Original Article

The Single-Item Sleep Quality Scale is a Valid Tool to Measure Sleep Quality

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Abstract

Background: Sleepiness and insomnia are common complaints in the general population. **Aim:** To estimate the reliability and the validity of the single-item sleep quality scale (SQS) in a sample of the general population in Greece.

Methods: We conducted a cross-sectional study during December 2024. We used the SQS to measure sleep quality. Also, we used a simple question (How sleepy do you feel in class/at work?) with answers in a scale from 0 to 10 to measure sleepiness. We used the Patient Health Questionnaire-4 (PHQ-4) to measure levels of anxiety and depression. We used the Bergen Social Media Addiction Scale (BSMAS) to measure social media addiction, and the TikTok Addiction Scale (TTAS) to measure TikTok addiction.

Results: Intraclass correlation coefficient between the two measurements of the SQS during the test-retest study was 0.976 (95% confidence interval = 0.968 to 0.982, p<0.001) indicating excellent reliability of the SQS. Correlations between the SQS and PHQ-4, TTAS, BSMAS and sleepiness were statistically significant and therefore concurrent validity of the SQS was excellent. In particular, we found a negative correlation between the single-item sleep quality scale, and PHQ-4 ($r = -0.470$, p-value < 0.001), TTAS ($r = -0.159$, p-value = 0.022), BSMAS ($r = -0.153$, p-value = 0.029) and sleepiness ($r = -0.443$, p-value < 0.001). Therefore, we found that better sleep quality is associated with lower levels of anxiety, depression, TikTok addiction, social media addiction, and sleepiness. **Conclusion:** The single-item sleep quality scale is a reliable and valid tool that we can use to measure sleep quality in the general population.

Key words: single-item sleep quality scale; sleepiness; validity; TikTok Addiction Scale; Patient Health Questionnaire-4

Introduction

Insomnia is a prevalent health issue marked by challenges in falling asleep or staying asleep, even when there are sufficient chances to sleep, which adversely impacts daytime activities (American Psychiatric Association, 2013). Studies have shown that the prevalence of insomnia varies between 4% and 22%, depending on the criteria used for diagnosis (Roth et al., 2011). While insomnia can occur independently, it is also a primary symptom of numerous medical and psychiatric disorders, including major depressive disorder, bipolar disorder, generalized anxiety disorders, posttraumatic stress disorder, and schizophrenia (Doghramji, 2006; Krystal, 2012).

Poor sleep is linked to negative effects on a person's psychological, social, and cognitive functioning, leading to a decline in overall quality of life (Szentkirályi et al., 2009). Given the significant impact of sleep disturbances on individuals and their implications, tools to measure sleep quality in clinical settings are crucial to determine if a sleep issue requires further investigation or treatment and to aid in monitoring treatment progress.

Sleep can be evaluated by assessing factors such as sleep duration, sleep architecture, sleep latency, and the frequency and duration of nighttime awakenings. Sleep-rating questionnaires assess the qualitative aspects of sleep quality, including perceptions of sleep depth, difficulty walking, and restfulness after sleep, along with other factors that might influence sleep quality, such as comorbid conditions and medication use. Evaluating the qualitative aspects of sleep is essential, as sleep complaints can persist even when quantitative sleep measures are normal (Krystal & Edinger, 2008; Zhang & Zhao, 2007).

Assessing sleep quality is particularly important. In response to the need for evaluation tools in insomnia research, several sleep questionnaires have been developed and validated (Lomeli et al., 2008). The single-item sleep quality scale (SQS) is a tool designed to offer a more practical approach to

assessing sleep quality in clinical settings compared to commonly used sleep quality evaluation standards. The SQS is a self-assessed, comprehensive sleep quality evaluation tool (Snyder et al., 2018).

The aim of our study was to estimate the reliability and the validity of the single-item sleep quality scale (Snyder et al., 2018) in a sample of the general population in Greece.

Methods

Study design: We conducted a cross-sectional study in Greece during January 2025. We employed the forward-backward method to translate and adapt the SQS in Greek language (Galanis, 2019). In particular, two scholars translated the English version of the SQS in Greek, and then two other scholars back translated the Greek version in English. Another scholar overviewed the translation procedure solving any discrepancies.

Moreover, we performed cognitive interviews with five individuals in order to assess the face validity of the SQS (Galanis, 2019). Face validity was excellent since all participants understand and complete the SQS.

