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RESEARCH ARTICLE **OPEN ACCESS**

Dental Students Stress during Clinical Restorative Procedures: A Saudi-Based Study

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Abstract:

Objectives: The study aims to assess the clinical restorative dental procedures' impact on the stress levels of Saudi dental students and explore variations in student year levels, genders, and restorative procedures.

Methods: An observational cross-sectional study was conducted using census sampling in 2023 at the College of Dentistry, University of Ha'il, Saudi Arabia. Out of 120 students, 105 completed the questionnaire. This questionnaire comprised thirteen questions that assessed stress levels using a 7-point Likert scale categorized into three types of dental procedures: diagnosis, operative, and endodontics. Descriptive statistics, Mann-Whitney U, Kruskal-Wallis, and Friedman tests were used to explore gender, students' year levels, and restorative category variations.

Results: The response rate was 87.5% of all students. The students' stress levels declined for all year levels and categories. No significant gender differences were found, except for fifth-year female students who reported higher stress levels in the endodontic category (p =.032). There were no significant differences in students' stress levels, except for third-year students, who reported higher stress levels in the operative category than fifth-year students (p =.01). The operative and endodontic categories had significantly higher impacts on perceived stress levels among all students compared to the diagnostic category (p =.001, p =.001, respectively).

Conclusion: The stress levels were declining as students advanced in academic year levels with variations in different restorative procedures with no significant overall gender differences. The findings recommend curriculum adjustments and targeted support for dental students.

Keywords: Dental education, Dental students, Dental stress, Clinical education, Restorative dentistry, Saudi Arabia.

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1. INTRODUCTION

Dental education is known for its demanding nature, imposing significant psychological burdens on students, and contributing to elevated stress levels [1, 2]. It is well documented that the rigorous demands and intensive curriculum of dental programs adversely impact students, affecting their mental health, well-being, and academic performance [3-5]. Several considerations affect dental students' stress levels. The change from theoretical to clinical training, an intensive curriculum, competitiveness, performance demands, and student-instructor and student-patient interactions all increase stress levels [6]. These factors not only challenge students' ability to manage time and master technical skills but also require them to apply theoretical knowledge in practical and clinical settings, where the interplay of skills, knowledge, and human interaction further amplifies stress [2, 7].

Students identify restorative dental procedures like

endodontics, restorations, caries treatment, and associated diagnostic procedures as significant stressors [8]. These procedures demand a high level of knowledge, precision, and technical skills, presenting challenges in mastering these skills and managing patient care, which students often find particularly stressful [6, 8, 9].

Assessing student's stresses and subsequently understanding their causes, especially those related to clinical procedures, can help develop and improve curricula in dental schools [10]. Identifying the most stressful clinical procedures can help develop targeted approaches to manage these challenges in the curriculum [11]. This can ultimately enhance the overall educational experience for dental students [12].

There are a few previous studies that investigated the effect of restorative dental procedures on stress levels among dental students at clinical levels. For example, Mocny-Pachońska *et al*. examined stress levels among dental students during specific conservative dental treatment procedures [8]. Recently, Alamoush *et al*. investigated stress levels and their factors among fourth- and fifth-year dental students, which included some restorative clinical procedures [13]. Tavares *et al*. reported students' perceptions of root canal treatments [14]. Rayyan *et al*. investigated the self-perceived stress levels of senior dental students in Saudi Arabia during fixed prosthodontic procedures, examining factors that contribute to stress during clinical practice [10]. Given the limited research focusing on stressors related to clinical procedures in restorative dental treatments for clinical levels and both genders, this study was conducted to address part of this gap.

This study aims to assess the stress levels faced by a group of Saudi dental students at clinical levels while performing different restorative dental procedures and to explore variations in these levels of stress among different student year levels, genders, and restorative categories to fill a critical research gap by examining this area. Understanding these stress levels can help improve the curriculum, develop targeted stress management strategies, and improve dental education. This study's findings can help create more resilient and competent dental professionals, which could improve patient care. Additionally, the findings of this study could improve students' preparation and the support of dental students for clinical education, thereby improving dental education and student well-being.

