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Original Article

Psychometric properties and clinical relevance of the Adolescent Sleep Hygiene Scale in Dutch adolescents

Eduard J. de Bruin *, Ris K.A. van Kampen, Tamar van Kooten, Anne Marie Meijer

Research Institute of Child Development and Education, University of Amsterdam, Amsterdam, The Netherlands

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ABSTRACT

Objective: This study investigated reliability, validity, and clinical relevance of the Adolescent Sleep Hygiene Scale (ASHS) in Dutch adolescents.
Methods: The Dutch translation of the ASHS was administered to 186 normal-sleeping adolescents and 112 adolescents with insomnia. Their sleep variables were measured using sleep logs and questionnaires. From the insomnia group, scores were also obtained after six weeks of cognitive behavioral therapy for insomnia ($n = 58$) or waiting list ($n = 22$).
Results: The full scale of the ASHS had acceptable internal consistency. The results showed moderate to strong correlations of the ASHS (domains) with sleep quality, sleep duration and chronic sleep reduction. Furthermore, the Dutch ASHS was able to discriminate between normal sleepers and adolescents with insomnia, and scores of adolescents with insomnia improved after treatment.
Conclusions: These findings confirm the importance of sleep hygiene in adolescent sleep, and contribute to the validity of the ASHS and its applicability in research and clinical practice.

1. Introduction

Sleep hygiene refers to a set of practices that promote adequate sleep duration, good sleep quality, and daytime alertness [1]. It includes guidelines for several aspects of life, such as general health practices (eg, exercise), environmental factors (eg, light), and sleep-related behaviors (eg, establishing a regular sleep schedule) [2].

Previous research has addressed the association between adolescent sleep hygiene and other sleep-related variables and aspects of daily functioning, such as daytime sleepiness. LeBourgeois et al. [1] demonstrated a moderate association between self-reported sleep hygiene and sleep quality in 776 Italian and 572 American public school students aged 12–17 years. They found that the cognitive and the emotional components of sleep hygiene are the strongest unique predictors of overall sleep quality. Similar results were found by Manni et al. [3] in 869 17-year-old Italian students. Brown et al. [4] showed that sleep–wake schedule irregularity, going to bed thirsty, environmental noise, and worrying while falling asleep contributed to poor sleep quality in 124 American undergraduate students. Again cognition, more specifically worry, was found to play an important role in poor sleep quality.

The association of sleep hygiene with sleep duration is less distinct. Regularity of the sleep–wake schedule is a sleep hygiene practice that has often been emphasized with respect to sleep duration, as it takes the adolescent circadian timing system a long time to shift back to an early sleep–wake cycle after a weekend of delayed bedtimes and sleeping in [5]. Storfer-Isser et al. [6] confirmed this assumption in a study with 514 American adolescents, showing small but positive associations with sleep duration as measured by actigraphy.

Several aspects of daily functioning also appeared to be related to sleep hygiene. Sleep hygiene was modestly related to perceptions of daytime sleepiness [6,7]. Finally, adolescents with poor sleep hygiene showed significantly lower school competency scores, higher problem scores, and worse grades [6,8]. The associations of sleep duration and sleep quality with adolescent problem behavior [9] justify the assumption that sleep hygiene is related to daytime functioning.

The Adolescent Sleep Hygiene Scale (ASHS) [1] and its revised form (ASHS-r) [6] are the only sleep hygiene measures for use in adolescents. The ASHS has been rated as 'approaching well-established' [10] according to the criteria for evidence-based pediatric sleep measures [11]. The reason for this rating is its moderate validation information.

* Corresponding author. Address: University of Amsterdam, P.O. Box 94208, 1090 GE Amsterdam, The Netherlands. Tel.: +31 (0)20 525 1327.
E-mail address: E.J.deBruin@uva.nl (E.J. de Bruin).

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Because sleep hygiene consists of practices that promote sleep quality and sleep duration, it is a plausible hypothesis that sleep hygiene plays a role in insomnia. Several studies compared the practice of sleep hygiene in insomnia patients and good sleepers. In a study comparing three groups of 18 adults each, with psychophysiological insomnia, insomnia associated with depressive disorder, and good sleepers, Kohn and Espie [12] concluded that patients with insomnia engage in significantly more habits that demote sleep and are characterized by heightened mental arousal at bedtime. In a study with 144 adults Lacks and Rotert [13] compared patients with sleep onset insomnia and sleep maintenance insomnia with good sleepers and found that patients with insomnia had more general sleep hygiene knowledge than good sleepers, but practiced it less often. Jefferson et al. [14] even found several maladaptive sleep hygiene practices to be predictors of insomnia in a population-based sample of 258 patients with insomnia and 258 normal sleepers. However, even though patients with insomnia were found to engage in less adequate sleep hygiene practices, a less straightforward association was found between sleep hygiene and sleep quality in this group. Yang et al. [2] only found a correlation between the domain of arousal-related behaviors of sleep hygiene and sleep difficulties in 106 patients with insomnia compared with 89 good sleepers. Stepanski and Wyatt [15] concluded from a literature review spanning 24 years of sleep hygiene practice that there are no empirical data demonstrating the role of poor sleep hygiene in insomnia or showing that good sleep hygiene improves sleep in patients with insomnia. All studies mentioned above concerning sleep hygiene and insomnia were conducted with adults. Concerning adolescents, Malone [16] concluded in a literature review that evidence for the applicability of sleep hygiene practices is questionable. Therefore the role of sleep hygiene in insomnia does not seem distinct. Nevertheless, since previous research has noted the association between sleep hygiene and sleep quality and sleep duration, more research on this topic is needed.

