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## Stressors and Their Association with Symptoms of Depression, Anxiety and Stress in Dental Students

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### Abstract

**Background:** Dental students are exposed to varying levels of stress that may affect their mental and physical health, academic performance and quality of life. This study aimed to determine the prevalence and severity of depression, anxiety and stress (DAS), and the relationships between DAS symptoms and stressors. **Methods:** This cross-sectional study included 257 dental students at the International Islamic University Malaysia. The prevalence and severity of DAS symptoms was measured by the Depression, Anxiety, Stress Scale (DASS-21). The stressors were self-reported by students from a list, and the relationships with the DAS symptoms were assessed. **Results:** The overall prevalence of DAS symptoms for depression, anxiety, and stress were 47.5%, 67.3% and 42.8%, respectively. Clinically significant depression was experienced by 9.3% of the students, anxiety by 28.8% and stress by 10.1%. Anxiety was significantly more frequent in women than in men, and anxiety scores were significantly increased in young students. The top five stressors were time management problems, fear of failing, examination and low grades; feeling of incompetence and study pressure. **Conclusions:** DAS symptoms occurred in dental students. Academic and personal factors produced stress that precipitated psychological distress.

*Keywords: anxiety, dental students, depression, stress, Malaysia*

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### Introduction

The World Health Organization defines health as ‘a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity’.<sup>1</sup> Maintaining psychological health and well-being are essential in achieving physical health, and contribute to feelings of satisfaction. University students experience various levels of stress related to their studies<sup>2,3</sup> and the higher education environment that require coping with living away from their families, a heavy class load and inefficiencies of mentor relationships and health education programmes. The Bachelor of Dental Surgery programme at the Kulliyah Faculty of Dentistry is a 5-year programme. Phase I consists of 2 years of preclinical training in the basic medical sciences and the foundation of dental skills. The aim is to acquire the scientific knowledge and psychomotor skills that are a prerequisite to the completion of the clinical training. Phase II includes 3 years for the development of clinical skills in the various dental disciplines. The presence of stressors can affect student academic performance and function, psychological well-being and physical health. The emotional responses increase the vulnerability to

symptoms of depression, anxiety and stress (DAS).<sup>4</sup> The Diagnostic and Statistical Manual of Mental Disorders (DSM-5) of the American Psychiatric Association defines depression as a disorder characterised by either a depressed mood or markedly diminished pleasure in all activities. It includes the presence of at least four other symptoms with a duration of at least 2 weeks. These are significant weight loss or gain, disturbed sleep, diminished concentration, fatigability, psychomotor agitation or retardation, feelings of worthlessness or inappropriate guilt, and thoughts of death or recurrent suicidal ideation.<sup>5</sup> Anxiety is characterised by intense feelings of dread accompanied by somatic symptoms that indicate a hyperactive autonomic nervous system. Anxiety also impairs cognition and may result in distortion of perception.<sup>6</sup> Stress is defined by physiological and psychological responses to events that are perceived as threatening or challenging, and which require a behavioural response.<sup>7</sup>

This study aimed to determine the prevalence and severity of DAS symptoms in dental students and to identify the stressors and their relationships with the student symptoms. The results should assist in designing

appropriate interventions and modifications of the dental curriculum to enhance students' ability to learn and their life as students.

## Methods

This cross-sectional study enrolled undergraduate dental students at the Kulliyah Faculty of Dentistry, International Islamic University Malaysia (IIUM). It was supported by a research grant from IIUM, and the Research Ethics Committee of the IIUM approved the study. Participation was entirely on a voluntary basis; students were ensured about confidentiality and consent was obtained prior to enrolment. The study was conducted in the middle of the term, before the examination period, to minimise any additional stress symptoms. Students who agreed to participate in the study and were registered as undergraduates at the IIUM Faculty of Dentistry were eligible. Students who did not give consent or were not conversant in English were excluded. The participant socio-demographic characteristics included in the study were nationality, age, marital status, sex, year of study, living accommodation during the studies and household income.

The psychological well-being was assessed by the Depression Anxiety Stress Scale (DASS-21), the short version of a self-rated questionnaire that assesses the severity of DAS symptoms experienced in the previous week. Items are scored on a 4-point scale: Did not apply to me at all (0); applied to me to some degree or some of the time (1); applied to me to a considerable degree or a good part of the time (2); and applied to me very much or most of the time (3).<sup>8</sup> The participants used the 4-point severity/frequency scales to rate the extent to which they experienced each symptom during the previous week. DAS scores were calculated by summing the scores of the relevant items. Each subscale was categorised as normal, mild, moderate, severe and extremely severe. Severe and extremely severe symptom scores were recorded as clinically significant. Mild and moderate symptom scores were recorded as subclinical. Students were given a list of possible stressors that had been used in previous studies.<sup>3,9-12</sup> The stressors were related to student life and accommodations and personal, academic, environmental and social factors experienced

during the current academic year. Respondents were asked to rate each item on the list on a scale from 0 (I don't consider it a stressful factor/Does not apply to me) to 4 (I consider it an extreme stressor).

