RESEARCH ARTICLE

Assessment of Sleep and Cognitive Decline Using Hindi Questionnaire

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Abstract

Background: Sleep and cognitive decline are co-dependent and occur in aging, menopause, chronic pain, and other chronic illnesses. The degree of decline is often difficult to assess and many questionnaires have been designed to assess them. It is useful to have a questionnaire in the native language for assessment as it removes translation bias. This study was designed to validate the Hindi-translated versions of the pre-validated Six-item cognitive impairment test (CIT-E) and the Jenkins sleep scale (JSS-E).

Materials and methods: 50 bilingual women, well-versed in English and Hindi, were recruited for the study. There was a drop out of two patients and 48 completed the study. They were first given the English version of the two questionnaires and scores were calculated. After fifteen days, the Hindi-translated version was given and scores were calculated. The two scores of English and Hindi versions were compared and analyzed for validation.

Results: The Hindi-translated versions of both questionnaires showed high validity and good correlation with the English version of the questionnaires. They possess good convergent and discriminant validity. Jenkins sleep scale-H showed a positive correlation with JSS-E with a correlation coefficient of 0.995, inter-rater kappa of 0.952, and p-value < 0.0001. CIT-H showed a positive correlation with CIT-E having a correlation coefficient of 0.91, inter-rater kappa of 0.658, and p-value < 0.0001.

Conclusion: The Hindi-translated versions of the JSS and CIT questionnaires are recommended for the assessment of sleep and cognitive decline in Indian women.

Keywords: Cognitive impairment questionnaire, Hindi questionnaire for cognitive impairment, Hindi questionnaire for sleep impairment, Indian menopausal women, Jenkin sleep score, Sleep questionnaire.

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Introduction

Sleep and cognitive decline are co-dependent and occur in aging, menopause, chronic pain, and other chronic illnesses. The degree of decline is often difficult to assess and many questionnaires have been designed to assess both sleep and cognitive decline.[1–3] It is useful to have a questionnaire in the native language for assessment as it removes translation bias. This study was done to validate the Hindi-translated version of two questionnaires on sleep and cognitive decline. The pre-validated six-item cognitive impairment test (CIT) and the Jenkins sleep scale (JSS) are internationally approved questionnaires for the assessment of cognition and sleep.[4,5] They have been translated into various languages worldwide. However, there is no Hindi-translated version of these scales available to date. This study was done to validate the two Hindi-translated questionnaires. The translation was done by four independent translators using a standard protocol and then tested for internal validity. The advantage of using these Hindi-translated questionnaires is that it not only removes translation bias but also helps save time for the health care provider by facilitating faster assessment of the patients in community settings.

Materials and Methods

Fifty women attending the Gynaecology OPD of ABVIMS & Dr. RML Hospital, New Delhi were recruited as per convenience sampling. It is a teaching, tertiary care, and central government hospital, and the study was carried out over six months from July to December 2023. Written and informed consent was taken from these bilingual women who were proficient in both English as well as Hindi. Firstly, they were provided the English versions of the CIT and JSS questionnaires (CIT-E and JSS-E, Appendix 1). The final score was compiled by the researcher.

After fifteen days, they were given the Hindi-translated version of the two questionnaires (CIT-H and JSS-H) (Appendix 2). The Hindi translation was done by four independent translators using standard protocol. The test scores were calculated for the Hindi versions. The scores in the two languages were then compared and tested for internal validity.

Statistical Analysis

Fifty women were recruited into the study, and two of them dropped out. Analysis was done of 48 women. The quantitative data were presented as mean ± SD (standard deviation) and as median

