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Optimizing Early Detection: Validating Obstructive Sleep Apnea-18 (OSA-18) in Turkish-Speaking Pediatric Patients

Original Investigation

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Abstract

Objective: Quality of life (QoL) assessments are increasingly important for evaluating the well-being of children with Obstructive Sleep Apnea Syndrome (OSAS). This study's objective is to culturally adapt and validate the Turkish version of the OSA-18 questionnaire, a commonly used tool for assessing QoL in children with OSAS.

Methods: The OSA-18 questionnaire was translated and culturally adapted for use in the Turkish-speaking population. The study was conducted with 180 participants, 100 boys and 80 girls, with a mean age of 6.16±2.14 years. The participants were divided into two groups. The patient group comprised individuals with symptoms of OSAS based on clinical evaluation, including anamnesis, physical examination, and video recording of apnea and snoring. The patient group underwent adenotonsillectomy and their caregivers completed the Turkish version of the OSA-18 scale postoperatively. The control group comprised 90 children who were similar to the patient group in terms of gender and age. These children had no major complaints such as snoring, apnea, fatigue during the day, irritability, or distraction. In the physical examination of this group, no major tonsillar or adenoid hypertrophy, which causes significant stenosis in the upper airway, was observed. Internal consistency, reliability, validity, responsiveness, and factor analysis were assessed.

Results: The Turkish version of the OSA-18 questionnaire demonstrated excellent reliability, with a Cronbach's alpha of 0.929. The test-retest results were not statistically different. Validity was confirmed through a positive correlation between the OSA-18 score and external parameters, such as the Mallampati score, and tonsil and adenoid size. We found a statistically significant reduction in OSA-18 scores postoperatively, signifying a robust responsiveness to the intervention.

Conclusion: Our study confirms the suitability of the Turkish OSA-18 questionnaire for assessing the QoL in children with OSAS. This quick and easy-to-use tool will be valuable for future research on Turkish-speaking children with OSAS, aiding in the evaluation of pediatric OSAS and QoL.

Keywords: Obstructive sleep apnea, children, quality of life, sleep-related breathing disorders, validation

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Introduction

Obstructive sleep apnea syndrome (OSAS) is the most critical clinical condition in the sleep-related breathing disorder spectrum. It is characterized by recurrent episodes of prolonged blockage of the upper airway during sleep, despite continued or increased respiratory effort, which leads to complete (apnea) or partial (hypopnea) cessation of airflow and disturbed sleep (1, 2). Studies have suggested that both habitual snoring and childhood OSAS are associated with behavioral problems, particularly impulsiveness, aggressiveness, and inattentive behaviors (3-9).

Quality of life (QoL) surveys are crucial for diagnosing and monitoring various diseases, including pediatric obstructive sleep apnea (OSA). Different assessment tools, such as the Obstructive Sleep Disorders-6 (OSD-6), Tonsil and Adenoid Health instrument, Pediatric Sleep Questionnaire (PSQ), and OSA-18, have been developed and validated to gauge the QoL in children with OSA. In a 2021 meta-analysis comparing various pediatric OSA questionnaires, 37 studies evaluating 20 different questionnaires met the criteria for qualitative analysis and none were considered to be of low quality. Among these reviewed articles, 13 studies assessed two specific questionnaires, the PSQ and the OSA-18, and both met the criteria for quantitative synthesis.

The findings revealed that the PSQ exhibited a higher sensitivity of 0.76 compared to the OSA-18 which showed a sensitivity of 0.56. Conversely, the OSA-18 demonstrated higher specificity with a value of 0.73, while the PSQ exhibited a specificity of 0.43. Notably, other questionnaires included in the analysis displayed lower sensitivities and specificities (10). Kang et al. (11) reported that the efficacy of the OSA-18 questionnaire varied across age groups. In toddlers, the questionnaire exhibited high accuracy (sensitivity: 78.6%, specificity: 85.7%). For preschoolers, robust sensitivity (78.8%) was accompanied by a trade-off in specificity (62.5%). In school-age children, the questionnaire performed exceptionally well, with a sensitivity of (81.0%) and perfect specificity (100%). Among adolescents, there was a moderate sensitivity (60%) while maintaining high specificity (100%). These findings emphasize the importance of tailoring screening methods based on age for effective detection of OSA in children (11).

