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Research Article

Validation of the Korean Version of the Mini-Sleep Questionnaire—Insomnia in Korean College Students

Hee-Ju Kim, PhD, RN, OCN *

College of Nursing, The Catholic University of Korea, Seoul, South Korea

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SUMMARY

Purpose: This study aimed to evaluate the reliability and validity of the Korean version of the Mini-Sleep Questionnaire—Insomnia in Korean college students.
Methods: A total of 470 students from six nursing colleges in South Korea participated in the study. The translation and linguistic validation of the Mini-Sleep Questionnaire-Insomnia was performed based on guidelines. The Pittsburgh Sleep Quality Index and the Perceived Stress Scale were used to validate the measure. Cronbach α, item-total correlation for internal consistency reliability and intraclass correlation coefficient for test–retest reliability were evaluated. Exploratory factor analysis for construct validity, Pearson's correlation with the Pittsburgh Sleep Quality Index and the Perceived Stress Scale for concurrent validity, and the receiver operating character curve for predictive validity were assessed.
Results: The 4-item Mini-Sleep Questionnaire—Insomnia had a Cronbach α of .69 and the item-total correlations were higher than .30. Cronbach α increased to .73 if the item assessing the use of sleeping pills and tranquilizers was deleted. This item had marked skewness and kurtosis issues. Factor analysis indicated unidimensionality, explaining 53.0% of the total variance. The measure showed high test–retest reliability (i.e., intraclass correlation coefficient = .84), acceptable concurrent validity (r with the Pittsburg Sleep Quality Index = .69; r with the Perceived Stress Scale = .31) and predictive validity [area under curve = .85; 95% confidence interval (0.81, 0.90)].
Conclusion: The Mini-Sleep Questionnaire—Insomnia showed acceptable reliability and validity. Yet, the limited distribution in sleep medications warrants further evaluations in the clinical population.

Introduction

Sleep disturbance has become a significant health issue for Koreans, with 7.6% annual national increase rates in number of cases and 13.5% annual increase rates in health insurance expenses since 2012 [1]. Sleep disturbance can occur in diverse forms, such as insomnia characterized by the difficulty in initiating and maintaining sleep, hypersomnia characterized by excessive somnolence, parasomnia characterized by abnormal behaviors or emotion during sleep, and sleep–wake cycle disorders [2]. The adverse impacts of sleep disturbance have been documented for psychological health [3–5], physical health [6], and cognitive function [7].

Reliable and valid subjective sleep measures are essential in assessing and managing sleep disturbance [8]. Several internationally recognized sleep measures are available in Korean, such as the Epworth Sleepiness Scale [9], the General Sleep Disturbance Scale [10], the Insomnia Severity Index [11], the Leeds Sleep Evaluation Questionnaires [10], and the Pittsburgh Sleep Quality Index (PSQI) [12]. These measures are mostly comprehensive in nature, evaluating various types of sleep disturbance (e.g., insomnia, hypersomnia) and their associated factors (e.g., substance use, exercise, and respiratory problems) or impacts (e.g., daytime sleepiness, naps, fatigue, and impairments in daily activities). For instance, the 19-item PSQI [13] measures sleep quality, sleep latency and duration, medication use, and daytime dysfunction. The 21-item General Sleep Disturbance Scale [14] measures sleep initiation and maintenance difficulty, quality and quantity of sleep, fatigue, hypersomnia, substance use, and daytime sleepiness. The 10-item Leeds Sleep Evaluation Questionnaire [15] measures initiating sleep, sleep quality, wakening, and behaviors after waking.

These comprehensive measures are useful tools. Yet, comprehensive sleep measures do not focus on specific types of sleep

* Correspondence to: Hee-Ju Kim, College of Nursing, The Catholic University of Korea, 505 Banpo Dong, Seo-Cho-Gu, Seoul, South Korea.
E-mail address: heeju0906@gmail.com

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disturbance; rather, they are general sleep-health assessment tools by nature. In addition, the length of the comprehensive measures makes them difficult to incorporate into busy clinical settings and research studies with frequent assessments or large numbers of survey questionnaires. Brief sleep measures are needed in situations where participant burden or assessment cost is an issue. Also, brief sleep measures are more likely to focus on a specific type of sleep disturbance. For instance, the Epworth Sleepiness Scale [16] assesses daytime sleepiness with eight items. The Insomnia Severity Index [17] assesses insomnia with seven items.

