

STRESS AND BRUXISM: A STUDY AMONG DENTAL AND MEDICAL STUDENTS AT THE UNIVERSITY OF GHANA

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Abstract

Objective: This study aimed to determine the association between stress and bruxism.

Methodology: A cross-sectional study was done among dental and medical students of the University of Ghana. Anonymized online questionnaires were distributed to the target population. Participants were asked if they, or anyone had noticed them repeatedly grind or clench their teeth while sleep or awake. The questionnaire also included the Perceived Stress scale (PSS) to determine the levels of self-perceived stress among the participants. The presence or absence of bruxism was cross-tabulated with the levels of PSS scores.

Results: A total of 129 students participated in this study. These consisted of 70 females. The prevalence of self-reported bruxism in general was 8.5% in the study population. That of sleep bruxism was 5.4%, while awake bruxism was self-reported in an equal number of students. The distribution of self-reported bruxism varied significantly among the different academic levels of the study participants ($P=0.008$). Students with bruxism reported higher stress scores ($P=0.041$).

Conclusion: Dental and medical students with self-reported bruxism indicated higher stress scores.

Key words: *Bruxism, stress, Ghana, parafunctional habit*

Introduction

Originating from the Greek expression “brychein odontas”, Bruxism is translated to mean gnashing one’s teeth¹, and represents a condition characterized by clenching or grinding of the teeth. This may be accompanied by bracing or thrusting of the mandible.² Several factors have been linked to bruxism. These include stress, occlusal factors, and central nervous or pathophysiological factors.¹ Broadly, the condition may manifest as sleep bruxism or awake bruxism.² It has been reported that particularly for sleep bruxism, events follow a certain notable autonomic activities of rapid-frequency cortical electroencephalogram (EEG) activity, heart rate elevation, increased jaw and oropharyngeal muscle tone, and increased respiratory effort and nasal air flow, leading to an elevated rhythmic masticatory muscle activity in the jaw muscles.^{3,4} Bruxism may lead to headaches⁵, muscular pain around the jaws and temporomandibular joint⁶, and worsening pre-existing periodontal disease⁷. It may also cause damage to restorative work, and for denture wearers, lead to pain and soreness of the denture bearing mucosa.⁸

Bruxism is considered to be a fairly common parafunctional habit, with worldwide reports of prevalence range from 8% to 31% in the general population.⁹ It is also reported to affect 15 to 40 percent of children and 8 to 10 percent of adults.³ The incidence

of bruxism amongst different ethnic groups also varies. In a study conducted on students of four ethnic groups, distributions were evidently different. African-American students reported the lowest incidence of self-reported bruxism (9.4%), Asian students the highest incidence (24.6%); Euro-American and 225 Hispanic students' incidence were intermediate.¹⁰

There seems to be scarce reports on the condition in Ghana and its subregion, while literature does not give any conclusive evidence on the relationship between bruxism and stress. This study, exploring self-reported bruxism and perceived stress, reports the prevalence of the condition and relationship with stress, among the unique population of dental and medical students.

Materials and Methods

Study Design and Participants

For this study, we carried out a cross-sectional study among dental and medical students of the University of Ghana from May to June 2021. Anonymized online questionnaires were distributed to the target population over the study period. The questionnaire (unvalidated) included questions on socio-demographics, and sought to determine the presence of self-reported bruxism. The study included current medical and dental students of the University of Ghana. Enrolled students who had not begun academic work were excluded. Pre-clinical Graduate Entry Medical students were also excluded from the study. Participants were asked if they, or anyone had noticed them repeatedly grind or clench their teeth while asleep (night bruxism) or awake (awake bruxism). Furthermore, they were asked if they experienced trismus, soreness or fatigue of the jaw or

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Conflict of Interest: None Declared

temporal region on waking up. The questionnaire also included the Perceived Stress scale (PSS) to determine the levels of self-perceived stress among the participants.¹¹ The scale required participants to answer 'never', 'almost never', 'sometimes', 'fairly often', or 'very often' to ten questions describing stressful events in the past month.

Ethical Consideration

Ethical approval was obtained from the Ethical Review Committee of the University of Ghana College of Health Sciences (ERC: CPDD/009/011/2020).

