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Translation and Validation of Adolescent Sleep Hygiene Scale in Hindi: A Pilot Study

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ABSTRACT

Aim and Background: To develop and validate Hindi version of Adolescent Sleep Hygiene Scale (ASHS) that measures the sleep related problematic behaviours and practices. **Methods**: A total of 46 healthy adolescents (15-18 years) with bilingual capability (English + Hindi) were administered 33-item English version of ASHS followed by administration of a Hindi-translated version fifteen days apart. Internal consistency was measured by Cronbach alpha and changed by stepwise data reduction. Test-retest validation was done by Intra-class Correlation (ICC) at item level and Pearson correlation coefficient for total scores. Paired 't'-test was used to compare differences in mean scores. **Results**: Total scores for original 33-item scale were 95.50 ± 12.46 and 95.33 ± 11.71 respectively for English and Hindi versions. There was excellent correlation (r=0.96) between two versions. Item wise ICC values were above 0.7 for all the items except for item number 23 (ICC=0.446) but Cronbach alpha values were below 0.7. On stepwise data reduction, deletion of five items (2, 5, 8, 10 and 27) resulted in achievement of internal consistency >0.7 for both language versions. Excellent correlation between reduced English as well as Hindi versions was seen for items as well as total scores. **Conclusion**: Excellent correlation at item as well as total score level of both full and reduced Hindi versions of ASHS but reduced version had a higher internal consistency even in small sample size considerations. **Clinical Significance**: Hindi version of ASHS could be used in Indian Hindi-speaking adolescent population to highlight the sleep related problematic behaviour and practices.

Key words: Sleep hygiene, Sleep quality, Reliability, Internal consistency, Adolescent sleep hygiene scale (ASHS).

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Introduction

Sleep has an important role in almost all ages – infants, children, adolescent, young and mature adults and elderly, all require sleep.[1] Sleep acts as a means to reboot the living beings and helps to improve cognitive functioning, mood, mental health, and cardiovascular, cerebrovascular, and metabolic health.[2] Good sleep is a qualitative term that can be further expanded as easy, undisturbed sleep, that does not end too early and makes a person refreshed in the morning.[3] However, poor and inadequate sleep is a common complaint in almost all the age groups. A number of underlying reasons for this poor quality of sleep include four important biological factors, *viz.* pain, being patient, strenuous physical activity and, fatigue. Other reported reasons for poor sleep quality are psychological distress, depression, confusion, and lower life satisfaction.[4,5] Apart from these factors, sleep quality in the long-term has also been known to be affected by one's personal habits and practices related with sleep, such as lack of a regular sleep schedule, absence of a relaxing bedtime schedule, absence of cool and comfortable place to sleep, inappropriate lighting, time gap between bedtime and work, caffeine intake, taking some foods that can disrupt sleep and use of substances that could affect the sleep quality. Together these habits and practices are termed to comprise the sleep hygiene, improvement of which could result in reducing a number of sleep related problems. In technical terms, sleep hygiene can be defined as "a set of behavioral and environmental recommendations intended to promote healthy sleep".[6] Inadequate sleep hygiene practices are responsible for poor sleep experience and insomnia.[7]

While sleep problems have been reported to be quite common in mature adults and elderly, the recent trends show teenagers and adolescents as the new emerging populations affected by problem of poor sleep. As per Center for Disease Control (CDC) data upto 70% of adolescents in US do not get adequate sleep.[8] As per a recent Indian study too, a sizeable proportion of adolescents experience poor sleep quality.[9] Evidence has shown that one of the most important reasons for this poor sleep quality in adolescents is poor sleep hygiene practices. Increasing use of smartphone, use of technology, video games, studying, and employment are some of the problems interfering with good sleep hygiene in these adolescents and are therefore responsible for declining sleep quality.[10,11] Thus, an understanding of the sleep hygiene practices in adolescents could be helpful in assessment of underlying reasons for sleep problems and their corrections.

