Perceived Sources of Stress among Junior & Mid-Senior Egyptian Dental Students

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Abstract:

Objectives: The purpose of this study was to identify the sources of stress among dental students enrolled at Pharos University in Alexandria (PUA) - Egypt, and to explore the role of gender, level of undergraduate study and residence with parents on perceived stressors.

Materials and Methods: A thirty-item self-reported modified version of the Dental Environment Stress (DES) questionnaire was administered to 537 junior and mid-senior undergraduate dental students during the academic fall semester 2010, with a response rate of 79.89%.

Results: Workload, performance pressure, and self-efficacy beliefs constituted the most stress-provoking factors. Female students experienced greater stress than males for all stressor items except for "Self-Efficacy Beliefs" and "Faculty & Administration" with no statistically significant difference by gender. Mid-senior dental students registered higher levels of perceived stress for "Workload", "Self-Efficacy Beliefs", and "Personal Factors" stressors in comparison to their junior peers. Those students who lived away of their parents were at higher risk of perceived stress than those students who lived with their parents. "Uncertainty about future dental career" was the first best predictor variable by gender. Whereas, "Difficulty of classwork" was the first predictor variable by both level of undergraduate study and residence with parents.

Conclusion: Female dental students had higher mean overall problem scores compared to their male counterparts, mid-senior students showed some higher perceived problems compared to junior students, and students who lived away from their parents revealed higher levels of perceived stress.

Key words: dental students, perceived stress, gender, level of undergraduate study, residence with parents.

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Introduction

Dentistry has long been viewed as a high-stress profession, [1, 2] and dental school is often where stress begins.

As in other countries around the world, the aim of an ideal undergraduate dental education in Egypt is to produce a dental practitioner who is ethical, competent to practice general dentistry at a level commensurate with the reasonable expectations of the society he or she is destined to serve, and committed to career-long educational and professional improvement.

Undergraduate dental education stands out as a unique pedagogical procedure. It involves the acquisition of required academic, clinical and interpersonal skills within ten semesters' programmes. [3] Contemporary dental curricula requires students to attain diverse proficiencies including acquisition of theoretical knowledge, clinical competencies and interpersonal skills [4-6] Such a challenge is unlike anything students have faced before, regardless of their pre-professional background.

Successful completion of a dental education program involves intensive academic and personal preparation by the students, beginning with their predentistry studies and continuing throughout their dentistry program. As such, dental education programs must make every effort to balance the demands of academic and clinical training with students' needs for a reasonable quality of life if programs are to successfully retain their students and adequately prepare them for the continuing stress involved in professional dental practice. [7, 8] This challenge has led to considerable interest in identifying sources of stress for students in dental education programs.

In a recent study of three European dental schools, [9] several sources of stress for students were identified, including ***limited leisure time***, ***examination anxiety***, and ***adapting to the clinical phase of dental education***.

In addition, in the dental literature, several factors have been linked to stress experienced as a response to students' efforts to meet academic performance requirements in dental school. The two most frequently cited are ***grade competition*** and ***heavy workload***. Competition to receive good grades for ***freshman*** and ***sophomore*** students is generally focused on the completion of preclinical laboratory projects in addition to successful performance in demanding basic science courses. ***Junior*** and ***senior*** students, on the other hand, generally experience stress related to difficulties in meeting procedural clinical requirements. [10-12] Long hours and heavy workload were also noted in several studies as contributing to a stressful learning environment. [13-15] The academic, preclinical and clinical requirements extend students' working hours into nights and weekends. [4, 5] Heavy workload pressures result in a fear of failure due to concerns about falling behind in course requirements. [6, 12, 15] Acharya [15] reported that Indian dental students were often stressed by the fear of facing their parents after failing academically.

Furthermore, in an Australian study,[16] ***examinations and grades*** were found to be the most potent stressors, with the highest levels reported by students in their fourth year of training. A study of stress among dental students in Jordan [5] similarly found examinations and grades to be the most stressful elements, along with ***limited time for relaxation or outside activities***. Researchers in dental education have reported student frustration with the lack of adequate amount of time for rest and relaxation. [11] Moreover, in a study of Canadian dental students, [17] a national survey found that students' top concerns about their academic program were ***lack of leisure time***, as well as ***meeting faculty expectations for workload***.

Dental students also suffered stress due to a perceived lack of competence in being able to treat patients. [18] During the clinical phase of training, difficulties related to ***patient attendance*** and ***ability to meet clinical requirements*** constituted additional sources of stress for the Jordanian students. [19]

It is clear from these studies that dental students reliably report a number of stressful factors in the learning environment. Although each student will experience the stresses of professional training somewhat differently, the cumulative effects of these stressors can have a serious impact on the psychological health of dental students. [19]

Interestingly, in contrast to studies showing that clinical practice increased stress levels, [5, 9, 16] some researchers [20] found that contact with patients was positive for students and resulted in lower levels of psychological distress. These researchers also found that students who lived with their families had substantially lower levels of psychological distress and emotional exhaustion. Furthermore, Humphris et al [20] in their study found that living at home reduced the effects of educational stress on dental students.

