



ORIGINAL ARTICLE

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Adaptation of the parents' sleep knowledge inventory to the Turkish language

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Abstract

It's critical to identify sleep disturbances from the earliest period in childhood. For this reason, parents should have sufficient information about their children's sleep habits. The purpose of this study was to adapt the Parents' Sleep Knowledge Inventory (PSKI) to the Turkish language and examine the reliability/validity of the inventory. 182 children between the ages of 3 and 12 with typically developing and developmental disabilities participated in the study. The participants were evaluated with the Parents' Sleep Knowledge Inventory and Children's Sleep Habits Questionnaire (CSHQ). After the translation stage, internal consistency (with Cronbach alpha) and test-retest reliability (with Intraclass Correlation Coefficients) of the PSKI were calculated. The validity of PSKI was analyzed according to the correlation with CSHQ. The internal consistency of the PSKI was determined to be acceptable for the total inventory (Cronbach's alpha=0.774). The test-retest reliability values were found to be extremely high (Intraclass Correlation coefficients=0.977). There was a weak correlation between PSKI and CSHQ domains ($p<0.05$). It was determined that the Turkish PSKI had acceptable reliability however, its validity could not be demonstrated in this study. We think it may be due to the differences in the focus of these inventories. Turkish PSKI is an appropriate tool to evaluate the parents' knowledge of sleep in children with typically developing and developmental disabilities.

Keywords: Developmental disabilities, parent, rehabilitation, reliability, sleep

Introduction

Good sleep habits are very important for a child's growth and development. Sleep disorders are seen as common in infancy, early childhood, school age, and adolescence [1,2]. According to recent studies, 20–30% of infants and young children suffer from sleep disorders [3,4]. The incidence of sleep disorders in children with developmental disabilities is up to two to three times higher than in their typically developing peers. Physical, sensory, and neurological developmental problems are among the reasons for the high incidence of sleep disorders in these children [5-7]. Sleep disorders have a detrimental effect on a child's overall health, leading to problems such as daytime drowsiness, psychological

challenges, metabolic complications, and reduced academic performance [8,9]. In addition, sleep problems in children can cause stress and negatively affect the well-being of their parents. Because of these negative consequences, it is important to diagnose and address sleep disorders in children at an early stage [10,11].

Sleep disorders are frequently reported by parents. According to recent studies, most parents are uninformed about what constitutes regular sleep, and primary care facilities rarely bring up children's sleep issues [12-14]. Research indicates that parents under-report sleep disorders in their children. Parents' lack of knowledge about children's sleep can make it difficult to identify

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sleep disorders. As a result, diagnosis of sleep disorders is delayed [7,12]. According to the research, parents who correctly answered more sleep knowledge questions about their children's sleep habits were more likely to say that their children followed such routines and that the amount of sleep was compatible with the recommended amount [15]. Parents play a significant role in identifying sleep disorders. There is also a need for more data on parents' awareness of their children's sleep habits. Assessing parents' knowledge about sleep: Increasing awareness in this regard can contribute to the early detection and diagnosis of sleep problems in children.

There are only two inventories in the literature that assess parents' knowledge of sleep. There is a short 10 questions inventory developed by Owens et al. [15,16] and the Parents' Sleep Knowledge Inventory (PSKI). It is important to assess parents' knowledge of appropriate sleep practices in children with developmental disabilities using practical and reliable criteria.

The PSKI is an inventory that assesses parents of children with developmental disabilities/typically developing children who have children between the ages of 2 and 17 [17]. To the best of our knowledge, there is no Turkish inventory that assesses parents' knowledge about children's sleep. The aim of this study is to adapt the PSKI, which assesses the sleep knowledge of parents of children with typical development/developmental disabilities, and to examine the reliability of the Turkish PSKI. Parents' knowledge about sleep should be assessed using valid and reliable methods, which can make a significant contribution to public health through early detection of sleep problems in children. We believe that adapting this inventory to the Turkish language may provide clinicians and academicians with a different perspective in assessing parental knowledge about sleep.

Material and Methods

Design

PSKI was developed by Schreck et al. in 2011 to assess parents' knowledge about childhood sleep. The inventory is answered by parents by its nature. The Children's Sleep Habits Questionnaire and PSKI used in this study are parent-reported and were filled out by the parents.

Participants

The study comprised parents of 182 typically developing and developmentally disabled children, aged 3 to 12 years. Parents who volunteered to participate in the study were included in the research. Children who could not be reached by their parents and whose parents could not speak Turkish and read or write were excluded from the research. Typically developing children were identified using snowball sampling methods, while those with developmental disabilities were accessed via Special Education

and Rehabilitation Centers. Between May 2021-May 2022, data were collected.