2. METHOD

2.1. Study Design and Settings

This is an observational cross-sectional study to explore the perceived stress levels among dental students performing restorative dental procedures such as diagnosis, operative, and endodontics. Utilizing a structured, anonymous questionnaire, the study targeted students who are at clinical levels studying at the College of Dentistry, University of Ha'il, Ha'il, Saudi Arabia. The data collection phase commenced from January to March 2024, extending over a three-month period to ensure active participation and comprehensive responses.

2.2. Participants and Sampling

The participants comprised all third, fourth, and fifth (post-preparatory year) dental students who were at the clinical level. The exclusion criteria included dental students who were not at an active clinical level or were not willing to participate. Due to population accessibility and the limited population size, a census approach was used, inviting all 120 eligible dental students for participation with the aim of achieving a minimum 70 percent response rate to obtain representative data. Out of the eligible dental students, 105 agreed to participate and completed the questionnaire, resulting in a response rate of 87.5%.

2.3. Data Collection and Measurement

Data were collected using a structured questionnaire (Appendix). The questionnaire was based on a previously validated questionnaire to assess students' experience with stressful dental treatment procedures in restorative dentistry [8]. Two experts in restorative dentistry and one in dental public health at the University of Ha'il conducted an expert review to ensure the content validity of the modified questionnaire, making necessary adjustments based on expert feedback.

The questionnaire included two main sections: first, demographic information and perceived stress levels during performing restorative dental procedures. The demographics section of the questionnaire includes age, gender, and the students' year levels. The section on perceived stress levels was organized into three categories: diagnosis, operative, and endodontic. The diagnosis category contained three questions; the operative and endodontic categories had five questions, for a total of thirteen questions. Participants were asked to assess their stress levels using a Likert 7-point scale. On this scale, a 0 signifies no stress, and a 6 indicates the highest stress. The diagnosis category includes questions related to the patient's medical and dental history, the diagnosis of caries and endodontic pathologies, and the patient's clinical examination for restorative dentistry. The operative category includes questions on treatment of deep caries, performing more than one surface tooth restoration, performing direct aesthetic anterior composite restoration, performing a single crown procedure, and placing a rubber dam. The endodontic category includes questions on access cavity preparation, pulp extirpation, establishing the working length of a canal, locating the canal orifice, and performing instrumentation and obturation. The students were given an electronic questionnaire, followed by two reminders at one-week intervals. To minimize bias, efforts were made to anonymize responses, and a census sampling strategy was employed.

2.4. Variables and Statistical Analysis

Microsoft Excel (Microsoft Corporation, Redmond, WA, USA) software was used for data entry, and the data was

then analyzed using SPSS 26.0 (IBM Corp., Armonk, NY, USA). The demographic characteristics, such as age, gender, and the student's year level in college, were the independent variables. The primary dependent variable in this study was the perceived stress level in the restorative categories. The internal consistency reliability analysis of the scale was tested using Cronbach's alpha coefficients.

Descriptive statistics were calculated. The median values of the ordinal responses for each set of category questions were computed and used for all subsequent inferential statistics. For presenting the students' stress level frequencies and percentages, the Likert scale originally measured on a seven-point scale was modified to a four-level stress scale: no stress (score 0), low stress (scores 1, 2), medium stress (scores 3, 4), and high stress (scores 5, 6) to represent the distribution of the perceived stress levels. These stress levels were then quantified as frequencies and percentages, representing the stress levels across different student year levels and genders.

This study employed nonparametric tests due to the ordinal nature of the data and the absence of normality assumptions. For inferential statistics, the significance level was set at $\alpha = 0.05$.