For Australian dental students, [16] it was found that perceptions of stress were due to an underlying tendency toward perfectionism based on an academic history of high achievement and powerful expectations of scholastic excellence. Once in dental school, where academic excellence is the norm, an adjustment in self-concept is required, and a new form of clinical competitiveness emerges. This transition can affect a student's level of self-efficacy, and high levels of stress can result in a variety of physical and psychological distress which in turn can affect the well-being and performance of the student. [21]

While the stress of professional training can be a motivator for some, for others it can have serious consequences. Although not all students are negatively affected by problems common to dental education, the potential seriousness of high stress levels on the student's emotional and physical well-being is hard to ignore. For many years the pressures inherent in the educational process in the health sciences were considered part of the overall experience, a way to prepare future practitioners for the reality of private practice. As a growing body of research documented the consequences of increased levels of educational stress, however, thinking among health care educators changed. The need for support programs to help students manage the rigor of the educational process and to buffer the deleterious effects of stress became evident. [12]

Because dentistry inflicts stress upon undergraduate dental students and due to the lack of adequate information about the sources of stress perceived by the Egyptian dental students the aim of this study was to identify sources of stress among undergraduate dental students at Pharos University in Alexandria (PUA) - Faculty of Dentistry and to explore the role of gender, level of undergraduate study and residence with parents on perceived stressors.

Materials and Methods

This study was carried out in Faculty of Dentistry, Pharos University (PUA), which is a private University in Alexandria, Egypt. The undergraduate course is five years with the fourth and fifth years consisting of clinical training along with didactic courses. Approval was obtained from the ethical committee and the dean of the faculty prior to initiating the study.

Data were collected in December 2010 at the end of whole class lectures for students enrolled in each of the Junior & Mid-Senior academic levels. Thus, a total 537 undergraduate students were asked to complete an anonymous questionnaire. The purpose of the study was communicated well in advance to the students, and student participation in the research was voluntary. To investigate the possible sources of stress, a modified version of the Dental Environment Stress (DES) questionnaire [4] was used in the study, keeping in mind the Egyptian situation.

The questionnaire consisted of thirty eight questions relating to possible sources of stress.

The questionnaire items were categorized into seven main groups of stress-provoking factors as in previous investigations: [6, 22]

- ***personal factors:*** difficulty in making friends, relationship with opposite sex, inadequate time for relaxation compared with other students, reduced holidays, financial problems: travel, accommodation, fees, clothes, food…., personal physical health (chronic disease, …. others)
- ***self-efficacy beliefs:*** lack of confidence in self to become a successful dentist, completing graduation requirements, lack of confidence in self to be a successful student, expectation versus reality of dental school, uncertainty about future dental career
- ***faculty and administration:*** delay of receiving study material, lack of adequate preclinical/clinical staff in lab/clinic, atmosphere created by faculty (preclinical/clinical), inconsistency of feedback on your work between different instructors, rules & regulations of the

faculty, lack of input into the decision making process of the faculty

- ***workload:*** the teaching & communication language, the amount of information given, references & information resources, amount of assigned classwork, lack of time to do assigned faculty work, difficulty of classwork, lack of time between seminars & laboratories or clinics
- ***clinical training:*** difficulty in learning precision manual skills required in preclinical & laboratory work, difficulty in learning clinical procedures & protocols
- ***performance pressure:*** examinations & grades, competition for grades, fear of failing course or year, fear of changing academic path after repeat course fail or academic probation
- ***clinical factors:*** transition from pre-clinical to clinical year, adequacy of clinical supervision, completing clinical requirements, insufficient treatment time, differences in opinion between the clinical staff concerning treatment plan, fear of dealing with patients who do not disclose the existence of a contagious disease, patients being late or not showing for their appointments, lack of communication or cooperation with patients.

The responses to the questionnaire were based on a four-point Likert scale with response options of 1 = not stressful at all, 2 = somewhat stressful, 3 = quite stressful, and 4 = very stressful. Total scores and scores for each category were obtained by summing the response codes in those categories. [23] Demographic information regarding gender, age, year of undergraduate study, and type of living accommodation were also obtained. Consent forms from the respondents were obtained to collect the above information. Separate questionnaires were used for preclinical (Junior) and clinical (Mid-Senior) dental students to take into account the limited exposure of the former to patient care. [14] The questions on clinical factors were not administered to pre-clinical (Junior) dental students.

Statistical Analysis

Statistical analysis was conducted using the SPSS program (SPSS 15.0 for windows, SPSS Inc., Chicago, USA). All statistical analyses were carried out at a significance level less than 0.05 & 0.001. Means and standard deviations were determined for stress scores of individuals for each item and percentage of the severity of the problem were analyzed. Then, independent samples t-test for overall stressor scores was used for two group comparisons as gender, level of undergraduate study as well as residence with parents. Moreover, compare means and a one-way analysis of variance was conducted to determine multiple group comparisons of stress. Lastly, stepwise linear regression analysis was employed to figure out which participants' DES factor scores has the main effect on the studied covariates.

Results

The modified DES questionnaire had very good reliability, with a Cronbach's Alpha of 0.933.

Among the students surveyed, 429 completed their questionnaires, representing a 79.89% response rate. Of the respondents, 59.9% were males & 40.1% were females. The mean age of respondents was 20.8 years (SD±0.87 years; range 19–23 years).