Age, gender, height, weight, features of the children's sleep, and the sociodemographic data of the parents were all inquired about in the demographic information form prepared for the study. The participants were evaluated with the Children's Sleep Habits Questionnaire for the purpose of assessing the validation of the Parents' Sleep Knowledge Inventory. For the test-retest application, 21 participants were asked to refill the PSKI 15 days after the first application. All participants in the study ensured written informed consent in these forms. The study had its ethical approval from the clinical research committee. The study had ethical approval from the clinical research committee (Approval date: 10.03.2021 and Protocol number: 2021-03/07). This study was performed in line with the principles of the Declaration of Helsinki.

Children's Sleep Habits Questionnaire (CSHQ)

The children's sleeping habits were evaluated by the CSHQ. This parent report form comprises 33 questions and was created to investigate children's sleep patterns and sleep-related disorders [18,19]. Items on the CSHQ are evaluated on a three-point Likert scale: usually, sometimes, and rarely. The questionnaire consists of eight sub-scales: bedtime resistance, delayed sleep onset, sleep duration, sleep anxiety, nighttime awakenings, parasomnias, sleep-disordered breathing, and daytime sleepiness. The cut-off score was determined to be 41. The presence of a clinically severe sleep disturbance is indicated by a total score of >41. The questionnaire's overall scores fall between 33 and 99. Higher scores indicate more sleep disturbances [18]. Fiş and coworkers tested the survey's validity in Turkish. It is a valid and reliable technique for identifying and evaluating potential sleep patterns and disorders in Turkish children. The Cronbach's alpha coefficient is stated to be 0.78 [20].

Parents' Sleep Knowledge Inventory

PSKI is a tool designed to measure parents' understanding of their child's sleep [17]. The inventory evaluates sleep-related issues, including snoring, difficulty falling asleep, excessive daytime sleepiness, nighttime awakenings, and sleep duration and pattern. The inventory has sections for the child's age-related sleep features, normally occurring sleep patterns, and sleep disorders. A question in the inventory can take place in more than one domain. There are 10 domains according to the sleep properties and four domains according to the age groups [17]. The inventory consists of 62 questions, and responses to all questions are based on a 4-point inventory: 0 (not true), 1 (somewhat or sometimes true), 2 (very true), and 3 (don't know). The number of accurate responses reflects the participants' overall PSKI scores as well as their domain scores. PSKI domains, questions in the PSKI domains, and true answers of the PSKI questions are presented in Table 1.

Table 1. True answers of the PSKI questions and questions in the PSKI domains

True answers of the PSKI questions	
Questions in the survey whose answers are “Very True”	1, 2, 3, 4, 5, 8, 9, 14, 16, 17, 18, 20, 21, 24, 25, 29, 30, 31, 33, 36, 37, 43, 44, 46, 48, 49, 50, 51, 54, 57, 58
Questions in the survey whose answers are “Not True”	6, 7, 10, 11, 12, 15, 19, 26, 27, 28, 32, 34, 35, 38, 40, 41, 42, 45, 47, 52, 53, 56, 59, 60, 61, 62
Questions in the survey whose answers are “Somewhat or Sometimes True”	13, 22, 23, 39, 55
Distribution of questions in PSKI according to domains	
Domains according to the age group	
Infancy	1, 2, 7, 8, 9, 10, 11, 14, 15, 16, 19, 23, 24, 25, 31, 32, 33, 35, 39, 43, 46, 47, 55, 57, 58, 59
Early Childhood	11, 13,17,18, 22, 26, 29, 33, 39, 43, 45, 46, 47, 51, 52, 53, 55, 59
Middle Childhood	3, 4, 5, 12, 20, 21, 28, 30, 36, 37, 38, 41, 45, 48, 49, 54, 56, 61, 62
Adolescence	3, 6, 12, 20, 27, 34, 40, 42, 44, 50, 56, 60
Domains according to the sleep properties	
Normal sleep	1, 2, 3, 6, 8, 9, 11, 13, 15, 16, 17, 19, 20, 21, 22, 23, 24, 29, 30, 31, 33, 34, 35, 36, 38, 40, 41, 42, 44, 45, 47, 49, 51, 52, 56
Hours	1, 6, 9, 11, 15, 23, 31, 32, 34, 40, 41, 42, 44, 45, 49, 52
Naps	2, 3, 13, 16, 22, 24, 37, 47
Problem sleep	4, 5, 7, 10, 12, 14, 18, 25, 26, 27, 28, 32, 37, 39, 43, 46, 48, 50, 53, 55, 57, 58, 59, 60, 61, 62
Apnea/snoring	46, 50, 54, 60
Daytime sleepiness	21, 61, 62
Body movements	48
Waking	2, 7, 8, 10, 12, 14, 17, 18, 21, 25, 26, 27, 28, 32, 33, 35, 37, 43, 53, 55
Settling	4, 7, 26, 30, 39, 54, 55, 57, 58, 59, 62
Dreams/nightmares	5, 19, 20, 29, 36, 38, 51, 53, 56