The Mann-Whitney U test was applied to evaluate gender-based differences in stress levels within each year level across the restorative categories. Additionally, the Kruskal-Wallis test was used to analyze stress level variations among different year levels within each procedure category. After the Kruskal-Wallis test result was found to be significant, post-hoc tests were run using nonparametric pairwise comparison tests of different combinations of students' year levels, with a significance level of Bonferroni corrected level $p < .0167$.

The Friedman test was used to assess the differences among the diagnosis, operative, and endodontic categories. Wilcoxon signed-rank tests were used for post-hoc pairwise comparisons between each pair of categories. Adjustments for multiple comparisons were made using the Bonferroni correction, $p < .0167$.

2.5. Ethical Considerations

This research was conducted in line with the Helsinki Declaration and ethical standards, obtaining informed consent from all participants. It provided detailed information on the study's objectives, potential risks, benefits, and confidentiality, emphasizing the voluntary nature of participation. The Research Ethics Committee of the University of Ha'il approved this study, with reference H-2023-307. Data were securely stored, and the results were reported anonymously to maintain ethical integrity.

3. RESULTS

3.1. Demographics

The study was conducted on data from 105 participants who completed the questionnaire. Among the participants, there was a slight male majority of 54 students (51%), compared to 51 female students, who accounted for 48.6% of the total sample. The distribution of students across the students' year levels is as follows: 33 third-year students (31.4%), comprising 17 males and 16 females; 35 fourth-year students (33.3%), with 19 males and 16 females; and 37 fifth-year students (35.2%), including 18 males and 19 females. All students had a mean age of 23.1 years; 3rd-year students had a mean age of 22.1 years; 4th-year students had a mean age of 23 years; and 5th-year students had a mean age of 24.08 years.

3.2. Reliability of the stress questions

The Cronbach's alpha coefficients of the diagnostic, operative, and endodontic stress scale questions were 0.856, 0.846, and 0.885, respectively, indicating good reliability of the measurement scale.

3.3. Diagnosis Category

Table **1** displays the stress levels across different students' year levels. In the third year, 36.30% of students reported medium and high stress, compared to 17.10% of fourth-year students and 8.10% of fifth-year students, respectively. The Mann-Whitney U test indicated no significant gender differences in perceived stress levels at each academic level, with p-values of 0.069 for the third year, 0.788 for the fourth year, and 0.081 for the fifth year.

Table 1. Distribution of students' stress across year levels and genders of diagnosis category.

Year Level	Gender	No Stress n (%)	Low Stress n (%)	Medium Stress n (%)	High Stress n (%)	[a]p
Third Year	M (N = 17)	4 (23.5%)	10 (58.8%)	3 (17.6%)	0 (0%)	.069
	F (N = 16)	4 (25.0%)	3 (18.8%)	8 (50.0%)	1 (6.3%)	
	All (N = 33)	8 (24.2%)	13 (39.4%)	11 (33.3%)	1 (3.0%)	
Fourth Year	M (N = 17)	0 (0%)	17 (89.5%)	2 (10.5%)	0 (0%)	.788
	F (N = 16)	0 (0%)	12 (75.0%)	4 (25.0%)	0 (0%)	
	All (N = 35)	0 (0.0%)	29 (82.9%)	6 (17.1%)	0 (0.0%)	
Fifth Year	M (N = 18)	0 (0%)	18 (100%)	0 (0%)	0 (0%)	.081
	F (N = 19)	0 (0%)	16 (84.2%)	3 (15.8%)	0 (0%)	
	All (N = 37)	0 (0.0%)	34 (91.9%)	3 (8.1%)	0 (0.0%)	

Note: [a]Mann-Whitney U Test, significance at $p < .05$.

Table 2. Distribution of students' stress across year levels and genders for operative category.