Academic and Clinic-Related Stressors

Table (1) portrays the mean scores for the DES items in decreasing order. **"Workload"** constituted the most academic group stressors for all students irrespective of academic year. About half of all students reported that "workload" represented in "Lack of time to do assigned faculty work" were "Quite stressful" to "Very stressful" for them. The second group of prominent sources of stress for all students was the **"Performance Pressure"** stressors which appear in the form of "Examination & grades," "Competition for grades", "Fear of changing academic path after repeat course fail or academic probation" and "Fear of failing course or year". Then came the third influential stressor which was the group of **"Self-Efficacy Beliefs"** that were reflected in the stress items "Completing graduation requirements", "Lack of confidence in self to be a successful student", "Expectation versus reality of dental school", "Lack of confidence in self to become a successful dentist", and "Uncertainty about future dental career". Furthermore, "Personal Factors" and "Faculty & Administration" group

stressors were the least influential for both junior and mid-senior students. Besides, the highest-ranking clinic-related DES stress item for mid-senior students was "Fear of dealing with patients who do not disclose the existence of a contagious disease" (2.52 ± 1.13). More than fifty percent (52.35%) of the mid-senior students reported that clinical factors in the form of "Fear of dealing with patients who do not disclose the existence of a contagious disease" were "Quite stressful" to "Very stressful" for them followed by "Differences in opinion between the clinical staff concerning treatment plan" (40.88%) and "Patients being late or not showing for their appointments" (40.33%) which indicates that these items are salient clinic-related stressors.

Independent samples t-test in **table (2)** indicated no statistically significant difference for overall stressor score by gender. It is noteworthy that female students had higher scores than their male peers in all stressor items except for "Self-Efficacy Beliefs" and "Faculty & Administration". The results revealed that, by gender, "Performance Pressure", "Workload" and "Clinical Factors" stressors constituted the most stress-provoking factors as perceived by the students. **Table (3)** portrays the stressors with significant differences by gender. It was found that "Examinations & grades" constituted greater stress for female students; this is followed by "Fear of failing course or year", "Transition from pre-clinical to clinical year", "Lack of confidence in self to become a successful dentist", and "Difficulty of classwork". On the other hand, male dental students were significantly higher stressed by "Expectation versus reality of dental school" as well as "The teaching & communication language" than their female peers. Data in **table (4)** present the effect of each independent variable in relation to dental environment scale stressors as perceived by the dental students assessed by **gender.** It was detected that out of **thirty eight** variables studied, only **six** variables were significantly different with gender which are "Uncertainty about future dental career", "Lack of time to do assigned faculty work", "Completing graduation requirements", "Lack of confidence in self to be a successful student", "Expectation versus reality of dental school", and "The teaching & communication language". **"Uncertainty about future dental career"** was the first best predictor variable of DES, in which the results revealed that male dental students who were worry & uncertain about their future dental career were 4.4 times at higher risk to be stressed than their female counterparts. The second predictor variable was **"Lack of time to do assigned faculty work"**. As female dental students who cannot find enough time to perform their assignments as well as study their lessons were 5.3 times at higher risk to be stressed than their male peers. The third most stress-provoking predictor variable was **"Completing graduation requirements"**, in which the results revealed that male students who were worried about the completion of graduation requirements were 5.2 times at higher risk to have stress than female dental students. **"Lack of confidence in self to be a successful student"** was the fourth stress-provoking predictor variable. Those female dental students who suffered from lack of self confidence to be successful dental students were 4.0 times at higher risk of having stress than their male dental colleagues.

With respect to the level of undergraduate study, results revealed that stress is highest for mid-senior dental students concerning "Workload", "Self-Efficacy Beliefs" as well as "Personal Factors" stressors' scores. While junior students registered higher stress scores in "Performance Pressure", "Clinical Training" and "Faculty & Administration" stressors' scores. Independent samples t-test analysis indicated a significant difference by level of education in "Workload", "Self-Efficacy Beliefs" as well as "personal factors" stressors' scores where mid-senior dental students gave significant higher stressors' scores than junior students, **table (5)**.

Item wise comparison between junior and mid-senior dental students in **table (6)** showed that there was a significant difference between levels of education for "Lack of time to do assigned faculty work" followed by "Amount of assigned classwork", " Inadequate time for relaxation compared with other students", "Competition for grades", "Expectation versus reality of dental school", "Lack of confidence in self to become a successful dentist", "Difficulty of classwork", "Reduced holidays" and finally "Financial problems" which were all significantly influential for the mid-senior dental students. **Table (7)** illustrates the effect of each

independent variable in relation to dental environment scale stressors as perceived by the dental students assessed by **level of undergraduate study.** Out of the **thirty eight** variables studied, only **six** variables were statistically associated with level of undergraduate study which are "Difficulty of classwork", "Difficulty in learning clinical procedures & protocols", "Completing graduation requirements", "Competition for grades", "Lack of adequate preclinical/clinical staff in lab/clinic" and "The amount of information given". **"Difficulty of classwork"** was the first best predictor variable for dental environment scale stressors. It was found that the variation of DES was explained by 9.8% of the variation in the difficulty of classwork, meaning that mid-senior dental students who faced difficulty of their classwork were 9.8 times higher in having stress than junior dental students. **"Difficulty in learning clinical procedures & protocols"** constitutes the second predictor variable, where also mid-senior dental students who suffered from difficulty in learning clinical procedures & protocols stressor were 2.8 times at higher risk to got stress than junior dental students. The third predictor variable was **"Completing graduation requirements"**. Where junior students who confront difficulty in fulfilling their graduation requirements were 4.5 times at higher risk to be stressed than those mid-senior dental students who registered that this stressor not or somewhat stressful for them.