**Statistical analysis.** The statistical package for social science (SPSS 22.0) was used to analyse the study data. Qualitative variables such as age group, sex, nationality, monthly household income, marital status, year of study and type of accommodation were reported as numbers and percentages. The Mann–Whitney *U* and the Kruskal–Wallis tests were used to evaluate the effects of the socio-demographic characteristics on the emotional disturbances reported by the students. The associations of the five stressors and the presence of emotional disturbances were evaluated using independent the *t*-test, *p*-values < 0.05 were considered statistically significant.

## Results

A total of 257 of the 290 registered students (88%) participated in the study. The majority were women older than 21 years of age, Malaysian, single, living in a student hostel and with a monthly household income of >5000 Malaysian Ringgit. The overall pre-valence of depression, anxiety and stress was 47.5%, 67.3% and 42.8%, respectively. Clinically significant depression was experienced by 9.3% (*n* = 24) of the students, clinically significant anxiety by 28.8% (*n* = 74) and clinically significant stress by 10.1% (*n* = 26) (Table 1). The mean DAS scores were higher in female than in male students, but the difference was statistically significant (*p* = 0.015) only for anxiety. The mean anxiety score was significantly higher in those ≤21 years of age than in those who were older (*p* = 0.032). The mean DAS scores were higher in preclinical- than in clinical-phase students, but only the difference of the mean anxiety scores was statistically significant (*p* = 0.042). The year of study and household income were not correlated with DAS (Table 2). The five stressors with the highest mean scores were time management problems, fear of failing, examination and grades, feelings of incompetence and study pressure and obligations (Table 3). All five stressors were significantly associated with increased mean DAS scores (Table 4).

**Table 1. Rate and Severity of Emotional Disturbances in the Study Participants**

	Depression N (%)	Anxiety N (%)	Stress N (%)
Normal (not affected)	135 (52.5)	84 (32.7)	147 (57.2)
Subclinical	98 (38.2)	99 (38.5)	84 (32.7)
Clinically significant	24 (9.3)	74 (28.8)	26 (10.1)
Overall No. of affected students	122 (47.5)	173 (67.3)	110 (42.8)
<b>Total</b>	<b>257 (100)</b>	<b>257 (100)</b>	<b>257 (100)</b>

**Table 2. Factors Associated with Significant Emotional Disturbances in the Study Participants**

	Total No. (%)	Mean Depressive Level	<i>p</i>	Mean Anxiety Level	<i>p</i>	Mean Stress Level	<i>p</i>
<b>Gender</b>							
Male	60 (23.3)	9.6	0.325	9.2	0.015	13.1	0.184
Female	197 (76.7)	10.6		11.8		14.7	
<b>Age</b>							
≤21	94 (36.6)	10.2	0.848	12.5	0.032	15.4	0.128
>21	163 (63.4)	10.4		10.4		13.7	
<b>Household income</b>							
≤RM1500	39 (15.2)	11.9	0.222	12.2	0.468	15.1	0.897
RM 1501–5000	103 (40.1)	10.9		11.0		14.3	
>RM 5000	115 (44.7)	9.2		10.9		14.0	
<b>Year of study</b>							
Year 1	56 (21.8)	10.6	0.283	11.9	0.130	14.7	0.252
Year 2	42 (16.3)	10.2		12.9		15.8	
Year 3	51 (19.8)	11.8		11.8		15.0	
Year 4	54 (21.0)	8.4		8.8		12.3	
Year 5	54 (21.0)	10.5		10.7		14.1	
<b>Phase of study</b>							
Preclinical	98 (38.1)	10.5	0.838	12.4	0.042	15.2	0.173
Clinical	159 (61.9)	10.3		10.4		13.8	
<b>Accommodation</b>							
Dormitory	245 (95.3)	10.2	0.364	11.2	0.869	14.3	0.614
Non-dormitory	12 (4.7)	12.3		10.8		15.5	

Data were analysed with the Mann–Whitney *U* test for two independent variables and the Kruskal–Wallis one-way analysis of variance for more than two independent variables, *p* < 0.05 (statistically significant).

