Stress levels among senior dental students in Saudi Arabia during fixed prosthodontics procedures

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ABSTRACT

Aims: To investigate self-perceived stress level of senior dental students in Saudi Arabia during different fixed prosthodontics procedures. Also, to explore the possible stress-related factors during each procedure. Settings and Design: A structured, close-ended, and open-ended, anonymous questionnaire was distributed in a website format to senior dental students of 19 dental schools in Saudi Arabia. Materials and Methods: Students were asked to rate the level of stress they feel during different fixed prosthodontics procedures on a scale from 0 to 10. They were also asked to rate the adequacy of their preclinical training in these procedures and how many times they have performed each of the procedures clinically. Statistical Analysis Used: Descriptive statistics were presented in means, percentages, and standard deviation and inferential statistics were performed using One-way ANOVA, independent t-test and Pearson’s correlation. Results: About 423 students answered the questionnaire, in which 228 (54%) were females and 195 (46%) were males. Vital tooth preparation (5.27 ± 2.459) and pos space preparation (5.13 ± 2.766) were rated as the most stressful procedures (P < 0.05). Fear of error or mishaps was the most reported reason for stress during these two procedures. Pearson’s correlation showed significant but weak negative correlation between stress scores and number of times the student has performed the procedure (P < 0.05). Students who believe that they had adequate preclinical training reported significantly lower stress scores (P < 0.05). Conclusion: Self-perceived stress among dental students is related to the type of procedure they perform in the clinic and how frequent they have been exposed to it during their preclinical training.

Keywords: Dental student, fixed prosthodontics, stress

Introduction

The dental profession is considered to be one of the most stressful occupations in the health sector.[9] Similarly, studying and training in dental schools can be more stressful when compared to other fields of study.[1] The nature of the dental undergraduate courses has frequently been referred to as one of the longest and the most demanding as students are expected to be academically competent as well as develop proper clinical skills and be able to perform under stressful conditions.[3,4] Several studies investigated that dental education is more stressful and complex than the medical profession.[7,8]

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During preclinical training, dental students need to manage various requirements that demand a significant amount of time and manual skills to prepare them for the clinical training on patients.\textsuperscript{[9,10]} Nevertheless, dental students are particularly susceptible to more stressors during their clinical years of study.\textsuperscript{[11–13]} The clinical part of their training requires the students to find their patients, be responsible for their care, and accomplish irreversible dental treatments on those patients. A previous study reported that clinical years were more stressful to the student than the preclinical years.\textsuperscript{[10]} Previous studies have reported several stressors for dental students during clinical training that includes: Time management, grading or evaluation, supervisor’s criticism, fear of error/mishap, patient satisfaction, cooperation and show on time, lack of confidence, managing pain of patients, and environmental related stressors like lack of availability, suitability of proper clinic, and dental materials.\textsuperscript{[16–20]} A previous study reported that majority of the participants agreed that the high clinical requirement is one of the main causes of stress.\textsuperscript{[9]}

All these factors together contribute to significant amounts of stress for dental students that put them at additional risk for psychological problems like anxiety, depression, and burnout.\textsuperscript{[2]}

Stress among dental students can affect the quality of their performance and have negative impact on patient safety and treatment outcomes.\textsuperscript{[21,22]} Thus, investigating stressors among dental students is important for educators to enable them to formulate adequate teaching strategies and prepare their students for successful future practice.

Although many studies have investigated stress encountered by dental students, only few studies have focused on specialty-related and procedure-related stressors and difficulties.\textsuperscript{[23–25]}

The aim of this study was to investigate the self-perceived stress level of senior dental students during different fixed prosthodontics clinical procedures, and also to explore the possible stress-provoking factors related to each procedure.

**Materials and Methods**

In this observational cross-sectional study, a structured, close-ended and open-ended, anonymous questionnaire was distributed to senior dental students in different dental schools in Saudi Arabia at the end of the academic year 2019-2020.