Adolescent Sleep Hygiene Scale (ASHS), a a 33-item self-report measure is a useful tool to assess adolescent sleep hygiene,[12] that was originally developed in English language to study the sleep hygiene in American and Italian adolescents, however, it has been found to be useful and adaptable to other populations too. Its adaptation in Persian, Dutch and Greek population has been found to be encouraging and successful.[13-15] In India too, given the emergence of adolescent sleep problems as a major public health issue, a need to adapt a standardized scale to assess the sleep hygiene was being felt for a long time, however, there is no such scale available in Hindi or any other vernacular Indian language. Hence, the present study was planned to translate Adolescent Sleep Hygiene Scale (ASHS) in Hindi and to validate and to assess its adaptability in Indian adolescents.

Methodology

The present study was carried out as an ICMR Project at Department of Physiology, Hind Institute of Medical Sciences (HIMS), Safedabad, Barabanki after getting approval from Institutional Ethics Committee.

This was a three part study, first part (Latent Stage) of which included preparation of Hindi version of ASHS, second part included data collection through a pilot study (Active Stage) and third part included data analysis (Analytical Stage).

Part 1: Translation of Hindi version of ASHS (Latent Stage)

The original version of Adolescent Sleep Hygiene Scale (ASHS) was obtained from University of Colorado-Boulder website and was given for translation into Hindi for a Physiologist who had Hindi as his/her native language. The original version includes a total of 33 items that are scored on a six-point Likert scale ranging from 0 to 5. After the translation of the scale, it was checked and evaluated for content contextuality and relevance by the Principal Investigator (PI) who also has Hindi as her native language. The scale was then back translated into English by the PI. The back translated scale was then checked by an Independent evaluator who was an Expert in English language for its consistency with the original version. Diligence was observed at each step so that the translated items be complete, comprehensible, acceptable as well as relevant.

After approval of Hindi translated version by the PI and consistency check of the back translated version by an Independent evaluator, copies of Hindi version were printed and were subjected for data collection in the pilot study. Same scoring pattern was proposed for the translated Hindi version too.

Part 2: Data Collection (Active Stage)

For this pilot study, a total of 50 adolescents aged 15 to 18 years (irrespective of sex) were randomly selected from amongst volunteers recruited from amongst relatives and dependents of staff and faculty of HIMS. The inclusion criterion for the study was students of class 8 onwards having proficient knowledge of both English as well as Hindi language. Children having any history of physical or psychiatric illness, and those on any systemic medication were excluded from the study. Girls having menstrual irregularities were also excluded from the study. Informed consent for the study was obtained from all the participating adolescents. Guardian's permission was also obtained for this purpose.

At enrolment, the adolescents were explained the purpose of study. Data collection was done in a comfortable, peaceful environment without external disturbances in the presence of investigator, parent and attendant staff in the ante room. Adolescents were given full privacy while providing the responses. In case of multiple respondents reporting in same time-frame, it was ensured that there was no mutual interaction during data collection. Data collection was done in two phases.

First Phase: Data Collection on English Version: A total of 50 participants participated in first phase of data collection. In the first phase, English version of the ASHS was administered and the participants were asked to report after 15 days for re-administration of Hindi version of scale.

Second Phase*: *Data Collection on Hindi Version: In the second phase, there were 4 dropouts and thus only 46 participants completed the second phase of data collection. In this phase, Hindi version of the ASHS was administered under similar environmental conditions and during the same time-frame as for first phase.

Part 3: Data Analysis (Analytical Stage)

In this pilot study, the focus of scale validation and adaptation was on internal consistency and test-retest validation. IBM-Statistics (SPSS) version 21.0 software was used for this purpose. For assessment of internal consistency (reliability), Cronbach alpha value was calculated. The targeted Cronbach alpha value was 0.7. To achieve, this stepwise data reduction technique was adopted in which the item deletion was continued till the Cronbach alpha value above cut-off was achieved.

