

Perceived Sources of Stress within a Dental Educational Environment

Wael M. Al-Omari, BDS, MDentSci, PhD



Abstract

The aim of this study was to identify the perceived sources of stress among dental students, dental hygiene students, and dental technology students enrolled at Jordan University of Science and Technology (JUST). The modified dental environment stress questionnaire was administered to 183 students. The perceived stressors varied between major and year. Dental students gave high scores for examinations, reduced holidays, inadequate time for relaxation, fear of failure, completing clinical requirements, and differences in opinion between staff. Dental hygiene students gave the highest scores for uncertainty about the field of study as future career, examinations, inadequate clinical training and supervision, inadequate relaxation, and discrimination between students. Dental technology students also gave high scores for uncertainty about future career, examinations, approachability of the staff, inadequate relaxation, and completing requirements. Females are more stressed than males with regard to personal factors. Dental technology and/or dental hygiene students have significantly higher scores than dental students in 12 items. Students who reported their first choice of study was not their current field of study showed more stress concerning their future careers. The high scores reported for some stressors among students emphasize the need to address student's concerns.

Keywords: Stress, dental students, dental technology students, dental hygiene students

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Introduction

Atkinson et al. stated the term stress describes external demands (physical or mental) on an individual's physical and psychological well-being.¹ Some stress is desirable to prevent boredom and under-stimulation, but the persistence of stress-related symptoms may result in mental and/or physical ill health, substance abuse, and diminished efficiency at work or learning. The dental profession is considered one of the most stressful health professions.² It was noted stress-related illnesses, together with musculoskeletal disorders, were the main factors influencing dentists to retire early.³ In addition intense interaction between the dentist and patient could precipitate a state of "burnout" that consists of emotional exhaustion, depersonalization, and reduced personal accomplishment.⁴ In another study⁵ it was concluded many factors led to dentistry being particularly stressful: the combination of time pressure, frightened patients, financial problems, staff supervision, and the routine and boring work regime.

It has been shown dental students generally receive some education on stress management, but many dental hygiene and graduate students do not.⁶ In a cross-cultural comparison the greatest stressor for Singapore students was completing graduation requirements, while American students were mostly stressed by examinations and grades.⁷ The stressors were generally related to internal factors related to the course. It was also suggested occupational hazards related to practice environment, such as materials used and intra-surgery risk including aerosols, particulate debris, and noise, could further exacerbate the problem.³ It is clear admission to dental schools is not seen just as a stressful course but also as a stressful career.⁵ The problem of student drop-outs from UK dental schools was also addressed and was feared it would affect future man power levels.⁸ Stress also arises from the need to meet treatment requirements, to pass stringent academic assessments, and is related to clinical and supporting staff.⁹ It has been shown the clinical years are more stressful than the pre-clinical years and staff create more stress than the treatment of patients. Moreover, uncertainty about dentistry as a career and unhealthy perfectionism may predispose to stress.^{10,11} It

has also been found academic pressure, service, working hours, as well as clinical events are more stressful than personal problems.^{12,13}

Although increasing stress may result in declining student performance¹⁴, high levels of stress can result in a wide variety of physical and psychological complaints and reaction to stress is influenced by a person's system of beliefs and attitudes.¹⁵ It is, therefore, recommended dental educators should determine the sources of stress among students to avoid resultant detrimental effects on the physical and mental health of the students.

Because dentistry inflicts stress upon all members of the dental team and due to the lack of adequate information about the sources of stress perceived by dental students, dental hygiene students, and dental technology students exposed to similar teaching environments, the aim of this study was to identify major stressors varied during undergraduate courses mentioned above and to determine if gender, origin, and first choice of study had any effect on perception of potential stressors.

