

## Validation of Sleep Bruxism Questionnaire Based on the Diagnostic Criteria of the American Academy of Sleep Medicine

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### Abstract

Sleep bruxism could be an etiology of temporomandibular disorders (TMD). Patients with sleep bruxism are more likely to experience jaw pain and limitation of jaw movement than people who do not have sleep bruxism. One common way to diagnose sleep bruxism is through the use of a questionnaire, along with a clinical examination, electromyography, and polysomnography. A sleep bruxism questionnaire from the American Academy of Sleep Medicine (2005) diagnostic criteria has been used worldwide, but it has never been validated in Indonesia. To analyze the reliability and validity of this questionnaire in Indonesian, the original English version of the questionnaire was translated using the forward-backward technique, pilot tested in 30 subjects, and then applied to 92 subjects between 20 and 50 years of age. The internal consistency of the questionnaire was evaluated using Cronbach's alpha ( $\alpha$ ) coefficient. The intra class correlation (ICC) coefficients were also evaluated. The validity was analyzed by convergent validity, which was done by analyzing sleep bruxism and TMD. Cronbach's alpha showed moderate result (0.515), and the ICC test-retest value was above 0.808. A validity analysis using coefficient contingency correlation showed a significantly different ( $p < 0.05$ ) and weak correlation value (0.362). A positive correlation value with a weak correlation showed that sleep bruxism does not always cause TMD. The Indonesian version of the sleep bruxism questionnaire is reliable and valid for the assessment of sleep bruxism.

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### Introduction

Sleep bruxism (SB) is an oral habit characterized by rhythmic activity of the masticatory muscles that results in recurrent friction between teeth surfaces during sleep. Two manifestations of bruxism are sleep bruxism and awake bruxism.<sup>1,2</sup> It is a common manifestation in humans. In a recent systematic review, Canto et al. stated that the prevalence of sleep bruxism is around 12.8% of the adult population while Aguilera et al. estimated a prevalence of around 54.51%.<sup>1,3,4</sup>

The occurrence is caused by many factors, such as malocclusion, medicines, alcohol, personality, psychology, and stress related factors. According to Winocur et al. awake

bruxism increases the odds for sleep bruxism and vice versa.<sup>2</sup>

Sleep bruxism could be an etiology of temporomandibular disorders (TMD). Patients with sleep bruxism are more likely to experience jaw pain and limitation of jaw movement than people who do not have sleep bruxism. TMD are a group of disorders with symptoms that include pain, clicking, noise, grating in the jaw joint, or problems chewing or opening the jaw. Okeson identified five factors associated with TMD: occlusal factors, trauma, emotional stress, deep pain input, and parafunctional activities. Parafunctional activity is the most common etiology of TMD, which is bruxism.<sup>5,6,7</sup>

There are various methods that can be used to diagnose sleep bruxism. The foremost among these are polysomnography (PSG), electromyography (EMG), the use of questionnaires, and the presence of tooth wear.<sup>4,8</sup> To diagnose whether an individual has sleep bruxism, many authors have suggested

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questionnaires as a simple method in diagnosis. The advantage of questionnaires is the ability to get information for a large population, making the statistic analysis and evaluation wider and more accurate.<sup>9</sup>

There is still no specific questionnaire for diagnosing sleep bruxism, and none has been validated in Indonesia. Thus, in this study, sleep bruxism was evaluated by a questionnaire based on the diagnostic criteria of the American Academy of Sleep Medicine (2005).

The questionnaire refers to events that occurred during the past six months. This questionnaire has been used worldwide, but it has never been validated in Indonesian. Therefore, the aim of this study is to analyze the reliability and validity of the sleep bruxism questionnaire in Indonesian.

## Method

This study is about the validation of a sleep bruxism questionnaire that has never been validated in the Indonesian language. The design of the study was cross-sectional and conducted in the Dental Teaching Hospital Faculty of Dentistry, Universitas Indonesia from February to May 2016 and approved by the Ethical Committee of the Faculty of Dentistry, Universitas Indonesia, Indonesia.

The original English version of the questionnaire was translated using the forward-backward technique, pilot tested in 30 subjects, and then applied to 92 subjects with the inclusion criterion of age above 18 years old.

The questionnaire refers to events that occurred during the past six months, as follows:

- Are you aware, or has anyone heard you, grinding your teeth frequently during sleep? (yes/no)
- Are you aware that your dentition is worn down more than it should be? (yes/no)
- Are you aware of any of the following symptoms upon awakening? (yes/no)
- Sensation of fatigue, tightness, or soreness of your jaw upon awakening?
- Feeling that your teeth are clenched or that your mouth is sore upon awakening?
- Aching of your temples upon awakening?
- Difficulty in opening your mouth wide upon awakening?