After the targeted reliability was achieved, the validation of reduced scale was done by correlating total scores of reduced Hindi version with total scores of English version as well as total scores of reduced English version. Item-wise differences in mean scores were evaluated using Paired't'-test.

ICC/r	<0.3	Weak correlation
ICC/r	0.3-0.5	Mild correlation
ICC/r	0.5-.0.7	Moderate correlation
ICC/r	0.7-0.9	Strong correlation
ICC/r	0.9	Near perfect correlation

Item-wise correlations were assessed using average measures intraclass correlation coefficient (ICC). 'p' value less than 0.05 was considered as significant. For total scores, correlation between Hindi and English versions of both original and reduced scale was assessed using Pearson's correlation coefficient. Interpretation of strength of correlation coefficient was done as follows:

Results

For English version, item-wise scores ranged from 1.04±0.21 (Item No. 6) to 4.65±1.40 (Item No. 33). Mean total score for English version of the scale was 95.50±12.46. Internal consistency assessment showed a Cronbach alpha value of 0.616. For Hindi version minimum mean scores were seen for item Nos. 6 and 7 (1.07 ± 0.25) whereas maximum mean scores were seen for item No. 33 (4.61 ± 1.39). Mean total score of Hindi version was 95.33 ± 11.73. The Cronbach alpha value for Hindi version was 0.583. On item wise comparison, no statistically significant difference was observed for total scores as well as item scores except for English version scores being significantly higher as compared to that of Hindi version for item Nos. 11 and 13 and Hindi version scores being significantly higher as compared to that of English version for item No. 23 ($p<0.05$). Intra-class correlation coefficient (ICC) values for itemized correlations were strong to excellent (>0.7 or above) for all the items except Item No. 23 (in one place and then move to another place during the night) where ICC value was 0.446 only reflecting a mild positive correlation between two versions. For total scores a near perfect correlation was seen between Hindi and English versions ($r=0.929$; $p<0.001$) **(Table 1; Fig. 1).**

Fig. 1: Comparison of item wise mean scores between English and Hindi versions

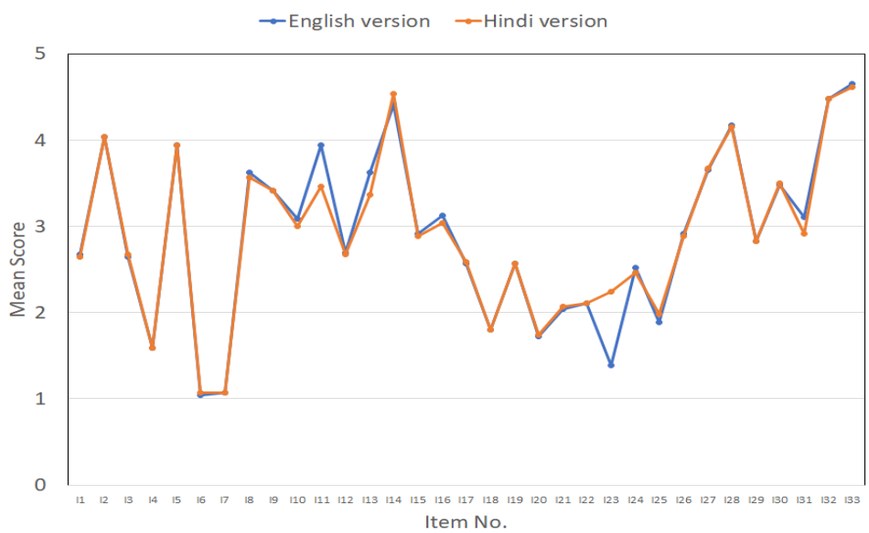

Table- 1: Comparison of item wise mean scores between English and Hindi versions (Unreduced Scales)