Material and Methods

This study population included 183 students attending dentistry, dental technology, and dental hygiene programs at Jordan University of Science and Technology (JUST). A modified American dental environmental stress questionnaire^{9,14}, applicable and relevant to young undergraduate dental and dental auxiliary student populations, was used in addition to information requested from the students on their gender, age, origin, first choice for study, and type of accommodation. (Figure 1)

The questionnaire was further modified to be applicable to Jordanian students. Hence, questions about marital status and parenting were replaced by other questions. It is very uncommon for students in Jordan to be married at this age and have a family of their own. The 38 item questionnaire was used to investigate the stress perceived by dental students (D), dental technology students (DT), and dental hygiene students (DH). The questions were allocated to examinations, fear of failing the

course or year, shorter and fewer holidays than other university students, and, for clinical students, approachability of staff and completing the required quantity and variety of work within a limited time. The 38 questions relating to potential stressors were divided into the following five groups⁹:

- Living accommodations, i.e., moving away from home, environment in which to study, staying with flat mates, lack of a recreation place within the accommodations.
- Personal factors, i.e., making friends, relationship with member of the opposite sex, lack of time for relaxation, reduced holidays, financial problems, personal health, and social demands.
- Educational environment, i.e., compliance of patients, appropriate teaching environment, receiving criticism at work, communication with and approachability of the staff, the teaching language, the rules and regulations at work, the system of student evaluations, discrimination between students due to sex, religion, origin, color, or race.
- Academic work, i.e., the teaching and communication at work, the amount of information given, new curriculum topics, the competition for grades, the examination, references and information resources, fear of failure, self confidence, manual dexterity and manual skills, health hazards at work, and uncertainty about the field of study as a future career.
- Clinical factors, i.e., adequacy of clinical supervision, completing requirements, insufficient treatment time, differences in opinion between the clinical staff, transition from pre-clinical to clinical year, difficulty in learning and mastering precision manual skills, confidence in own clinical decision making, difficulty in managing difficult cases, and communication with patients.

The questions on clinical factors were not administered to pre-clinical third year dental students or to dental technology students. Students were asked to grade the potential stressors on a scale 0 (not stressful) to 5 (extremely stressful). All variables were entered

into a personal computer; the statistical package for social sciences (SPSS) software was used for data processing and data analysis. Mean values and standard deviations were calculated. The t-test was used for independent samples to compare scores by gender, nationality, and first choice of study (desired this field of study or preferred another field of study). Analysis of variance (ANOVA) was used to compare by year and field of study. The differences between pairs of individual year and field of study were analyzed using Tukey's studentized post-hoc test.

Results

The overall population used in this analysis was 183 students studying at JUST. Distribution by dental class was: D3, n=60 (63%), D4, n=69 (74%), D5, n=75 (73%); by dental hygiene students: DH3, n=12 (83%), DH4, n=8 (100%); and by dental technology students: DT3, n=24 (66%), DT4, n =16 (75%). Forty six percent (86) of the subjects were females and 53% (97) were males. At the time of the survey, 8% were aged 20 years or under, 86% between 21 and 25 years, and only 1% over 25.

Living Accommodations

Among the study sample, 48% of the students lived in their parents' home. ANOVA revealed non-significant differences between the students in all disciplines. Although fourth year dental hygiene students had the highest group mean stress score to these stressors, it was not significantly different from the score given by students in other years and fields of study. The highest scores for the individual stressor 'moving away from home' and for 'difficult environment in which to study' were given by the fourth year dental hygiene students and were 2.3 and 2.75, respectively. Third year dental students had higher scores than fourth and fifth year dental students and also had higher scores than dental technology students.

The t-test revealed those students who lived away from home gave statistically higher mean scores to this group of stressors than students who lived with their parents ($P < 0.05$). The means and standard deviations of the stressors groups are presented in Tables 1-3 for all majors and classes.

Figure 1. Questionnaire used in the study.

Perceived Sources of Stress in University Students

Gender: _____ Age: _____ Nationality: _____ Field of study: _____
 Year of undergraduate study: _____ First choice for study: _____

- 1- Do you live with your parent? Yes/ No.
- 2- If the answer is yes, is your home in the same city where you study? Yes/ No.
- 3- If the answer of Q.2 is No, how long do you travel daily to reach your university?
- 4- If you stay in an accommodation:
 - a- Do you stay alone, or with flat mates? _____
 - b- Does the accommodation provide good studying environment? Yes/ No
- 5- If your family lives abroad, how often do visit them per year? _____

Please record the score you find it more applied to you next to each item, the scores are classified as the following:

0	3
1	4
2	5

I- Living accommodation:

1- Living away from home	
2- Accommodation is not appropriate environment for studying	
3- Staying with flat mates	
4- Lack of recreation places within the accommodation	

II- Personal factors:

1- Difficulty in making friends	
2- Relationship with opposite sex	
3- Inadequate time for relaxation	
4- Reduced holidays	
5- Financial problems; travel, accommodation, fees, clothes, food... etc	
6- Personal health (chronic disease, drugs, ... others)	
7- Social demands (married or unmarried, family and society expectations)	

Figure 1. Continued.