PSKI: Parents' Sleep Knowledge Inventory

Translation Steps of the Inventory

Firstly, approval from Prof. Dr. Kimberly Anne Schreck was obtained in order to adapt the PSKI to Turkish. The translation steps of the inventory were carried out by taking into account the guidelines for translation, adaptation, and validation between cultures [21]. The questionnaire was translated from English into Turkish by two native Turkish speakers with a good command of English. The final version of the questionnaire was then back-translated into English by two native translators who were unfamiliar with the aims of the study but who had sufficient knowledge of Turkish. The translators then reviewed the Turkish version of the questionnaire with two physiotherapists for wording and clarification.

The final Turkish version was pre-tested with a group of ten parents who had not participated in the test-retest study. They were asked to rate the clarity of the questions and any irrelevant items that they did not fully understand. Feedback indicated that all items were clear and relevant. No changes were made to any of the items as a result of the feedback.

Statistical Analysis

The IBM Statistical Package for Social Sciences (SPSS) 23.0 application was used to analyze the data (SPSS Inc., Chicago, IL, USA). The distribution of the PSKI domains and Total Score data was examined using the Kolmogorov-Smirnov test, as well as mean, median, skewness, and kurtosis. It was revealed that all of the domains and total score data in our study came from a normal distribution, with the exception of the Body Movements domain.

When determining the number of samples in adaptation studies of scales such as the PSKI used in our study, it is recommended to reach cases that are 2-10 times the number of items in the scale [22]. There are 62 items in the PSKI scale. In our study, it was aimed to reach at least 124 individuals, and 182 individuals reached were included in the study. In order to determine the test-retest reliability of the PSKI, a re-test was performed 15 days after the first application. In order to assess test-retest reliability, the intraclass correlation coefficient (ICC) was determined. To reach an ICC score of at least 0.50; (the α value settled as 0.05% and the power of the study was settled as 80%) it was determined that 20 participants should be included for test-retest reliability analysis. In our study, 21 cases were retested.

The ICC values were interpreted in the 95% confidence interval; values less than 0.5 were interpreted as weak reliability, values between 0.5-0.75 were interpreted as moderate reliability, values between 0.75-0.9 were interpreted as high reliability, and values greater than 0.90 were interpreted as excellent reliability [23]. The Cronbach's alpha values were used to determine internal consistency. If the Cronbach's alpha coefficient is below 0.5, it is interpreted as unacceptable; if it is between 0.5 and 0.6, it is interpreted as weak; if it is between 0.6 and 0.7, it is interpreted as acceptable; if it is between 0.7 and 0.9, it is interpreted as high; and if it is greater than 0.9, it is interpreted as excellent [24]. The threshold for statistical significance was set at 0.05.

Results

50 children (27.5%) who were typically developing and 132 (72.5%) children with developmental disabilities between the

ages of 3-12 participated in this study, along with their parents. 50 children (27.5%) who were typically developing and 132 (72.5%) children with developmental disabilities between the ages of 3-12 participated in this study, along with their parents. The mean diary sleep duration of children with typically developing was 9,750 hours and 10,323 hours for children with developmental disabilities. While 62% (n=31) of parents of typically developing children were university/master/PhD graduates, 22.73% (n=30) of parents of children with developmental disabilities were university/master/PhD graduates. Descriptive variables of the parents and children and the children's sleep-related features are presented in Table 2.

It was found that the ICC values were quite high in the analysis performed to look at the test-retest reliability of PSKI and its domains. The highest reliability was found for the domain of

"middle childhood" with ICC=0.982. The ICC value for the PSKI total score was also extremely high (ICC=0.977). It was observed that the internal consistency values were low for the domains, but the total, including all questions together, was high (Cronbach's alpha=0.774). The test-retest reliability and internal consistency of the PSKI total score and its dimensions are presented in Table 3.

The descriptive variables of PSKI and CSHQ are presented in Table 4.