The OSA-18, widely used in both research and clinical settings, is a reliable and quick survey applicable across various medical specialties (12-15). It provides insights into the impact of OSA on children's QoL, aiding physicians in assessing treatment outcomes in conjunction with other clinical parameters. The OSA-18 questionnaire was originally developed for an English-speaking population, and its use in non-English-speaking countries requires translation and validation in the target population's language (11, 13, 16-19). Currently, a validated Turkish version of the OSA-18 questionnaire is absent. Thus, the objectives of the present study revolve around the translation and subsequent validation of the OSA-18 questionnaire for its utilization among Turkish-speaking children. This initiative holds the potential to facilitate comprehensive assessments of the impact of OSAS on the QoL in this specific population.

Methods

Study Design

This prospective instrument validation study was conducted between June 2022 and March 2023 according to the ethical standards specified in the Helsinki Declaration of Good Clinical Practices. The study received approval from the Institutional Review Board of University of Health Sciences Turkey, Bakırköy Dr. Sadi Konuk Training and Research Hospital (decision no: 2022-09-08, date: 09.05.2022), and informed consent was obtained from the caregivers of all participants, allowing for the processing of personal data and publication of study results.

Participants

The determination of the sample size or power calculation for psychometric validation of questionnaires lacks a widely accepted theoretical basis (20). As a result, in this study, we employed a general rule of thumb for sample size calculation. This rule suggests that the minimum recommended number of participants should be within the range of 5 to 10 times the number of questionnaire items (20, 21). In our presented research, we have chosen a sample size of 180 participants for a questionnaire with 18 items, complying with the minimum ratio of 10 to 1.

One hundred and one children were examined in the outpatient clinic from June 2022 onwards. Excluding five patients who did not meet the inclusion criteria, 96 participants were enrolled in the study and successfully completed the questionnaire during their initial visit. Of these, 90 children fully participated in both the initial questionnaire and the retest evaluation after two weeks, comprising the final sample. The control group comprised 90 healthy children, chosen to align with the patient group in terms of both quantity and gender. These individuals were free from any health issues and exhibited no symptoms. In the physical examination of this group, no cases of major tonsillar or adenoid hypertrophy were observed that could cause significant stenosis in the upper airway.

Inclusion and Exclusion Criteria

The participants, 100 boys and 80 girls aged between 3 and 15 years, were divided into two groups; the patient group comprised individuals with symptoms of OSAS based on clinical evaluation, including anamnesis, physical examination, and video recording of apnea and snoring and

were subsequently treated with surgical intervention for tonsil and adenoid hypertrophy. The control group included 90 children who were similar to the patient group in terms of gender and age. These children had no major complaints such as snoring, apnea, fatigue during the day, irritability, or distraction. The participants were also examined for tonsillar and adenoid hypertrophy which causes significant stenosis in the upper airway.

The exclusion criteria for the study were as follows: prior surgery on the head and neck region, any central nervous system disease, congenital malformations related to the head and neck region, presence of syndromic disease, and the inability of the caregiver to read and understand Turkish. These criteria were established to ensure the sample population was free of any conditions that could potentially interfere with the study's objectives and results.

Adaptation and Translation Into Turkish

The original authors of OSA-18 were conducted via e-mail, and their permission to use the questionnaire in this research was obtained. OSA-18 consists of five domains: sleep disturbance, physical symptoms, emotional symptoms, daytime function, and caregiver concerns. Respondents are asked to rate each item on a scale of one to seven, with one indicating "never" and seven indicating "always." The minimum possible score is 18, while the maximum is 126. The OSA-18 questionnaire is easy to administer and suitable for use in various clinical and research settings (12-15).