Item No.	English Version	Hindi Version	Significance of difference (Paired 't'-test)		Intra class consistency (Average measures ICC)
	Mean ± SD	Mean ± SD	't'	'p'	
1	2.67± 0.94	2.65±0.92	1.000	0.323	0.988
2	4.04±1.56	4.04±1.56	-	-	1.000
3	2.65±1.35	2.67±1.40	-1.000	0.323	0.997
4	1.59±0.65	1.59±0.65	-	-	1.000
5	3.94±1.64	3.94±1.64	-	-	1.000
6	1.04±0.21	1.07±0.25	-1.000	0.323	0.884
7	1.07±0.25	1.07±0.25	-	-	1.000
8	3.63±1.58	3.57±1.54	1.000	0.323	0.980
9	3.41±1.60	3.41±1.60	-	-	1.000
10	3.09±1.68	3.00±1.46	0.663	0.511	0.913
11	3.94±1.20	3.46±1.26	2.976	0.005	0.756
12	2.69±1.33	2.67±1.36	1.000	0.323	0.997
13	3.63±1.44	3.37±1.47	2.136	0.038	0.911
14	4.41±1.07	4.54±1.00	-1.430	0.160	0.902
15	2.91±1.43	2.89±1.42	1.000	0.323	0.997
16	3.13±1.45	3.04±1.33	0.540	0.592	0.819
17	2.57±1.66	2.59±1.51	-0.256	0.799	0.966
18	1.80±1.00	1.80±1.00	-	-	1.000
19	2.57±1.19	2.57±1.19	-	-	1.000
20	1.72±1.03	1.74±1.02	-1.000	0.323	0.995
21	2.04±1.17	2.07±1.16	-1.000	0.323	0.996
22	2.11±1.43	2.11±1.43	-	-	1.000
23	1.39±0.88	2.24±1.29	-4.369	<0.001	0.446
24	2.52±1.55	2.46±1.49	1.354	0.183	0.988
25	1.89±1.70	1.98±1.41	-0.628	0.533	0.901
26	2.91±1.60	2.89±1.61	1.000	0.323	0.998
27	3.65±1.69	3.67±1.69	-1.000	0.323	0.998
28	4.17±1.35	4.15±1.40	0.443	0.660	0.985
29	2.83±1.62	2.83±1.61	0.000	1.000	0.996
30	3.48±1.35	3.50±1.36	-1.000	0.323	0.997
31	3.11±1.70	2.91±1.52	1.847	0.071	0.948
32	4.48±1.35	4.48±1.35	-	-	1.000
33	4.65±1.40	4.61±1.39	1.430	0.160	0.995
Total	95.50±12.46	95.33±11.71	0.338	0.737	r=0.960
Cronbach alpha	0.616	0.583			

Statistically, there was no significant difference between two scales for the total scores for reduced scale ($p>0.05$). Cronbach alpha value of reduced Hindi and English versions was recorded as 0.716 and 0.743 respectively. In the reduced scale too, ICC values were above 0.7 (reflecting strong correlation) and mostly above 0.95 (reflecting near perfect correlation) for all the items except the item no. 23 for which the ICC value was 0.446. For total scores for reduced scales a near perfect correlation was seen between Hindi and English versions ($r=0.965$; $p<0.001$) (Table 2).

Table -2: Comparison of item wise mean scores between Reduced English and Hindi versions (Unreduced Scales)