Year Level	Gender	No Stress n (%)	Low Stress n (%)	Medium Stress n (%)	High Stress n (%)	[a]p
Third Year	M (N = 17)	2 (11.8%)	2 (11.8%)	8 (47.1%)	5 (29.4%)	.313
	F (N = 16)	1 (6.3%)	4 (25.0%)	3 (18.8%)	8 (50.0%)	-
	All (N = 33)	3 (9.1%)	6 (18.2%)	11 (33.3%)	13 (39.4%)	-
Fourth Year	M (N = 19)	0 (0%)	10 (52.6%)	9 (47.4%)	0 (0%)	.072
	F (N = 16)	1 (6.3%)	5 (31.3%)	6 (37.5%)	4 (25.0%)	-
	All (N = 35)	1 (2.9%)	15 (42.9%)	15 (42.9%)	4 (11.4%)	-
Fifth Year	M (N = 18)	3 (16.7%)	10 (55.6%)	5 (27.8%)	0 (0%)	.080
	F (N = 19)	1 (5.3%)	9 (47.4%)	6 (31.6%)	3 (15.8%)	-
	All (N = 37)	4 (10.8%)	19 (51.4%)	11 (29.7%)	3 (8.1%)	-

Note: [a]Mann-Whitney U test, *significance at p< .05.

Table 3. Distribution of students' stress levels across year levels and genders for endodontic category.

Year Level	Gender	No Stress n (%)	Low Stress n (%)	Medium Stress n (%)	High Stress n (%)	[a]p
Third Year	M (N = 17)	2 (11.8%)	5 (29.4%)	6 (35.3%)	4 (23.5%)	.675
	F (N = 16)	2 (12.5%)	5 (31.3%)	2 (12.5%)	7 (43.8%)	-
	All (N = 33)	4 (12.1%)	10 (30.3%)	8 (24.2%)	11 (33.3%)	-
Fourth Year	M (N = 19)	0 (0%)	13 (68.4%)	4 (21.1%)	2 (10.5%)	.065
	F (N = 16)	1 (6.3%)	4 (25.0%)	7 (43.8%)	4 (25.0%)	-
	All (N = 35)	1 (2.9%)	17 (48.6%)	11 (31.4%)	6 (17.1%)	-
Fifth Year	M (N = 18)	4 (22.2%)	9 (50%)	4 (22.2%)	1 (5.6%)	.032*
	F (N = 19)	1 (5.3%)	8 (42.1%)	5 (26.3%)	5 (26.3%)	-
	All (N = 37)	5 (13.5%)	17 (45.9%)	9 (24.3%)	6 (16.2%)	-

Note: [a]Mann-Whitney U test, *significant at p < .05.

3.4. Operative Category

Table **2** illustrates the stress levels across students' year levels. In the third year, 72.70% of students reported medium and high stress, while 54.30% of fourth-year students and 37.80% of fifth-year students reported similar stress levels. The Mann-Whitney U test results for the operative category showed no significant gender differences in perceived stress levels during these procedures in each student's year levels, with p-values of .313 for the third year, .072 for the fourth year, and .080 for the fifth year.

3.5. Endodontic Category

As shown in Table **3**, for the third year, 57.50% of students reported medium and high stress, compared to 48.50% of fourth-year students and 40.50% of fifth-year students. The Mann-Whitney U test results revealed a significant gender difference in stress levels in the fifth year (U = 102, Z = -2.138, p = .032), where females reported significantly higher perceived stress than males. However, the third and fourth years showed no significant gender differences, with p-values of 0.675 and 0.065, respectively.

3.6. Comparisons across Students' Year Levels within each Category

In Table **4**, the Kruskal-Wallis test found no significant differences in perceived stress levels among third-, fourth, and fifth-year students across all categories, except for the operative category, which showed a significant difference (H = 7.485, p =.024). A post hoc pairwise analysis in the operative category revealed a statistically significant difference where third-year students reported higher stress levels than fifth-year students (U = 395, Z = -2.580, p =.01), with a significance level below the Bonferroni corrected value (p <.0167) as shown in Table **5**.

Table 4. Differences across students' year levels within each category.