Ethical approval was obtained from the research board of Riyadh Elm University (SRS/2020/37/217/211). The Questionnaire included a cover letter containing the purpose of the study and emphasizing confidentiality of individuals in addition to the consent for participating in the study. The Questionnaire was in a website format and was sent to participants electronically. The questionnaire comprised multiple sections. First, demographic data regarding subjects’ gender, dental college attending, and their year of undergraduate study was collected. Second part comprised a list of the most commonly practised clinical procedure during the clinical training in fixed prosthodontics. Procedures were: Vital and nonvital tooth preparation, provisional restorations, retraction cord packing, cementation of final restoration, final impression, postspace preparation, and cementation of endodontic posts. For each procedure, respondents were asked to rate their level of stress on a scale of 0 (no stress) to 10 (highest stress) and to report the common stressors when performing this procedure. Also, respondents were asked how many times they have performed the procedure clinically. Lastly, they were asked if they believe they have received adequate preclinical training for the specific procedure. The questionnaire was evaluated for its credibility and reliability through a pilot study. It was carried out on 15 dental students prior to the distribution of the questionnaire. Accordingly, some modifications were introduced.

**Data analysis**

Data were analyzed using the Statistical Package for Social Sciences (SPSS, Chicago IL) version 22. Descriptive statistics were used to summarize the data. Categorical variables were expressed as proportions, and continuous variables were expressed as the mean ± standard deviation (SD). The one-way ANOVA, independent t-test and Pearson’s correlation coefficient test were used to analyze categorical and continuous data. A P value of < 0.05 was considered significant.

**Results**

A total of 423 senior students, 228 (54%) females, and 195 (46%) males participated in the research; participants were from 19 different dental colleges across Saudi Arabia.

Table 1 shows the mean, median, standard deviation (SD), minimum, and maximum stress scores by students for the different procedures. The highest mean stress score was during vital tooth preparation (5.27 ± 2.459) and postspace preparation (5.13 ± 2.766). One-way ANOVA revealed statistically significant difference of the mean stress scores among the eight different procedures ($P < 0.001$).

In all procedures, stress scores were significantly higher among students who think they did not have adequate preclinical training when compared to students who think their preclinical training was adequate ($P < 0.05$) [Figure 1].

Table 2 shows reported reasons for stress in the eight different procedures.

For the following procedures: Vital tooth preparation, non-vital tooth preparation, retraction cord packing, cementation of final restoration, endodontic postspace preparation and cementation of endodontic post, Pearson’s correlation test showed significant but weak negative correlation between stress scores and number of times the student has performed the procedure ($P < 0.05$) [Table 3].
Table 1: Means, Median, SD, minimum, and maximum stress scores by the students for the eight different procedures

| Procedure                                      | n   | Mean | Median | Std. deviation | Minimum | Maximum |
|------------------------------------------------|-----|------|--------|----------------|---------|---------|
| Vital Tooth Preparation                        | 284 | 5.27 | 5.00   | 2.459          | 0       | 10      |
| Nonvital tooth preparation                     | 404 | 3.63 | 3.00   | 2.422          | 0       | 10      |
| Provisional restorations                       | 400 | 3.33 | 3.00   | 2.707          | 0       | 10      |
| Retraction Cord packing                        | 403 | 3.13 | 3.00   | 2.631          | 0       | 10      |
| Final impression                               | 416 | 3.62 | 3.00   | 2.619          | 0       | 10      |
| Cementation of final restoration               | 404 | 3.43 | 3.00   | 2.578          | 0       | 10      |
| Postspace prep                                 | 393 | 5.13 | 5.00   | 2.766          | 0       | 10      |
| Cementation of endodontic post                 | 387 | 3.30 | 3.00   | 2.551          | 0       | 10      |

Table 2: Reported stressors by senior dental students during fixed prosthodontics procedures

| Procedure                                      | Time management | Fear of error/mishaps | Patient cooperation | Difficulty in procedure | Others | Total |
|------------------------------------------------|-----------------|-----------------------|---------------------|-------------------------|--------|-------|
| Vital Tooth Preparation                        | 94 19.6%        | 218 45.4%             | 100 20.8%           | 66 13.8%                | 2 0.4% | 480 100%  |
| Nonvital tooth preparation                     | 149 25.9%       | 226 39.2%             | 96 16.7%            | 77 13.4%                | 28 4.8%| 576 100%  |
| Provisional Restorations Fabrication           | 204 38.1%       | 105 19.6%             | 79 14.8%            | 120 22.4%               | 27 5.1%| 535 100%  |
| Retraction Cord Packing                        | 126 26.5%       | 45 9.3%               | 134 28.2%           | 145 30.5%               | 25 5.2%| 475 100%  |
| Final Impression Making For Single Crown/FPD   | 158 25.2%       | 163 26.0%             | 181 26.9%           | 115 18.3%               | 10 1.6%| 627 100%  |
| Cementation of Final Restoration               | 86 17.8%        | 228 47.2%             | 75 15.5%            | 57 11.8%                | 37 7.7%| 483 100%  |
| Endodontic Postspace Preparation               | 104 16.8%       | 298 48.1%             | 59 9.5%             | 144 23.2%               | 15 2.4%| 620 100%  |
| Cementation of Endodontic Post                 | 98 20.9%        | 215 45.9%             | 46 9.8%             | 81 17.3%                | 28 6.0%| 468 100%  |

