

Measuring Stress, Quality Of Health And Life In Dental Students With Temporomandibular Disorders

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Abstract

Introduction: Stress, characterized by anxiety and dread, affects wellbeing in various aspects of life. Dentistry is one of the most stressful occupations, with studies linking it to hypertension and TMD. This study aims to understand how students' emotional states relate to oral tissue parafunction and muscle tone.

Methodology: The study analyzed the psychological condition of first and final year BDS students at private teaching institute, using a two-part questionnaire and analyzing prevalence data using Student's t-tests or chi-square tests.

Results: The study analyzed 56 first-year and 65 final-year students, with the first-year group being significantly younger. Clinical and psycho-emotional findings showed significant differences between the two groups. The mean masseter tone values in the final year were greater than in the first year, with 32% of students reporting discomfort in their temporomandibular joints. Self-reported bruxism was also significantly higher in the final year, with a larger rate compared to the first year. Teeth wear was more common in the final year, with 42% of students exhibiting signs of tooth wear. Linea alba was more prevalent in the first year (67%) than in the final (29%). No discernible difference was found for cretated tongue. The PSS-10 score showed greater levels of perceived stress in first-year students than final-year students. The HADS-Anxiety score showed a noticeable difference in stress and anxiety levels between the two groups.

Conclusion: Undergraduate dentistry students experience stress and anxiety, highlighting the need for mental health support with dental education. Addressing psychological well-being promotes success and self-care, recognizing unique challenges and implementing strategies for academic and emotional success.

Keywords: BDS Students, temporomandibular disorders (TMD), Stress, Anxiety, wellbeing.

Introduction

According to Naz and Iqbal, stress is a relationship between a person and their environment which exceeds the person's abilities and threatens the well-being of the person. (1)

Carneiro, on the other hand, discusses anxiety as a temporary state, induced by a specific situation in an individual, that is characterized by feelings of worry and nervousness, along with the activation of the autonomic nervous system. (2) Dentistry is considered to be one of the most

stressful Dental professions. (1,3) Many studies have shown that psycho-emotional factors play a significant role in causing various modern civilization diseases, such as hypertension, cardiovascular disease, diabetes mellitus, and temporomandibular disorder (TMD). (4–7) According to the World Health Organization, temporomandibular disorders are the third most common reason for seeking dental care, after caries and periodontal disease(8) Temporomandibular disorder is more prevalent in industrialized countries, (9) and there are many factors that contribute to its development and one of them is the stressful conditions of life, which can result to some oral parafunction, like teeth grinding, bruxism and cheek biting.(3) These parafunction's can increase the tone of the masticatory muscles and worsen the symptoms of TMD, such as facial muscle pain, headaches, temporomandibular joint dysfunction or clicking. Moreover, increased tone of the masseter muscle itself is one of the signs of temporomandibular disorder TMD. (10,11) Students are exposed to more stressful situations than the average person in society, with some of the common stressors being: coping with exams and years, limited free time, long teaching hours, high workload, and high competitiveness. Researchers have found that Dental students are more stressed than students from other disciplines. (12,13) In this study, we aimed to examine the relationship between students' psycho-emotional states and manifestations of both occlusal and nonocclusive parafunction in the oral tissues and masseter muscle tone.

The present study consisted of following stages: to assess the psycho-emotional state of the participants; measurement the tone of masseter muscle; and to analysis of the associations between the different examined parameters.

Methods:

Study population

This observational study involved a group of first and final year BDS students who volunteered from the Private teaching institute. The study was conducted from March to April 2023. Participants gave verbal informed consent and the study was approved by the Institutional Review Board. Data were collected through questionnaires and clinical examination were statistically analyzed for differences and correlations between groups.