**Table 3. The Five Most Frequently Cited Stressors**

Stressor	Mean (SD)
Time management problems	2.39 (1.06)
Fear of failing	2.38 (1.13)
Examination and grades	2.19 (1.03)
Feeling of incompetence	2.17 (1.12)
Study pressure and obligations	2.06 (1.05)

**Table 4. The Association of the Five Most Cited Stressors and Depression, Anxiety and Stress Scores**

Mean	Depressed	Not depressed	<i>p</i>	Anxiety	No anxiety	<i>p</i>	Stress	No stress	<i>p</i>
Time management problems	2.65	2.16	0.000	2.53	2.11	0.000	2.66	2.19	0.00*
Fear of failing	2.71	2.07	0.000	2.57	1.99	0.000	2.74	2.11	0.00*
Examination and grades	2.44	1.97	0.000	1.86	2.36	0.000	2.50	1.97	0.00*
Feeling of incompetence	2.49	1.87	0.000	1.75	2.37	0.000	2.55	1.88	0.00*
Study pressure and obligations	2.34	1.81	0.000	1.68	2.24	0.000	2.30	1.88	0.00*

## Discussion

The percentage of students who experienced depression in this study is higher than previously reported in dental students in Malaysia (44.9%)<sup>13</sup> or Pakistan (20%).<sup>14</sup> It is also higher than that in medical students in Malaysia (39.7%),<sup>15</sup> lower than reported in dental students in Saudi Arabia (55.9%),<sup>16</sup> Jamaica and West Indies (60%),<sup>18</sup> and much lower than that found in undergraduate science students in Malaysia (64.4%).<sup>17</sup> Clinically significant depression was found in 9.3% of

the dental students in this study, which is lower than in a study by Lowe in which 40% of the university students were clinically depressed.<sup>18</sup> It is also lower than previous reports of 13.9% of Malaysian science and medicine students with DASS-21 scores indicating severe, or 9.8% indicating very severe, clinical depression.<sup>17,19</sup> However, it is slightly higher than in other studies in medical and dental students in Malaysia reporting rates of clinical depression from 5.5% to 7.2%.<sup>13,15,20</sup> The overall rate of anxiety in this study was slightly higher than the 66.1% reported previously in

dental,<sup>13</sup> 65.8% in medical and 84.5% in science students in Malaysia.<sup>17</sup> Despite the high overall rate, anxiety was clinically significant in only 28.8% of the students, which is similar to a previous report in dental undergraduates in Malaysia.<sup>13</sup> The overall rate of stress in this study is similar to that of a previous report in dental students in Malaysia,<sup>13</sup> but lower than that reported in others.<sup>21,22</sup> The stress experienced by 10.4% of the students in this study was clinically significant, which is comparable to previous DASS scores of 8.7% and 13.1% for severe and very severe stress, respectively.<sup>13,22</sup> Differences in the reported rates of DAS may result from the use of different assessment tools or study course enrolment, sample size, stage of study, difficulty of the curriculum and cultural differences. Higher DAS scores have been reported in female than in male students.<sup>15</sup> The mean DAS scores were higher in female than in male study participants in this study, but the difference was statistically significant only for anxiety. Such gender differences may arise from hormonal differences or differing psychosocial stressors or stress coping mechanisms in men and women.<sup>23</sup>

Students 21 years of age and younger had significantly higher anxiety scores than previously reported,<sup>15,17,24</sup> but, in at least one other study, anxiety was higher in older than in younger students.<sup>25</sup> The younger students in this study may have been less skilled in dealing with challenges in life, going through a transition phase, inexperienced in time management, less able to adjust to a new environment, or found it difficult to adapt to the university curriculum. The mean anxiety score was significantly higher during the preclinical than clinical phase of their study. Students are newly exposed to the university environment in years 1 and 2, and are less able to deal with stressors than students in the clinical phase, who have some medical education and training in psychiatric coping with stress. Academic and personal factors included the five most frequently cited stressors. This finding is consistent with other studies in which academic factors were found to be the main sources of stressors.<sup>3,10,26,27</sup> All five factors were found to be significantly associated with DAS. The study findings will assist in designing interventions and changes in the dental curriculum to enhance student learning and improve emotional status.

## Conclusions

Time management problems, fear of failing, examinations and grades, feelings of incompetence, and study pressure and obligations were stressors that precipitated psychological distress in dental students. DAS symptoms were reported by many dental students, with increased rates of anxiety in young students in the preclinical phase of the dental study.

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## Conflict of Interest Statement

The authors declare no conflict of interest.

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