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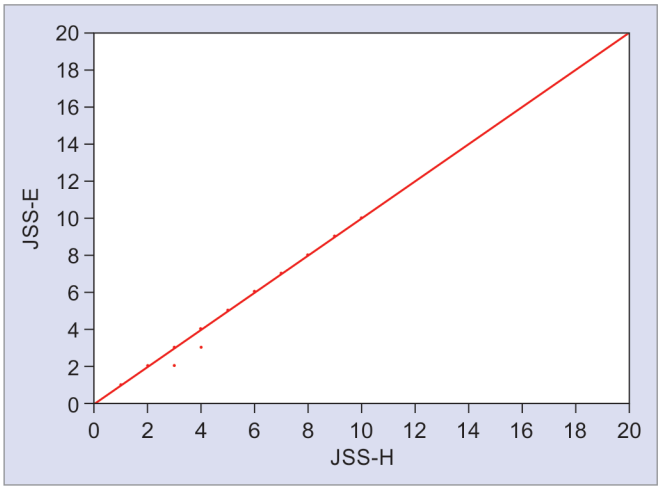

Fig. 1: Correlation of Jenkins sleep scale (JSS-H and JSS-E)

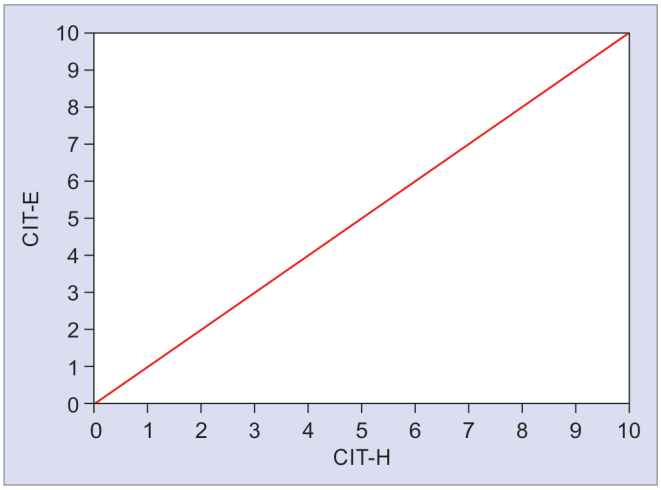

Fig. 2: Correlation of cognitive impairment test (CIT-H and CIT-E)

with 25th and 75th percentiles (interquartile range). Spearman rank correlation coefficient was used for the correlation of Jenkins sleep scale score and cognitive impairment test score in English and Hindi. Inter-rater kappa agreement was used to find the strength of agreement between the two scores. Bland Altman plot was used for comparing the questionnaires in both languages. Data entry was done in Microsoft EXCEL spreadsheet and analysis was done with Statistical Package for Social Sciences (SPSS) software, IBM manufacturer, Chicago, USA, ver 25.0. For statistical significance, *p*-value of less than 0.05 was considered significant.

Results

Demographic Details of the Study Group

Out of the total 48 women, 13 (27%) were premenopausal while 35 (73%) were postmenopausal. 33 women (68.75%) were of the age 50 years and above while 15 women (31.25%) were less than 50 years of age. The mean age of the study participants was 49.54 years with a standard deviation of 12.3. The median age was 53 years, with a 25th to 75th percentile range of 36–57 years. The majority of the women, 21 (43.75%) were housewives, followed by 13 patients (27.08%) who were nurses. The rest were engaged in private jobs.

Figure 1 shows a strong and significant correlation between the English and Hindi versions of the JSS score with a correlation coefficient of 0.995 and a *p*-value of < 0.0001.

Figure 2 shows a significant and strong correlation between the Hindi and English versions of the cognitive impairment test score with a correlation coefficient of 0.91 and a *p*-value of < 0.0001.

Figure 3 shows the comparison between the Hindi and English versions of the Jenkin Sleep scale. The arithmetic mean difference between the two versions was calculated to be 0.042, with a 95% confidence interval (CI) ranging from −0.017 to 0.100. The *p*-value was 0.160, indicating no significant difference in means. The standard deviation of the differences was 0.202. The lower and upper limits of agreement were −0.354 and 0.437, respectively, with 95% CIs ranging from −0.455 to −0.253 and 0.337–0.538. These findings suggest consistent agreement between the Hindi and English versions of the JSS scores, with minor variations falling within the specified confidence intervals.

Figure 4 shows the comparison between the Hindi and English versions of the cognitive impairment test. The arithmetic mean difference between the two versions was 0.25, with a 95% confidence interval ranging from −0.558 to 0.0583. The *p*-value was calculated as 0.110, suggesting no significant difference in means.