In designing the study's methodology, our primary focus was to ensure the validity and the cultural relevance of the Turkish adaptation of the OSA-18 questionnaire. Securing official approval from the original authors underscored our commitment to maintaining the questionnaire's integrity. Two proficient bilingual Turkish physicians meticulously translated the questionnaire, leveraging their linguistic dexterity to ensure accuracy. A consolidation process followed, addressing any disparities in the Turkish translation through collaborative discussions with the research team. A rigorous back-translation, performed by a native English speaker, guaranteed linguistic and conceptual equivalence. Discrepancies were scrutinized and resolved by an independent expert, ensuring the adapted questionnaire's accuracy and cultural suitability. These meticulous procedures resulted in a final OSA-18 Turkish adaptation that attests to its precision and cultural relevance. This adapted questionnaire is poised to significantly contribute to understanding and assessing QoL in Turkish-speaking children with OSAS, enhancing research and clinical care in the Turkish context (Appendix).

Statistical Analysis

Statistical analyses were performed using the Statistical Package for Social Sciences (SPSS) version 25.0 software (IBM SPSS Statistics for Windows; Armonk, NY: IBM Corp). Demographic and clinical data, including age, gender, Friedman tongue position and Mallampati classification, degree of tonsillar hypertrophy, and adenoid hypertrophy assessment, were reviewed in the analysis. The normality of the variables was assessed using histogram graphics and the Kolmogorov-Smirnov test. Descriptive analyses were presented using mean, standard deviation, median, and minimum-maximum values. Categorical variables were compared using Pearson's chi–square test, Fisher's exact test, and Mann–Whitney U test for non-normally distributed variables. An independent t-test was used to compare normally distributed variables between the two groups. Repeated measures analysis was performed to evaluate the change in the scale score between groups, while the dependent t-test was used to evaluate the change within the group. Spearman's correlation test was utilized to analyze the measurement data. Statistical significance was set at p-value <0.05.

Validity and Reliability for the OSA-18 Scale

A total of 180 individuals completed the OSA-18 questionnaire. Exploratory factor analysis was conducted to determine the factor structure of the 18-item measurement tool. The analysis resulted in grouping all 18 items of the scale under a single factor. To confirm the factor structure, confirmatory factor analysis (CFA) was conducted. In addition, Cronbach's alpha coefficient was calculated to assess the reliability of the scale and its subdimensions.

Results

The study included a total of 180 participants, 100 boys and 80 girls, with a mean age of 6.16±2.14 years (range: 3–15 years). The mean age of the patient group was 6.11±1.9 years, while that of the control group was 6.21±2.35 years. No significant differences were observed between the patient and control groups in terms of gender (p=0.764), age (p=0.878), or comorbidities (p=0.081). In the patient group, three out of 90 had asthma. There were no comorbid diseases in the children in the control group. There were 10 and seven underweight, 53 and 65 normal weight, 16 and 13 overweight, and 11 and five obese patients in the patient and control groups, respectively. After applying the chi-square test, we found that there was a significant association between weight and OSA (χ^2= 33.87, df: 3, p<0.0001).

Our study found a significant difference between the patient and control groups in terms of OSA-18 scores, with patients having higher scores than the controls (Table 1).

We evaluated the internal consistency of the Turkish translation of the OSA-18 scale, which measures how well the scores of individual items in the instrument correlate with each other (22). We used Cronbach's alpha to analyze

internal consistency, which was found to be 0.929, indicating excellent reliability for the overall questionnaire and each domain (Table 1). The exclusion of any item or domain did not significantly affect the overall score (Table 2).

Test-retest reliability is a crucial metric for assessing the consistency of calculated scores with repeated testing, which can be accomplished by examining the correlation between initial test scores and subsequent retest scores. In the presented study, we randomly enrolled 36 children from both the OSAS and the control groups. Using Wilcoxon correlations, we analyzed test-retest reliability and found that the total OSA-18 score was significantly reliable (p=0.0155; R=0.759). The test and retest evaluations were conducted with an average two weeks apart. We assessed the validity of the OSA-18 scale by examining the correlation between the OSA-18 scores and external parameters such as the Mallampati score, tonsil size, and adenoid size. Spearman's rank correlation analysis revealed a positive correlation between the OSA-18 score and Friedman Mallampati score, tonsils and adenoid grade in the patient group (Tables 3, 4).

The Kaiser–Meyer–Olkin test yielded a value above 0.7, indicating good sample adequacy (0.912) in terms of inter-item relationships. Since the significance value of the Bartlett sphericity test was below 0.001 (χ^2=1901.050), the matrix with inter-item relations was different from the unit matrix without relations. Therefore, the assumptions were met in terms of scale. In addition, when the relationships between the items were examined, the number of items with an acceptable relationship (r>0.30) was quite high, and multicollinearity between the items (items with r>0.8) was not observed.