Table 3: Correlation between mean score levels and number of times the student has performed the procedure

| Procedure                                      | Number of participants (N) | Pearson's Correlation | Sig (2-tailed) |
|------------------------------------------------|----------------------------|-----------------------|----------------|
| Vital Tooth Preparation                        | 284                        | -0.152                | 0.010**        |
| Non-vital tooth preparation                    | 404                        | -0.184                | 0.000**        |
| Provisional Restorations Fabrication           | 400                        | -0.047                | 0.348          |
| Retraction Cord Packing                        | 403                        | -0.267                | 0.000**        |
| Final Impression Making For Single Crown/FPD   | 416                        | -0.096                | 0.051          |
| Cementation of Final Restoration               | 404                        | -0.199                | 0.000**        |
| Endodontic Postspace Preparation               | 393                        | -0.203                | 0.000**        |
| Cementation of Endodontic Post                 | 387                        | -0.177**              | 0.000**        |

Discussion

Understanding the stressors that encounter dental students throughout their education and factors associated with stress among dental students is crucial in developing effective teaching methods and meeting the intended learning outcomes. Recognizing where our students’ stress lies will allow the educators to help them overcome their stressors and improve their performance within the clinical environment.\[5,6,13\]

Student’s opinions about their most stressful procedures in the clinics and understanding the stressors would be helpful in reviewing and improving the academic programs. The presented study focused on self-reported stress level regarding different fixed prosthodontics procedures among dental students. Stress can arise from many different sources, which eventually can affect the clinical performance of the students.\[23\] A previous study reported that the most common stressors in the prosthodontics department were the patient’s presence followed by lack of facilities.\[26\] Evidently, high stress levels can have a negative impact on patient safety and dental outcomes.

Majority of the participants in the current study reported higher stress rates during vital tooth preparation and postspace preparation. Fear of error/mishap was the most frequently reported reason. Any damage to the tooth is considered irreversible and this could be the most probable concern regarding these two procedures.\[12\]

In the current study, the reported stress level scores during a given procedure decreased with the increasing number of times the
student has performed this procedure. So, the experience has an important effect on stress reduction. Not surprisingly, previous studies have found that final year students reported lower stress levels compared with junior students.\[15\]

In the current study, participants believed that those who did not have adequate preclinical training have reported higher stress levels. Poor previous experience of the students may lead to anxiety and low level of confidence.\[10\] Previous studies suggested that some of the dental students rely on their knowledge while performing the procedures, although they had no adequate preclinical training. Effective training is mandatory for minimizing any mishap and keeping the patient safe. Thus the importance of preclinical training cannot be underestimated.\[25\]

It is evident from the literature that the transition time from preclinical to clinical years can be stressful, and effective preclinical training allows the students to shift smoothly from preclinical to clinical phase.\[9\] Moreover, preclinical training is essential in developing skills, confidence, and experience before the students are treating the real patients.\[12\]

In our study, we were able to include participants from a large number of universities across Saudi Arabia. This in turn gave us a more generalized, but less specific overview of stress levels of the students at their specific university. Each university has a different learning environment and other variables that may contribute to students’ stress perception. This must be taken into consideration when analyzing the results of the current study.

### Conclusion

Within the limitations of the current study, it can be concluded:

1. Self-perceived stress among dental students is related to the type of procedure they perform in the clinic and how frequent they have been exposed to it during their preclinical and clinical training.
2. In fixed prosthodontics, vital tooth preparation and postspace preparation were the most stressful procedures and fear of errors and mishaps was the main reason for stress during these procedures.

### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

### Key messages

Stress among dental students is related to the type of procedure they perform in the clinic. Adequate preclinical and clinical training are essential to reduce the stress level of the students and improve their performance in the clinical environment.

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### Conflicts of interest

There are no conflicts of interest.

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