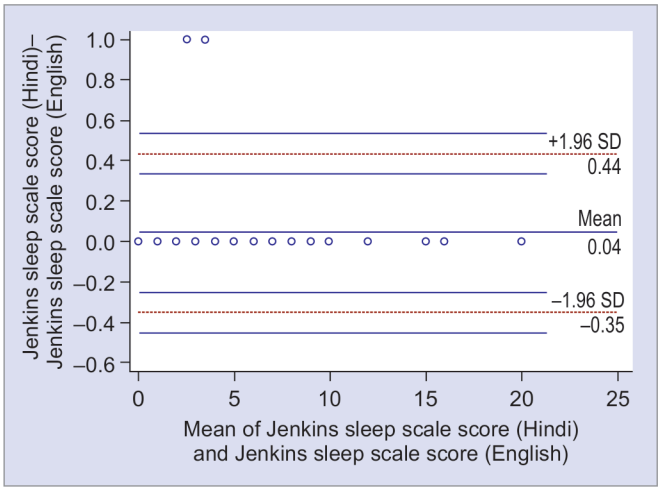

Fig. 3: Comparison of scores of Jenkins sleep scale (JSS-H and JSS-E)

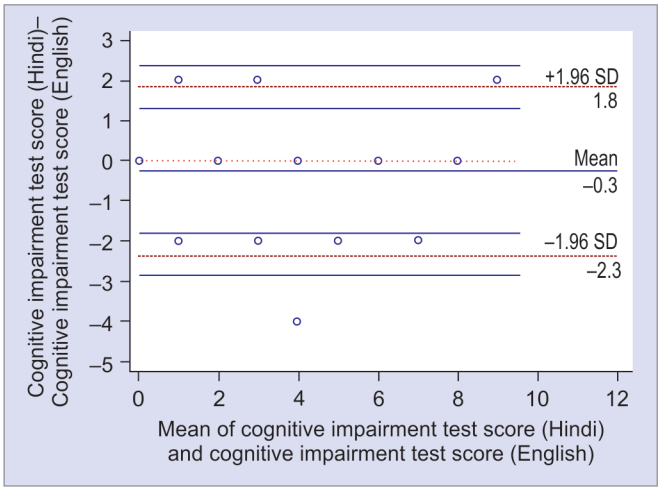

Fig. 4: Comparison of scores of cognitive impairment test (CIT-H and CIT-E)

Table 1: Inter-rater kappa agreement between JSS-H and JSS-E

	JSS-H																	
JSS-E	*0*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*12*	*15*	*16*	*20*	*Total*	*p-value*	*Kappa*
0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2		
1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1		
2	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	5		
3	0	0	1	4	0	0	0	0	0	0	0	0	0	0	0	5		
4	0	0	0	1	12	0	0	0	0	0	0	0	0	0	0	13		
5	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	7		
6	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	3		
7	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	<0.0001	0.952
8	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	3		
9	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2		
10	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1		
12	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2		
15	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1		
16	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1		
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1		
Total	2	1	6	5	12	7	3	1	3	2	1	2	1	1	1	48		

Table 2: Inter-rater kappa agreement between CIT-H and CIT-E

	CIT-E							
CIT-H	*0*	*2*	*4*	*6*	*8*	*Total*	*p-value*	*Kappa*
0	20	1	0	0	0	21		
2	1	13	4	1	0	19		
4	0	1	2	1	0	4		
6	0	0	0	1	1	2	<0.0001	0.658
8	0	0	0	0	1	1		
10	0	0	0	0	1	1		
Total	21	15	6	3	3	48		

The standard deviation of the differences was 1.062. The lower and upper limits of agreement were determined to be –2.331 and 1.831, respectively, with 95% CIs ranging from –2.862 to –1.801 and 1.301 to 2.362. These results indicate consistent agreement between the Hindi and English versions of the cognitive impairment test scores, with variations falling within the specified confidence intervals.

Table 1 shows the inter-rater kappa agreement between the Hindi and English versions of the Jenkins sleep scale questionnaire. Good agreement was seen between the JSS scores of the two languages with kappa 0.952 and p-value < 0.0001. The overall concordance rate was 95.82% and the overall discordance rate was 4.16%.

