

# Pattern of Stress in the field of dentistry: from pre-clinical studies to work as a clinical dentist

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## Article

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# Abstract

**Background:** Dental education is considered a highly stressful training process that can lead to high levels of perceived stress, anxiety and depression which can affect wellbeing and performance; Therefore, the aim of this study is to investigate the levels of stress, anxiety and depression experienced by dental students during their pre- clinical and clinical year and compare it to professional dentist.

**Methods:** In the present cross-sectional study, 42 general dentists and 131 undergraduate dental students at Tel Aviv University in the fourth, fifth and sixth year were participated. The psychological well- being was assessed by Depression Anxiety Stress Scale (DASS-21) which measure the severity of psychological distress by a reliable self- rated questionnaire. Mann-Whitney tests were performed to evaluate the effects of gender on the DASS scores. Kruskal-Wallis one-way tests were used for comparison between dental students in their fourth. Fifth, sixth year of study and dentists.

**Results:** overall prevalence of depression, anxiety and stress was 45.1%, 48.8% and 47.1% respectively. Clinically significant (severe and extremely severe) depression, anxiety and stress were experienced by 16.2% (n=28), 21.6% (n= 37) and 20.9% (n=36) of the participants, respectively. Significant differences were found in relation to DASS category (normal, mild, moderate, severe, and extremely severe) of depression ( $p=0.001$ ), anxiety ( $p=0.011$ ) and stress ( $p=0.018$ ) in which higher level of psychological symptoms of anxiety and depression were observed in fifth-year students and lower levels in dentists, compared to the fourth and sixth years.

**Conclusions:** High levels of depression, anxiety, and stress were observed in dental students during their clinical and pre-clinical years of study. However, these levels significantly decreased upon becoming a dentist.

## Introduction

Stress is a behavioral response of an individual to threatening or challenging situations, it can lead to anxiety which is often accompanied by a hyperactive autonomic nervous system. Symptoms may include sweating, sleep disturbance, fatigue, abdominal disturbance and depression with intense mood swings. These mental disturbances can subsequently impair cognition, learning ability and academic or clinical performance<sup>1-5</sup>.

Dental education is considered a highly stressful training process<sup>1</sup> that can lead to high levels of perceived stress, anxiety and depression which can affect wellbeing and performance of dental students<sup>5</sup>. Dentistry is a stressful occupation due to several factors, including direct interaction with patients, which may result in reduce performance, decreased productivity and professional burnout<sup>6</sup> in addition to threaten the physical health of the patients<sup>7</sup>. According to the current literature, persistent stress may eventually lead to psychological morbidity and increase risk for suicide intent<sup>3</sup>. The question being asked is: what is the pattern of stress among dentists from their studies to their clinical work, and

which stage in this process is the most stressful. Recognizing the peak of stress will help control stress in the field of dentistry, leading to better achievement and success in their career development.

Studies have shown that gender is a risk factor, with women experiencing greater psychological distress than men<sup>8,9</sup>. Radeef A.S et al.<sup>8</sup> concluded that dental students are exposed to high levels of psychological distress, significantly more in women than in men. Bayram N et al.<sup>9</sup> reported a high prevalence of depression, anxiety and stress among university students, with higher stress scores reported by women.

Farokh-Gisour E et al.<sup>10</sup> investigated the stress level among dental students, dentists and pediatric dental specialists, finding that specialists had significantly lower stress than dentists or dental students. Siddiqui M.K et al.<sup>11</sup> discovered a high stress level among young and junior dentists, and Barberia E et al.<sup>2</sup> explored the stress levels among pre-clinical and clinical dental students, concluding that there is an increase in psychological distress level during transition from preclinical to clinical year.

To the best of our knowledge, there is no study investigated the pattern of stress in dentistry field from the process of dental education to the clinical work as a dentist. Therefore, the aim of this study is to investigate the levels of stress, anxiety and depression experienced by dental students during their pre-clinical and clinical year and as a dentist. This will help to understand the pattern of stress in the field of dentistry and compare the stress levels between male and female dental students and dentists.