Item No.	English Version	Hindi version	Significance of difference (Paired 't'-test)		Intraclass consistency (Average measures ICC)
	Mean ± SD	Mean ± SD	't'	'p'	
1	2.67 ± 0.94	2.65 ± 0.92	1.000	0.323	0.988
3	2.65 ± 1.35	2.67 ± 1.40	-1.000	0.323	0.997
4	1.59 ± 0.65	1.59 ± 0.65	-	-	1.000
6	1.04 ± 0.21	1.07 ± 0.25	-1.000	0.323	0.884
7	1.07 ± 0.25	1.07 ± 0.25	-	-	1.000
9	3.41 ± 1.60	3.41 ± 1.60	-	-	1.000
11	3.94 ± 1.20	3.46 ± 1.26	2.976	0.005	0.756
12	2.69 ± 1.33	2.67 ± 1.36	1.000	0.323	0.997
13	3.63 ± 1.44	3.37 ± 1.47	2.136	0.038	0.911
14	4.41 ± 1.07	4.54 ± 1.00	-1.430	0.160	0.902
15	2.91 ± 1.43	2.89 ± 1.42	1.000	0.323	0.997
16	3.13 ± 1.45	3.04 ± 1.33	0.540	0.592	0.819
17	2.57 ± 1.66	2.59 ± 1.51	-0.256	0.799	0.966
18	1.80 ± 1.00	1.80 ± 1.00	-	-	1.000
19	2.57 ± 1.19	2.57 ± 1.19	-	-	1.000
20	1.72 ± 1.03	1.74 ± 1.02	-1.000	0.323	0.995
21	2.04 ± 1.17	2.07 ± 1.16	-1.000	0.323	0.996
22	2.11 ± 1.43	2.11 ± 1.43	-	-	1.000
23	1.39 ± 0.88	2.24 ± 1.29	-4.369	<0.001	0.446
24	2.52 ± 1.55	2.46 ± 1.49	1.354	0.183	0.988
25	1.89 ± 1.70	1.98 ± 1.41	-0.628	0.533	0.901
26	2.91 ± 1.60	2.89 ± 1.61	1.000	0.323	0.998
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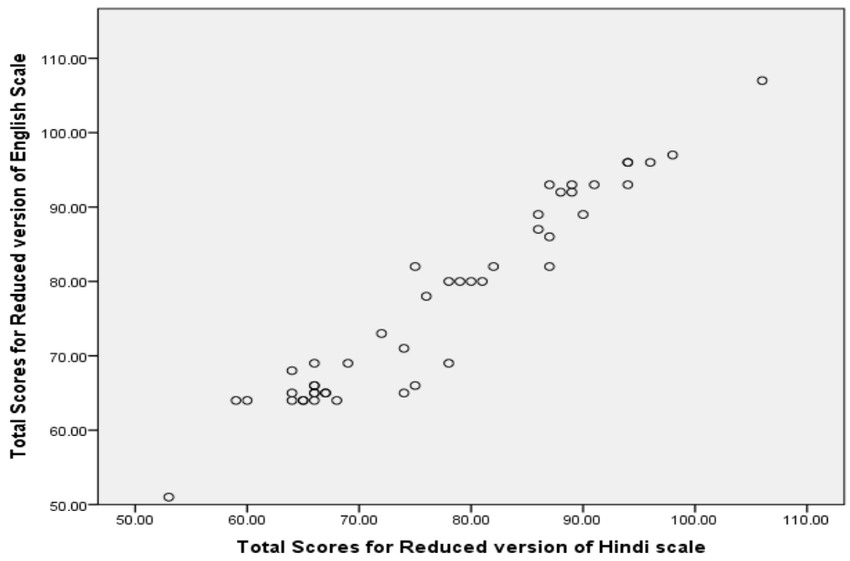
29	2.83 ± 1.62	2.83 ± 1.61	0.000	1.000	0.996
30	3.48 ± 1.35	3.50 ± 1.36	-1.000	0.323	0.997
31	3.11 ± 1.70	2.91 ± 1.52	1.847	0.071	0.948
32	4.48 ± 1.35	4.48 ± 1.35	-	-	1.000
33	4.65 ± 1.40	4.61 ± 1.39	1.430	0.160	0.995
Total	78.21 ± 12.40	78.41 ± 13.15	0.085	0.933	r=0.965
Cronbach alpha	0.743	0.716			

Fig. 2: Correlation of total scores of Reduced English and Hindi versions of AHSD



Consort Chart Explaining Study Methodology

ACTIVE STAGE

PHASE 1:
Enrolment of eligible participants and data collection on original English version (n=50)

Drop outs (n=4)

PHASE 2:
Data collection on translated Hindi version 15 days after the first phase (n=46)

ANALATICAL STAGE

Assessment of Internal consistency, Data reduction and Test-Retest validation (through correlation analysis).