Data Analysis

Returned questionnaire were checked for errors. Incomplete questionnaires were excluded from the study. Collected data were entered into Stata software Stata (16.1, Stata Corp LLC, College Station, TX) for analyses.

The prevalence of sleep and awake bruxism among the study population were determined. The PSS scores were obtained by reversing responses (e.g., 0 = 4, 1 = 3, 2 = 2, 3 = 1 & 4 = 0) to the four positively stated items (items 4, 5, 7, & 8) and then summing across all scale items. Total scores were obtained for all participants. The median scores were obtained for the entire population and sub-populations based on the sociodemographic variables. Scores were further divided into 'low', 'moderate' or 'high' levels of stress for scores corresponding to '0-13', '14-26', and '27-40' respectively. The presence or absence of bruxism was then cross-tabulated with the levels of PSS scores, applying the Chi-square test and Fisher's exact test where applicable. The mean PSS scores were also compared among background characteristics. The 'medium' and 'high' PSS levels were further classified as 'substantial' stress. The distribution of 'substantial' stress was determined among sex, course of study, and level of study.

Results

A total of 129 students participated in this study. These consisted of 70 females. About a quarter of the study population were made up of dental students. Other background characteristics are shown in Table 1.

The prevalence of self-reported bruxism in general was 8.5% in the study population. That of sleep bruxism was 5.4%, while awake bruxism was self-reported in an equal number of students. Three participants (2.3%) gave the indication of experiencing both awake and sleep bruxism. The distribution of self-reported bruxism was significantly distributed among the academic levels of the study participants ($P=0.008$).

The Perceived Stress scale scores ranged from 0 to 36, with mean and median scores of 18.9 (SD= 7.8) and 19 (IQR: 14,23) respectively. The mean PSS scores varied significantly among sex, study course, level, and age category. Furthermore, participants who indicated

experiencing bruxism had significantly higher scores compared to those who did not experience bruxism (P -value=0.041). There was generally a high prevalence of 'substantial' stress among the study participants, being present in 99 (76.7%). This was not significantly distributed among the various sub-populations (Table 3).

Table 1: Background Characteristics of Respondents

| Variable | Number | Percent |
|---------------------|--------|---------|
| Sex | | |
| Male | 59 | 45.7 |
| Female | 70 | 54.3 |
| Course | | |
| Dentistry | 34 | 26.4 |
| Medicine | 95 | 73.6 |
| Level | | |
| Basic Science | 12 | 9.3 |
| 1st Clinical | 18 | 14.0 |
| 2nd Clinical | 21 | 16.3 |
| 3rd Clinical | 26 | 20.2 |
| Final year | 52 | 40.3 |
| Age Category | | |
| Less than 23 | 59 | 45.7 |
| 23 or more | 70 | 54.3 |

Table 2: Distribution of Bruxism among dental and medical students

| Variable | Day Bruxism | Night | Total | X ² (P Value) |
|---------------------|-------------|----------|----------|--------------------------|
| Sex | | | | |
| Male | 4 (5.8) | 4 (6.8) | 7 (11.9) | 0.343 |
| Female | 3 (4.3) | 3 (4.3) | 4 (5.7) | |
| Course | | | | |
| Dentistry | 1 (2.9) | 2 (5.9) | 3 (8.8) | 0.943 |
| Medicine | 6 (6.3) | 5 (5.3) | 8 (8.4) | |
| Level | | | | |
| Basic Science | 1 (8.3) | 0 | 1 (8.3) | 0.008 |
| 1st Clinical | 0 | 0 | 0 | |
| 2nd Clinical | 0 | 0 | 0 | |
| 3rd Clinical | 3 (11.5) | 6 (23.1) | 7 (26.9) | |
| Final year | 3 (5.8) | 1 (1.9) | 3 (5.8) | |
| Age Category | | | | |
| Less than 23 | 2 (3.4) | 4 (6.8) | 5 (8.5) | 0.984 |
| 23 or more | 5 (7.1) | 3 (4.3) | 6 (8.6) | |