Concerning the residence with parents, the independent samples t-test revealed that those students who lived away from home gave statistically higher mean scores to "Workload", "Faculty & Administration" and "Personal Factors" stressors than students who lived with their parents ($P < 0.001$), **table (8)**. **Table (9)** demonstrates the stressors with significant differences by residence with parents. Results revealed that those students who lived away from home gave statistically higher mean scores to group of stressors headed by "Examinations & grades" and "Amount of assigned classwork", than students who lived with their parents. **Table (10)** portrays the effect of each independent variable in relation to dental environment scale stressors as perceived by the dental students assessed by **residence with parents.** Out of the **thirty eight** variables studied, only **four** variables were statistically associated with residence with the parents. The first best predictor variable for DES was **"Difficulty of classwork"**, where those students who lived away from home were facing difficulty in completing their classwork requirements 6.5 times more than their peers who lived with their families. Furthermore, **"Relationship with opposite sex"** was the second predictor variable that likely to cause stress 2.4 times more for students who didn't live with their parents. The third predictor variable was **"Atmosphere created by faculty (preclinical/clinical)"**, where the dental students who lived away from their parents were 2.1 times suffering from the atmosphere created by the faculty. The last predictor statistically associated with residence with the parents was **"Difficulty in learning clinical procedures & protocols"**, in which those students who lived away from their parents were 2.6 times at higher risk of having stress concerning difficulty in learning clinical procedures & protocols more than their counterparts who resident with their parents.

Discussion

Dental schools are known to be highly demanding and stressful learning environments. [6] Over the past decade, dental educators have given increasing attention to investigating stress among dental students within the academic environment. Several authors have attempted to identify the factors perceived as stressful among dental students. [17, 24] It is assumed that higher levels of perceived student problems lead to more stress. [17] 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 as well as to take precautionary measures to prevent dental stress. [13] The aim of this study was to identify the major sources of stress in the junior & mid-senior undergraduate dental students. The study was conducted to ascertain whether the major stressors vary during the undergraduate course and to discover if gender, level of undergraduate study, or living away from parents would affect the perception of sources of stress.

While the results of this study do indicate many findings consistent with the international literature, some findings may further enhance our understanding of dental student stress. In the present study, the general problem level perceived by dental students was represented by the overall problem score. Stress levels, inferred from the overall problem score, revealed that most of the students in this study had a relatively high level of perceived stress, which lies between ''Quite stressful'' and ''Very stressful''. This may indicate that most of the dental students are not well adjusted to the dental school educational environment and to the pressure imposed to fulfill the school requirements **(table 1)**.

Among the investigated categories, the problem score related to academic, clinical training and clinical factors aspects was the highest. The problem score of personal and administrative issues was lower than other problem scores, which indicated that non-academic areas are not considered as stressful as the academic and clinical aspects of dental education **(table 1)**.

It is clear that item-wise analysis of the results of the current study rating overall "Workload stressors", "Performance Pressure" and "Self-Efficacy beliefs" as the main perceived stressors for the examined student body. The results of the present study support the existing literature identifying stress sources among dental students and are in agreement with similar studies carried out by Polychronopoulou A. et al. (2005) [6] where they reported that the primary sources of stress in the Greek dental school are assigned workload, performance pressure, and self-efficacy beliefs, and also is consistent with findings of other studies carried out by Garbee et al (1980), [4] Crombie (1994), [25] and Rajab (2001). [5]

One of the demographic variables related to the problem scores was gender. Female students reported higher scores in certain aspects of the educational process than males, as overall stressor score of "Performance Pressure", "wokload", "Clinical Factors", and "Personal Factors" **(table 2)**. These findings are consistent with previous international studies where female students perceived several items as significantly more stressful than male students. [5, 11, 13, 16, 26] In the present study "examinations and grades" were found to evoke greater perceived stress among female students than their male peers **(table 3)**. These results are in accordance with the findings of Acharya (2003) [15] and Muirhead et al (2007). [23] Female students also seemed more concerned about "Transition from pre-clinical to clinical year", "The amount of information given", and "Difficulty of classwork" **(table 3)**. The fact that female students report significantly higher distress can be attributed to additional strains they may face in the dental school environment or their different patterns of response to stressful events. [27, 28] It has also been suggested that females receive less peer support than male students, [29] and they also feel more pressured to succeed in a male-dominated profession. [26] Moreover, the competitive nature of dental school particularly by itself is stressful. [11, 26] Sanders and Lushington, [16] however, suggested that gender differences in most of the perceived stressors could be explained by their differing patterns of psychological morbidity and because males are simply less expressive of their concerns. On the other hand, the findings of the present study are in contrary to other findings that did not support any gender difference [17] or showed that males experienced greater stress than their female counterparts. [15] In this investigation, the observed differences by year of study indicate that junior (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, they are mostly concerned with factors closely related to "Performance Pressure", Clinical Training" as well as "Faculty & Administration", whereas mid-senior (clinical year) students were more stressed about "Workload", "Self-Efficacy Beliefs", and "Personal Factors" stressors. Further, students in the junior level of study were the most affected by the acquisition of manual skills in laboratory and preclinical work **(table 5)**. These findings indicate that junior students may be overloaded by the high academic demands of their year of study, whereas the absence of early clinical exposure may be triggering anticipatory stress reactions in regard to the upcoming encounter with clinical training. These findings agree with the findings of Polychronopoulou A. et al. [6, 30] However,

significant differences between classes were found only for "Lack of time to do assigned faculty work", "Amount of assigned classwork", "Inadequate time for relaxation compared with other students", "Competition for grades", "Expectation versus reality of dental school", "Lack of confidence in self to become a successful dentist", "Difficulty of classwork", and "Reduced holidays" where stress was more for the mid-senior students **(table 6)**. This spike in stress levels for mid-senior students, suggesting a somewhat high degree of stress, indicates that the transition into the clinical setting may be difficult for many students. Interestingly, this finding is not reported in the United States,[11] but is similar to findings in the UK,[26] Australia,[16] and Singapore,[13] where increased stress levels coincided with the point of transition to clinical training. Moreover, the findings of the current study are in accordance with the findings of Al-Omari W.M. (2005) [22] where he reported that clinical year students generally had higher scores for the educational environment than those in preclinical study, and the relatively high scores allocated by clinical year students to these stressors reflect the reality of the stressful nature of the dental school environment. These findings support recommendations towards the implementation of specific programs or supportive interventions in order to minimize the negative impact of this critical transition in the dental student's education.