There are negligible negative relationships between PSKI domains and CSHQ in some dimensions. Of these low-severity relationships, the highest score was between the PSKI Body Movements domain and the CSHQ Parasomnias dimension ($r=0.240$, $p=0.001$). The construct validity of PSKI domains with CSHQ dimensions is presented in Table 5.

Table 2. Descriptive variables of the parents and children and children's sleep-related features

	Typically developing children (n=50)		Children with developmental disability (n=132)	
	Number (n)	Percentage (%)	Number (n)	Percentage (%)
Who responded to the inventory				
Mother	41	82.00	124	93.94
Father	9	18.00	8	6.06
Educational status of respondent				
Literate/primary school graduate	6	12.00	29	21.97
Secondary school graduate	1	2.00	35	26.52
High school graduate/associate degree graduate	12	24.00	38	28.79
University graduate	23	46.00	30	22.73
Master or PhD graduate	8	16.00	-	-
	Min-Max	Mean±SD	Min-Max	Mean±SD
Age	3-12	6.690±2.531	3-12	5.549±2.060
Daily sleep time (hours)	7-13	9.750±1.270	7-16	10.323±1.726
Daily screen time (hours)	0.5-8	2.770±1.620	0-16	2.651±2.411
Where does the child sleep?				
	Number (n)	Percentage (%)	Number (n)	Percentage (%)
In her/his own room, in her/his own bed	33	66.00	35	26.52
In her/his parents' room, in her/his own bed	1	2.00	60	45.45
In her/his parents' bed	5	10.00	15	11.36
In her/his own bed in the room he shared with her/his sibling	11	22.00	22	16.67
How does a child fall asleep?				
Swinging by an adult on a lap, foot, cradle, or blanket	2	4.00	23	17.42
Lying next to her/his parents	18	36.00	42	31.82
By herself/himself	30	60.00	67	50.76
Does the child need to listen to lullabies or music to sleep?				
Listens to lullaby	5	10.00	17	12.88
Listens to music	3	6.00	4	3.03
Sleeps in a quiet environment	31	62.00	93	70.45
Other	11	22.00	18	13.64
Lighting of the environment where the child sleeps				
Sleeps in the dark	27	54.00	62	46.97
Sleeps with night light	16	32.00	42	31.82
Sleeps in dim light	7	14.00	28	21.21
Does the child have screen time in the last hour just before going to sleep?				
Yes	31	62.00	73	55.30
No	19	38.00	59	44.70

Table 3. Test-retest reliability (n=21) and internal consistency (n=182) of the Parents' Sleep Knowledge Inventory total score and its domains

	ICC	95% CI	df	Cronbach's alpha	Number of questions
Domains according to sleep characteristics					
PSKI infancy	0.960	0.902-0.984	20	0.685	26
PSKI early childhood	0.933	0.835-0.973	20	0.439	18
PSKI middle childhood	0.982	0.957-0.993	20	0.529	19
PSKI adolescence	0.921	0.805-0.968	20	0.259	12
Domains according to age groups					
PSKI normal sleep	0.981	0.953-0.992	20	0.677	36
PSKI hours	0.936	0.843-0.974	20	0.280	16
PSKI naps	0.970	0.926-0.988	20	0.301	8
PSKI problem sleep	0.947	0.870-0.979	20	0.603	26
PSKI apnea/snoring	0.959	0.898-0.983	20	0.378	4
PSKI daytime sleepiness	0.936	0.842-0.974	20	0.074	3
PSKI body movements	0.938	0.846-0.975	20	NA	1
PSKI waking	0.965	0.914-0.986	20	0.599	20
PSKI settling	0.896	0.744-0.958	20	0.161	11
PSKI dreams/nightmares	0.951	0.880-0.980	20	0.316	9
PSKI total score	0.977	0.943-0.991	62	0.774	62

ICC: intraclass correlation coefficients, CI: confidence interval, df: degrees of freedom, PSKI: Parents' Sleep Knowledge Inventory