Table 2 shows the Inter-rater kappa agreement between the Hindi and English versions of the cognitive impairment test questionnaire. Good agreement was seen between the English and Hindi versions with kappa 0.658 and p-value < 0.0001. The overall concordance rate was 77.08% and the overall discordance rate was 22.89%.

Discussion

Quality of life indicators need questionnaires for assessment, like menopause, chronic pain, sleep, and cognitive decline. Menopause rating scale and pain score are two examples that are used in clinical practice. The association of cognitive decline and sleep disorders with increasing age has emerged as an area of research and analysis in recent times. As per a meta-analysis, the prevalence of sleep disorders is 42% in premenopausal women, 47% in perimenopause, and 60% in postmenopausal women.[6,7] Studies have shown that obstructive sleep apnea (OSA) is seen in 47–67% of postmenopausal women.[8] Obstructive sleep apnea is also linked to cognitive impairment in attention, memory, and visuospatial deficits. Furthermore, treatment of OSA has shown a protective effect on the incidence of cognitive disorders in the older population. It has been seen that sleep-based interventions could mitigate cognitive impairment in women as they transition to menopause, especially the ones with early menopause.[9]

Hence it is imperative that women can be timely assessed and early diagnosis be made regarding these crucial symptoms. Over the years, a variety of assessment tools have been designed to assess sleep disorders. Of these, the Jenkins sleep scale was the earliest to be developed in 1988. There are scales to identify biopsychosocial situations like the perceived stress scale (PSS-14) which identifies, stress situations in the last month.[10] The Goldberg anxiety and depression scale (GADS) defines the presence of probable anxiety and depression.[11] The SCOFF Scale assesses symptoms related to eating disorders in the last three months and the Hughes Loneliness Scale considers the perception of loneliness.[12,13]

Cognitive impairment is mainly assessed by the CIT tool. The JSS has been translated into many languages like Portuguese and Turkish.[14–16] To the best of our knowledge, we are the first to translate JSS and CIT scales in the Hindi language in this study. Both the translated questionnaires are valid as well as reliable tools for the easy and quick assessment of Hindi-speaking women. The use of these questionnaires can help in the multidisciplinary assessment of pre and postmenopausal women so that timely assistance can be provided to them. They can be used to assess the severity and prevalence of sleep and cognitive decline and also see the response after treatment. Another alternative remains the

use of smart watches for sleep impairment which cannot be widely used because of the cost involved. The authors have been using the Hindi-translated versions of these questionnaires successfully in the gynecology and menopause outpatient departments. Their use is recommended in the geriatric population, pain clinics, and other community settings for easy and quick assessment of sleep and cognitive decline.

The limitation of our study is the sample size which was taken as per convenience sampling. Further studies on a larger population might shed more light on the applicability of these two Hindi-translated versions in the general population. A fifteen-day washout period was taken in our study. According to available literature, it varies from two weeks to three months. A short washout period can be considered a potential confounder.[17,18]

Conclusion

The Hindi-translated versions of the Jenkins sleep scale and the cognitive impairment test are simple and easy-to-use questionnaires with high validity. They are recommended for the assessment of Hindi-speaking pre and postmenopausal women of India and neighboring countries for the assessment of sleep and cognitive decline. The Hindi-translated version helps eliminate translation bias and saves time for both the patient as well as the healthcare provider, especially in community settings.

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Authors Contributors

Renuka Malik was responsible for the conception and design of the study. Aarti Jangid was responsible for data collection. Vandana Agarwal has written the manuscript which was critically evaluated by Renuka Malik for important intellectual content. All the authors have finally approved the version submitted.

Ethical Clearance

Taken from the Institutional Ethics Committee (146/2022/IEC).