CFA was conducted to examine whether the factor structure of the OSA-18 scale was confirmed in the current sample. Several fit indices were used to assess the adequacy of the model. The results of the CFA for the one-dimensional factor structure of the scale revealed a ratio of chi–square

Table 1. Demographic data and OSA-18 scores (each item and total) according to groups

	Patient (n=90)		**Control (n=90)**		**Total (n=180)**		
	Mean ± SD	**Median (min-max)**	**Mean ± SD**	**Median (min-max)**	**Mean ± SD**	**Median (min-max)**	**p-value**
Age	6.11±1.9	6 (3–15)	6.21±2.35	6 (3–15)	6.16±2.13	6 (3–15)	0.878
Gender (boy-%)	41 (45.56%)		39 (43.33%)		80 (44.44%)		
Gender (girl-%)	49 (54.44%)		51 (56.67%)		100 (55.56%)		0.764
OSA-18 scores items							
Snoring	5.81±1.4	6 (1–7)	2.74±1.78	2 (1–7)	4.28±2.22	4 (1–7)	**<0.001**
Breath holding	3.94±1.93	4 (1–7)	1.53±1.09	1 (1–6)	2.74±1.98	2 (1–7)	**<0.001**
Choking/ gasping	3.34±1.93	3 (1–7)	1.36±0.75	1 (1–4)	2.35±1.77	1 (1–7)	**<0.001**
Fragmented sleep	4.14±1.97	4 (1–7)	1.98±1.36	1 (1–7)	3.06±2.01	3 (1–7)	**<0.001**
Mouth breathing	5.97±1.28	6 (1–7)	3.32±1.98	3 (1–7)	4.64±2.12	5 (1–7)	**<0.001**
URTI/colds	4.88±1.82	5 (1–7)	3.18±1.8	3 (1–7)	4.03±2	4 (1–7)	**<0.001**
Nasal discharge	4.8±1.83	5 (1–7)	3.08±1.7	3 (1–7)	3.94±1.96	4 (1–7)	**<0.001**
Dysphagia	4.21±1.99	4 (1–7)	1.77±1.32	1 (1–6)	2.99±2.08	2 (1–7)	**<0.001**
Temper tantrums	3.33±1.93	3 (1–7)	1.74±1.43	1 (1–7)	2.54±1.87	2 (1–7)	**<0.001**
Aggressiveness	4.06±2.02	4 (1–7)	1.99±1.45	1 (1–7)	3.02±2.04	2 (1–7)	**<0.001**
Discipline problems	3.26±1.93	3 (1–7)	1.7±1.18	1 (1–7)	2.48±1.77	2 (1–7)	**<0.001**
Excessive daytime drowsiness	2.81±1.77	2 (1–7)	1.44±0.78	1 (1–4)	2.13±1.52	1 (1–7)	**<0.001**
Attention deficit	3.99±2.01	4 (1–7)	1.44±0.84	1 (1–4)	2.72±2	2 (1–7)	**<0.001**
Difficulty waking up	3.36±2.18	3 (1–7)	1.72±1.17	1 (1–5)	2.54±1.93	2 (1–7)	**<0.001**
Caregiver worried about child's health	4.83±1.82	5 (1–7)	2.12±1.44	2 (1–6)	3.48±2.13	3 (1–7)	**<0.001**
Caregiver worried about the child does not get enough air	5±1.96	6 (1–7)	1.77±1.37	1 (1–7)	3.38±2.34	3 (1–7)	**<0.001**
Caregiver missed activities	3.2±1.94	3 (1–7)	1.62±1.18	1 (1–6)	2.41±1.78	1 (1–7)	**<0.001**
Caregiver frustration	2.67±1.92	2 (1–7)	1.53±1.15	1 (1–6)	2.1±1.68	1 (1–7)	**<0.001**
OSA-18 (total)	73.6±16.26	73 (39–120)	36.04±12.87	33 (18–72)	54.82±23.84	54 (18–120)	**<0.001**

