

RESEARCH ARTICLE

## Early identification of sleep bruxism among dental students: an observational study

Fahmi Yunisa\*✉, Indri Kurniasih\*\*, Vinanga Dentia Putri\*\*\*, Muhammad Kunta Biddinika\*\*\*\*

\*Department of Prosthodontic, Faculty of Dentistry, Universitas Muhammadiyah Yogyakarta, Yogyakarta, Indonesia

\*\*Dental Education Unit, Faculty of Dentistry, Universitas Muhammadiyah Yogyakarta, Yogyakarta, Indonesia

\*\*\*School of Dentistry, Faculty of Dentistry, Universitas Muhammadiyah Yogyakarta, Yogyakarta, Indonesia

\*\*\*\*Magister Teknik Informatika, Universitas Ahmad Dahlan, Yogyakarta, Yogyakarta, Indonesia

\*Jl Brawijaya, Kasihan, Bantul, Yogyakarta, Indonesia; ✉ correspondence: fahmi\_yunisa@umy.ac.id

Submitted: 4<sup>th</sup> July 2023; Revised: 15<sup>th</sup> May 2024; Accepted: 13<sup>rd</sup> August 2024

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### ABSTRACT

Psychological conditions such as stress, anxiety, and depression can trigger sleep bruxism, a parafunctional activity. Dental students are one group that may experience psychological difficulties. Study workloads for dental students can cause stress and lead to sleep bruxism. This research aimed to identify the incidence of sleep bruxism among dental students. Participants were dental students of Universitas Muhammadiyah Yogyakarta (n = 200) aged 23–29 years, with 1–5 years of study periods. We adapted a questionnaire from the American Academy of Sleep Medicine to detect sleep bruxism. This questionnaire contains eight questions about the signs and symptoms experienced by respondents with sleep bruxism. The result of this study showed that only 18% of the participants had sleep bruxism. It can be concluded that the incidence of sleep bruxism in dental students is relatively low.

**Keywords:** dental students; questionnaire; sleep bruxism; study periods

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### INTRODUCTION

Bruxism is defined as a repetitive activity of the chewing muscles during sleep (sleep bruxism) or wakefulness (awake bruxism).<sup>1</sup> In healthy individuals, this behaviour is not classified as an illness, but rather as a behaviour that can contribute to specific clinical implications and comorbidities, either as a risk factor or as a protective factor.<sup>2</sup> The global prevalence of bruxism is estimated to range from 8% to 31.4%. Awake bruxism accounts for 22.1% to 31%, whereas sleep bruxism accounts for 12.8%.<sup>3</sup>

Sleep bruxism is a complex condition which has varied causes. Psychological variables, including depression, anxiety, and stress, are one of the factors contributing to sleep bruxism.<sup>4</sup> Goulart et al. conducted a study that revealed a significant correlation between common psychiatric disorders and sleep bruxism. Clinical diagnosis of bruxism revealed a significant link between somatic anxiety and excessive teeth grinding or jaw clenching.<sup>5</sup>

Polmann et al.'s analysis also indicates a favorable correlation between sleep bruxism and symptoms of stress.<sup>6</sup> Although its mechanism is unknown, people with higher stress levels are more likely to experience bruxism.<sup>7</sup>

Dental education is a complex, rigorous, and unpleasant pedagogical experience. Students are required to complete clinical and non-clinical academic tasks.<sup>8</sup> In Indonesia, all dental schools use a system of clinical case fulfillment at the vocational education level. To be able to graduate and become a dentist, the student must provide direct care to a patient under the supervision of a lecturer as the supervisor and meet specific standards.<sup>9</sup> Throughout the study, students face challenges that may arise from the patient, the tutor, the lecturer, or even the student himself. This condition can trigger depression and stress.<sup>10</sup> Alkhateri et al. conducted a study which revealed that students enrolled in the College of Dentistry had notably elevated levels of stress

and lower scores in terms of both physical and psychological health in comparison to students in other colleges.<sup>11</sup> Basudan et al. found a significant prevalence of depression, anxiety, and stress among dental students. Furthermore, more than half of the students exhibited abnormal levels of these illnesses.<sup>10</sup>

The School of Dentistry at Universitas Muhammadiyah Yogyakarta applies problem-based learning methods to its dental education curriculum. These methods encourage students to become active adult learners during the learning process. These processes can raise the stress level of students. The incidence of bruxism in dental students needs attention, given that the student population is more stressed than the general population.<sup>12</sup> This study aimed to determine the prevalence of sleep bruxism among dental students at Universitas Muhammadiyah Yogyakarta (UMY), Indonesia with varying periods of study.

## MATERIALS AND METHODS

The Research Ethics Committee of the Faculty of Medicine and Health Sciences at UMY had approved the study (approval number: 594/EP-FKIK-UMY/XII/2018). This was a descriptive observational study with a cross-sectional design. We used the non-probability sampling technique to determine the number of respondents. The study's respondents were UMY dental students who met the inclusion criteria: students who were at the

clerkship level and were enrolled at UMY Dental Hospital when the study was conducted. Those who failed to provide comprehensive questionnaire responses met the exclusion criteria.