Psycho-emotional assessment

Using a two-part questionnaire, each student was evaluated based on their psychological state. The first part included two psychological instruments: The Perceived Stress Scale (PSS)-10 by Cohen, Kamarch and Mermelstein¹⁹ and the Hospital Anxiety and Depression Scale (HADS) by Zigmond and Snaith. (14) The PSS-10 is a self-reported questionnaire that measures the level of psychological stress. It is widely used to assess how individuals perceive the stressfulness of situations and how effective their actions are in reducing stress. In this study, we also the condensed 10-item PSS-10 questionnaire with 10 items was used.(8) The scale consists of 10 questions with values ranging from 0 (never) to 4 (very frequently), with a maximum score of 40 points and a minimum score of 0. Higher scores indicate higher stress levels. Points are divided into three categories: low (0–13 points), medium (14–19 points), and high (20–40 points). According to research, the PSS-10 can predict objective biological stress signs and a greater risk of illness in persons who report feeling more stress than usual.(4,7,15) different studies indicated that about 20.5% of student stress studies used PSS to assess psychological aspects of stress. Clinicians commonly use the HADS to assess anxiety and depression in nonpsychiatric patients and healthy adults, as well as a screening tool for mood disorders and anxiety disorders. The HADS has a good reliability Cronbach's alphas ranging from 0.84–0.90 and validity

confirmed in many studies.²² There are 14 questions in the HADS questionnaire, half of which are about anxiety (HADS-A) and half are about depression (HADS-D). Responses are graded on a scale of 0 to 3, therefore the range of results for either subscale (depression or anxiety) is 0 to 21 points. The three categories of scored points are normal (0–7 points), borderline abnormal (8–10 points), and abnormal (11–21 points) for the responders. (14)

In this current study, students were evaluated by using only the HADS-A subscale. Students were questioned about their demographics and subjective stomatognathic system symptoms, such as felt temporomandibular joint discomfort, bruxism and teeth grinding, and increased tension of the masticatory muscles, in the second section of the questionnaire.

Statistical analysis:

There are two types of prevalence data: mean \pm SD or n (%) prevalence. Depending on the type of data, Student's t-tests or chi-square tests were used to analyze differences between groups. The Pearson correlation coefficient was used to analyse correlations between parameters. A P value of 0.05 or below was regarded as statistically significant when doing the statistical analyses using the EpiInfoTM7 software, version 7.1.1.14 (Centres for Disease Control and Prevention, Atlanta, GA, USA; <http://www.cdc.gov/epiinfo/>). P values greater than 0.1 were deemed nonsignificant, whereas values between 0.05 and 0.1 were thought to suggest a potential trend.

Results:

The study included a total of 56 first-year students and 65 final-year students. The first-year group consisted of 16 male and 40 female students (mean age, 20.1 ± 2 years) and the final-year group consisted of 21 male and 44 female

students (mean age, 23.6 ± 0.9 years). The first-year student group was significantly younger than the final-year group ($P < 0.05$). Summaries of clinical and psycho-emotional findings are presented in Tables 1 and 2.

The findings for all students generally as well as a static analysis comparing several factors between a study group of first and final years. The mean right and left masseter tone values in the final year are greater than those in the first year in terms of masseter tone. These differences are substantial, according to the statistical significance. Students in the final year (32%) were much more likely than those in the first year (13%) to report having discomfort in their temporomandibular joints. When all pupils are taken into account, this tendency is still there, with 23% of them reporting temporomandibular joint pain. Additionally, a significant difference was seen in self-reported bruxism, with a larger rate in the final year (26%) compared to the first year (14%). Recessions of the gingiva did not reveal a significant difference. However, compared to the first year (27%), the final year (42%) had considerably more students exhibiting signs of tooth wear. Although not statistically significant, Linea alba had a larger proportion in the first year (67%) than in the final (29%). There was no discernible difference between the two years for a crenated tongue. Overall, this static analysis reveals significant differences between the first and final years in linea alba, self-reported bruxism, masseter tone, and discomfort in the temporomandibular joint.