Results of the current study revealed that students living away from their parents had higher stress scores for all overall stressor scores than their counterparts who registered that they live with their parents **(table 8)**. This can be related to the fact that all the students living away from parents encounter difficulties with adapting to living alone and being completely self-dependent in running their own lives. Moreover, the present results indicate the extreme need of the student and the urgency of the presence of his family beside him for his care. The current results may support previous findings that the most highly stressed students had difficulties with domestic arrangements. [31] Seemingly, the influence of staying at home had a positive influence upon students and appears to provide a protective environment against stress. [20] On the other hand, the findings of the present study disagree with that of Muirhead V. (2007) [23] where she reported that students living with their parents had higher stress scores than those in other living arrangements. Also the results of Al-Saleh S.A. et al. (2009) [21] were in contrast to the present findings where they found that students living with their families had higher overall problem scores, and higher problem scores for the categories of personal and administrative issues and clinical training.

Several factors, individually or in combination, may have contributed to the high perceived sources of stress among dental students. So, dental environment scale stressors were analyzed statistically using linear multiple regression. It was found that the variation of dental environment scale stressors by gender was explained by 4.4% of the variation in "Uncertainty about future dental career" which is considered to be the best predictor variable. It is one of the "Self-Efficacy Beliefs" in which those male dental students do not seem to have optimistic perspective about having a successful future career or getting a decent job. Moreover, the variation of dental environment scale stressors by level of undergraduate study as well as by residence with parents was explained by 9.8% and 6.5%, respectively, of the variation in "Difficulty of classwork" which is considered to be the best predictor variable for both of them **(Tables 4, 7 & 10)**.

Conclusion

The current study was performed to assess the perceived sources and factors affecting stress among students in a private dental school in Alexandria-Egypt. It contributes to the support literature by going beyond the documentation of problems common to dental school or the evaluation of a single support program. The researcher sought to understand the help-seeking behavior and preferences of dental students and to assess the perceived effectiveness of a variety of academic and non-academic stressors.

Within the limitations of this study, the findings indicated that Egyptian dental students had high levels of perceived stress. "Workload" was perceived to be the highest source of problems for both junior and mid-senior dental students. The lack of time to do assigned faculty work, together with lack of time between seminars & laboratories or clinics, as

well as the amount of assigned classwork and the amount of information given were the students' main concerns related to their workload. This suggested that enhancing and adjusting systems of students' workload and the judicious and good distribution of assigned classwork and information given, may contribute to possible reduction in the perceived problems by the students. Fear of dealing with patients who do not disclose the existence of a contagious disease as well as differences in opinion between the clinical staff concerning treatment plan are a potent stressor for mid-senior dental students. In this study, female students expressed higher levels of stress in certain stressors as "Performance Pressure", "Workload", "Clinical Factors", "Clinical Training" and "Personal Factors". Moreover, mid-senior students perceived higher sources of stress in certain items compared with their junior counterparts. Furthermore, those expatriate students who live away from their parents were also suffering from higher levels of perceived stress than their peers who live with their parents.

This study has brought to our attention many of the risk factors that add to the stress levels of dental students. Because this research was limited to one campus located in the north central part of Egypt, it is not known whether trends found reflect local attitudes or are more widespread. It is also important that we openly discuss the current results with students and explore ways in which we can work in collaboration to limit the factors that cause stress, decrease the negative effects that result from that stress, and provide appropriate support and treatment.

Finally, further study is indicated to determine the effects of curricular changes and stress management programs on overall student stress levels.

Recommendations

- A congenial environment needs to be created by the dental faculty so that students can pursue their studies with less anxiety or fear.
- Teaching staff and faculty administrators have to implement effective student support services, such as academic advising and counseling. Also, effective assistance from families is essential.
- The educational system should deal with the potential stressors for students by stress management programs, to cope with and to overcome the difficulties and overloads they met during their studies.
- Both academic and non-academic perceived sources of stress should be considered in curriculum planning and the working environment for dental education, and new innovative dental curricula or modification of traditional curricula should be encouraged.
- Measuring stress level before admission and personality identification will help in knowing the actual increase of stress subsequent to undertaking dental education.
- Successful reduction or intervention of stress before graduation will be considered as preventive measure for stress after graduation.
- More studies are needed for dental programs or courses for prevention of stress and intervention whenever it happened.

If these improvements are introduced, hopefully stress on dental students will be reduced helping them to be more successful as students and, eventually, as dentists.