Table 4. PSKI and CSHQ variables

	Typically developing children (n=50)				Children with developmental disability (n=132)			
	Minimum	Maximum	Mean	SD	Minimum	Maximum	Mean	SD
PSKI infancy	1.00	18.00	10.000	4.036	0.00	19.00	9.657	3.766
PSKI early childhood	0.00	11.00	5.500	2.384	0.00	12.00	5.336	2.458
PSKI middle childhood	0.00	14.00	5.420	2.726	0.00	13.00	5.412	2.773
PSKI adolescence	0.00	8.00	3.660	1.858	0.00	7.00	2.947	1.707
PSKI normal sleep	1.00	20.00	10.500	3.877	0.00	21.00	10.153	4.271
PSKI hours	0.00	7.00	3.920	1.748	0.00	8.00	3.901	1.771
PSKI naps	0.00	6.00	3.500	1.432	0.00	8.00	3.176	1.591
PSKI problem sleep	0.00	20.00	9.320	3.997	0.00	18.00	9.092	3.788
PSKI apnea/snoring	0.00	4.00	1.400	1.340	0.00	4.00	1.328	1.119
PSKI daytime sleepiness	0.00	3.00	0.980	0.845	0.00	3.00	0.756	0.680
PSKI body movements	0.00	1.00	0.240	0.431	0.00	1.00	0.389	0.489
PSKI waking	0.00	14.00	6.640	2.761	0.00	15.00	6.374	3.019
PSKI settling	0.00	8.00	4.260	1.925	0.00	7.00	3.954	1.544
PSKI dreams/nightmares	0.00	28.00	7.120	8.390	4.00	26.00	17.168	4.977
PSKI total score	10.00	29.00	20.888	5.860	0.00	39.00	19.130	7.106
CSHQ bedtime resistance	6.00	16.00	9.500	2.573	6.00	17.00	10.512	2.926
CSHQ sleep onset delay	1.00	3.00	1.220	0.506	1.00	3.00	1.512	0.758
CSHQ sleep duration	3.00	16.00	3.820	2.077	3.00	9.00	4.679	1.651
CSHQ sleep anxiety	4.00	12.00	6.820	2.265	4.00	12.00	7.458	2.546
CSHQ night wakings	3.00	8.00	4.080	1.368	3.00	9.00	4.718	1.479
CSHQ parasomnias	6.00	15.00	7.980	1.846	7.00	21.00	9.748	2.615
CSHQ sleep disordered breathing	3.00	6.00	3.260	0.664	3.00	13.00	3.878	1.549
CSHQ daytime sleepiness	8.00	20.00	12.360	2.790	8.00	19.00	12.731	2.964
CSHQ total score	33.00	66.00	45.280	7.437	33.00	76.00	51.351	9.375

PSKI: Parents' Sleep Knowledge Inventory, CSHQ: Children's Sleep Habits Questionnaire

Table 5. Construct validity of PSKI domains with CSHQ dimensions (n=182)

		CSHQ bedtime resistance	CSHQ sleep onset delay	CSHQ sleep duration	CSHQ sleep anxiety	CSHQ night wakings	CSHQ parasomnias	CSHQ sleep disordered breathing	CSHQ daytime sleepiness	CSHQ total score
PSKI infancy	r	-0.084	-0.108	-0.132	0.014	-0.055	0.022	-0.011	-0.145	-0.110
	p	0.259	0.149	0.077	0.847	0.465	0.769	0.887	0.052	0.142
PSKI early childhood	r	-0.167*	-0.154*	-0.133	-0.127	-0.081	-0.058	-0.010	-0.187*	-0.196**
	p	0.025	0.039	0.075	0.090	0.277	0.436	0.899	0.012	0.008
PSKI middle childhood	r	-0.105	-0.075	-0.055	-0.040	0.018	0.063	-0.058	-0.029	-0.049
	p	0.158	0.316	0.465	0.593	0.806	0.400	0.437	0.703	0.510
PSKI adolescence	r	-0.128	-0.182*	-0.087	-0.074	-0.007	-0.083	0.019	-0.061	-0.122
	p	0.086	0.014	0.243	0.325	0.930	0.265	0.795	0.414	0.100
PSKI normal sleep	r	-0.067	-0.127	-0.103	-0.002	-0.001	0.004	-0.021	-0.072	-0.077
	p	0.367	0.088	0.168	0.979	0.987	0.959	0.779	0.337	0.306
PSKI hours	r	-0.065	-0.074	-0.086	0.000	0.005	0.043	0.070	0.041	-0.001
	p	0.384	0.320	0.249	0.997	0.950	0.569	0.346	0.587	0.994
PSKI naps	r	-0.070	-0.231**	-0.117	-0.038	-0.044	-0.046	-0.093	-0.125	-0.146
	p	0.347	0.002	0.117	0.609	0.559	0.542	0.215	0.094	0.050
PSKI problem sleep	r	-0.173*	-0.092	-0.097	-0.073	-0.054	0.036	-0.011	-0.168*	-0.140
	p	0.020	0.218	0.195	0.326	0.469	0.628	0.880	0.024	0.059
PSKI apnea /snoring	r	-0.062	-0.021	-0.051	-0.066	-0.026	-0.017	0.029	-0.168*	-0.099
	p	0.408	0.780	0.492	0.378	0.729	0.817	0.702	0.024	0.186
PSKI daytime sleepiness	r	0.026	-0.040	-0.002	0.044	-0.052	-0.153*	-0.113	-0.053	-0.083
	p	0.733	0.590	0.982	0.560	0.487	0.040	0.131	0.481	0.266
PSKI body movements	r	0.010	-0.002	0.046	0.043	0.054	0.240**	-0.038	-0.046	0.085
	p	0.897	0.974	0.540	0.562	0.467	0.001	0.611	0.537	0.257
PSKI waking	r	-0.100	-0.093	-0.109	-0.024	0.004	0.004	-0.028	-0.106	-0.102
	p	0.180	0.213	0.144	0.746	0.957	0.961	0.713	0.158	0.171
PSKI settling	r	-0.168*	-0.156*	-0.102	-0.051	-0.027	-0.037	-0.070	-0.157*	-0.167*
	p	0.024	0.036	0.173	0.493	0.720	0.625	0.350	0.035	0.025
PSKI dreams/ nightmares	r	0.036	0.153*	0.239**	-0.019	-0.027	0.130	0.077	-0.129	0.077
	p	0.633	0.040	0.001	0.800	0.722	0.082	0.303	0.084	0.300
PSKI total score	r	-0.113	-0.106	-0.118	-0.085	-0.013	0.042	-0.007	-0.164*	-0.118
	p	0.172	0.197	0.151	0.300	0.880	0.614	0.934	0.046	0.153