The SQS assesses the sleep quality overall with the following single item "During the past 7 days, how would you rate your sleep quality overall?" (Snyder et al., 2018). Developers of the SQS request from individuals to think about the quality of their sleep overall, such as how many hours of sleep they got, how easily they fell asleep, how often they woke up earlier than they had to in the morning, and how refreshing their sleep was. Answers are on a scale from 0 (terrible sleep quality) to 10 (excellent sleep quality). Answers from 1 to 3 refer to poor sleep quality, from 4 to 6 to fair sleep quality, and from 7 to 9 to good sleep quality.

We performed a test-retest study to examine the reliability of the SQS by calculating the intraclass correlation coefficient (Galanis, 2013).

We examined the concurrent validity of the SQS using the Patient Health Questionnaire-4 (PHQ-4) (Karekla et al., 2012; Kroenke et al., 2009). Higher scores on the PHQ-4 indicate higher levels of anxiety and depression. We expected a negative correlation between the SQS and the PHQ-4.

Moreover, we examined the concurrent validity of the SQS using the TikTok Addiction Scale (TTAS) (Bilali et al., 2025; Galanis et al., 2024, 2025; Katsiroumpa, Moisoglou, Gallos, et al., 2025). Higher scores on the TTAS indicate higher levels of TikTok addiction. We expected a negative correlation between the SQS and the TTAS.

Also, we used the Bergen Social Media Addiction Scale (BSMAS) (Andreassen et al., 2016; Dadiotis et al., 2021; Katsiroumpa, Katsiroumpa, et al., 2025; Katsiroumpa, Moisoglou, Mitropoulos, et al., 2025) to examine the concurrent validity of the SQS. Higher scores on the BSMAS indicate higher levels of social media addiction. We expected a negative correlation between the SQS and the BSMAS.

We used a simple question (How sleepy do you feel in class/at work?) with answers in a scale from 0 (not at all) to 10 (very much) to measure sleepiness. Then, we examined the concurrent validity of the SQS with this question. We expected a negative correlation between the SQS and sleepiness.

Ethical considerations: We applied the guidelines of the Declaration of Helsinki to perform this study (World Medical Association, 2013). Additionally, the study protocol was approved by the Ethics

Committee of Faculty of Nursing, National and Kapodistrian University of Athens (approval number; 15, December 9, 2024).

Statistical analysis: We use numbers and percentages to present categorical variables, and means and standard deviations to present continuous variables. We calculated intraclass correlation coefficient between the two measurements of the SQS during the test-retest study. We calculated Pearson's correlation coefficient between the SQS and PHQ-4, TTAS, BSMAS and sleepiness in order to estimate the concurrent validity of the SQS. We used the IBM SPSS 28.0 for the analysis.

Results

Study population included 205 participants. Among them, 76.6% (n=157) were females and 23.4% (n=48) were males. Mean age of our sample was 24.3 years (standard deviation; 7.8).

Intraclass correlation coefficient between the two measurements of the SQS during the test-retest study was 0.976 (95% confidence interval = 0.968 to 0.982, p<0.001) indicating excellent reliability of the SQS.

Correlations between the SQS and PHQ-4, TTAS, BSMAS and sleepiness are presented in Table 1. All correlations were statistically significant and therefore concurrent validity of the SQS was excellent. In particular, we found a negative correlation between the single-item sleep quality scale, and Patient Health Questionnaire-4 (r = -0.470, p-value < 0.001), TikTok Addiction Scale (r = -0.159, p-value = 0.022), Bergen Social Media Addiction Scale (r = -0.153, p-value = 0.029) and sleepiness (r = -0.443, p-value < 0.001).

Therefore, we found that better sleep quality is associated with lower levels of anxiety, depression, TikTok addiction, social media addiction, and sleepiness.

Table 1. Correlations between the single-item sleep quality scale (SQS), and study scales.

Scale	Single-item sleep quality scale	
	Correlation coefficient	**P-value**
Patient Health Questionnaire-4	-0.470	<0.001
TikTok Addiction Scale	-0.159	0.022
Bergen Social Media Addiction Scale	-0.153	0.029
Sleepiness	-0.443	<0.001

Discussion

In this study, the SQS was translated into Greek for the first time, and its psychometric characteristics were examined. We conducted a thorough psychometric analysis to evaluate the measurement attributes of the Greek SQS. The results demonstrated that the Greek SQS exhibits high validity and test-retest reliability. The findings suggest that the SQS

has excellent concurrent validity. There were statistically significant correlations between the SQS and the Patient Health Questionnaire-4, TikTok Addiction Scale, and Bergen Social Media Addiction Scale. The association was negative, indicating that better sleep quality correlates with lower scores on the PHQ-4, TTAS, and BSMAS.

