ORIGINAL ARTICLE

The Pittsburgh Sleep Quality Index: Validation of the Urdu Translation

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ABSTRACT

Objective: To translate and validate the Pittsburgh Sleep Quality Index (PSQI), a standardized self-administered questionnaire for the assessment of subjective sleep quality into the Urdu language.

Study Design: Validation study.

Place and Duration of Study: Mayo Hospital, Lahore, from March to April 2012.

Methodology: The PSQI was translated into Urdu following standard guidelines. The final Urdu version (PSQI-U) was administered to 200 healthy volunteers comprising medical students, nursing staff and doctors. Inter-item correlation was assessed by calculating Cronbach alpha. Correlation of component scores with global score was assessed by calculating Spearman correlation coefficient. Correlation between global PSQI-U scores at baseline with global scores for each PSQI-U and PSQI-E at 4-week interval was evaluated by calculating Spearman correlation coefficient. Moreover, scores on individual items of the scale at baseline were compared with respective scores after 4-week by t-test.

Results: One hundred and eighty five (185) participants completed the PSQI-U at baseline. The Cronbach alpha for PSQI-U was 0.56. Scores on individual components of the PSQI-U and composite scores were all highly correlated with each other (all p-values < 0.01). Composite scores for PSQI-U at baseline and PSQI-E at 4-week interval were also highly correlated with each other (Spearman correlation coefficient 0.74, p-value < 0.01) indicating good linguistic interchangeability. Composite scores for PSQI-U at baseline and at 4-week interval were positively correlated with each other (Spearman correlation coefficient 0.70, p < 0.01) indicating good test-retest reliability.

Conclusion: The PSQI-U is a valid and reliable instrument for the assessment of sleep quality. It shows good linguistic interchangeability and test-retest reliability in comparison to the original English version when applied to individuals who speak the Urdu language. The PSQI-U can be a tool either for clinical management or research.

Key Words: *Sleep. Rating scale. Urdu version. Validation study. Pittsburgh sleep quality index (PSQI).*

INTRODUCTION

Sleep disorders can cause impairment in school and work performance, family and social relationships and are also associated with increased risk for accidents.[1] Patients with sleep disorders often seek medical attention due to the effect of their symptoms on their quality of life.[2,3] Research tools have, therefore, been developed for assessing and investigating these disorders. Most of these tools have been developed and validated in English-speaking populations. Appropriate cross-cultural adaptation and validation is required in order to apply these tools to non-English speaking populations.[4-6]

The Pittsburgh Sleep Quality Index (PSQI), developed by Buysse *et al*.[7] is a widely used, standardized self-administered questionnaire to assess subjective sleep quality over the past month. Seven clinical domains of sleep difficulty, including sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medications, and daytime dysfunction are assessed by the PSQI. The PSQI has demonstrated good internal consistency (Cronbach's-alpha: 0.83) and overall test-retest reliability (Pearson's correlation coefficient: 0.85) in psychiatric patients with major depression, healthy controls, and subjects with insomnia and excessive daytime sleepiness. There are also distinct group differences in these populations suggesting good construct validity. Similar reliability and validity measures have been reported in patients with primary insomnia in addition to psychiatric patients.[8-10] The PSQI has been translated into several languages including French, Japanese, German, Spanish, Chinese, Hebrew and others.[8-10]

The aim of the present study was to validate the Urdu version of the PSQI (PSQI-U) for use in the Urdu speaking population of Pakistan, India and elsewhere.

METHODOLOGY

The Pittsburgh Sleep Quality Index (PSQI) is a self-rated questionnaire that assesses sleep disturbance over the

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past one month. It has 19 questions which can be grouped into seven categories: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medications, and daytime dysfunction. A global score of > 5 distinguishes poor sleepers from good sleepers, with higher scores reflecting poor sleep pattern.

In order to develop a reliable Urdu version of the PSQI, we followed the standard procedure for such translations described in previous research.[6] Each item of the PSQI was subjected to the same rigorous procedure. The PSQI was translated into Urdu by two independent bilingual researchers who were not part of the study project. These two translations were then back-translated into English by another two independent researchers who did not have access to the original English version. These Urdu translations and back-translations were critically analyzed and compared with the original English version (PSQI-E) by a research committee comprising two US Board Certified Psychiatrists and a Research Assistant (all of them fluent in both English and Urdu) and a final Urdu version (PSQI-U) was prepared.