III- Educational Environment	
1- Compliance of patients (patients turn up to their appointments)	
2- Conducive environment for teaching	
3- Receiving criticism at work	
4- Communication with and approachability of the staff	
5- The teaching language	
6- The rules and regulations at work	
7- Discrimination between students	
8- Discrimination by sex, religion, origin, colour, or race	
IV- Academic work:	
1- The teaching and communication language at work	
2- The amount of information given	
3- New curriculum topics	
4- Competition for grades	
5- Examinations	
6- References and information resources	
7- The system of study (credit hours or yearly)	
8- Self confidence	
9- Manual dexterity and manual skills	
10- Health hazards at work	
11- Uncertainty about the field of study as a future career	
V- Clinical factors:	
1- Adequacy of clinical supervision	
2- Completing clinical requirements	
3- Insufficient treatment time	
4- Differences in opinion between the clinical staff	
5- Transition from pre- clinical to clinical year	
6- Difficulty in learning and mastering precision manual skills	
7- Confidence in own clinical decision making	
8- Difficulty in managing difficult cases	
9- Communication with patients	

Table 1. Means and standard deviations for scores of potential stressors groups for dental students.

<i>Group stressor</i>	3rd year (N=38)	4th year (N=51)	5th year (N=55)
Living Accommodations	2.04 (1.31)	1.65(1.34)	1.62 (1.12)
Personal Factors	2.04 (0.83)	2.02 (0.90)	1.5 (0.75)
Education Environment	2.12 (0.93)	1.93 (0.97)	1.59 (0.86)
Academic Work	2.42 (0.77)	1.94 (0.9)	1.72 (0.82)
Clinical Factors	-	2.10 (1.08)	1.84 (0.94)

Table 2. Means and standard deviations for scores of potential stressor groups for dental hygiene students.

<i>Group stressor</i>	3rd year (N=10)	4th year (N=8)
Living Accommodations	1.41 (0.95)	2.26 (1.94)
Personal Factors	2.24 (0.75)	2.48 (1.35)
Education Environment	2.44 (0.98)	2.45 (1.06)
Academic Work	2.43 (0.50)	2.30 (0.59)
Clinical Factors	2.59 (1.20)	2.73 (0.78)

Table 3. Means and standard deviations for scores of potential stressor groups for dental technology students.

<i>Group stressor</i>	3rd year (N=16)	4th year (N=12)
Living Accommodations	1.98 (1.21)	1.191 (1.01)
Personal Factors	2.36 (0.96)	2.41 (0.93)
Education Environment	1.89 (0.99)	2.38 (0.71)
Academic Work	2.12 (0.82)	2.29 (0.62)

Personal Factors

There was a significant difference between the student groups ($P < 0.05$). Fifth year dental students gave significantly lower scores for the personal group of stressors (1.5) than all other students except the third year dental hygiene students. High scores were given for 'inadequate time for relaxation,' in which fourth year dental technology students gave the highest score (3.9) but were significantly different only from fifth year dental students. Moreover, 'reduced holidays' was particularly stressful to all students in all majors and classes. Personal health was not viewed by a majority of students as particularly stressful except for third year dental technology students who gave significantly higher scores than fifth year dental students.

Educational Environment

Significant differences were found between students ($P < 0.05$). Fifth year dental students had significantly lower scores (1.59) than fourth year dental hygiene students (2.45) and fourth year dental students (1.93). No other significant differences were found.