**Correlation is significant at the 0.01 level (2-tailed), *Correlation is significant at the 0.05 level (2-tailed); PSKI: Parents' Sleep Knowledge Inventory, CSHQ: Children's Sleep Habits Questionnaire

Discussion

The Turkish adaptation of the PSKI was successfully completed for this study, which examined the validity and reliability of the Turkish version of the PSKI. It has been revealed that the Turkish version has a high level of test-retest reliability, including the entire inventory and its domains assessing the knowledge of parents of children with typically developing/developmental disabilities. Additionally, the Turkish version of PSKI is an inventory with good internal consistency (total inventory). To the best of our knowledge, this is the first study to examine the reliability and validity of PSKI that questions the parents' knowledge of sleep.

In the present study, it has been seen that there are no questions that could not be understood during the cultural adaptation of the inventory after it was translated into Turkish. The test-retest reliability of the inventory has high values. Although the inventory has low internal consistency for the domains, it has been presented that there is good internal consistency for the overall inventory. Within the scope of our study, it has been revealed that the PSKI has appropriate reliability. Since there is no study in the literature evaluating the reliability of PSKI similar to ours, it was not possible to make a comparison.

In this study, the correct answer rates of parents were found to be low. The PSKI total score ranged between 10-29 for typically

developing children and 0-39 for those with developmental disabilities. This shows the points received the most from an inventory, which can be taken as 62 points from the total. The mean of the correctly answered questions on the PSKI was 20.888 for children who were typically developing and 19.130 for those who had developmental disabilities. The rates of incorrect responses and "don't know" responses have also been found to be high. The lack of parental understanding concerning their children's sleep is highlighted in the literature [14,25]. Parental sleep knowledge is often low, and precise profiles of sleep knowledge patterns have not been established [25,26]. It is mentioned that parents' knowledge about sleep hygiene in children can contribute to sleep difficulties [26].

When the relationship of PSKI with CSHQ was examined to evaluate its validity, it was seen that there were weak relationships between some domains and dimensions of both tools. Although this result supports our argument, the weak relationships make the discussion difficult. We think that the reason for this may be related to the fact that the focus of the CSHQ scale and PSKI inventory is on different subjects. CSHQ is used to detect sleep disorders, while PSKI evaluates parents' knowledge about children's healthy sleep. Sleep problems in children can be affected by many factors other than the knowledge level of the family. Therefore, relations between the scale and inventory may not have been observed.

In recent years, emphasis has been placed on the importance of methods implemented to provide guidance on parent health education and parental knowledge. It is emphasized that parents, based on their level of knowledge about poor sleep, should be included in various educational programs [14,27]. The importance of sleep health education is highlighted, and it is noted that it should be tailored according to the needs and values of communities and specific parents [28]. Harmoniously, it is emphasized that parent-healthy sleep education programs improve sleep quality in children [29]. Similarly, it can be recommended to design educational programs in order to improve parents' knowledge about child sleep in the Turkish community.