LATEST STAGE

Translation of English version of ASHS into Hindi, qualitative assessment by a person with Hindi as the native language, back translation to English and its qualitative assessment by an Independent evaluator

Discussion

This pilot study attempted to develop Hindi translation of ASHD, study its applicability in an Indian adolescent population and validate it through test-retest method. In the initial assessment, although the test-retest validation was very effective resulting in near perfect correlation ($r=0.929$; $p<0.001$) for overall scale and a very high item-wise correlation too (ICC values >0.9 for 29/33 items), however, the internal consistency of both English as well as Hindi versions was compromised and could not reach the desired cut-off level (Cronbach alpha ≥ 0.7). Lack of desired internal consistency in the original as well as modified scale reflects two problems, the first is cultural differences contributing to context-validity and applicability of some items in the population being studied.[16,17] Another reason could be the pilot nature of the study. In the present study, only 46 subjects completed the study. For internal consistency assessment of psychometric scales, generally suggested sample sizes range from 300 to 400.[18-20] Even those who have favoured a smaller sample size, minimum recommended sample size is 100.[21] Compared to these studies, the present study had a relatively much smaller sample size (n=46) and this could be one of the reasons for failure to achieve the targeted internal consistency. Compared to the present study, Greek version of ASHS was found to have adequate internal consistency ($r=0.73$) in the pilot survey on 20 adolescents only.[14] However, similar to the present study, de Bruin *et al*.,[15] also found that Dutch translation of ASHD resulted to achieve targeted Cronbach alpha value of 0.70. In their study, they recorded it as 0.67 only despite having a sample size of 112. Chehri *et al.*,[13] however, in their study obtained adequate internal consistency for Farsi version of AHSD (Cronbach alpha=0.8) but their sample size was much larger (n=1013).

Despite, sample size being one of the possible reasons behind failure to achieve the targeted internal consistency, the contextual validity of some questions in scale cannot be ruled out as the other possible reason. Some previous studies have also indicated that adaptation of ASHD in different populations affects the internal consistency.[15] In the present study, we used a stepwise data reduction approach to screen the items that resulted in decline of internal consistency of scale. Although, the lack of desired internal consistency was seen in both English as well as Hindi versions, however, in view of the fact that we were primarily focused on development of a scale suitable for Hindi speaking population, the manoeuvre for data reduction was done on Hindi version of the scale. Subsequently, internal consistency of both the scales was re-assessed after deleting the identified items responsible for decline in internal consistency. A total of five items were identified, (item nos. 2, 5, 8, 10 and 27), deletion of which resulted in achievement of Cronbach alpha values above target 0.7 for both the scales. Among these item number 2 and 5 were related with "duration of time to play or exercise/perform any physical activity". The lack of internal consistency for this item could be owing to improper phrasing of the question. Although intent of the question is on "physical games/exercise and physical activity", however, some of the adolescents might have included "virtual games" too as their playtime/exercise activity. Moreover, definition of physical activity also remains unclear or not fully understood by the young minds. It may be understood that the respondents were young adolescents, who might have responded differently for a question that was not properly phrased. Item number 8 was related with performing activities that make one feel calm or relaxed, for which some examples have been provided in the original scale (taking a hot bath/shower, listening to soft music, reading). It may be assumed that instead of considering them as inclusive options, the young adolescents limited their response to the readily available options " taking a hot bath/shower, listening to soft music, reading". The youngsters perform different activities for relaxation including gossiping, humming a song, watching movie or television or just texting or updating their social media profiles. As a number of alternatives could be added to this list, hence, providing some limited options could have resulted in some confusion in the mind of adolescent respondents which could be responsible for contributory role of this item towards a below targeted Cronbach alpha value.