The score allocated to 'receiving criticism at work' (3.12) by fourth year dental hygiene students was significantly higher than in other years. The stressor 'approachability of staff' was significantly more stressful to fourth year dental technology students (2.80) when compared to fifth year dental students. Fourth year dental hygiene students and fourth year dental technology students gave the highest scores for the stressor 'teaching language' and were 2.13 and 2.2, respectively. However, those were significantly higher than fifth year dental students (0.75). Final year dental technology students found the rules and regulations as a potential stressor; they gave this the highest mean score (3.10). 'Discrimination between student' was apparently more stressful for dental hygiene students (Table 4). Generally, fifth year dental students gave the lowest scores for potential stressors within the 'education environment' group of stressors.

Academic Work

The only significant difference ($P < 0.05$) was between the third year students, who gave a high score for 'academic work' (2.42) and the

**Table 4. Mean stress scores and differences between majors and classes.
The highest six scores for each class is printed in bold.**

<i>Stress Item</i>	<i>D3</i>	<i>D4</i>	<i>D5</i>	<i>DH3</i>	<i>DH4</i>	<i>DT3</i>	<i>DT4</i>	<i>Significant Differences</i>
Living away from home	2.2	2.2	1.7	1.83	2.3	2.0	1.78	NS
Lack of atmosphere in living quarter	2.13	1.41	1.68	1.3	2.75	2.10	2.1	NS
Staying with flat mates	1.37	1.14	1.4	1.3	1.74	2.0	1.67	NS
Lack of recreation in living place	2.44	1.84	1.72	1.2	2.25	1.81	2.1	NS
Difficulty in making friends	1.56	0.87	0.79	1.6	2.21	1.25	1.7	DH4>D5
Relationship with opposite sex	1.21	1.61	0.9	2.1	1.75	1.37	0.8	NS
Inadequate time for relaxation	2.95	2.88	2.14	2.67	3.0	3.37	3.9	DT4>D5
Reduced holidays	3.58	3.25	3.21	3.0	2.88	3.31	3.6	NS
Financial responsibilities	2.0	2.15	1.24	3.0	2.87	2.66	2.7	NS
Personal physical health	1.26	1.54	0.9	1.6	2.1	2.55	2.3	DT3>D5
Social demands	1.71	1.82	1.32	1.7	2.5	2.0	1.9	NS
Receiving criticism at work	2.61	2.56	2.76	2.8	3.12	2.19	2.2	NS
Teaching atmosphere	1.92	2.05	1.62	2.3	2.0	2.12	1.78	NS
Approachability of staff	2.16	1.98	1.2	2.2	2.0	1.75	2.8	DT4>D5
The teaching language (English)	1.23	1.12	0.75	2.2	2.13	1.32	2.2	DH3, DT4>D5
Rules and regulations at work	1.52	1.88	1.64	2.1	2.5	1.62	3.1	DT4 > D3, D5
Evaluation of students	2.92	2.12	1.65	2.9	3.12	2.19	2.5	D3, DH3, DH4>D5
Discrimination based on sex, religion, or race	2.47	1.8	1.54	2.77	2.87	2.25	2.6	NS
Atmosphere created by staff	1.26	1.2	1.3	1.8	1.82	1.31	1.4	NS
Amount of information given	2.47	1.39	1.25	2.2	2.12	1.68	2.1	D3>D5
New curriculum topics	2.29	1.75	1.46	2.4	1.87	1.75	1.7	NS
Competition for grades	3.05	2.33	1.85	2.3	1.87	1.75	1.7	NS
Examinations	3.68	3.29	2.56	2.7	3.37	2.81	3.4	D3>D5
References and information	2.21	2.54	2.04	2.7	2.5	2.5	2.6	NS
Fear from failing the year or course	3.66	2.21	2.1	2.0	1.5	2.43	1.2	D3>DH4, TD4, D4, D5
Lack of self confidence	1.81	1.27	1.4	2.0	1.13	1.13	1.8	NS
Manual skills	1.86	1.35	1.5	3.3	2.75	2.12	2.9	DT4, DH3>D4, D5
Occupational hazards	1.88	2.04	1.94	2.3	2.25	2.65	2.3	NS
Uncertainty about a future career	2.47	1.98	1.48	3.0	4.13	3.19	4.1	DH4, TD4>D4, D5
Inadequacy of clinical supervision	-	1.97	1.6	2.2	2.87	-	-	DH4 > D5
Completing clinical requirements	-	2.41	2.42	2.7	2.65	-	-	NS
Insufficient treatment time	-	1.61	1.98	2.8	2.75	-	-	NS
Difference in opinion between staff	-	2.86	2.34	2.7	2.87	-	-	NS
Transition from pre-to clinical year	-	2.25	2.0	2.7	3.87	-	-	DH4 > D5
Mastering clinical skills	-	1.94	1.36	2.5	2.95	-	-	DH4 > D5
Clinical decision-making	-	1.72	1.48	2.85	2.23	-	-	DH3>D4, D5
Managing difficult cases	-	2.43	2.30	2.7	2.63	-	-	NS
Communication with patients	-	1.75	1.1	2.2	1.75	-	-	DH3 > D5