Category	H	*df*	p[a]
Diagnosis clinical procedures	3.967[a]	2	.138
Operative clinical procedures	7.485	2	.024*
Endodontic clinical procedures	1.511	2	.470

Note: ***df***, degree of freedom, [a]Kruskal-Wallis test, *significant at p < .05.

Table 5. Pairwise post hoc comparison tests of student's stress levels across year levels in operative category.

Students' years level	Mann-Whitney U	Z	p[a]
Third *vs*. Fourth Year	429.5	-1.845	.065
Third *vs*. Fifth Year	395	-2.580	.010*
Fourth *vs*. Fifth Year	553	-1.099	.272

Note: [a]Mann-Whitney U Test, *significant at the Bonferroni-adjusted p-value < .017.

Table 6. Significant differences across all categories, and post-hoc differences between the categories.

Comparison	Values	p
Overall Categories[a]	χ^2 = 56.466	.001*
Operative *vs*. Diagnosis[b]	Z = -6.088	.001**
Endodontic *vs*. Diagnosis[b]	Z = -5.583	.001**
Endodontic *vs*. Operative[b]	Z = -0.876	.381

Note: [a]Friedman test, [b]Wilcoxon Signed-Rank test, *significant at p < .05, **significant at p < .0167.

3.7. Comparisons of Categories among all Students

In Table **6**, Friedman test results indicated significant differences across the three categories (χ^2 = 56.466, p <.001). Subsequent post-hoc Wilcoxon signed-rank tests showed significant differences between the operative and diagnosis categories (Z = -6.088, p <.001) and between the endodontic and diagnosis categories (Z = -5.583, p <.001). However, the endodontic and operative categories showed no significant differences (Z = -0.876, p =.381).

4. DISCUSSION

This study investigated the self-perceived stress levels of dental students at the College of Dentistry, University of Ha'il, Saudi Arabia, during various clinical restorative procedures using a structured questionnaire. The stress levels showed a declining trend from third to fifth-year levels in all categories. Most students reported no or low stress during diagnostic procedures, while approximately half experienced medium or high stress during operative or endodontic procedures. Across all categories, there were no significant gender differences in stress levels, except for fifth-year students, where females reported higher stress than males during the endodontic category. Additionally, no significant differences in stress levels were observed between students' year levels across all categories, except for third-year students, who reported significantly higher stress in the operative category. Comparing the categories, both operative and endodontic procedures significantly increased stress levels in dental students compared to diagnostic procedures. However, there were no significant differences in stress levels between the operative and endodontic categories.

Previous studies have explored the differences in stress levels across students' year levels, reporting diverse findings. Jowkar *et al*. observed that the highest stress levels occurred among fifth-year students, attributed to their increased clinical responsibilities [15]. Tangade *et al*. also observed an increase in student stress levels from the first to the final year, with a notable increase between the second and third years, likely due to the shift from pre-clinical to clinical education [16]. Ersan *et al*. [17] and Alamoush *et al*. [13] also noted that stress levels tend to increase as students progress to higher levels, reflecting the cumulative effect of ongoing academic and clinical pressures. In contrast, our study found that third-year students reported the highest stress levels, but there was a noticeable reduction in stress by the fifth year across all categories. This reduction may be attributed to improvements in students' clinical skills and educational interventions that aid in managing and adapting to the demands of their training. This is supported by findings from Mocny-Pachońska *et al*., where third-year students felt a high level of stress during endodontic procedures, which decreased markedly by the fifth year [8]. Furthermore, Tavares *et al*. highlighted that difficulties in performing specific endodontic techniques decreased significantly as students progressed in their training, pointing out the importance of continuous education and practice in reducing stress [14].

These observations highlight the complex interplay between students' year levels, clinical exposure, and stress perception in dental education. As they progress through their programs, targeted support and structured educational strategies are critical in helping them navigate these challenges effectively. This includes focusing on both the technical aspects of dental procedures and the psychological support needed to manage stress, which can enhance both educational outcomes and students' well-being.