Item number 10 " …I am very active (for example: playing outside, running, wrestling)" is another item that has a lot of associated subjectiveness owing to addition of adjective "very". The differentiation between active and very active is a herculean task for even an adult. What can be "very active" for one person cannot be termed as "very active" for another person. For an example, a person routinely practicing a sports for two hours a day at stadium can consider it as a routine activity and not "very active" as a number of his fellow sportsperson are also following the same routine whereas a person whose friends do not participate in a sports, can consider this level of participation into sports as "very active" participation. This question in the original version is thus dubious in nature as it does not take into account the relative impression of the adjective used ("very"). The next item that was identified to cause interference in the achievement of desired Cronbach alpha value was item no. 27 "…..use a bedtime routine (for example: bathing, brushing teeth, reading)", this again could be cause of confusion owing to the examples provided which might have been considered as "exclusive" and not "inclusive" of other possible practices.

In this way, we can see that content continuality is the other possible reason for a low internal consistency for the originally framed questionnaire. Adaptation of this scale in Indian population thus requires some content rephrasing or omission of such doubtful items. After deleting these items, we achieved Cronbach alpha values of 0.743 and 0.716 for both the English as well as Hindi versions. In the present study, we used the 33-item extended version of ASHD, but found it to produce adequate internal consistency for the reduced scale comprising of 28-items. de Bruin et al.,[15] however used the 28-item ASHD and found its internal consistency to be good (Cronbach alpha=0.67).

Due to pilot nature of the study, and possible dependence of internal consistency on both sample size as well as contextual validity, we did not confirmatory or exploratory perform factor analysis which were left to be studied in the full-fledged study. Nevertheless, the scale had high itemized as well as correlation which reflects that the Hindi version was as effective as original English version and could be used effectively in Hindi speaking Indian adolescents. The study also highlighted the need to rephrase some questions in order to make them more cogent and easy to understand in the targeted age group by making options confusion-free.

Conclusion and Recommendation

The translated Hindi version of the ASHD can be used effectively in Indian adolescents. In view of possible role of some of the items due to confusion in understanding the available options as inclusive instead of exclusive, a better rephrasing could help to obtain a better internal consistency for the original 33-item version of ASHD itself. Further studies on a larger sample size are recommended by including outcome validation (such as sleep duration, sleep quality assessment using (Epworth Sleep scale or Pittsburgh Sleep Quality Index) using the translated 33-item version of the scale itself. Factor analysis using Exploratory/Confirmatory analysis domain-wise correlation is also recommended in a larger sample size.

It may be noted that despite a low internal consistency for both original English as well as Hindi versions, there was strong correlation both for item scores as well as total scores, thus implying that though content validity may be an issue, yet both the instruments were able to record the order of sleep hygiene practices of similar order. Thus, the Hindi version of ASHD was as effective as English version in its original form as well as in reduced form.