fifth year dental students (1.72). Third year dental students allocated high mean scores to 'amount of information given' (2.47). The item 'new curriculum topics' was given high scores by third year dental hygiene students (2.40). 'Examinations' were among the most potent stressors for all students, with mean scores between 3.68 in third year dental students and 2.56 in fifth year dental students. Lack of confidence was relatively a potent stressor for third year dental hygiene students. 'Fear from failing the course or the year' was extremely stressful for third year dental students (3.66). 'Mastering manual skills' was particularly stressful for third year dental hygiene students (3.30), which is their first clinical year, and in the fourth year for dental technology students (2.90) in which they are allocated clinical cases. Dental technology students and dental hygiene students gave higher scores for 'occupational health hazards' than dental students. Uncertainty about a future career was a very potent stressor for the fourth year dental hygiene (4.13) and the fourth year dental technology students (4.10). Thus, the third year dental hygiene and fourth year dental technology students may be most stressed with regard to 'academic work,' but this was not confirmed statistically.

Clinical Factors

There were statistically significant differences between the dental hygiene students and the dental students ($P < 0.05$). The third and fourth year dental hygiene students had higher scores (3.59 and 3.73, respectively) than fourth year and fifth year dental students. Of the questions directed specifically to clinical year students, the fourth year dental hygiene students gave the highest score for 'inadequacy of clinical supervision.' Moreover, all the students gave relatively high, but not significantly different, scores to 'completing clinical requirements.' Third year dental hygiene students beginning their clinical experience with patients gave higher scores to 'insufficient treatment time' and 'communication with patients.' However, differences between the major clinical year students were not statistically significant. The potential stressor 'differences in opinion between clinical staff' seems to induce a stressful response by all clinically involved dental hygiene and dental students. The scores were as follows fourth year

dentistry (2.86); fifth year dentistry (2.34); and third (2.7) and fourth year dental hygiene (2.87). There were non-statistically significant differences between the dental hygiene students and the dental students.

Effect of Gender

Generally, concerning the stressor groups, the female respondents (86) were not significantly more stressed than men (97). The following have previously been found to evoke greater stress from female respondents and were confirmed in this survey:

- Reduced holidays (women: 3.19, men: 2.80)
- Examinations (women: 3.17; men: 3.0)
- Inadequate time for relaxation (women: 3.01; men: 2.51)
- Uncertainty about future career (women: 2.69; men: 2.27)
- Receiving criticism at work (women: 2.51; men: 2.2)

When considered by group for potential stressors, female students had higher scores for personal factors (women: 1.98; men: 1.78) and for living accommodations (women: 1.87; men: 1.67).

Effect of the First Choice of Field of Study

Among all the students, 67 students (37%) reported the field of their study was not their first choice, while 116 students (63%) reported their field of study was their first choice when they applied for acceptance in the university. There were statistically significant differences between the two groups of students in the scores given only to the 'personal factors' ($P < 0.05$). Both groups of students had examinations and reduced holidays as the major stressors. However, those whose first choice for study was not their current field of study are more stressed about 'uncertainty about future career' (3.12).

Discussion

The aim of this study was to identify the major sources of stress in the students, which form the members of the dental team namely: dental students, dental hygiene students, and dental technology students exposed to the same educational environment at JUST. The study was conducted to ascertain whether the major stressors vary during the undergraduate course

and to discover if gender, origin, or living away from home would affect the perception of sources of stress. However, identification of potential perceived stressors throughout the course of the study may allow students, staff, and administrators an opportunity to be proactive in their approach to student stress and to modify the teaching curriculum or environment to be more conducive to the students.