Examining gender differences in stress perception reveals a complex landscape where gender influences the stress dental students encounter in various contexts. Contrary to the findings by Jowkar *et al*. [15], which indicated no significant gender-related differences in depression, anxiety, or stress among students, findings from Tangade *et al*. [16] and Ersan *et al*. [17] suggested a more nuanced picture. Tangade *et al*. [16] found that men experienced higher stress levels than women, while Ersan

et al. [17] noted that female students generally suffered from more stress. Similarly, Alamoush *et al*. [13] observed that female dental students reported higher stress levels than their male counterparts, a trend also supported by Mocny-Pachońska *et al*. [8], particularly during procedures related to caries treatment. However, our findings complicate this narrative by showing no significant gender differences across most clinical categories and students' year levels, except for fifth-year students, where female participants exhibited significantly higher stress levels during endodontic procedures compared to their male counterparts. This suggests that while there may be a general trend towards higher stress levels in female students, such differences are not universal and may depend on a variety of factors beyond simple psychological or physiological differences between genders. These factors could include the specific educational environment, the nature of clinical tasks, or even the level of support and mentoring available to students. It is important for dental education programs that want to target interventions that effectively address gender-specific stress disparities to recognize these complexities. One way to do this could be to provide specialized support systems and stress management training for high-stress clinical procedures [2, 18].

There are significant variations in how students perceive stress depending on the type of procedure they are performing. Consistent with findings by Frese *et al*., our study indicates that diagnostic procedures generally cause the lowest stress levels among students [6]. Frese *et al*. recommended that students begin their clinical training with a focus on diagnostics, preventive dentistry, and initial periodontal treatment before advancing to more complex procedures such as endodontics, which are known to be highly stressful [6]. Consistent with our results, Mocny-Pachońska *et al*. found that dental students viewed endodontic treatment procedures as particularly stressful [8]. This view is supported by Tanalp *et al*., who observed that senior students rated endodontics as the most challenging dental specialty [19]. This indicates that while endodontic procedures are stressful, the complexity and perceived risk involved in such treatments, such as managing complications and using specialized equipment like rubber dams, might contribute to the high-stress levels experienced by students [19].

Furthermore, Alrahabi *et al*. [11] and Tavares *et al*. [14] discussed the specific aspects of endodontic procedures that challenge students, such as endodontic radiology and root canal obturation evaluation. These findings suggest that targeted training in these areas might alleviate some of the stress associated with endodontic treatments. Tavares *et al*. pointed out that while basic endodontic procedures like chamber access and working length determination did not pose significant difficulty, areas requiring high precision, such as radiographic examination and the choice of intracanal medication, were more problematic [14].

Overall, these insights underline the importance of curriculum design that considers the varying stress levels induced by different clinical procedures. Introducing high-stress procedures like endodontics later in the curriculum and ensuring adequate preparatory training and support can help reduce stress and improve educational outcomes. This approach not only aligns with the goals of dental education but also with the practical realities faced by students in their clinical training.

Research on students' clinical stress revealed a variety of methodologies. This study, along with other studies by Jowkar *et al*. [15], Ersan *et al*. [17], Alrahabi *et al*. [11], Tavares *et al*. [14], Alamoush *et al*. [13], and Mocny-Pachońska *et al*. [8], demonstrated a variety of methods and tools used to assess stress. For example, the Dental Environment Stress questionnaire was employed by Jowkar *et al*. [15] and Alamoush *et al*. [13], while Ersan *et al*. [17] employed the Perceived Stress Scale and the General Self-Efficacy Scale. This study used a structured questionnaire focusing on three restorative categories: diagnosis, operative, and endodontic dental procedures, across third, fourth-, and fifth-year students. Similarly, Mocny-Pachońska *et al*. employed a similar methodology, using a structured questionnaire, including caries treatment [8]. However, there are variations in focus, such as Alrahabi *et al*., who studied endodontic procedures solely [11]. Tanalp *et al*. emphasized the significance of confidence in performing endodontic treatments [19]. Future research should aim to standardize methods by developing a standardized questionnaire. Furthermore, conducting qualitative methods might deepen understanding and enhance the applicability of findings across educational settings.