After approval of the final version of the PSQI-U, a validation study was conducted in Mayo Hospital, Lahore from March to April 2012. The PSQI-U was administered to 200 healthy individuals comprising medical students, nursing staff, and doctors. Individuals with complaints of insomnia, obstructive sleep apnea, major depression and those who were sleep deprived because of having taken call the night before were excluded. Basic demographic information, including name, age, gender, education etc., was collected. After 4 weeks of administration of the PSQI-U, 100 bilingual subjects were administered PSQI-E, and the remaining 100 subjects were administered PSQI-U again for assessment of linguistic interchangeability and test-retest reliability respectively. Informed consent was taken from each participant and the study was approved by the Ethical Review Board at King Edward Medical University/Mayo Hospital, Lahore.

Statistical Package for the Social Sciences (SPSS) version 20 was used for data entry and analysis. Frequencies and proportions were calculated for categorical variables, and means and standard deviations for continuous variables. Inter-item correlation was assessed by calculating Cronbach alpha. Correlation of component scores with global score was assessed by calculating Spearman correlation coefficient. Correlation between global PSQI-U scores at baseline with global scores for PSQI-U and PSQI-E each at 4-week interval was evaluated by calculating Spearman correlation coefficient. Moreover, scores on individual items of the scale at baseline were compared with respective scores after 4 weeks by t-test. All statistical tests were two-sided and p-value < 0.05 was considered significant.

RESULTS

One hundred and eighty five (185) participants completed the PSQI-U at baseline. Mean age of participants was 21.4 ± 7 years and 126 of them (68.1%) were males. The Cronbach alpha for PSQI-U was 0.56. Table I shows the correlation coefficients for score on each item of the scale with composite score. All the correlation coefficients were significant with p-values < 0.01.

Composite scores for PSQI-U at baseline and PSQI-E at 4-week interval were highly correlated with each other (Spearman correlation coefficient 0.74, p-value < 0.01). Scores for individual items of PSQI-U and PSQI-E were compared with each other by using paired t-test. As shown in Table II, there was no significant difference between scores for individual items of both the scales.

Composite scores for PSQI-U at baseline and at 4-week interval were positively correlated with each other (Spearman correlation coefficient 0.70, p-value < 0.01). Table III shows the comparison between scores for

Table I: Correlation of individual components and composite PSQI-U scores.

Component	Correlation coefficient	p-value
Duration of sleep	0.48	< 0.01
Sleep disturbance	0.41	< 0.01
Sleep latency	0.63	< 0.01
Days dysfunction due to sleepiness	0.55	< 0.01
Sleep efficiency	0.47	< 0.01
Overall sleep quality	0.49	< 0.01
Need medicines to sleep	0.25	< 0.01

Table II: Comparison between scores for individual items of PSQI-U and PSQI-E.

Item	PSQI-U (mean± SD)	PSQI-E (mean± SD)	p-value
Duration of sleep	0.65 ± 0.90	0.69 ± 0.94	0.48
Sleep disturbance	1.14 ± 0.49	1.09 ± 0.49	0.13
Sleep latency	1.06 ± 0.85	1.02 ± 0.80	0.48
Days dysfunction due to sleepiness	1.25 ± 0.88	1.31 ± 0.86	0.42
Sleep efficiency	0.27 ± 0.51	0.23 ± 0.49	0.44
Overall sleep quality	0.75 ± 0.57	0.85 ± 0.62	0.07
Need medicines to sleep	0.18 ± 0.5	0.26 ± 0.6	0.13

Table III: Comparison between scores for individual items of PSQI-U at baseline and at 4-week interval.

Item	PSQI-U (mean± SD)	PSQI-URT (mean± SD)	p-value
Duration of sleep	0.88 ± 0.89	0.82 ± 0.85	0.53
Sleep disturbance	0.91 ± 0.42	0.95 ± 0.40	0.37
Sleep latency	0.96 ± 0.91	1.00 ± 0.87	0.69
Days dysfunction due to sleepiness	1.24 ± 0.95	1.13 ± 0.95	0.21
Sleep efficiency	0.32 ± 0.76	0.31 ± 0.70	0.88
Overall sleep quality	0.84 ± 0.72	0.82 ± 0.70	0.85
Need medicines to sleep	0.12 ± 0.47	0.12 ± 0.42	1.00

individual items of PSQI-U at baseline with scores at 4-week interval. There was no significant difference between these scores.