Staff and administrators may then address potential stressors for students in orientation courses, conferences, classrooms, and stress management programs. Also, acknowledgement of potential stressors can be useful to students as they monitor their own reactions during the education process, and, hopefully, attempt to develop a less stressful lifestyle. Among three dental school classes, two dental hygiene classes, and two dental technology classes, differences in perception of stress on 38 dental environment stress questionnaire items were significant.

In the current study there was statistical association between living accommodations and potential stressors for all students. This could be attributed to high scores for 'living away from home.' On the other hand, the third year dental students' scores were not statistically different from scores given by other students in other dental years. The highest scores for individual stressors within the grouped stressor 'living accommodations' were allocated to fourth year dental hygiene students. This can be related to the fact all the students in this class were females. This can be explained by the difficulties the students encounter with adapting to living alone and being completely self-dependent in running their own lives. The current result may support previous findings that the most highly stressed students had difficulties with domestic arrangements.¹⁶ Seemingly, the influence of staying at home had a positive influence upon students and appears to provide a protective environment against stress.¹⁷

In the study the demands of the dental, dental hygiene, and dental technology courses were obviously reflected in the high scores given for 'inadequate time for relaxation.' The demand of the course and the long hours of training seem

to have induced the highest stressful response in fourth year dental technology students who gave the highest score for this stressor. Those students are concerned with graduation requirements and job placement in addition to lack of time to fulfill the assigned schoolwork. Although fifth year students have the same challenges, they gave lower scores for most of the items within the 'personal factors' group of stressors. It seems fifth year dental students, who are older, have more capability in stress management than dental technology students and they do not have as many worries about future careers as technology students. Although financial problems have been found to increase progressively with the passage of time among dental students, the current study did not reveal such a progressive increase.⁹

Clinical year students generally had higher scores for the educational environment than those in pre-clinical study. The relatively high scores allocated by clinical year students to these stressors reflect the reality of the stressful nature of the dental school environment.

Special attention should be drawn to the results concluded by dental technology students and dental hygiene students who gave high scores for 'receiving criticism at work' and 'approachability of staff.' The fact those students are taught by dental staff may give the impression of difficult communication and that dental staff are more communicable with and relate more to dental students. Moreover, this may reflect a problem with regard to approachability of senior dental technicians supervising undergraduate students. Dental hygiene students may have felt ignored or underestimated by dental staff who spend the vast majority of their clinical time supervising dental students. This may emphasize the need for specialists in dental hygiene and dental assisting fields to directly assess, supervise, and teach the dental hygiene students.

In confirmation of previous surveys^{7,9,18} 'examinations' were among the most potent forms of stress in almost all years and majors. However, 'uncertainty about the field of study as a future career' was the major stressor for fourth year dental technology and fourth year dental hygiene students.

Establishing academic performance may preclude third year dental students from desiring input into decision-making processes. Third year dental students with two years of experience in the university got more involved in the dental school environment. Since the third year is the dental pre-clinical year, students relate more to their field of study and, thus, may seek more of a voice in the policy making process. As students are exclusively taught the dental school curriculum in this year, it is understandable they become more concerned with class work, amount of information, new curriculum topics, grades, and examinations.

Although third year dental hygiene students gave the highest score for 'lack of self confidence,' there were no statistical differences with groups of students. Dental students had lower scores. The present finding does not support findings by Heath et al. who found lack of confidence was a stressor for dental students in all years except the final year. 'Manual dexterity' was stressful for third year dental hygiene students.⁹ This could be attributed to the fact those students commence their clinical training in this year and they encounter a wide variety of materials to handle and clinical procedures to master. Fourth year dental technology students also gave high scores for the same stressor as they too commence their training in fabricating prostheses and crown/bridge work for patients, which requires more manual dexterity and precision. Dental technology students and dental hygiene students gave higher scores for 'health hazards at work' than dental students. However, the health hazards in technology laboratories may be challenging and pose an especially stressful experience.