Table (1). Mean Dental Environment Scale stressors listed in descending order & percentage of the severity of the problem

	Stress Items	Mean Score (SD)	% of Students Rating the Problem "Quite stressful to Very stressful
For Junior & Mid-Senior Students (N=429)			
1	Lack of time to do assigned faculty work	2.60 (1.04)	49.76
2	Lack of time between seminars & laboratories or clinics	2.56 (1.14)	48.62
3	Amount of assigned classwork	2.51 (1.03)	46.39
4	The amount of information given	2.51 (1.15)	45.92
5	Examination & grades	2.49 (1.16)	44.99
6	Competition for grades	2.38 (1.00)	42.89
7	Fear of changing academic path after repeat course fail or academic probation	2.33 (1.05)	41.49
8	Fear of failing course or year	2.30 (1.24)	39.86
9	Completing graduation requirements	2.30 (0.96)	37.53
10	Lack of confidence in self to be a successful student	2.29 (1.00)	37.06
11	Expectation versus reality of dental school	2.25 (0.96)	34.50
12	Lack of confidence in self to become a successful dentist	2.17 (1.13)	32.87
13	Uncertainty about future dental career	2.17 (0.92)	32.87
14	Difficulty in learning precision manual skills required in preclinical & laboratory work	2.17 (1.13)	32.63
15	Difficulty in learning clinical procedures & protocols	2.17 (0.92)	32.63
16	References & information resources	2.16 (0.97)	32.63
17	Difficulty of classwork	2.14 (0.93)	32.17
18	The teaching & communication language	2.11 (1.08)	31.70
19	Lack of adequate preclinical/clinical staff in lab	2.11 (0.95)	31.47
20	Reduced holidays	2.10 (0.95)	31.24
21	Inadequate time for relaxation compared with other students	2.09 (0.99)	29.60
22	Lack of input into the decision making process of the faculty	2.02 (0.98)	27.97
23	Delay of receiving study material	2.00 (0.96)	27.04
24	Rules & regulations of the faculty	1.96 (0.88)	23.08
25	Atmosphere created by faculty (preclinical/clinical)	1.90 (0.98)	22.14
26	Inconsistency of feedback on your work between different instructors	1.80 (0.99)	20.28
27	Financial problems	1.80 (0.87)	21.21
28	Relationship with opposite sex	1.69 (0.97)	18.65
29	Personal physical health	1.63 (0.98)	18.18
30	Difficulty in making friends	1.60 (0.87)	16.55
For Mid-Senior Students (N=181)			
31	Fear of dealing with patients who do not disclose the existence of a contagious disease	2.52 (1.13)	52.35
32	Differences in opinion between the clinical staff concerning treatment plan	2.33 (1.04)	47.88
33	Patients being late or not showing for their appointments	2.33 (1.05)	40.33
34	Lack of communication or cooperation with patients	2.33 (1.08)	38.67
35	Insufficient treatment time	2.27 (1.01)	37.02

36	Transition from pre-clinical to clinical year	2.25 (1.05)	36.46
37	Adequacy of clinical supervision	2.09 (0.96)	33.15
38	Completing clinical requirements	2.06 (1.02)	27.07

Table (2). Mean Dental Environment Scale stressors & Standard Deviation (S.D.) for Male Dental Students versus their Female counterparts listed in descending order

Overall Stressor Score	Gender	N	Mean (SD)	t-test	Sig
Performance Pressure Stressors' Score	**Male**	257	2.34 (0.67)	-1.04	0.30
	Female	172	2.42 (0.73)		
Workload Stressors' Score	**Male**	257	2.28 (0.56)	-1.77	0.08
	Female	172	2.38 (0.61)		
Clinical Factors Stressors' Score	**Male**	95	2.21 (0.62)	-1.32	0.19
	Female	86	2.35 (0.73)		
Self-Efficacy Beliefs Stressors' Score	**Male**	257	2.25 (0.58)	0.03	0.98
	Female	172	2.25 (0.61)		
Clinical Training Stressors' Score	**Male**	257	2.13 (0.75)	-1.15	0.25
	Female	172	2.22 (0.83)		
Faculty & Administration Stressors' Score	**Male**	257	2.02 (0.58)	0.16	0.88
	Female	172	2.01 (0.72)		
Personal Factors Stressors' Score	**Male**	257	1.83 (0.56)	-0.02	0.99
	Female	172	1.83 (0.51)		

Table (3). Stressors with significant differences by Gender

Stress Items	Male (N=257)	Female (N=172)	F	Sig.
	Mean (SD)	Mean (SD)		
Examinations & grades	2.36 (0.97)	2.73 (1.09)	13.21**	0.00
Fear of failing course or year	2.21 (1.22)	2.44 (1.26)	3.74*	0.04
Transition from pre-clinical to clinical year	2.09 (0.95)	2.43 (1.14)	4.66*	0.03
Lack of confidence in self to become successful dentist	2.11 (0.84)	2.39 (1.00)	9.55**	0.00
Difficulty of classwork	1.98 (1.00)	2.27 (0.86)	9.52**	0.00
Expectation versus reality of dental school	2.07 (0.94)	1.88 (0.99)	4.29*	0.04
The teaching & communication language	1.92 (0.83)	1.62 (0.89)	12.38**	0.00

Table (4). Significant variables related to Dental Environment Scale stressors assessed by (Gender) based on linear regression analysis