The respondents who filled out an informed consent as proof of consent were willing to participate in the study. Subsequently, they filled out a questionnaire, which we adapted from the American Academy of Sleep Medicine (Table 1).<sup>13</sup>

The results of the questionnaire filling were then analyzed. The respondents were assessed as experiencing sleep bruxism if they answered "yes" to question number 1 or 2, or both, and answered "yes" to at least one symptom in question number 3. The flow of questionnaire analysis is shown in Figure 1.

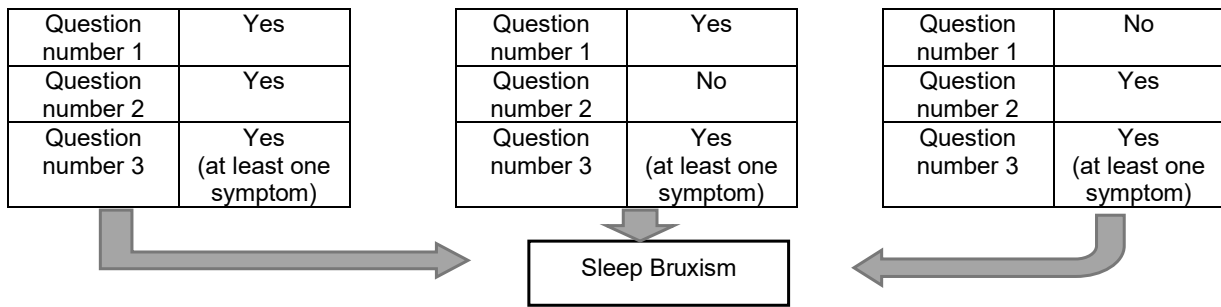
## RESULTS

This study involved 200 respondents who were UMY dental students, consisting of 41 male respondents and 159 female respondents. The respondents in this study had varying study periods, ranging from 1 year to 5 years. The age of the respondents ranged from 23 to 29 years (Table 2). The summary of the questionnaire filling results is shown in Table 3. Thirty-six respondents (18%) were aware of teeth grinding while sleeping.

The results of the questionnaire analysis showed that 36 respondents (18%) experienced sleep bruxism, consisting of 11 respondents with a study period of 1 year, 14 respondents with a study period of 2 years, 7 respondents with a study

**Table 1.** The sleep bruxism questionnaire (American Academy of Sleep Medicine)

1	Are you consciously grinding your teeth, or do other people hear you grind your teeth at night? (Yes No)
2	Do you consciously know that your teeth are deformed? (Yes No)
3	Do you consciously experience any of the following symptoms when you wake up? (Yes, No):
	a. Does your jaw feel sore or stiff when you wake up?
	b. Do you feel that you often bring your upper and lower teeth tightly together or that your mouth hurts when you wake up?
	c. Does your forehead feel tense when you wake up?
	d. Do you have trouble opening your mouth wide when you wake up?
	e. Does your jaw feel tense when you wake up and feel that the tension will decrease if your lower jaw is moved?
	f. Do you hear or feel a clicking sound in your jaw when you wake up and then go away after that?



**Figure 1.** The flow of questionnaire analysis

**Table 2.** The characteristics of respondents based on study period and gender

Study period (year)	Gender (n)		Total (n)
	Man	Woman	
1	14	68	82
2	9	41	50
3	15	35	50
4	2	13	15
5	1	2	3
Total (N)	41	159	200

**Table 3.** A summary of the questionnaire results

No.	Question	Yes	No
1.	Are you consciously grinding your teeth, or do other people hear you grind your teeth at night?	36	164
2.	Do you consciously know that your teeth are deformed?	51	149
3.	Do you consciously experience any of the following symptoms when you wake up? (Yes, No):		
a.	Does your jaw feel sore or stiff when you wake up?	26	174
b.	Do you feel that you often bring your upper and lower teeth tightly together or that your mouth hurts when you wake up?	22	178
c.	Does your forehead feel tense when you wake up?	18	182
d.	Do you have trouble opening your mouth wide when you wake up?	11	189
e.	Does your jaw feel tense when you wake up and feel that the tension will decrease if your lower jaw is moved?	19	181
f.	Do you hear or feel a clicking sound in your jaw when you wake up and then go away after that?	47	143

**Table 4.** The results of the questionnaire analysis

Analysis result	Study period (year)					Total (n)	%
	1	2	3	4	5		
Sleep bruxism	11	14	7	4	0	36	18
Not sleep bruxism	71	36	43	11	3	164	82

period of 3 years, and 4 respondents with a study period of 4 years (Table 4).