The table includes general findings for all students as well as a static analysis comparing variables between a first-year and final-year study group. The PSS-10 score, which measures perceived stress levels, showed that first-year students had considerably greater levels of perceived stress than final-year students. Additionally, there was a noticeable difference in the HADS-Anxiety score, with first-year students

scoring higher on the anxiety scale. The first-year students had a larger percentage of medium stress scores when the scores were categorized, whereas the final-year students had a higher percentage of low and high-stress levels. In a similar vein, first-

year students scored more abnormally on the anxiety scale than final-year students did, and vice versa. Overall, these results show differences in stress and anxiety between the first and final years.

Table 1. Distribution of clinical findings in 121 first and final-year Dental students.

Study Group Parameter	First year n=56	Final year n=65	All students n=121	Statistical significance
Mean right masseter tone, μ V	63.4 \pm 2.5	67.7 \pm 12.2	65.55 \pm 7.2	$\rho=0.001$
Mean left masseter tone, μ V	63.4 \pm 2.6	67.8 \pm 11.8	65.58 \pm 5.3	$\rho=0.004$
Perceived temporomandibular joint pain	7 (13)	21 (32)	28(23)	<0.001
Self-observed bruxism	8 (14)	17 (26)	25(21)	$\rho=0.027$
Gingival recessions	18 (32)	15 (23)	33(27)	NS
Tooth wear symptoms	15 (27)	27 (42)	42(35)	$\rho=0.014$
Linea alba	38 (67)	19 (29)	57(47)	$\rho=0.090^*$
Crenated tongue	11 (20)	10 (15)	21(17)	NS

Data presented as mean SD, or n (%) prevalence. *Possible tendency towards statistical significance.

NS, no statistically significant between-group difference ($P \leq 0.1$).

Table 2. Distribution of scores PSS-10 and HADS-anxiety amongst n=121 Dental students.

Study Group Parameter	First Year n=56	Final Year n=65	All students n=121	Statistical significance
PSS-10 score	24 \pm 2.5	17 \pm 2.3	20.5 \pm 2.4	$\rho=0.032$
Low score 0-13 points	16 (28)	15 (23)	31 (25)	$\rho=0.037$
Medium score 14-19 points	12 (21)	36 (55)	48 (39)	$\rho=0.008$
High score 20-40 points	28(68)	14 (37)	41 (35)	$\rho=0.014$
HADS-Anxiety score	14 \pm 1.6	6 \pm 2.7	10 \pm 2.2	$\rho=0.009$
Normal score 0-7 points	15 (27)	12 (18)	27 (22)	$\rho=0.031$
Borderline score, 8-10 points	21 (38)	19 (29)	40 (33)	NS
Abnormal score, 11-21 points	20 (36)	34 (52)	44 (40)	$\rho=0.017$

Data presented as mean \pm SD, or n (%) prevalence
 PSS, Perceived Stress Scale; HADS, Hospital
 Anxiety and Depression Scale

NS, no statistically significant between-group
 difference (P \geq 0.1)

Table 3. Correlation between the perceived stress levels, according to Perceived Stress Scale (PSS)- 10, and student age and masseter muscle tone in n=121 Dental students

Pearson's correlation coefficient		
Variable Pair	r	Statistical significance
PSS-10 and age	-0.30	P<0.001
PSS-10 and right masseter	0.17	P=0.026
PSS-10 and left masseter	0.23	P=0.002

Table 3 offered correlations showing intriguing connections between various factors and perceived stress, as determined by the PSS-10. First off, there is a somewhat negative association between age and felt stress, indicating that experienced stress tends to diminish as age increases. Additionally, both the right and left masseter tone exhibit weakly positive

associations with perceived stress, indicating that greater levels of perceived stress are linked to a modest increase in the muscular tension in the masseter muscles. These results provide important insights into the variables impacting perceived stress levels by shedding light on the links between stress, age, and muscular tension.