The SQS can serve as an initial step in screening for sleep issues, as well as during treatment and post-discharge. Additionally, the SQS can complement other screening and health-related measures. Various composite and ultra-brief measures of sleep problems have been developed and utilized in both clinical practice and research (Cudney et al., 2022). However, there is growing interest in single-item screeners for sleep issues in clinical settings and research. These screeners reduce patient burden, administration time, and cost, and are easy to interpret. Research has shown that single-item scales significantly correlate with multi-item sleep measures. For instance, a significant relationship has been found between the single-item Sleep Quality Scale (Snyder et al., 2018) and both the Insomnia Severity Index and Pittsburgh Sleep Quality Index (Dereli & Kahraman, 2021; Snyder et al., 2018). Other examples include a significant correlation between the single-item Patient Global Impression-Severity scale and the Insomnia Severity Index (Snyder et al., 2021), as well as a significant correlation between a single sleep item from the Posttraumatic Stress Disorder Checklist—Civilian Version and the Insomnia Severity Index (Parsons et al., 2018). The significant relationships between single-item and multi-item measures, as mentioned above, indicate that using single-item measures in certain situations is

desirable, appropriate, and practical (Diamantopoulos et al., 2012).

Our study had several limitations. We used a convenience sample of the general population to validate the SQS in Greek, which limits the generalizability of our findings. It is important to validate this tool with other samples in Greece. Additionally, we used self-reported questionnaires, such as the PHQ-4, TTAS, and the BSMAS, to examine the concurrent validity of the SQS. Researchers could also explore various other types of validity for the SQS.

In conclusion, the single-item sleep quality scale is a reliable and valid tool that we can use to measure sleep quality in the general population.

References

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders: DSM-5* (5th ed). American psychiatric association.

Andreassen, C. S., Billieux, J., Griffiths, M. D., Kuss, D. J., Demetrovics, Z., Mazzoni, E., & Pallesen, S. (2016). The relationship between addictive use of social media and video games and symptoms of psychiatric disorders: A large-scale cross-sectional study. *Psychology of Addictive Behaviors*, *30*(2), 252–262. https://doi.org/10.1037/adb0000160

Bilali, A., Katsiroumpa, A., Koutelekos, I., Dafogianni, C., Gallos, P., Moisoglou, I., & Galanis, P. (2025). Association Between TikTok Use and Anxiety, Depression, and Sleepiness Among Adolescents: A Cross-Sectional Study in Greece. *Pediatric Reports*, *17*(2), 34. https://doi.org/10.3390/pediatric17020034

Cudney, L. E., Frey, B. N., McCabe, R. E., & Green, S. M. (2022). Investigating the

relationship between objective measures of sleep and self-report sleep quality in healthy adults: A review. *Journal of Clinical Sleep Medicine*, *18*(3), 927–936. https://doi.org/10.5664/jcsm.9708

Dadiotis, A., Bacopoulou, F., Kokka, I., Vlachakis, D., Chrousos, G. P., Darviri, C., & Roussos, P. (2021). Validation of the Greek version of the Bergen Social Media Addiction Scale in Undergraduate Students. *EMBnet.Journal*, *26*(1), e975. https://doi.org/10.14806/ej.26.1.975

Dereli, M., & Kahraman, T. (2021). Validity and reliability of the Turkish version of single-item Sleep Quality Scale in healthy adults. *Sleep Medicine*, *88*, 197–203. https://doi.org/10.1016/j.sleep.2021.10.032

Diamantopoulos, A., Sarstedt, M., Fuchs, C., Wilczynski, P., & Kaiser, S. (2012). Guidelines for choosing between multi-item and single-item scales for construct measurement: A predictive validity perspective. *Journal of the Academy of Marketing Science*, *40*(3), 434–449. https://doi.org/10.1007/s11747-011-0300-3

Doghramji, K. (2006). The epidemiology and diagnosis of insomnia. *The American Journal of Managed Care*, *12*(8 Suppl), S214-220.

Galanis, P. (2013). Validity and reliability of questionnaires in epidemiological studies. *Arch Hellen Med*, *30*(1), 97–110.

Galanis, P. (2019). Translation and cross-cultural adaptation methodology for questionnaires in languages other than Greek. *Arch Hellen Med*, *36*(1), 124–135.

Galanis, P., Katsiroumpa, A., Moisoglou, I., & Konstantakopoulou, O. (2024). The TikTok Addiction Scale: Development and validation. *AIMS Public Health*, *11*(4), 1172–1197. https://doi.org/10.3934/publichealth.2024061

Galanis, P., Katsiroumpa, A., Moisoglou, I., & Konstantakopoulou, O. (2025). Determining an optimal cut-off point for TikTok addiction using the TikTok Addiction Scale. *Archives Hellenic Medicine*, *42*(4), 554–559.