Uncertainty about future career was a very potent stressor for the fourth year dental hygiene students and the fourth year dental technology students. Those students do not seem to have optimistic perspectives about having a successful future career or getting a descent job. This can be expected, as those specialties were introduced recently, and there is no set plan to recruit the graduates in the public sector. Moreover, dental nurses and dental technicians in the private sector are either unqualified or much less educated, thus, those graduates may

be considered as overqualified to run these jobs. This greatly emphasizes the need to educate the private sector establishments about the benefits of recruiting such graduates and to contact various relevant public sector establishments to employ the graduates.

The third and fourth year dental hygiene students gave higher scores for 'inadequacy of clinical supervision' than fourth year and fifth year dental students. The fourth year dental hygiene students gave the highest score for 'inadequacy of clinical supervision.' This may be attributed to the dental staff that devote their clinical time to supervising dental students and overlook the dental hygiene students. Moreover, all the students gave relatively high, but not significantly different, scores to 'completing clinical requirements' as the students are under pressure to fulfill their graduation requirements. The highest score for 'transition from pre-clinical to clinical year' is by fourth year dental hygiene students. The score was significantly higher than in third year dental hygiene students and fifth year dental students. The adverse impact of staff on students has been noted in previous surveys.¹⁹ Third year dental hygiene students beginning patient treatment and fourth year dental technology students who were allocated clinical cases that require precision gave higher scores to 'mastering precision manual skills.' This is consistent with commencing clinical practice and unfamiliarity with clinical handling of dental materials and management of patients.

The potential stressor 'differences in opinion between clinical staff' seems to induce a stressful response by all clinically involved dental hygiene students and dental students. This is basically attributed to the differences between the clinical staff. The dental staff has pursued their higher qualifications from different dental schools around the world. This is clearly manifested in the differences in opinion, particularly concerning management of patients. However, there were no-statistically significant differences between the dental hygiene students and the dental students.

In the current investigation female students were more stressed than male students with concern to grouped stressors. When considered by group potential stressors, female students

had higher scores for personal factors and for living accommodations, but the differences were not statistically significant. The most stressful items were 'reduced holidays,' 'examinations,' 'inadequate relaxation,' 'uncertainty about future career,' 'receiving criticism at work,' and 'discrimination between students.' These were not in agreement with previous studies except for examination. Although it has been reported in earlier investigations female students worry more about financial problems²⁰, this was not confirmed in this study. Differences may be related to socio-cultural differences. Moreover, most students are either completely funded by scholarships or by their parents, i.e., they are not directly involved with the expenses of their study.

The number of stressors of greater significance to female students gives cause for concern as women may feel under greater pressure to succeed than male students.²¹ The author even broadens the stressful experience of female dental students to include fear of failure, examinations, competition for grades, and lack of confidence. This may be explained by the fact females may respond more severely than males.

Thirty seven percent of the students reported the field of their study was not their first choice, while 63% reported their field of study was their first choice. There were statistically significant differences between the two groups of students in the scores given only to the 'personal factors' ($P < 0.05$). The obvious difference between the two groups of students when the most highly stressors are listed is those students whose first choice for study is not their current field of study are clearly more stressed about their future careers. This may be due to the lack of motive to be distinguished in a field of study that is not desired by this group of students and to have an unwanted career for the rest of their lives. The

highest scores for individual stressors for students at various major fields of study and at varying years are presented in Table 4.

Conclusions

The prime sources for stress among the students included in the study were examinations, high demand of the course, competition for grades, and completing graduation requirements. Failure of the year or a course was found to be a potent stressor among all students, as was fear of being left behind by their peers. Final year dental students are stressed about placement of a job and about dentistry as a future career. Differences in opinion between the clinical staff are a potent stressor for fourth year dental students. Dental hygiene students expressed highly stressful reactions to the stressor 'uncertainty about field of study as future career' more than to 'examinations.' Moreover, the clinical environment seems to be stressful too, in addition to lack of time for relaxation and perception of discrimination between students. The dental technology students' prime sources of stress are uncertainty about the future career, lack of time for relaxation, and examinations. Female students are more stressed about 'personal factors' than their male counterparts. Prime sources of stress in female students are reduced holidays, examinations, time pressure, uncertainty about future career, and discrimination between students. Non-Jordanian students did not respond differently to individual stressors than Jordanian students. However, the non-Jordanian students are more stressed about living away from home and the environment of the accommodations. First choice for study does not seem to have a detrimental impact on students. However, students whose first choice for study is not their current field of study expressed a more stressful reaction to the stressor 'uncertainty about the future career.'