Model	Variables	Understandardized Coefficients	Standardized Coefficients	R^2	R^2 Change	T	P-value
		B	Beta				
1	(Constant)	1.707		0.044	0.044	19.306	0.000
	Uncertainty about future dental career	-0.103	-0.210			-2.881	0.004
2	(Constant)	1.432		0.097	0.053	11.815	0.000
	Uncertainty about future dental career	-0.119	-0.243			-3.378	0.001
	Lack of time to do assigned faculty work	0.114	0.232			3.232	0.001
3	(Constant)	1.532		0.150	0.052	12.578	0.000
	Uncertainty about future dental career	-0.090	-0.184			-2.539	0.012
	Lack of time to do assigned faculty work	0.155	0.316			4.249	0.000
	Completing graduation requirements	-0.122	-0.253			-3.298	0.001
4	(Constant)	1.401		0.190	0.040	11.025	0.000
	Uncertainty about future dental career	-0108	-0.221			-3.070	0.002
	Lack of time to do assigned faculty work	0.146	0.298			4.067	0.000
	Completing graduation requirements	-0.147	-0.305			-3.954	0.000
	Lack of confidence in self to be a successful student	0.110	0.216			2.962	0.003
5	(Constant)	1.551		0.234	0.044	11.697	0.000
	Uncertainty about future dental career	-0.117	-0.239			-3.404	0.001
	Lack of time to do assigned faculty work	0.163	0.332			4.597	0.000
	Completing graduation requirements	-0.147	-0.306			-4.060	0.000
	Lack of confidence in self to be a successful student	0.153	0.301			3.956	0.000
	Expectation versus reality of dental school	-01.111	-0.230			-3.176	0.002
6	(Constant)	1.636		0.258	0.024	12.060	0.000
	Uncertainty about future dental career	-0.123	-0.251			-3.611	0.000
	Lack of time to do assigned faculty work	0.170	0.346			4.843	0.000
	Completing graduation requirements	-0.134	-0279			-3.705	0.000
	Lack of confidence in self to be a successful	0.164	0.322			4.262	0.000

	student						
	Expectation versus reality of dental school	-0.106	-0.220			-3.072	0.002
	The teaching & communication language	-0.090	-0.163			-2.380	0.018

Dependent Variable: Gender

Table (5). Mean Dental Environment Scale stressors & Standard Deviation (S.D.) for Junior versus Mid-Senior Dental Students listed in descending order.

Overall Stressor Score	Level of Education	N	Mean (SD)	t-test	Sig
Workload Stressors' Score	Junior	248	2.24 (0.50)	-3.26**	0.00
	Mid-Senior	181	2.43 (0.67)		
Performance Pressure Stressors' Score	Junior	248	2.38 (0.70)	0.14	0.89
	Mid-Senior	181	2.37 (0.70)		
Self-Efficacy Beliefs Stressors' Score	Junior	248	2.18 (0.57)	-3.06**	0.00
	Mid-Senior	181	2.35 (0.61)		
Clinical Training Stressors' Score	Junior	248	2.08 (0.80)	0.99	0.32
	Mid-Senior	181	2.01 (0.84)		
Faculty & Administration Stressors' Score	Junior	248	20.6 (0.63)	0.51	0.61
	Mid-Senior	181	20.3 (0.63)		
Personal Factors Stressors' Score	Junior	248	1.75 (0.59)	-3.38**	0.00
	Mid-Senior	181	1.94 (0.52)		

**p<0.001

Table (6). Stressors with significant differences by Level of Undergraduate Study

Stress Items	Junior (N=248)	Mid-Senior (N=181)	F	Sig.
	Mean (SD)	Mean (SD)		
Lack of time to do assigned faculty work	2.50 (1.04)	2.73 (1.02)	4.97*	0.03
Amount of assigned classwork	2.35 (1.12)	2.72 (1.16)	10.95**	0.00
Inadequate time for relaxation compared with other students	1.87 (0.99)	2.58 (1.17)	46.31**	0.00
Competition for grades	2.23 (0.88)	2.57 (1.12)	12.10**	0.00
Expectation versus reality of dental school	2.10 (0.87)	2.47 (1.04)	16.31**	0.00
Lack of confidence in self to become a successful dentist	2.10 (0.84)	2.39 (1.00)	10.79**	0.00
Difficulty of classwork	1.91 (0.90)	2.35 (0.97)	23.09**	0.00
Reduced holidays	1.98 (0.86)	2.28 (1.04)	10.05**	0.00
Financial problems	1.71 (0.92)	1.92 (1.07)	4.72**	0.00

*P<0.05
**P<0.001

Table (7). Significant variables related to Dental Environment Scale stressors assessed by (Level of Undergraduate Study) based on linear regression analysis

Model	Variables	Understandar-dized Coefficients	Standardized Coefficients	R^2	R^2 Changing	T	P-value
		B	**Beta**				
1	(Constant)	3.124		0.098	0.098	63.444	0.000
	Difficulty of classwork	0.137	0.313			6.805	0.000
2	(Constant)	2.970		0.126	0.028	46.471	0.000
	Difficulty of classwork	0.122	0.279			6.044	0.000
	Difficulty in learning clinical procedures & protocols	0.089	0.172			3.720	0.000
3	(Constant)	3.103		0.172	0.045	45.525	0.000
	Difficulty of classwork	0.140	0.318			6.957	0.000
	Difficulty in learning clinical procedures & protocols	0.130	0.251			5.231	0.000
	Completing graduation requirements	-0.131	-0.233			-4.823	0.000
4	(Constant)	3.199		0.190	0.018	42.983	0.000
	Difficulty of classwork	0.151	0.344			7.470	0.000
	Difficulty in learning clinical procedures & protocols	0.141	0.271			5.664	0.000
	Completing graduation requirements	-0.125	-0.224			-4.667	0.000
	Completion for grades	-0.066	-0.140			-3.068	0.002
5	(Constant)	3.134		0.204	0.014	40.393	0.000
	Difficulty of classwork	0.148	0.338			7.388	0.000
	Difficulty in learning clinical procedures & protocols	0.121	0.234			4.736	0.000
	Completing graduation requirements	-0.141	-0.252			-5.175	0.000
	Completion for grades	-0.073	0.155			-3.393	0.001
	Lack of adequate preclinical/clinical staff in lab/clinic	0.067	0.135			2.776	0.006
6	(Constant)	3.180		0.219	0.015	40.381	0.000
	Difficulty of classwork	0.158	0.361			7.825	0.000
	Difficulty in learning clinical procedures & protocols	0.128	0.246			4.999	0.000
	Completing graduation requirements	-0.125	-0.223			-4.538	0.000
	Completion for grades	-0.069	-0.147			-3.239	0.001
	Lack of adequate preclinical/clinical staff in lab/clinic	0.069	0.139			2.877	0.004
	The amount of information given	-0.060	-0.131			-2.799	0.005