## Methods

In the present cross sectional study, 42 general dentists (male = 22, female = 20, mean age = 37.14, range 35) and 131 (male = 53 female = 78, mean age = 26.69 ,range 22–33 ) undergraduate dental students in the fourth (male = 17 female = 41, mean age = 26.43, range 22–33 ), fifth (male = 20 female = 22, mean age = 26.58, range 23–33) and sixth (male = 16 female = 15, mean age = 27.42 range 24–33) year were participated.

Students and dentists' participation were completely voluntary after explanation of research goals and its importance by the principal investigator. The experiment was conducted according to the guidelines and approved by the Institutional Ethics Committee, and all participants signed an informed consent document before commencing the study.

The psychological well-being was assessed by Depression Anxiety Stress Scale (DASS-21) which measure the severity of psychological distress by a reliable self-rated questionnaire that assesses the severity of DAS symptoms experienced in the previous week<sup>12</sup>. Items are scored on a 4-point scale: Did not apply to me at all (0), applied to me to some degree or some of the time (1), applied to me to a considerable degree or a good part of the time (2), and applied to me very much or most of the time (3)<sup>10</sup>. The dental participants used the 4-point scales to rate their symptoms during the previous week. For continuous score (mean and  $\pm$  SD), DAS scores calculated by summing the score of 7 statement relevant

to each subscale: Stress, Anxiety and Depression. Higher scores indicated higher level of psychological distress. The scores for each subscale are then categorized to evaluate symptom severity (frequency and percentage) of each condition ranging from normal, mild, moderate, severe and extremely severe according to cut points suggested by Lovibond S.H.<sup>12</sup> Severe and extremely severe symptoms scores were recorded as clinically significant.

All analyses were performed using SPSS, version 20 (IBM Corp., Armonk, NY). Significant statistical differences were defined as  $p < 0.05$ . Mann-Whitney tests were performed to evaluate the effects of gender on the DASS scores.

Kruskal-Wallis one-way tests were used for comparison between dental students in their fourth, fifth, sixth year of study and dentists regarding DASS score while chi-squared tests were used for DASS category comparison.

## Results

In the present study, the overall prevalence of depression, anxiety and stress was 45.1%, 48.8% and 47.1% respectively. Clinically significant (severe and extremely severe) depression, anxiety and stress were experienced by 16.2% ( $n = 28$ ), 21.6% ( $n = 37$ ) and 20.9% ( $n = 36$ ) of the participants, respectively. Table 2.

Significant differences were found in relation to DASS category (normal, mild, moderate, severe and extremely severe) of depression ( $p = 0.001$ ), anxiety ( $p = 0.011$ ) and stress ( $p = 0.018$ ) in which higher level of psychological symptoms of anxiety and depression were observed in fifth-year students and lower levels in dentists, compared to the fourth and sixth years (Table 2).

Mean DASS scores of depressions, anxiety and stress were significantly lower in dentists compared to fourth year ( $p < 0.001$ ), fifth year ( $p < 0.0005$ ) and sixth year ( $p < 0.003$ ), Table 1. In contrast, no statistically significant differences were found between the fourth and fifth, fifth and sixth, fourth and sixth year of dentistry study regarding mean DASS score of depression ( $p = 0.115, 0.188, 0.983$ ), anxiety ( $p = 0.219, 0.818, 0.186$ ) and stress ( $p = 0.384, 0.906, 0.415$ ), respectively, Table 1. However, the pattern of stress and depression of mean DASS score showed a gradual increase level until the sixth year, with highest mean in the sixth year, and then acute decline at the dentists group who showed the lowest mean scores, Fig. 1,2. The pattern of anxiety of mean DASS score showed an increase from the fourth to fifth year of study and then a gradual decrease until the dentists group, who showed the same trend of the lowest mean anxiety score, Fig. 3.

No significant differences were found between males and females in the levels of mean DASS score of depression, anxiety and stress across all study groups ( $p > 0.05$ ), Table 1.