DISCUSSION

Sleep disturbance commonly causes psychological problems resulting from effects on emotional state and behavior, cognitive function and performance at work or at school, family and social life, and quality of life in general.[13] Severe, sustained sleep loss can even cause psychosis.

It is estimated that 50 - 70 million Americans suffer from a chronic disorder of sleep and wakefulness,[14] hindering daily functioning and adversely affecting health. Among these individuals with sleep disorders are 3 - 4 million individuals with moderate to severe obstructive sleep apnea.[15] Chronic insomnia is observed in approximately 10% of the American population.[15-17]

Further, awareness among health care professionals and the general public is low considering the size of the problem. In Pakistan, there are very few studies evaluating the incidence of sleep problems in the general population. Those that are available, use non-standardized measures to evaluate sleep difficulties and are not representative of the general population.[18-20]

A major barrier in conducting reliable research in sleep disorders is the lack of instruments which have been validated in the local language of the area where research is being conducted.

Urdu is an Indo-Aryan language belonging to the Indo-European family of languages. It is the national language of Pakistan and also the language predominantly spoken in certain states of India such as Uttar Pradesh, Bihar, Andhra Pradesh, Jharkhand, Jammu and Kashmir and New Delhi. There are 60 - 70 million self-identified native speakers of Urdu.[21] It is also spoken outside of its native areas of South Asia by a large number of migrant South Asian workers in the major urban centers of the Persian Gulf countries and Saudi Arabia as well as South Asian immigrants and their children in the major urban centers of the United Kingdom, the United States, Canada, Germany, Norway, Australia and many other countries.

Although it is the native language of only about 8% of people in Pakistan (population of 177 million-2011 Census), most Pakistanis are bilingual, speaking their native language and Urdu equally easily.[22] There are few research instruments for measuring disturbances of sleep which have been validated or indigenously developed in Urdu, the language spoken and understood by the vast majority of Pakistanis. A recent review identified twelve psychiatric rating scales that had been developed indigenously in Urdu and 43 that had been translated from English.[23] This review did not identify any rating scales or instruments to measure insomnia or other sleep difficulties. A recent abstract indicated a small study (n = 89) to validate an Urdu translation of the PSQI.[24] However, it reports only global PSQI scores for the original English and the Urdu translation.

The Pittsburgh Sleep Quality Index (PSQI) is widely used to assess subjective sleep disturbances in psychiatric, medical, and healthy adult and older adult populations.[7-9] It measures seven clinically derived domains of sleep difficulty. These include sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medications, and daytime dysfunction as measures by excessive daytime sleepiness. Many psychometric aspects of the PSQI have been examined and found to be appropriate, including internal consistency,[7,25] concurrent validity and discriminative validity.[9,25] For the purpose of this study, a rigorous procedure was followed for translation/back translation and final approval of the Urdu version of the PSQI (PSQI-U).

Following the development of the final PSQI-U, both the PSQI-U and the original English PSQI were administered to 200 healthy comprising medical students, nursing staff, and doctors. Subject recruitment was based on the convenience non-probability sampling design.

A total of one hundred and eighty five (185) participants completed the PSQI-U at baseline. The Cronbach alpha for PSQI-U was 0.56 which is comparable to other studies where the PSQI was applied to non-clinical (i.e. healthy) subjects.[12] There was no significant difference between scores for individual items of both the scales indicating good linguistic interchangeability. There was no significant difference between composite scores for PSQI-U at baseline and at 4-week interval scores indicating high test-retest reliability. In this study, the translated subjective sleep quality questionnaire (the PSQI-U) exhibited moderate reliability and good validity. The individual items and clinical domains within the PSQI-U were significantly correlated with each other as well as with the items on the original English version. In addition, similar scores on retest 4 weeks later indicated good test-retest reliability.

One obvious limitation of this study was the application of the PSQI-U to healthy subjects only. This would also explain its relatively low internal consistency (Cronbach's alpha 0.56). This is in keeping with the findings in other studies where normal controls were compared to patients with insomnia or other sleep difficulties.[12] Further studies with the PSQI-U should include its application to patients with sleep difficulties and other conditions which affect sleep.

CONCLUSION

The PSQI-U is a valid and reliable instrument for the assessment of daytime sleepiness, being equivalent to its original version when applied to individuals who

speak Urdu. No major cultural adaptations or significant structural modifications were necessary during the validation process, despite the cultural and language differences between the two populations for which the questionnaire was validated. The PSQI-U can be regarded as a useful tool in clinical practice and research.

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