Dependent Variable: Level of Undergraduate Study

Table (8). Mean Dental Environment Scale stressors & Standard Deviation (S.D.) for Residence with the parents versus stay away from them for Dental Students listed in descending order

Overall Stressor Score	Do you live with your parents?	N	Mean (SD)	t-test	Sig
Workload Stressors' Score	Yes	254	2.24 (0.55)	-3.57**	0.00
	No	175	2.44 (0.62)		
Performance Pressure Stressors' Score	Yes	254	2.36 (0.66)	-0.60	0.55
	No	175	2.40 (0.75)		
Clinical Factors Stressors's Score	Yes	96	2.23 (0.69)	-1.00	0.32
	No	85	2.33 (0.66)		
Self-Efficacy Beliefs Stressors' Score	Yes	254	2.21 (0.60)	-1.94	0.05
	No	175	2.32 (058)		
Faculty & Administration Stressors' Score	Yes	254	1.96 (0.62)	-3.52**	0.00
	No	175	1.96 (0.62)		
Clinical Training Stressors' Score	Yes	254	2.17 (0.63)	-1.45	0.15
	No	175	2.12 (0.82)		
Personal Factors Stressors' Score	Yes	254	1.75 (0.55)	-3.66**	0.00
	No	175	1.95 (0.58)		

**P<0.001

Table (9). Stressors with significant differences by Residence with Parents

Stress Items	Live with parents (N=254)	Live away from parents (N=175)	F	Sig.
	Mean (SD)	Mean (SD)		
Examination & grades	2.38 (0.97)	2.70 (1.10)	10.09**	0.00
Amount of assigned classwork	2.41 (1.13)	2.64 (1.17)	4.06*	0.04
Transition from pre-clinical to clinical year	2.10 (1.08)	2.42 (1.00)	4.21*	0.04
Atmosphere created by faculty (preclinical/clinical)	2.00 (0.87)	2.42 (0.94)	22.70**	0.00
Lack of confidence in self to become a successful dentist	2.12 (0.90)	2.37 (0.93)	7.77*	0.01
Inadequate time for relaxation compared with other students	2.03 (1.14)	2.37 (1.08)	9.28**	0.00
References & information resources	2.05 (0.95)	2.33 (0.96)	8.53**	0.00
Difficulty of classwork	1.98 (0.92)	2.27 (0.98)	9.93**	0.00
Delay of receiving study material	1.86 (0.95)	2.25 (0.97)	16.96**	0.00
Difficulty in learning precision manual skills required in preclinical & laboratory work	2.06 (0.93)	2.25 (0.92)	4.29*	0.04
Reduced holidays	2.02 (0.94)	2.23 (0.96)	4.83*	0.03
Inconsistency of feedback on your work between different instructors	1.81 (0.96)	2.03 (0.99)	5.48*	0.02
Financial problems	1.68 (0.93)	1.98 (1.04)	9.48**	0.00
Relationship with opposite sex	1.59 (0.87)	1.83 (1.09)	6.79*	0.01
Personal physical health	1.54 (0.97)	1.75 (0.99)	4.57*	0.03

*P<0.05
**P<0.001

Table (10). Significant variables related to Dental Environment Scale stressors assessed by (Residence with parents) based on linear regression analysis

Model	Variables	Unstandardized Coefficients	Standardized Coefficients	R^2	R^2 Change	t	P-value
		B	Beta				
1	(Constant)	1.162		0.065	0.065	12.324	0.000
	Difficulty of classwork	0.131	0.255			3.532	0.001
2	(Constant)	1.004		0.089	0.024	8.470	0.000
	Difficulty of classwork	0.139	0.271			3.768	0.000
	Relationship with opposite sex	0.084	0.155			2.153	0.033
3	(Constant)	0.882		0.110	0.021	6.665	0.000
	Difficulty of classwork	0.117	0.227			3.047	0.003
	Relationship with opposite sex	0.085	0.156			2.188	0.030
	Atmosphere created by faculty (preclinical/clinical)	0.078	0.150			2.028	0.044
4	(Constant)	0.936		0.136	0.026	7.048	0.000
	Difficulty of classwork	0.151	0.294			3.715	0.000
	Relationship with opposite sex	0.095	0.174			2.453	0.015
	Atmosphere created by faculty (preclinical/clinical)	0.089	0.172			2.323	0.021
	Difficulty in learning clinical procedures & protocols	-0.093	-0.179			-2.304	0.022

Dependent Variable: Do you live with your parents?

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