Table 4. Correlation between level of (HADS)-Anxiety (A) scores, and student age and masseter muscle tone in n=121 Dental students.

Pearson's correlation coefficient		
Variable Pair	r	Statistical significance
HADS-A and age	-0.19	P = 0.002
HADS-A and right masseter	0.15	P = 0.047
HADS-A and left masseter	0.13	P = 0.089*

In the above table 4, Interesting relationships between anxiety levels (as determined by the HADS-A) and other factors are shown by the correlation analysis. First off, there is a slender negative association between age and anxiety levels, suggesting that as people age, their reported anxiety tends to decline a little. Additionally, both the right and left masseter tone show weakly positive associations with anxiety levels, suggesting that higher anxiety levels may be linked to a minor rise in the muscular tension in the masseter muscles. It's important to note, though, that the link with left masseter tone is only a little bit insignificant. Our knowledge of the variables influencing anxiety levels is aided by these findings, which offer insightful information on the connection between anxiety, age, and muscular tension.

Discussion:

The present study examined the psycho-emotional state of a population of undergraduate Dental students, using the PSS-10 and HADS-A psychological tools, which allowed the observation of increased exposure to stress and increased measured values of anxiety. The significant negative correlation between perceived stress and age suggests that as individuals grow older, their perceived stress levels tend to decrease. This finding aligns with the notion that individuals may develop better-coping mechanisms and resilience over time, leading to lower perceived stress levels. Our study coincides with those of on stress and anxiety levels in dental students.(8) On the whole study population, 41% of subjects had high, abnormal perceived stress levels and 44% showed abnormal levels of experienced anxiety. 56 first year Dental students made up 37% of the study's sample, whereas 65 final-year made up 43% of the total population

The present results agree with those of a published on the subject of perceived capacity to

handle stress was the same for both genders. Men were more likely to employ maladaptive and avoidance coping mechanisms, whilst women were more likely to utilize adaptive coping mechanisms. When it came to stress management, there were no gender differences that were particularly noticeable. (16) The prevalence of anxiety was high in junior undergraduate Dental students as compared to senior undergraduate Dental students. A study conducted in Brazilian southern state of Santa Catarina shows the prevalence of anxiety was high, similarly, the present study shows Students in first grade had considerably higher mean HADS-A scores than those in final-grade. By further segmenting the research population into smaller subgroups based on reported stress and anxiety levels, connections between psychoemotional states and other metrics were revealed.(2,17)

A higher degree of felt stress is linked to more tension in the masseter muscles, according to the positive correlations between perceived stress and both the right and left masseter tone. This result raises the possibility that stress may physically emerge as tension in the jaw muscles, causing problems of the temporomandibular joint and bruxism.(18,19) Age and reported anxiety levels have a modest negative connection, which suggests that as people get older, their reported anxiety tends to gradually decline. This finding implies that coping skills and emotional control may improve with age, resulting in lower levels of anxiety.(20,21) Higher anxiety levels may be linked to more tension in the masseter muscles, according to the positive connections between anxiety levels and both the right and left masseter tones. This result is consistent with the notion that stress and worry may increase muscle tension and activity around the jaw. Similar observations have been published in a study that used the same psychological tool.(22) Many studies demonstrates that individuals with TMD report

more stress than the general healthy population, emphasizing the connection between stress and an increase in masticatory muscle tone. (19,22)

Conclusion

The manifestation of stress and anxiety in the stomatognathic system of undergraduate dentistry students highlights the need for comprehensive mental health support in dental education. By addressing the psychological well-being of students, educational institutions can create an environment that promotes overall student success and fosters a lifelong commitment to self-care. It is imperative to recognize the unique challenges faced by dental students and implement strategies that empower them to thrive both academically and emotionally.

Acknowledgments:

The authors would like to acknowledge all medical students.

Conflict of Interest

The authors declare no conflict of interest

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