- Feeling of tension in your jaw joint upon awakening and feeling as if you have to move your lower jaw to release it?
- Hearing or feeling a “click” in your jaw joint upon awakening that disappears afterwards?

The respondents were scored as suffering from active sleep bruxism if their answer was positive to question 1 and/or question 2, in addition to at least one positive answer to a symptom listed in question 3.<sup>1</sup>

The first step in validation is based on cross-cultural adaptations of the questionnaire according to Beaton et al. (2000). The first stage in adaptation is forward translation. The sleep bruxism questionnaire was translated from English to Indonesian by two translators. The two translators and a recording observer worked together to synthesize the results of the translations until written agreement was documented. Two translators, who had never read the English version, then translated the Indonesian questionnaire back into the original language. The back translations were produced by two persons whose native language was English. Then, the expert committee (methodologists, health professionals, language professionals, and the translators) consolidated the versions of the questionnaire and developed the prefinal version of the questionnaire for field testing. The next stage of the adaptation process was the pretest of 30 subjects. Each subject completed the questionnaire, signed informed consent, and was interviewed. The final stage in the adaptation process was the submission of all the reports and forms to the developer of the instrument or the committee, and then the final result of the translation was achieved.<sup>9</sup>

After the translation and adaptation processes, the questionnaire was ready for reliability and validity analysis with 92 subjects. The internal consistency of the questionnaire was evaluated using Cronbach's alpha ( $\alpha$ ) coefficient. The intra-class correlation (ICC) coefficients were also evaluated. The validity was analyzed by convergent validity analysis, which was done by analyzing sleep bruxism and TMD.

Himawan et al. (2006) developed the Indeks Diagnostic Temporomandibular Disorder (ID-TMD) questionnaire to diagnose TMD in Indonesia. The ID-TMD questionnaire consists of eight questions that use a four-point rating, which

are never (score of 0), rare (score 1), often (score 2) and always (score 3). The total value ranges from 0 to 24, with a cutoff point value of 3, so that when the total value indicates the value

more than 3, the subject is considered to have TMD (Figure 1).<sup>10</sup>

No	Question Lists	Code	Filling Instruction
1	Do you have symptom such as headache?		<b>Fill in code with:</b> <b>0=Never</b>  <b>1=Sometimes</b>  <b>2=Often</b>  <b>3=Always</b>
2	Do you have symptom such as pain during close and open mouth?		
3	Do you have symptom of joint trismus when getting up in the morning?		
4	Do you have symptom of pain around neck?		
5	Do you have symptom of tinnitus?		
6	Do you clench your teeth when in worries?		
7	Do you clench your teeth when in anger?		
8	Do you clench your teeth when concentrating?		
<b>TOTAL SCORE</b>			
Total Score : 0 – 24 Total Score ≤ 3 : Non Temporomandibular Disorder Total Score > 3 : Temporomandibular Disorder			

**Figure 1.**ID-TMD questionnaire

## Results

The subjects were selected using the consecutive sampling (non-probability sampling) technique, and they were between 20 and 50 years of age. All subjects signed an informed consent and indicated their willingness to participate in filling out the ID-TMD and sleep bruxism questionnaires. All data were processed using IBM SPSS 20 software.

The adaptation result of sleep bruxism questionnaire in the Indonesian language is as follows:

- *Apakah anda mengetahui, atau adakah seseorang yang pernah mendengar anda sering mengerat gigi dalam tidur? (ya/tidak)*
- *Apakah Anda mengetahui bahwa gigi geligi anda menjadi aus lebih dari yang seharusnya terjadi? (ya/tidak)*
- *Apakah anda mengetahui adanya salah satu gejala berikut saat anda bangun? (ya/tidak)*
- *Perasaan lelah, kaku, atau nyeri pada rahang anda saat bangun? (ya/tidak)*
- *Perasaan bahwa gigi anda terkatup rapat atau mulut anda terasa sakit saat bangun? (ya/tidak)*
- *Sakit pada pelipis/dahi anda saat bangun? (ya/tidak)*

- *Kesulitan membuka mulut anda dengan lebar saat bangun? (ya/tidak)*
- *Terasa adanya ketegangan pada sendi rahang saat bangun dan perasaan seolah anda harus menggerakkan rahang bawah anda untuk melepaskan tekanan tersebut? (ya/tidak)*
- *Mendengar atau merasa ketika ada bunyi “klik” pada sendi rahang anda saat bangun, yang kemudian menghilang? (ya/tidak)*