Table 1

Mean and  $\pm$  SD of DASS scores (Depression, Anxiety and Stress) in dental students in fourth (n = 58), fifth (n = 42), sixth (n = 31) year of study and dentists (n = 42).

|                                                      |        | <b>Total<br/>n (%)</b> | <b>Mean <math>\pm</math> SD<br/>Depressive<br/>Level</b> | <b>P<br/>value</b> | <b>Mean <math>\pm</math> SD<br/>Anxiety<br/>Level</b> | <b>P<br/>value</b> | <b>Mean <math>\pm</math><br/>SD<br/>Stress<br/>Level</b> | <b>P<br/>value</b> |
|------------------------------------------------------|--------|------------------------|----------------------------------------------------------|--------------------|-------------------------------------------------------|--------------------|----------------------------------------------------------|--------------------|
| Pre-clinical<br>year<br><br>Fourth<br>year<br>n = 58 | Male   | 17<br>(30%)            | 5.29 $\pm$ 5.18                                          | P =<br>0.052       | 3.11 $\pm$ 3.07                                       | P =<br>0.763       | 7.47 $\pm$<br>4.14                                       | p =<br>0.314       |
|                                                      | Female | 41<br>(70%)            | 5.73 $\pm$ 5.04                                          |                    | 5.63 $\pm$ 4.69                                       |                    | 9.17 $\pm$<br>5.13                                       |                    |
| Clinical<br>year<br><br>Fifth<br>year<br>n = 42      | Male   | 20<br>(47%)            | 6.95 $\pm$ 4.72                                          | P =<br>0.940       | 6.10 $\pm$ 4.56                                       | P =<br>0.417       | 10.60 $\pm$<br>5.03                                      | P =<br>0.230       |
|                                                      | Female | 22<br>(53%)            | 6.04 $\pm$ 4.94                                          |                    | 5.81 $\pm$ 3.56                                       |                    | 8.90 $\pm$<br>4.42                                       |                    |
| Clinical<br>year<br><br>Sixth<br>year<br>n = 31      | Male   | 16<br>(51%)            | 6.93 $\pm$ 5.37                                          | P =<br>0.358       | 5.75 $\pm$ 4.82                                       | P =<br>0.984       | 8.93 $\pm$<br>5.70                                       | P =<br>0.358       |
|                                                      | Female | 15<br>(49%)            | 6.93 $\pm$ 5.61                                          |                    | 4.20 $\pm$ 4.16                                       |                    | 10.60 $\pm$<br>5.47                                      |                    |
| Dentists<br>n = 42                                   | Male   | 22<br>(53%)            | 2.31 $\pm$ 2.23                                          | P =<br>0.208       | 1.54 $\pm$ 2.24                                       | P =<br>0.701       | 4.77 $\pm$<br>2.59                                       | P =<br>0.800       |
|                                                      | Female | 20<br>(47%)            | 3.00 $\pm$ 3.09                                          |                    | 3.15 $\pm$ 3.98                                       |                    | 5.40 $\pm$<br>4.48                                       |                    |

Data were analyzed with Mann-Whitney U tests for gender differences.

Table 2  
Outcome of DASS- 21(dental questionnaire) among dental students in the fourth, fifth and sixth year of study and dentists.

| Category   |                  | Year 4<br>n (%) | Year 5<br>n (%) | Year 6<br>n (%) | Dentists<br>n (%) |
|------------|------------------|-----------------|-----------------|-----------------|-------------------|
| Depression | Normal           | 30 (51.7%)      | 18 (42.9%)      | 15 (48.4%)      | 32 (76.2%)        |
|            | Mild             | 13 (22.4%)      | 8 (19%)         | 1 (3.2%)        | 5 (11.9%)         |
|            | Moderate         | 3 (5.2%)        | 6 (14.3%)       | 9 (29%)         | 5 (11.9%)         |
|            | Severe           | 7 (12.1%)       | 5 (11.9%)       | 1 (3.2%)        | 0 (0%)            |
|            | Extremely Severe | 5 (8.6%)        | 5 (11.9%)       | 5 (16.1%)       | 0 (0%)            |
| Anxiety    | Normal           | 26 (44.8%)      | 14 (33.3%)      | 16 (51.6%)      | 33 (78.6%)        |
|            | Mild             | 13 (22.4%)      | 7 (16.7%)       | 5 (16.1%)       | 2 (4.8%)          |
|            | Moderate         | 6 (10.3%)       | 8 (19%)         | 2 (6.5%)        | 4 (9.5%)          |
|            | Severe           | 4 (6.9%)        | 3 (7.1%)        | 0 (0%)          | 1 (2.4%)          |
|            | Extremely Severe | 9 (15.5%)       | 10 (23.8%)      | 8 (25.8%)       | 2 (4.8%)          |
| Stress     | Normal           | 27 (46.6%)      | 20(47.6%)       | 11 (35.5%)      | 33 (78.6%)        |
|            | Mild             | 7 (12.1%)       | 2 (4.8%)        | 6 (19.4%)       | 4 (9.5%)          |
|            | Moderate         | 11 (19%)        | 7 (16.7%)       | 5 (16.1%)       | 3 (7.1)           |
|            | Severe           | 7 (12.1%)       | 7 (16.7%)       | 3 (9.7%)        | 2 (4.8%)          |
|            | Extremely Severe | 5 (8.6%)        | 6(14.3%)        | 6 (19.4%)       | 0 (0%)            |