Table 3: Perceived Stress Among Participant Characteristics

| Variables | Stress score (SD) | Test | Moderate/ Severe (%) | X ² (P-value) |
|---------------------|-------------------|--------|----------------------|--------------------------|
| Sex | | 0.332 | | 0.340 |
| Male | 8.3 (9.2) | | 43 (72.9) | |
| Female | 19.6 (6.5) | | 56 (80) | |
| Course | | 0.011* | | 0.065 |
| Dentistry | 21.9 (6.7) | | 30 (88.2) | |
| Medicine | 17.9 (7.9) | | 69 (72.6) | |
| Level | | 0.001* | | 0.274 |
| MB 2 Class | 20.1 (6.6) | | 11 (91.7) | |
| MB 3 Class | 20.5 (7.4) | | 13 (72.2) | |
| 1st Clinical | 22.7 (7.0) | | 19 (90.5) | |
| 2nd Clinical | 17.6 (7.6) | | 18 (69.2) | |
| Final year | 17.3 (8.2) | | 38 (73.1) | |
| Age Category | | 0.018* | | 0.145 |
| Less than 23 | 20.7 (7.1) | | 49 (83.1) | |
| 23 or more | 17.5 (8.1) | | 50 (71.4) | |
| Bruxism | | 0.041* | | 0.456 |
| Yes | 22.9 (6.1) | | 10 (90.1) | |
| No | 18.6 (7.8) | | 89 (75.4) | |

Discussion

This study, exploring bruxism among a unique population of dental and medical students found its prevalence to be 8.5%. Of this number, 27% reported the occurrence of bruxism both at night, and while awake. The prevalence of bruxism seems to vary, largely depending on the population of study as corroborated by Strausz et al,¹² that the older the population, the lower the prevalence of bruxism. This study found 8.5% while 27% experienced both awake and asleep bruxism. For instance, Fluerasu et al,¹³ recorded prevalence of 15.2% for awake bruxism while asleep bruxism was 32%. Our total prevalence of 8.5% was close to that of Wetselaar et al¹⁴ conducted on the Danish population which revealed 6.6% for awake and 20% for asleep bruxism. From the various studies done across different geographical and cultural backgrounds, bruxism is a major challenge mostly triggered by psychological factors including stress and anxiety and manifests negatively in the dento-maxillary functions of the individuals. There is the need for extensive education to create awareness among the public on the causes of such pathology when it presents so that the appropriate remedies can be sought.

The relationship between bruxism and stress has been implied by several authors over the years. Physiologically, it has been suggested that the two processes might sometimes share some common pathways. Chemelo et al, despite the low certainty of the evidence, demonstrated that stressed individuals show a higher chance of experiencing bruxism when compared to healthy individuals.¹⁵ In corroboration to this observation, our study showed that patients with bruxism significantly had higher stress scores. Our study population, consisting of Dental and Medical students is generally considered to be exposed to several stressors.

From this study, dental students reported a higher level of stress compared to medical students. This observation was at variance to findings by Bali et al, who reported that stress scores for medical students were higher than those for dental students.¹⁶ In the geographic region of the study, dental and medical students are essentially one class for the first four years of study. Among these, 1st clinical year students reported the highest stress scores. Younger students, (less than 23 years) also had higher stress scores. This could have been due to acquisition of adaptive mechanisms over time, as students grow into their fields of study.

Compared to sleep bruxism, awake bruxism is more linked with life stress caused by familial responsibility or work pressure. Sleep bruxism on the other hand is considered as a stereotyped movement disorder occurring during sleep, and classified as a sleep related movement disorder according to recent classification of Sleep Disorders.¹

Conclusion

This study further highlights the potential interrelationship of the two clinical entities which may be relevant for medical practice. Stress management could therefore be considered as a target for allied therapy in the treatment of bruxism. Similarly, bruxism should be considered as a potential sequelae in long-standing stressful situations in the Ghanaian environment.

Our study could have benefited from a larger sample size, while the assertion of the link between bruxism and stress would need further clinical and laboratory investigations. Furthermore, future studies could also incorporate more robust designs and research variables. This study however provides useful information that could be used to inform subsequent studies in Ghana and the sub-region.

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