	0.82	0.65	0.35	NS	0.243
	Married	0.18	0.68	0.87	NS	
	Age > 30 years	0.22	0.77	1.20	NS	
	Master	-0.12	0.64	0.47	NS	
	Program	0.13	0.33	1.60	NS	
	1st year	-1.62	0.46	0.44	NS	
	2nd year	-0.40	0.72	0.78	NS	
	3rd year	0.35	0.27	0.35	NS	
4th year						

SE= Standard Error; Sig= Approximate significance; NS= Non significant; *p< 0.05

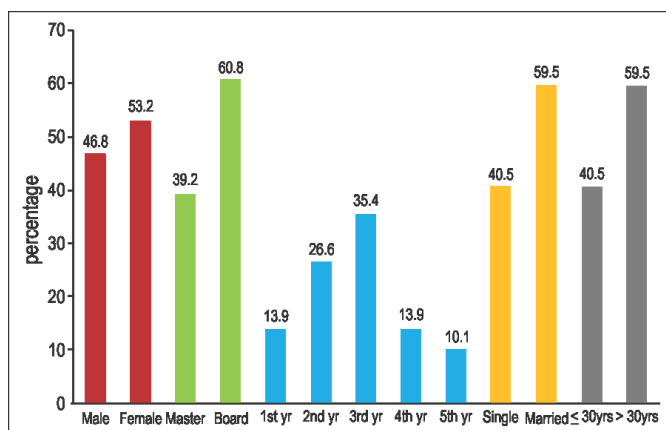


Fig 1: Sample distribution according to demographic details

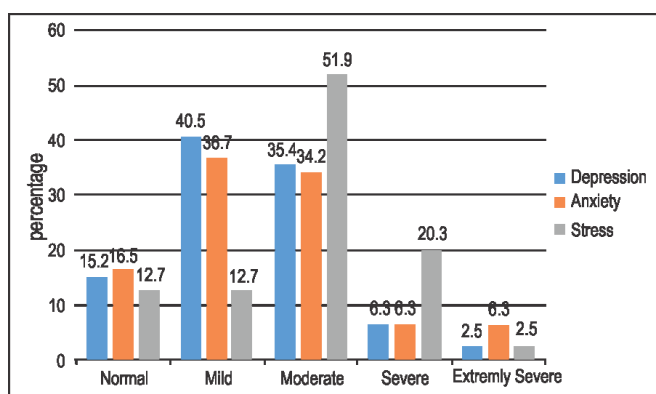


Fig 2: Sample distribution according to the severity categories

specific year of study.^{4,15,27,28} Although each student will experience the stress of professional training somewhat differently, the cumulative effect of these stressors can lead to depression, anxiety, substance misuse, diminished work efficiency, and exhaustion.^{4,15,27,28} In a European study of stress in dental students, the researchers found that 10% of the dental students suffered from severe emotional exhaustion; 17% complained about a severe lack of accomplishment and 28% experienced severe depersonalization symptoms.⁷ The present study was conducted within this context, to assess the extent of three emotional states; depression, anxiety, and stress among postgraduate orthodontic residents in Saudi Arabia. The study used the short-form version of the Depression Anxiety Stress Scale-21 items (DASS-21) due to its reliability, measurement validity, its relatively intelligible language, simple procedures, and suitability for both clinical and research purposes.^{29,30} The overall results of the study showed that the level of depression among the participants was slightly higher, while the levels of anxiety and stress were moderately higher than the contemporary norms.^{31,32} Similar findings have been previously reported for depression and stress

symptoms by Madhan et al¹⁹ in Indian postgraduate orthodontic students. However, they did not find any student reporting depression or anxiety to extremely severe level.

Many studies have examined depression, anxiety, and stress in undergraduate dental students and dental practitioners; and have shown that the concerns of dental students mirror those of qualified dental practitioners.^{5,6,20} Ahola and Hakanen³³ found a reciprocal relationship between burnout and depressive symptoms in dentists. The findings of a high level of occupational stress in the present study are consistent with previous studies amongst undergraduate dental students and general dental practitioners.^{5,15,34-36}

In the present study, females and males showed similar levels of depression, anxiety, and stress. This is consistent with previous studies, which have argued that gender-derived differences in dentists may have become a thing of the past.^{5,14,24} In contrast, some researchers have reported that female dental students are more likely to express their perceptions of stress,^{12,19,23,36} arguing that it is easier for female students to express their experiences of stress than male students.¹² The results of the present study also showed that students older than 30 years of age exhibited a lower level of anxiety symptoms than those who were thirty years or younger, though the association between age and anxiety was not significant in regression analysis. In addition, the findings of the present study also indicated that married students were less likely to report anxiety symptoms compared to their unmarried counterparts. This finding was supported by the result of regression analysis for moderate or higher severity of symptoms. The explanation for reported lower anxiety among married students may be that marriage is considered as a measure of social support. Several studies suggest that home environment and marriage offered some protection against dental school stress.^{5,15,37} A cross-sectional study by Musser and Lloyd found that married students had the lowest reported total mean stress score than unmarried students.³⁸

Results showed a higher level of depression symptoms among students who were pursuing three-year Master's Degree compared to those who were pursuing five-year Saudi Board. The higher level of stress among the Master students could be attributed to the fact that it is a condensed three years program and hence more demanding. The mean scores of depression, anxiety and stress were similar in all years of both the programs. This in contrast with previous studies which showed

an increase in the overall student stress levels as the student progresses in his/her program.^{6,15,39} Most of these studies attributed their finding to the student's transition from preclinical into clinical training, which is not applicable to the present study; since the all participants were postgraduates and started their clinical training from the first year of their programs.

The results of the present study have to be interpreted keeping in sight the small sample size and cross-sectional nature of the study. In addition some factors (such as curricula, teaching and learning methods, and training environment) that may influence the level of depression, anxiety, and stress were not included in the study. Nevertheless, high levels of depression, anxiety, and stress manifested in this study suggest that student-oriented programs should be implemented to provide appropriate support systems and management for the students enrolled. Further research is needed with larger sample size to establish native population norms for Depression Anxiety Stress Scale. Research is also needed to identify the sources and consequences of dental students' stress, and to test its impact longitudinally on perceptions of stress in postgraduate dental students.

CONCLUSION

- The postgraduate orthodontic students were found to experience mildly elevated levels of depression and moderately elevated levels of anxiety and stress symptoms.
- Females and males experienced similar levels of depression, anxiety, and stress symptoms.
- Married students reported lower levels of anxiety symptoms compared to their unmarried counterparts.
- Master's degree program students showed a higher level of depression symptoms compared to Saudi Board students.
- No significant difference was found in depression, anxiety and stress levels between the students from various years in both the postgraduate programs.

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