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Appendix A (English version): The Jenkin sleep scale: English version (JSS-E)

	Score					
How often in the past did you:	*0*	*1*	*2*	*3*	*4*	*5*
1. Have trouble falling asleep	Not at all	1–3 days	4–7 days	8–14 days	15–21 days	22–31 days
2. Wake up several times per night	Not at all	1–3 days	4–7 days	8–14 days	15–21 days	22–31 days
3. Have trouble staying asleep	Not at all	1–3 days	4–7 days	8–14 days	15–21 days	22–31 days
4. Wake up after your usual amount of sleep feeling tired	Not at all	1–3 days	4–7 days	8–14 days	15–21 days	22–31 days

Total score: 0–20
Interpretation:
0: No sleep problem
20: Most sleep problems
<12: Little of sleep disturbances
≥12: High frequency of sleep disturbances

Six-item Cognitive Impairment Test (CIT-E)

- What year is it? Correct—0 points, incorrect—4 points
- What month is it? Correct—0 points, incorrect—3 points
- Give the patient an address phrase to remember with five components, e.g. John, Smith, 42, High St, Bedford.
- What time is it (within 1 hour)? Correct—0 points, Incorrect—3 points
- Count backwards from 20 to 1. Correct—0 points, 1 error 2 points, more than one error—4 points
- Say the months of the year in reverse. Correct—0 points, 1 error—2 points, more than one error—4 points
- Repeat the address phrase. Correct—0 points, 1 error—2 points, 2 errors—4 points, 3 errors—6 points, 4 errors—8 points, All wrong—10 points

Score: The CIT uses an inverse score and questions are weighted to produce a total out of 28.

Scores of 0–7: Normal
Scores of 8 or more: Significant.

Appendix B (Hindi version): The Jenkin Sleep Scale: Hindi version (JSS-H)

जेकिन्स शयनस्तर मापक

पिछले महीने कितनी बार

	0	*1*	*2*	*3*	*4*	*5*
1. सोने में परेशानी हुई?	कभी नहीं	1–3 दिन	4–7 दिन	8–14 दिन	15–21 दिन	22–31 दिन
2. हर रात कई बार जागी?	कभी नहीं	1–3 दिन	4–7 दिन	8–14 दिन	15–21 दिन	22–31 दिन
3. अच्छी तरह से सो नहीं पाई (बहुत जल्दी जागना शामिल है)	कभी नहीं	1–3 दिन	4–7 दिन	8–14 दिन	15–21 दिन	22–31 दिन
4. सामान्य नींद लेने के बाद उठने पर थका मंदा महसूस किया?	कभी नहीं	1–3 दिन	4–7 दिन	8–14 दिन	15–21 दिन	22–31 दिन

कुल स्कोरः 0 से 20

व्याख्याः

0: नींद की समस्या नहीं

20: नींद की सबसे ज्यादा समस्या

<12: नींद की थोड़ी गड़बड़ी

≥12: नींद की गड़बड़ी की उच्च आवृत्ति

Six-item Cognitive Impairment Test (Hindi version) (CIT-H)

हिंदी प्रश्नावलीः छः अंश संज्ञानात्मक घटोती मापक

- यह कौन सा वर्ष चल रहा है? सही – 0 अंक, गलत – 4 अंक
- यह कौन सा महीना चल रहा है? सही – 0 अंक, गलत – 3 अंक
- 5 भागों वाला पता रोगी को याद करने के लिए कहें बाबा खड़क सिंह मार्ग, दिल्ली
- इस समय कितने बजे हैं? (एक घन्टे के अंदर) सही – 0 अंक, गलत – 3 अंक
- 20–1 तक उल्टी गिनती सुनाएँः सही – 0 अंक, एक गलत – 2 अंक, एक से ज्यादा गलत – 4 अंक
- वर्ष के महीनों को उल्टे क्रम में बताएँः सही – 0 अंक, एक गलत – 2 अंक, एक से ज्यादा गलत – 4 अंक
- पता दोहराने को कहेंः सही – 0 अंक, 1 गलत – 2 अंक, 2 गलत – 4 अंक, 3 गलत – 6 अंक, 4 गलत – 8 अंक, सभी गलत – 10 अंक

स्कोरः 6CIT एक व्युत्क्रम स्कोर का उपयोग करता है और प्रश्नों को 28 में से कुल उत्पादन करने के लिए भारित किया जाता है।

0–7 के स्कोरः सामान्य

8 या अधिक के स्कोरः महत्वपूर्ण।