Karekla, M., Pilipenko, N., & Feldman, J. (2012). Patient Health Questionnaire: Greek language validation and subscale factor structure. *Comprehensive Psychiatry*, *53*(8), 1217–1226. https://doi.org/10.1016/j.comppsych.2012.05.008

Katsiroumpa, A., Katsiroumpa, Z., Koukia, E., Mangoulia, P., Gallos, P., Moisoglou, I., & Galanis, P. (2025). *Bergen Social Media Addiction Scale: Translation and validation in Greek*. https://doi.org/10.31219/osf.io/93rns_v1

Katsiroumpa, A., Moisoglou, I., Gallos, P., Katsiroumpa, Z., Konstantakopoulou, O., Tsiachri, M., & Galanis, P. (2025). Problematic TikTok Use and Its Association with Poor Sleep: A Cross-Sectional Study Among Greek Young Adults. *Psychiatry International*, *6*(1), 25. https://doi.org/10.3390/psychiatryint6010025

Katsiroumpa, A., Moisoglou, I., Mitropoulos, A., Paschali, A., Koutelekos, I., Katsiroumpa, Z., & Galanis, P. (2025). Association Between Social Media Addiction and Mental Health among Greek Young Adults. *International Journal of Caring Sciences*, *18*(1), 459–466.

Kroenke, K., Spitzer, R. L., Williams, J. B. W., & Lowe, B. (2009). An Ultra-Brief Screening Scale for Anxiety and Depression: The PHQ-4. *Psychosomatics*, *50*(6), 613–621. https://doi.org/10.1176/appi.psy.50.6.613

Krystal, A. D. (2012). Psychiatric disorders and sleep. *Neurologic Clinics*, *30*(4), 1389–1413. https://doi.org/10.1016/j.ncl.2012.08.018

Krystal, A. D., & Edinger, J. D. (2008). Measuring sleep quality. *Sleep Medicine*, *9 Suppl 1*, S10-17. https://doi.org/10.1016/S1389-457(08)70011-X

Lomeli, H. A., Pérez-Olmos, I., Talero-Gutiérrez, C., Moreno, C. B., González-Reyes, R., Palacios, L., de la Peña, F., & Muñoz-Delgado, J. (2008). Sleep evaluation scales and questionaries: A review. *Actas Espanolas De Psiquiatria*, *36*(1), 50–59.

Parsons, E. C., Hough, C. L., Vitiello, M. V., Palen, B., Zatzick, D., & Davydow, D. S. (2018). Validity of a single PTSD checklist item to screen for insomnia in survivors of critical illness. *Heart & Lung*, *47*(2), 87–92. https://doi.org/10.1016/j.hrtlng.2017.12.006

Roth, T., Coulouvrat, C., Hajak, G., Lakoma, M. D., Sampson, N. A., Shahly, V., Shillington, A. C., Stephenson, J. J., Walsh, J. K., & Kessler, R. C. (2011). Prevalence and Perceived Health Associated with Insomnia Based on DSM-IV-TR; International Statistical Classification of Diseases and Related Health Problems, Tenth Revision; and Research Diagnostic Criteria/International Classification of Sleep Disorders, Second Edition Criteria: Results from the America Insomnia Survey. *Biological Psychiatry*, *69*(6), 592–600. https://doi.org/10.1016/j.biopsych.2010.10.023

Snyder, E., Cai, B., DeMuro, C., Morrison, M. F., & Ball, W. (2018). A New Single-Item Sleep Quality Scale: Results of Psychometric Evaluation in Patients With Chronic Primary Insomnia and Depression. *Journal of Clinical Sleep Medicine*, *14*(11), 1849–1857. https://doi.org/10.5664/jcsm.7478

Snyder, E., Tao, P., Svetnik, V., Lines, C., & Herring, W. J. (2021). Use of the single-item Patient Global Impression-Severity scale as a self-reported assessment of insomnia severity. *Journal of Sleep Research*, *30*(1), e13141. https://doi.org/10.1111/jsr.13141

Szentkirályi, A., Madarász, C. Z., & Novák, M. (2009). Sleep disorders: Impact on daytime functioning and quality of life. *Expert Review of Pharmacoeconomics & Outcomes Research*, *9*(1), 49–64. https://doi.org/10.1586/14737167.9.1.49

World Medical Association. (2013). World Medical Association Declaration of Helsinki: Ethical Principles for Medical Research Involving Human Subjects. *JAMA*, *310*(20), 2191. https://doi.org/10.1001/jama.2013.281053

Zhang, L., & Zhao, Z.-X. (2007). Objective and subjective measures for sleep disorders. *Neuroscience Bulletin*, *23*(4), 236–240. https://doi.org/10.1007/s12264-007-0035-9