## Discussion

This study was conducted to explore the pattern of psychological distress among individuals in the field of dentistry, from the pre-clinical and clinical years of study to their professional practice as dentists. Interestingly, contrary to the notion that direct patient interaction in clinical work increase psychological symptoms, our study found that group of practicing dentists exhibit the lowest level of depression, stress and anxiety. According to this study, dentists demonstrated low level of depression (23.8%), anxiety (21.4%) and stress (21.4%). This is in contrast with other studies that concluded that high stress is common among dentists<sup>13,14</sup>. In consensus with other studies<sup>8,15</sup>, our study reported high DASS symptoms among dental students. For example, in our study, the overall prevalence of depression, anxiety and stress among dental students was 52%, 57% and 55% re-spectively. In the study of Radeef A.S et al.<sup>8</sup> the overall prevalence of depression, anxiety and stress was 47.5%, 67.3% and 42% re-spectively.

According to the pattern of stress, the psychological symptoms increased during the clinical year (fifth and sixth year at Tel Aviv University) of dentistry study. We postulated that the transition from pre clinical to clinical level led to greater levels of stress due to clinical requirements that necessitate the integration of theoretical knowledge, patient interaction and care, and the performance of dental procedures with a high level of manual skill. These finding are similar to those of Al-Sowygh Z.H et al.<sup>17</sup> who concluded that the workload and clinical requirements were the greatest stressors, with highest level observed during the clinical years of dentistry study. This finding is consistent with other studies that found the main sources of stressors among dental students were academic factors<sup>18</sup>. Therefore, modification to the dental curriculum must be made to enhance students achievements, improve emotional status, and prevent negative effect on the health of the students.

Although female gender is a risk factor for stress in previous studies<sup>2,16</sup> due to different stress coping mechanisms, in the present study women showed insignificant difference regarding their stress, anxiety and depression levels in comparison to male across all study groups.

This study was a cross sectional study which influence the main limitation of the study. Another longitudinal study is required that explore the same population from years of dentistry study to the work as a dentists to confirm the results of the present study.

## Conclusions

High levels of depression, anxiety, and stress were observed in dental students during their clinical and pre-clinical years of study. However, these levels significantly decreased upon becoming a dentist. No differences were found between males and females in terms of their depression, anxiety, and stress levels across all study groups..

## Declarations

**All authors have read and agreed to the published version of the manuscript.**

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**Institutional Review Board Statement:** This study was conducted in accordance with the Declaration of Helsinki and approved by the Institutional Review Board (or Ethics Committee) of Tel Aviv University (protocol code 0005714-1, 5 December 2022).

**Informed Consent Statement:** Informed consent was obtained from all subjects involved in the study. Written informed consent was obtained from the patient(s) to publish this paper.

**Data Availability Statement:** The data presented in this study are available on request from the corresponding author. Dr Asaf Shely, mail: asafshely@gmail.com. +972528787472

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**Conflicts of Interest:** The authors declare no conflicts of interest.