To our knowledge, there are just two surveys that ask parents about their level of understanding of their children's sleep habits in the literature. The PSKI is one of them, and it has various domains and questions for different age groups. By means of these properties, the PSKI is a comprehensive assessment inventory. Another one, in addition to the PSKI, is a short inventory consisting of 10 questions [15,16]. This inventory is calculated based on the percentage of correct and incorrect answers, similar to the PSKI. Due to the small number of items, it can be considered that this inventory might be more practical for clinical use. However, it should be taken into account that this inventory will provide limited information. There is a need to examine the psychometric properties of this inventory in detail.

In addition to these, the PSKI consists of 62 questions and includes sections such as sleep aspects, normal sleep, and sleep problems based on the child's age. According to child

development patterns for age groups from infancy through adolescence, features associated with sleep that are formed based on the child's age have been determined [17]. These features emphasize its comprehensive nature, but the large number of questions might make its use in clinics more challenging in terms of assessment time. We believe that reducing the number of questions could make it more efficient for easier use in clinical settings and clinical studies.

The section on developmentally normal sleep contains 36 questions. This section includes questions about the recommended quantity of sleep for a child of a specific age, daytime naps, typical sleeping habits, or sorts of dreams. Our personal experience shows that parents better know the characteristics of the age group of the child while raising their children. In this respect, the fact that the questions in PSKI cover the ages of 2-18 may have caused the insufficient measurement of the knowledge level of the families on this subject. A parent with a 3-year-old child may not yet know the sleep characteristics of a 12-year-old or what normal sleep should mean for this age group. We believe that querying specific age and sleep durations by providing hours, and moreover, the large number of questions in this section, might lead to parents' overall knowledge being inadequate. We think it would be beneficial to categorize questions based on age groups instead of specific ages to reduce the number of questions in the PSKI. Grouping by age can not only facilitate application but also better reflect parents' knowledge levels regarding age.

The major limitation of our study was the sample size; study was carried out with the minimum number of samples (twice the number of items) that could be reached for scale validity and reliability studies. In addition, families of children with developmental disabilities were willing to participate in the study, but it was difficult to include families of typically developing children in the study. For this reason, our study could not be comprised of an equal number of families of children with developmental disability/typically developing children.

There are various methods for assessing the validity of Likert-type scales (exploratory and confirmatory factor analyses). However, for inventories like PSKI, which query knowledge levels and have correct and incorrect answers for each question and are not Likert-type, the methods for determining validity are limited. In this study, these methods were used to examine the validity status. Since there is currently no tool available in the Turkish language to assess parents' knowledge about sleep, the reliability of PSKI has been evaluated using CSHQ, which assesses sleep disorders in children.

Conclusion

Since sleep has a significant effect on healthy development, it is important to assess and enhance parental knowledge. As a result of the present study, the PSKI was translated into Turkish, and it has been seen that the test-retest reliability of the questionnaire is extremely high. The absence of parental

knowledge regarding their children's sleep has also been discovered. It can be stated that parents' knowledge about their children's sleep is not adequately defined and researched. The number of inventories assessing parents' knowledge about their children's sleep is also quite limited. We can state that there is a need for valid and reliable inventories that assess parents' knowledge about their children's sleep status, and their number should be increased.

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Conflict of Interests

The authors declare that there is no conflict of interest in the study.

Financial Disclosure

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Ethical Approval

Approval for the study was granted by the Ethics Committee of the Non-invasive Clinical Trials of Sivas Cumhuriyet University (Approval Date:10.03.2021 and Approval Number:2021-03/07). On the date the ethics committee approval was received (2021), the institution where the second author Ayse Numanoglu Akbas worked was Sivas Cumhuriyet University, Faculty of Health Sciences, Department of Physical Therapy and Rehabilitation, Sivas, Türkiye.