The present study aimed to examine the psychometric properties of the translated version of the ASHS in Dutch adolescents and to examine scores in samples of normal sleepers and adolescents with insomnia. Based on the results of previous research, we expect that sleep hygiene scores from the ASHS correlate positively with sleep quality and sleep duration and that they correlate negatively with daytime sleepiness, and in particular with chronic sleep reduction. Chronic sleep reduction has been demonstrated to have negative effects on daytime functioning [8,17].

Since the importance of the cognitive and emotional aspects of sleep hygiene has been emphasized by multiple studies [1,3,4], strong correlations between these aspects of sleep hygiene and the sleep-related variables are expected.

Furthermore, we aim to explore the role of sleep hygiene in adolescents with insomnia by comparing their sleep hygiene practices with a community sample, and by comparing the effects of cognitive behavior therapy for insomnia (CBT-I) on sleep hygiene between a waiting list group and a group of adolescents receiving CBT-I. Improvement of sleep hygiene scores in the CBT-I group indicates the validity of sleep hygiene in insomnia in adolescents and its importance for treatment.

2. Methods

2.1. Participants

A community sample of adolescents and a sample of adolescents with insomnia were recruited. The community sample consisted of 186 participants, 58 (31%) male and 128 (69%) female, recruited from two secondary schools in Amsterdam, The Netherlands. Age ranged from 12:6 to 19:8 years (mean, 14:4 years). Thirty-six percent of the children were in their first year of secondary school, 24% in the second year, 27% in the third and 13% in the fourth.

Because not all adolescents in the community sample reported as good sleepers, for further analysis this group was divided into good sleepers and poor sleepers. Participants who reported sleeping badly at least once or twice a week were labeled as poor sleepers.

The second group consisted of adolescents with a diagnosis of insomnia, recruited through the media and youth healthcare centers. After registering through an online website, these participants received an e-mail outlining the aims and procedures of the study. Inclusion criteria were: (i) age 12–19 years; (ii) insomnia complaints according to the DSM-IV-TR criteria for primary insomnia [18] as indicated by scores above cut-off on the insomnia scale of the Holland Sleep Disorder Questionnaire (HSDQ) [19] and confirmed by information from the intake interview; (iii) no suicidal intentions or drug abuse, investigated through clinical scores and item screening on the Youth Self Report [20] and information from the intake interview; (iv) no indication of sleep disorders other than insomnia indicated by scores above cut-off on other scales from the HSDQ and confirmed with information from the intake interview; (v) not presently being treated for psychological or sleep problems; and (vi) no use of drugs or medication that interferes with sleep. From the initial 417 adolescents who registered online, 276 withdrew from the study for: no reason given (51.4%); already under psychological or medical treatment (for sleep or other problems) (8.1%); too busy in school or otherwise (9.4%); too young (4.0%); or too old (27.1%). From the 141 adolescents who were interviewed by an academically trained and experienced sleep specialist, 29 were excluded from the study: four withdrew with no reason given, nine were excluded because of strong indications of a delayed sleep phase syndrome and were referred to a specialized clinic for further diagnosis and treatment, nine were starting other treatments, and seven indicated that they did not have sufficient time or motivation to engage in the treatment. There were 112 adolescents with insomnia included in the study, of which 25 (22%) were male and 87 (78%) female. Age (years:months) ranged from 12:4 to 19:11 (mean, 15:9). Ten percent were in their first year of secondary school, 14% in their second, 22% in their third, 25% in their fourth, 13% in their fifth, 3% in their sixth; and 13% were in post-secondary education.

The participants with insomnia in this study were recruited for the clinical trial registered with ISRCTN registration number: ISRCTN33922163.

2.2. Procedure

After recruitment, participants received information on the study and informed consent was obtained from adolescents and their parents.

In the community sample, participants were given 40 min to complete the questionnaires individually in a classroom setting, after a short instruction by the researcher. In the questionnaires, participants also answered questions on socio-economic status (SES), age, and gender. Afterwards, they received a sleep log form and were instructed to register their sleep during a period of 14 days. The Dutch translation of the ASHS was included at the end of the sleep log.

Participants in the insomnia sample registered through a website with a questionnaire on their initial sleep complaint, SES details and contact information. After obtaining informed consent, they filled out the questionnaires and sleep logs online. These participants were then diagnosed for primary insomnia according to the DSM-IV-TR in a face-to-face 1 h interview. This group of adolescents with insomnia was recruited for another study into