## Author Contribution

Conceptualization, G.B.-I. and A.S.; methodology, D.L. and G.B.-I.; software, S.Z.; validation, R.S.L. and O.R.; formal analysis, D.L.; investigation, A.S.; resources, D.L.; data curation, D.L.; writing—original draft preparation, G.B.-I. and A.S.; writing—review and editing, N.U. and S.N.; visualization, G.B.-I.; supervision, D.L.; project administration, A.S.; funding acquisition, G.B.-I. All authors have read and agreed to the published version of the manuscript.

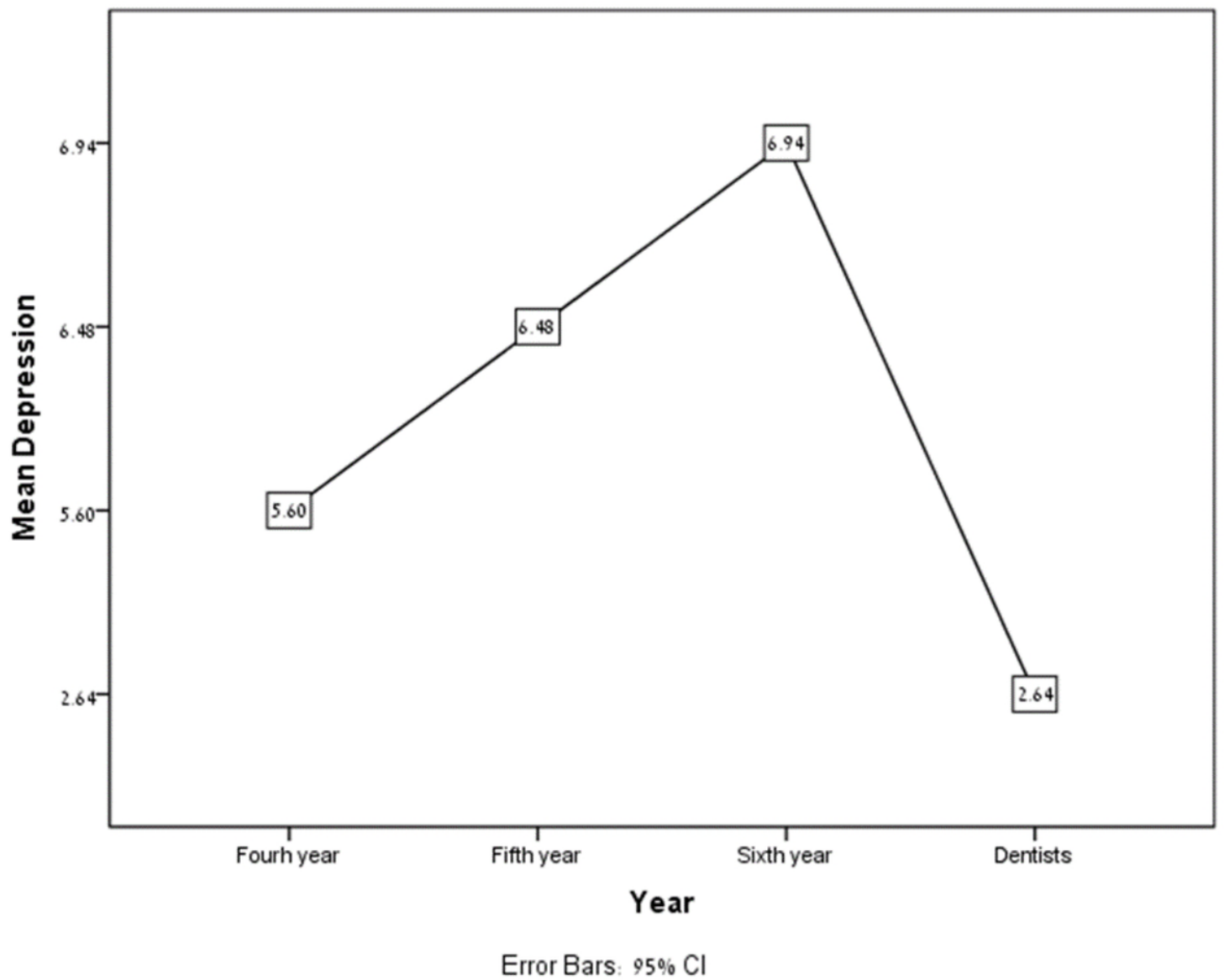
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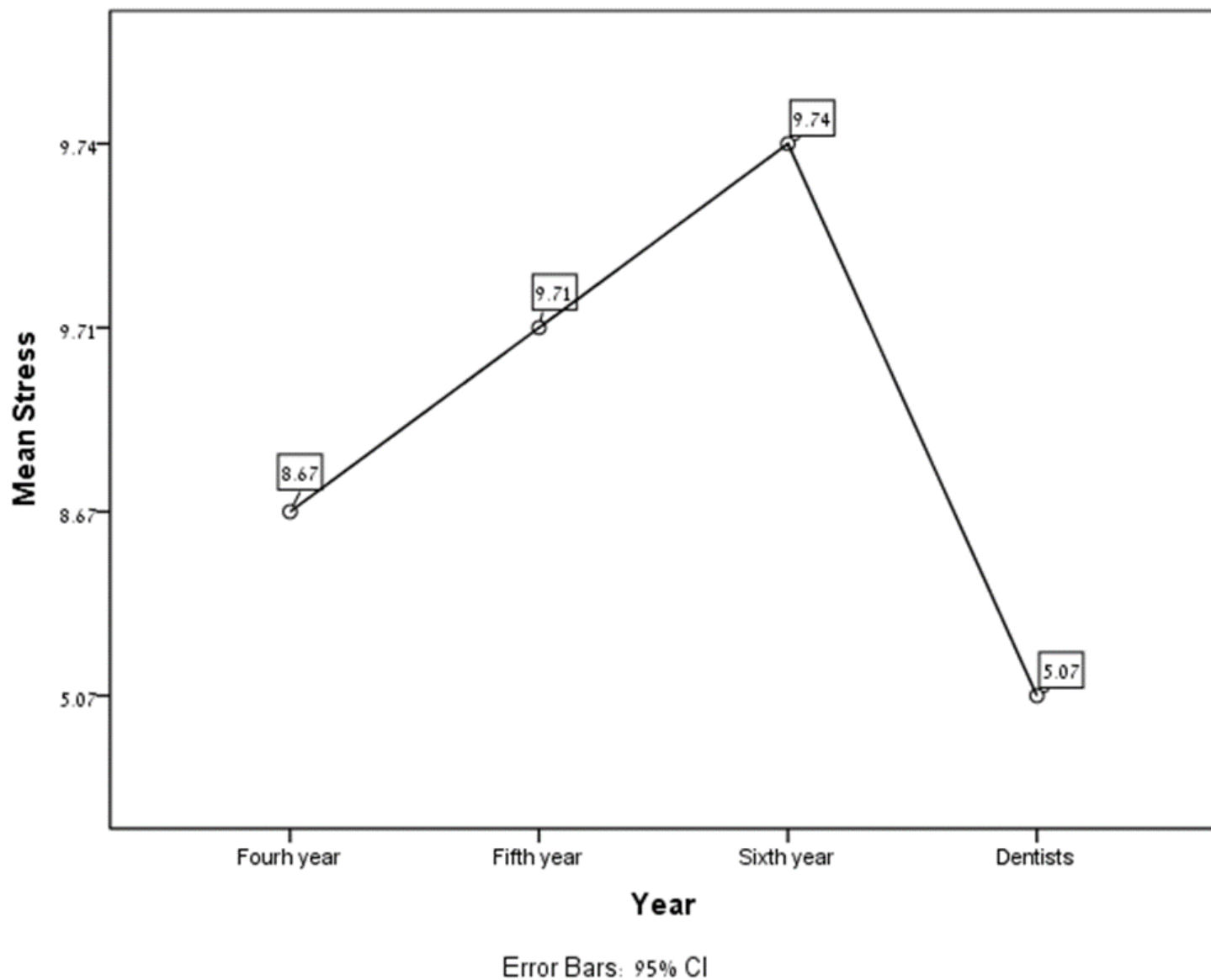
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## Figures