References

- Blackmer AB, Feinstein JA. Management of sleep disorders in children with neurodevelopmental disorders: a review. *Pharmacotherapy*. 2016;36:84-98.
- Goldberg WA, Lucas-Thompson RG, Germon GR, et al. Eye of the beholder? Maternal mental health and the quality of infant sleep. *Soc Sci Med*. 2013;79:101-8.
- Sadeh A, Tikotzky L, Scher A. Parenting and infant sleep. *Sleep Med Rev*. 2010;14:89-96.
- Pavlova MK, Latreille V. Sleep disorders. *Am J Med*. 2019;132:292-9.
- Angriman M, Caravale B, Novelli L, et al. Sleep in children with neurodevelopmental disabilities. *Neuropediatrics*. 2015;46:199-210.
- Jacquier D, Newman CJ. Parent-reported sleep disorders in children with motor disabilities: a comparison with the Sleep Disturbance Scale for Children's new norms. *Sleep Med*. 2019;55:26-32.
- Tsai SY, Lee WT, Lee CC, et al. Sleep in children with epilepsy: the role of maternal knowledge of childhood sleep. *Sleep*. 2018;41. doi: 10.1093/sleep/zsy157.
- Bhargava S. Diagnosis and management of common sleep problems in children. *Ped Rev*. 2011;32:91-8.
- Valicenti-McDermott M, Lawson K, Hottinger K, et al. Sleep problems in children with autism and other developmental disabilities: a brief report. *J Child Neurol*. 2019;34:387-93.
- Liu R, Dong H, Wang Y, et al. Sleep problems of children with autism may independently affect parental quality of life. *Child Psychiatry Hum Dev*. 2021;52:488-99.
- Korb L, O'Regan D, Conley J, et al. Sleep: the neglected life factor in adults with intellectual disabilities. *BJPsych Bull*. 2023;47:139-45.
- Honaker SM, Meltzer LJ. Sleep in pediatric primary care: a review of the literature. *Sleep Med Rev*. 2016;25:31-9.
- Karabulut D, Avcı Ş. Relationship between sleep problems and gross motor function in children with cerebral palsy and investigation of their parents' quality of life. *Turk J Physiother Rehabil*. 2020;31:180-7.
- Li D. Characterization of parental knowledge on early child sleep and association with child sleep quality: a cross-sectional pilot study in Chongqing, China. *Risk Manag Health Policy*. 2023;16:851-64.
- Owens JA, Jones C. Parental knowledge of healthy sleep in young children: results of a primary care clinic survey. *J Dev Behav Pediatr*. 2011;32:447-53.
- Owens JA, Jones C, Nash R. Caregivers' knowledge, behavior, and attitudes regarding healthy sleep in young children. *J Clin Sleep Med*. 2011;7:345-50.
- Schreck KA, Richdale AL. Knowledge of childhood sleep: a possible variable in under or misdiagnosis of childhood sleep problems. *J Sleep Res*. 2011;20:589-97.
- Owens JA, Spirito A, McGuinn M. The Children's Sleep Habits Questionnaire (CSHQ): psychometric properties of a survey instrument for school-aged children. *Sleep*. 2000;23:1043-51.
- Goodlin-Jones BL, Sitnick SL, Tang K, et al. The Children's Sleep Habits Questionnaire in toddlers and preschool children. *J Dev Behav Pediatr*. 2008;29:82-8.
- Fiş NP, Arman A, Ay P, et al. The validity and the reliability of Turkish Version of Children's Sleep Habits Questionnaire. *Anadolu Psikiyatr Derg*. 2000;11:151-60.
- Sousa VD, Rojjanasrirat W. Translation, adaptation and validation of instruments or scales for use in cross-cultural health care research: a clear and user-friendly guideline. *J Eval Clin Pract*. 2011;17:268-74.
- Anthoine E, Moret L, Regnault A, et al. Sample size used to validate a scale: a review of publications on newly-developed patient reported outcomes measures. *Health Qual Life Outcomes*. 2014;12:176.
- Koo TK, Li MY. A guideline of selecting and reporting intraclass correlation coefficients for reliability research. *J Chiropr Med*. 2016;15:155-63. Erratum in: *J Chiropr Med*. 2017;16:346.
- Mallery P, George D. SPSS for Windows step by step: A simple guide and reference. 4th edition. 11.0 update, Boston. Allyn & Bacon. 2003.
- McDowall PS, Galland BC, Campbell AJ, Elder DE. Parent knowledge of children's sleep: a systematic review. *Sleep Med Rev*. 2017;31:39-47.
- Hatton RE, Gardani M. Maternal perceptions of advice on sleep in young children: How, what, and when?. *Br J Health Psychol*. 2018;23:476-95.
- Bonuck K, Collins-Anderson A, Schechter CB, et al. Effects of a sleep health education program for children and parents on child sleep duration and difficulties: A stepped-wedge cluster randomized clinical trial. *JAMA Netw Open*. 2022;5:2223692.
- Daniel LC, Poliakova P, Stein M, et al. Maternal perceptions of evidence-based early childhood sleep health promotion recommendations: an explanatory sequential study. *Behav Sleep Med*. 2024;22:87-99.
- Lin YM, Kuo SY, Chang YK, et al. Effects of parental education on screen time, sleep disturbances, and psychosocial adaptation among Asian preschoolers: a randomized controlled study. *J Pediatr Nurs*. 2021;56:27-34.