## DISCUSSION

This was the first-time research that has been conducted on sleep bruxism in UMY dental students. This study involved students with a study period ranging from 1 to 5 years. The study period at UMY dental school follows the study period regulated by the National College Standards (SNPT), which is a minimum of two years and a maximum of five years. Students must complete learning activities, clinical care requirements for patients, and other tasks to achieve the learning outcomes outlined in the dentistry curriculum.<sup>9</sup>

Various efforts have been made to determine methods of diagnosis of bruxism, and researchers have introduced a variety of techniques and methods for determining bruxism, such as questionnaires, clinical examinations (e.g., tooth decay, hypertrophy of the masseter muscle, hyperkeratosis of the cheeks, lips, and tongue), and polysomnography recording (PSG).<sup>4</sup> Each method possesses distinct implications and varying degrees of assurance. However, the presence of bruxism cannot be reliably determined just by questionnaires and clinical examinations, as this activity is impacted by various factors and is not consistently present at the time of assessment. Polysomnography (PSG) is considered the most reliable and accurate method. Nevertheless, PSG is laborious and incurs expenses and exertion, hence impeding its application in clinical research procedures and routine clinical practice.<sup>2</sup>

According to Lobezzo et al., three criteria for sleep bruxism determine the degree of accuracy of the diagnosis: Possible Sleep Bruxism, Probable Sleep Bruxism, and Definitive Sleep Bruxism. The questionnaire resulted in a diagnosis of Possible Sleep Bruxism. A clinical examination is used to determine a Probable Sleep Bruxism, while a combination of questionnaires, clinical examinations, and polysomnographic recordings is used to establish a Definitive Diagnosis.<sup>12</sup>

This study identified sleep bruxism using a questionnaire adapted from the American Academy of Sleep Medicine. Furthermore, questionnaire methods have been widely used to determine bruxism in research and epidemiological studies. This model is efficient to apply to large populations despite its limitations, such as the fact that respondents need help to understand specific questions and are unaware of their tooth parafunctional behavior. As a result, the questionnaire method needs a higher level of accuracy.<sup>14</sup> It is recommended that the questionnaire be used in conjunction with other clinical evaluation approaches to improve its accuracy.<sup>15</sup>

Based on the findings of this study, the prevalence of sleep bruxism in UMY dental students was relatively low, at 18%. The results are almost the same as a study conducted on Brazilian dental students by Serra Negra et al., which was 21.5%. Serra Negra et al. used answers to the question "In the last 30 days, has anyone ever told you that you grind your teeth in your sleep?" to determine sleep bruxism in the respondents.<sup>14</sup>

Another study on the prevalence of sleep bruxism among students revealed contradictory results. Toyama et al. found that bruxism during sleep occurred in 6.3% of first-year students of Okayama University aged 18–19 years. Toyama et al. used the International Classification of Sleep Disorders, Edition 3 (ICSD-3) questionnaire to determine the status of sleep bruxism.<sup>16</sup> Cavallo et al. found that 31.8% of undergraduate students at University of Salerno with an average age of 23.7 years experienced sleep bruxism. Cavallo used the Fonseca questionnaire to determine the diagnosis of sleep bruxism.<sup>17</sup> According to Soares et al., bruxism was identified in 31.6% of undergraduate students at Federal University of Jequitinhonha and Mucuri Valleys with an average age of 21.5 years.<sup>7</sup>

The prevalence of bruxism in the general population is not homogeneous. According to previous findings, the prevalence of bruxism in adults ranges from 8 to 31.4%.<sup>18</sup> The prevalence of bruxism in children is much higher, ranging

from 3.5 to 40.6%.<sup>19,20</sup> The widespread disparity in prevalence is influenced by the diagnostic methods used, socio-economic conditions, geographical and cultural conditions, and population characteristics.<sup>7</sup>

Although its mechanisms are uncertain, stress is essential in initiating bruxism. The most logical explanation is that emotional stress interferes with sleep quality, so bruxism is a side effect of such a disorder.<sup>21</sup> People who are stressed are three times more likely to have bruxism than those who are not.<sup>7</sup> Several studies have aimed at determining the relationship between stress and the occurrence of sleep bruxism. Some have identified associations,<sup>17,22,23</sup> but some other studies have not found any correlations.<sup>24,25</sup> Individuals suffering from severe sleep bruxism often appear tired at work and in everyday life, affecting their physical health. They also have an inadequate stress response.<sup>26</sup>

Dental students experience more stress than students in other medical fields.<sup>11</sup> This condition seems to be because the dentistry curriculum encourages students to undertake clinical activities related to non-clinical academic tasks.<sup>10</sup> Financial difficulties, lack of free time, and parents' worries about their children's lack of study habits contribute to dental students' stress and academic obstacles.<sup>27,28</sup>

There are some limitations to this study. First, the status of sleep bruxism is determined by filling out a questionnaire with low accuracy. These questionnaire results need to be validated with future clinical and polysomnographic examinations. However, the results of the questionnaire in this study can still be used to detect the prevalence of sleep bruxism in UMY dental students. Second, the study burden or academic achievements of dental students were not included in this study, which could impact the respondents' stress levels.

## CONCLUSION

The percentage of UMY dental students who experienced sleep bruxism was low, at 18%. Students who have studied for more than a year typically exhibit sleep bruxism. However, further

research is necessary to understand the factors that influence sleep bruxism in students.

## ACKNOWLEDGMENT

We would like to thank Universitas Muhammadiyah Yogyakarta for providing funding and research licensing. We also thank all the respondents, including UMY dental students, who have participated in this study.

## CONFLICT OF INTEREST

There is no Conflict of Interest in this study.

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