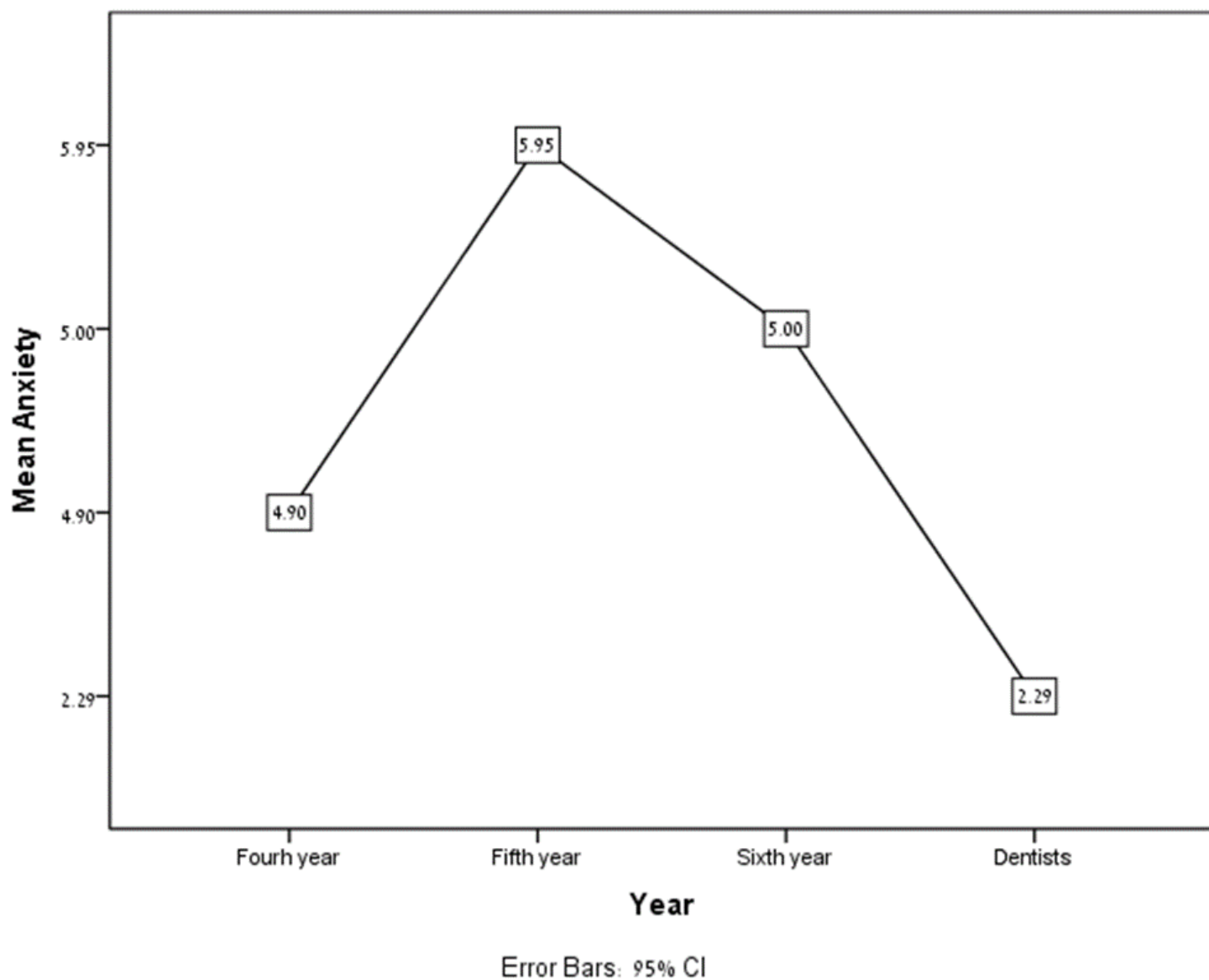
**Figure 1**

Pattern of mean DASS score of depression from fourth year of dentistry study to dentists.



**Figure 2**

Pattern of mean DASS score of stress from fourth year of dentistry study to dentists.



**Figure 3**

Pattern of mean DASS score of anxiety from fourth year of dentistry study to dentists.