The purpose of this study was to test whether the sleep bruxism questionnaire could be used to diagnose sleep bruxism in Indonesia, and thus it is necessary to test the reliability and validity of the questionnaire. The reliability was tested using Cronbach’s alpha and ICC test–retest coefficients. A Cronbach’s alpha coefficient above 0.8 indicates good internal consistency, 0.4–0.6 is moderate, and less than 0.4 shows low internal consistency. For each question, the subjects answered yes or no. The reliability test to examine the internal consistency showed a moderate result for Cronbach’s alpha (0.515) (Table 1).<sup>11</sup>

The ICC values of the eight test–retest questions ranged from 0.808 to 1.00. The Kappa agreement showed a value above 0.8, from

which it can be concluded that the sleep bruxism questionnaire is reliable (Table 2).

The validity analysis using coefficient contingency correlation showed that the correlation of sleep bruxism and TMD varied significantly ( $p < 0.05$ ), although the correlation value was weak (0.362). A positive correlation value with a weak correlation showed that sleep bruxism does not always cause TMD (Table 3).<sup>12</sup>

**Table 1.** Internal consistency of sleep bruxism questionnaire.

Internal Consistency (Cronbach's Alpha)	Item
0.515	8

**Table 2.** Interclass correlation coefficient

Interclass correlation coefficient (ICC)	
Question No. 1	0.808
Question No.2	0.942
Question No. 3	0.933
Question No.4	0.978
Question No. 5	0.929
Question No. 6	1.000
Question No. 7	0.911
Question No. 8	0.891

**Table 3.** Correlation between sleep bruxism and TMD

ID-TMD Coefficient p	
Non TMDTMD Correlation (r)	
Non-sleep bruxism	2621 0.3620.000
Sleep bruxism	8 37

Coefficient contingency correlation.

## Discussion

Sleep bruxism was evaluated using a questionnaire based on the diagnostic criteria of the American Academy of Sleep Medicine (AASM, 2005). The questionnaire is an accurate, systematic, and simple tool for diagnosing sleep bruxism. This instrument has been used by Winocur et al. to examine self-reported bruxism.<sup>2</sup> Canto et al. (2014) argued that the clinical diagnosis of sleep bruxism should be based on

the international diagnostic criteria proposed by the AASM.<sup>1</sup> Although it has been used worldwide, this questionnaire has not yet been validated in Indonesia

A good research study should be reliable and valid. Reliability is the degree to which an assessment tool produces stable and consistent results.<sup>12</sup> Validity refers to how well a test measures what it is supposed to measure.<sup>13</sup> The sleep bruxism questionnaire contains eight questions, and based on the reliability and validity analyses, the Indonesian version of the questionnaire is reliable and valid for the assessment of sleep bruxism.

This study did not use other instruments, such as clinical examination, electromyography, or polysomnography (PSG) because those assessments are time consuming, expensive, and difficult to gain access to in the public health system. The gold standard for the diagnosis of sleep bruxism is polysomnographic assessment in a sleep laboratory when the subject is asleep, but the PSG data can be affected by the numerous electrodes attached to the subjects face and body or by environmental bias.<sup>4</sup> Episodes of rhythmic masticatory muscle activity of the masseter are not always accompanied by tooth grinding sounds.<sup>1</sup> Questionnaires have a disadvantage in that the quality of the findings depends on the extent to which the subject is aware of his or her teeth grinding.<sup>7</sup>

One way of establishing whether a person suffers from bruxism is to use a more complex technique, such as polysomnography for sleep bruxism or electromyography for awake bruxism.<sup>2,14</sup> Canto et al. utilized polysomnography (PSG) and electromyography (PSG), finding that the prevalence of sleep bruxism in the adult population is about 12.8%.<sup>1</sup> However, according to Aguilera et al., the overall prevalence of self-reported sleep bruxism was 54.51%. Aguilera et al. used a questionnaire, which made it easier to deal with a large sample of 1220 subjects from January 2007 to March 2012. One of the questions refers to self-reported sleep bruxism: "Have you been told, or do you notice that you grind your teeth or clench your jaw while sleeping at night?" (Question 15c on the RDC/TMD).<sup>4,15</sup> This question is similar to question number 1 from the sleep bruxism questionnaire that was used in this study.

## Conclusion

The Indonesian version of the sleep bruxism questionnaire is reliable and valid for the assessment of sleep bruxism.

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