The Mini-Sleep Questionnaire—Insomnia (MSQ-Insomnia) is another brief measure for insomnia. It is a subscale of the Mini-Sleep Questionnaire [18] consisting of four items assessing difficulties in initiating and maintaining sleep, waking too early, and the use of sleep medication on a 7-point scale (1 = *never*, 7 = *always*). The Mini-Sleep Questionnaire was originally developed with seven items: six items assess hypersomnolence and one item assesses sleep maintenance. By adding three items, this 10-item version includes the two subscales of insomnia (4 items) and hypersomnia (6 items) [19,20]. The separate use of each subscale is often recommended because each subscale measures different types of sleep disturbance [20]. The conceptual elusiveness in the relationships between hypersomnia (i.e., often assessed as daytime sleepiness) and insomnia further supports the separate use of subscales. Insomnia does not necessarily accompany daytime sleepiness, as evidenced by the lack of association between chronic insomnia experiences and daytime sleepiness in college students [5]. In other words, insomnia and hypersomnolence are unrelated experiences in some populations and should be evaluated separately. Due to its brevity, the MSQ-Insomnia subscale has great usefulness. Yet, no one has made a formal translation of this measure into Korean or performed subsequent systematic evaluations of its psychometric quality.

Therefore, this study aimed to evaluate the reliability and validity of the Korean version of the MSQ-Insomnia in Korean college students. In particular, internal consistency reliability, test–retest reliability, construct validity, concurrent validity, and predictive validity were of interest in the evaluation. The present study used a college student sample, as other studies validated the Mini-Sleep Questionnaire in this population [19,21] and sleep disturbance is common in this age group [5,22]. The present study used the PSQI and the Perceived Stress Scale (PSS) as the external criterion to validate the MSQ-Insomnia. The PSQI was chosen because it is associated with the Mini-Sleep Questionnaire in a previous measurement validation study [20]. Stress, theoretically and empirically, is associated with sleep. Researchers have often reported an association between stress and sleep quality in college students [23,24].

Methods

Study design

This was a cross-sectional descriptive study.

Setting and sample

Data were collected from 470 students between June 2012 and December 2012 in six conveniently selected nursing schools (one in Seoul, three in Daegue, and two in Pusan); 115 students from the total sample attended the retest. The retest was conducted exactly 1 week later in three conveniently selected schools (one school in each city). The time interval of 1 week was determined based on the previous Mini-Sleep Questionnaire validation study with college students [19]. The sole inclusion criterion was students who were taking classes at a selected college. The sample size was not predetermined because this study was exploratory in nature.

Ethical consideration

The primary investigator obtained approval from The Catholic University of Korea institutional review board (approval no. MC12QISI0075).

Instruments

The translation process of the MSQ-Insomnia Korean version included the following steps: First, the MSQ-Insomnia was translated into Korean by the researcher, who was fluent in English and Korean. Linguistic validation was conducted using two methods, as suggested by Brislin [25]: back-translation and bilingual techniques. Three bilingual volunteers independently back-translated the Korean version into English. Then, a bilingual volunteer evaluated the level of agreement between the original English version and the back translations on a scale of 0–10 (0 = *never agree*, 10 = *almost identical*). Each item from the three volunteers' back-translations were evaluated and found to have equal or higher than eight points in agreement. Thus, the researcher concluded the original English version and the back-translated English versions from bilingual volunteers were identical in content with only slight wording differences.

In the bilingual technique, three bilingual volunteers were asked to respond to the Korean version and the original English version. A minimum of a 3-hour interval was allowed in responding to the two versions. Then, the item-response consistency between the two versions was checked. No item-response discrepancy was found in any of the three bilingual volunteers' responses. Thus, the Korean translation of MSQ–Insomnia was found to be valid.

The PSQI [13] consists of 19 items: subjective sleep quality (1 item), sleep latency (2 items), sleep duration (1 item), sleep efficiency (3 items), sleep disturbance (9 items), sleep medication (1 item), and daytime dysfunction (2 items). The global score on the PSQI ranges from 0 to 21 with higher scores indicating worse sleep quality. Internal consistency, stability (test–retest reliability), and various forms of validity were confirmed in a general population [13]. The PSQI was translated into Korean and validated in the sample including participants with clinical sleep disorder and healthy controls [12]. Cronbach α was .84 in the validation study. Cronbach α was .62 for the global scale and .69 for the sleep disturbance component in the present study.

The PSS [26] is a widely used stress measure. Its validated Korean version [27] consists of 10 items rated on a 5-point scale (0 = *not at all* to 4 = *extremely often*) with a higher score indicating more severe stress. Cronbach α was .77 for the negative-perception subscale and .74 for positive-perception subscale [27]. Cronbach α of the total scale was .80 in the present study.

The recall timeframe in the present study was the past month for all measures. This timeframe was selected to assess habitual, consistent sleep problems, not situational problems. This was also the timeframe suggested by the test developers for the PSQI [13].

Data collection and procedure

The primary investigator obtained approval to access participants from course directors. Then, research assistants visited participants in a classroom after the class and informed them of the purpose and procedure of the study. Those who agreed to participate in the study completed the questionnaires. Those who wanted to attend the retest were asked to remember the random number on the initial questionnaire and write down the same number on