Managing stress in dental education requires addressing both environmental factors and individual coping strategies to create a supportive educational atmosphere. Frese *et al*. [6] and Ersan *et al*. [17] advocated for a thorough examination of dental curricula to identify and alleviate sources of overload, thereby minimizing unnecessary stressors. Moreover, specific adjustments to endodontics education were recommended by Alrahabi *et al*., including increasing both preclinical and clinical sessions and incorporating new teaching methods [11]. This approach aligns with findings by Kashbour *et al*., which highlight the benefits of early clinical exposure to bridge the gap between simulated environments and real clinical settings [9]. Furthermore, stress management strategies should focus early in the curriculum on reducing stressors and enhancing coping mechanisms, including stress reduction techniques, as outlined by Alzahem *et al*. [20] and Colley *et al*. [21].

This study has limitations because of its cross-sectional design, which prevents establishing cause-and-effect relationships or tracking changes in student stress over time. Furthermore, because the research took place at the University of Ha'il, its findings might not be applicable to other dental schools operating in different contexts. Furthermore, while this study focused on restorative procedures that are central to the daily practice of general practitioners, the focus on restorative procedures limits a broader, more comprehensive understanding of stress in

different disciplines such as prosthodontics, oral surgery, and pedodontics.

CONCLUSION

This study demonstrated the varying stress levels experienced by dental students across different student year levels and different restorative clinical procedures. While diagnostic procedures were generally considered less stressful, operative, and endodontic procedures were more challenging. As students advance across students' year levels, stress tends to decrease, with no generally significant gender-based differences. These findings highlight the necessity of adapting the curriculum and implementing targeted support interventions, particularly in the early stages of training and addressing gender-specific needs. This study lays a base for future research, highlighting the importance of longitudinal studies to track stress progression and evaluate the effectiveness of interventions.

AUTHORS' CONTRIBUTION

The author confirms sole responsibility for the following: study conception and design, data collection, analysis and interpretation of results, and manuscript preparation.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This study was approved by the Ethics Committee of the University of Ha'il, Saudi Arabia. Reference number: H-2023-307.

HUMAN AND ANIMAL RIGHTS

All human research procedures followed were in accordance with the ethical standards of the committee responsible for human experimentation (institutional and national), and with the Helsinki Declaration of 1975, as revised in 2013.

CONSENT FOR PUBLICATION

Informed written consent was obtained from each participant.

STANDARDS OF REPORTING

STROBE guidelines were followed.

AVAILABILITY OF DATA AND MATERIALS

The data and supportive information are available within the article.

FUNDING

None.

CONFLICT OF INTEREST

The author declares no conflict of interest financial or otherwise.

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Declared none.

APPENDIX

Section 1: Demographics							
Age:							
Gender	☐ ***Male***	☐ ***Female***					
What grade level of college are you in?	**3rd th year**	**4th th year**	**5th year**				
Section 2: Stress levels during Dental Treatment Procedures							
Diagnosis procedures:							
1. Taking medical and dental history.	☐ 0	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
2. Diagnosing needed for restorative dentistry (caries, endodontic pathologies).	☐ 0	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
3. Patient examination in restorative dentistry.	☐ 0	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
Operative procedures:							
1. Treatment of deep caries.	☐ 0	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
2. Performing more than one suface tooth restoration.	☐ 0	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
3. Performing anterior asthetic Composite restoration.	☐ 0	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
4. Performing a Single crowns procedure.	☐ 0	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
5. Placing a rubber dam.							
Endodontic procedures:							
1. Access cavity preparation.	☐ 0	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
2. Performing a pulp extirpation	☐ 0	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
3. Establishing the Working Length of a Canal	☐ 0	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
4. Locating the Canal Orifices	☐ 0	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
5. performing instrumentation and obturation	☐ 0	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6

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