References

1. Ramar K, Malhotra RK, Carden KA, Martin JL, Abbasi-Feinberg F, Aurora RN et al. Sleep is essential to health: an American Academy of Sleep Medicine position statement. J Clin Sleep Med. 2021; 17 (10):2115–2119.
2. Consensus Conference Panel; Watson NF, Badr MS, Belenky G, Bliwise DL, Buxton OM, Buysse D, et al.. Joint Consensus Statement of the American Academy of Sleep Medicine and Sleep Research Society on the Recommended Amount of Sleep for a Healthy Adult: Methodology and Discussion. Sleep. 2015; 38(8):1161-83.
3. Informed Health.org [Internet]. Cologne, Germany: Institute for Quality and Efficiency in Health Care (IQWiG); 2006-What is "normal" sleep? Sep 18, 2013 [Updated 2016 Dec 30]. https://www.ncbi.nlm.nih.gov/ books/ NBK279322/.
4. Altun I, Cınar N, Dede C. The contributing factors to poor sleep experiences in according to the university students: A cross-sectional study. J Res Med Sci. 2012 Jun; 17 (6):557-61.
5. Suen LK, Tam WW, Hon KL. Association of sleep hygiene-related factors and sleep quality among university students in Hong Kong. Hong Kong Med J. 2010; 16: 180–5.
6. Hauri P. Sleep hygiene. In: Hauri P, editor. Current Concepts: The Sleep Disorders. The Upjohn Company; Kalamazoo, MI: 1977. pp. 21–35.
7. Alanazi EM, Alanazi AMM, Albuhairy AH, Alanazi AAA. Sleep Hygiene Practices and Its Impact on Mental Health and Functional Performance Among Adults in Tabuk City: A Cross-Sectional Study. Cureus. 2023; 15 (3):e36221.
8. Zee PC, Badr MS, Kushida C, et al. Strategic opportunities in sleep and circadian research: report of the joint task torce of the sleep research society and American Academy of Sleep Medicine. Sleep. 2014; 37 (2):219–227.
9. Dubey M, Nongkynrih B, Gupta SK, Kalaivani M, Goswami AK, Salve HR. Sleep Quality Assessment of Adolescents Residing in an Urban Resettlement Colony, New Delhi, India. Indian J Community Med. 2019; 44 (3):271-276.
10. Miguez MJ, Bueno D, Perez C. Disparities in Sleep Health among Adolescents: The Role of Sex, Age, and Migration. Sleep Disord. 2020; 5316364.
11. Maurya C, Muhammad T, Maurya P, Dhillon P. The association of smartphone screen time with sleep problems among adolescents and young adults: cross-sectional findings from India. BMC Public Health. 2022; 22(1):1686.
12. LeBourgeois MK, Giannotti F, Cortesi F, Wolfson AR, Harsh J. The relationship between reported sleep quality and sleep hygiene in Italian and American adolescents. Pediatrics. 2005; 115 : 257–265.
13. Chehri A, Khazaie H, Eskandari S, Khazaie S, Holsboer-Trachsler E, Brand S, Gerber M. Validation of the Farsi version of the revised Adolescent Sleep Hygiene Scale (ASHSr): A cross-sectional study. BMC Psychiatry 2017; 17: 408.
14. Efthymiou V, Kotsikogianni D, Tsitsika AK, Vlachakis D, Chrousos GP, Charmandari E, Bacopoulou F. Validation of the Greek version of the Adolescent Sleep Hygiene Scale (ASHS). EMBnet J. 2021; 26 : e979.

15. de Bruin EJ, van Kampen RK, van Kooten T, Meijer AM. Psychometric properties and clinical relevance of the adolescent sleep hygiene scale in Dutch adolescents. Sleep Med. 2014; 15 (7) :789-97.

16. Braun T, Ehrenbrusthoff K, Bahns C, Happe L, Kopkow C. Cross-cultural adaptation, internal consistency, test-retest reliability and feasibility of the German version of the evidence-based practice inventory. BMC Health Serv Res. 2019; 19 (1):455.

17. Flosadottir V, Roos EM, Ageberg E. Translation, Cross-Cultural Adaptation, and Validation of the Activity Rating Scale for Disorders of the Knee. Orthop J Sports Med. 2017;5(9):2325967117729361.

18. Kline P. A handbook of test construction: Introduction to psychometric design. 1986, New York: Methune & Company.

19. Nunnally JC, Bernstein IH. Psychometric Theory, (3rd ed), 1994, McGraw-Hill: New York.

20. Charter RA. Sample Size Requirements for Precise Estimates of Reliability, Generalizability, and Validity Coefficients. Journal of Clinical and Experimental Neuropsychology, 1999; 21: 559-566.

21. Kennedy I. Sample size determination in test-retest and Cronbach alpha reliability estimates. British Journal of Contemporary Education 2022; 2 (1): 17-29.

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