References

1. Atkinson JM, Millar K, Kay EJ, et al. Stress in dental practice. *Dent Update* 1991;3: 60-64.
2. Cooper CL, Watts J, Kelly M. Job satisfaction, mental health, and job stressors among general dental practitioners in the UK. *Br Dent J* 1987;162: 77-81.
3. Burke FJ, Maine JR, Freeman R. The practice of dentistry: an assessment of reasons for premature retirement. *Br Dent J* 1997;182: 250-254.
4. Maslach C, Jackson SE, Leiter MP. *Maslach Burnout Inventory Manual*. 3rd Edition. Palo Alto: CA Consulting Psychology Press Inc, 1986.
5. Hoad-Reddick G, Macfarlane TV, Gibson VM. Relating personality to interview results and performance in the first year dental course. *Br Dent J* 1999;186: 348-352.
6. Alexander RE. Stress-related suicide by dentists and other health care workers fact or folklore?. *J Am Dent Assoc* 2001;132: 786-794.
7. Yap AU, Bhole S, Teo CS. A cross-cultural comparison of perceived sources of stress in the dental school environment. *J Dent Educ* 1996;60: 446-451.
8. Drummond JR, Duguid R. Student drop-out from UK dental schools. *Br Dent J* 1997;182: 347-349.
9. Heath JR, Macfarlane TV, Umar MS. Perceived sources of stress in dental students. *Dent Update* 1999;26: 94-100.
10. Henning K, Eye S, Shaw D. Perfection, the imposter phenomenon and psychological adjustment in medical, dental nursing and pharmacy students. *Med Educ* 1998;32: 456-464.
11. Sanders AE, Lushington K. Sources of stress for Australian dental students. *J Dent Educ* 1999;63: 688-697.
12. Brand AA, Chikte UM. Student attitude to dentistry in South African Dental schools. *J Dent Assoc South Afr* 1997;52: 713-720.
13. Peretz B, Rosenblum A, Zadik D. Stress levels and related variable among dental students in Jerusalem, Israel. *Eur J Dent Educ* 1997;1: 162-66.
14. Westerman GH, Grandy TG, Ocanto RA, et al. Perceived sources of stress in the dental school environment. *J Dent Educ* 1993;57: 225-231.
15. Tedesco LA. A psychosocial perspective on the dental education experience and students performance. *J Dent Educ* 1986;50: 601- 605.
16. Sturdevant JR, George JM, Lundeen TF. An interactional view of dental student stress. *J Dent Educ* 1987;51: 481-485.
17. Humphris G, Blinkton A, Freeman R, et al. Psychological stress in undergraduate dental students: baseline results from seven European dental schools. *Eur J Dent Educ* 2002;6: 22-29.
18. Grandy TG, Westerman GH, Coms CE, et al. Perceptions of stress among third-year dental students. *J Dent Educ* 1989;53: 718-721.
19. Newton JT, Baghainaini F, Goodwin SR, et al. Stress in dental school: a survey of students. *Dent Update* 1994;21: 162-164.
20. Musser LA, Lloyd C. The relationship of marital status and living arrangement to stress among dental students. *J Dent Educ* 1985;49: 573-578.
21. Goldstein MB. Sources of stress and interpersonal support among first-year dental students. *J Dent Educ* 1979;43: 625- 629.

About the Authors

Wael M. Al-Omari, BDS, MDentSci, PhD



Dr. Al-Omari is an Assistant Professor in the Department of Restorative Dentistry, Jordan University of Science and Technology. The focus of his practice is on prosthodontics, esthetic dentistry and oral implants. He has conducted novel research projects in the UK, Munich, and at the Minnesota Dental Research Centre for Biomaterials and Biomechanics. These areas of research included the wear of restorative materials, all ceramic materials, resin-bonded bridges, postoperative sensitivity with restorations and the behavioral sciences in dentistry.

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