OSA-18: Obstructive Sleep Apnea-18, SD: Standard deviation, min-max: Minimum-maximum, URTI: Upper respiratory tract infection

Table 2. Internal consistency analysis of OSA-18 scores items

OSA-18 scores items	Cronbach's alpha if item is deleted*	OSA-18 scores items	Cronbach's alpha if item is deleted*
Snoring	0.924	Aggressiveness	0.926
Breath holding	0.924	Discipline problems	0.928
Choking/gasping	0.924	Excessive daytime drowsiness	0.927
Fragmented sleep	0.924	Attention deficit	0.924
Mouth breathing	0.924	Difficulty waking up	0.927
URTI/colds	0.928	Caregiver worried about child's health	0.923
Nasal discharge	0.928	Caregiver worried about the child does not get enough air	0.921
Dysphagia	0.926	Caregiver missed activities	0.925
Temper tantrums	0.927	Caregiver frustration	0.928

*Cronbach's alpha for 18 items is 0.929

OSA-18: Obstructive Sleep Apnea-18, URTI: Upper respiratory tract infection

Table 3. The positive correlation between the total OSA-18 score and the Friedman–Mallampati score, tonsils and adenoid grade in the patient group

		Mallampati score	Tonsil grade	Adenoid grade
OSA-18	r	0.668	0.747	0.575
	p	<0.001	<0.001	<0.001

OSA-18: Obstructive Sleep Apnea-18

Table 4. Table indicates the mean OSA-18 score according to tonsil and adenoid grades

		OSA-18 score
Grade 1	Tonsil	41.15
	Mallampati	56.6
Grade 2	Tonsil	58.07
	Mallampati	70.8
Grade 3	Tonsil	76.34
	Mallampati	87.2
Grade 4	Tonsil	92.87
	Mallampati	96.16

OSA-18: Obstructive Sleep Apnea-18

statistics to degrees of freedom (χ^2/df) of 4.372 (χ^2=590.2; df=135; p=0.000), a root mean square error of approximation of 0.137, and a comparative fit index of 0.750. These findings indicate that the one-dimensional factor structure of the scale provided adequate fit values.

To assess the responsiveness of the questionnaire, we utilized the Wilcoxon test to compare OSA-18 scores before and after adenotonsillectomy in a cohort of pediatric patients. In the control group, comprising individuals without symptoms of OSAS, the mean OSA-18 score was 36.04. Among the patient group, which consisted of ninety individuals, adenotonsillectomy procedures were performed, and their caregivers completed the Turkish version of the OSA-18 questionnaire within a period of 1–3 months following the procedure. Remarkably, the OSA-18 scores exhibited a statistically significant reduction postoperatively (T1) compared to preoperative levels (T0), signifying robust responsiveness to the intervention. The mean OSA-18 score at T1 was 33.9±10.2, while the mean OSA-18 score at T0 was 73.53±15.88 (p<0.001).

Discussion

Our study intended to adapt and validate the OSA-18 score in the Turkish context. The study encompassed a diverse group of 180 participants, including both genders, and spanning an age range from 3 to 15 years. This comprehensive sample size aligns with the recommended guidelines for questionnaire validation studies (20, 21). The distribution of the participants into patient and control groups allowed for a robust evaluation of the adapted questionnaire's performance. The validation process involved rigorous analysis of various aspects, such as internal consistency, reliability, validity, and responsiveness.

The Turkish version of the OSA-18 questionnaire exhibited excellent internal consistency, with a Cronbach's alpha coefficient of 0.929. This signifies strong inter-item correlations, indicating that the adapted questionnaire consistently measures the construct it intends to assess. Our results are consistent with earlier findings in the literature. The Chinese version showed a range of Cronbach alpha values, ranging from 0.62 to 0.84. The Portuguese version

had a Cronbach's alpha of 0.82, the Spanish version scored 0.91, the Greek version 0.94, and the Italian version 0.93 (13, 16-18, 20).

Validation of the adapted questionnaire involved examining its correlation with external parameters related to OSAS symptoms. Positive correlations between the OSA-18 score and parameters such as the Mallampati score, and tonsil and adenoid size confirmed its validity, as similar to the literature (11, 13, 17). These correlations underline the questionnaire's ability to capture relevant aspects of OSAS symptoms and their impact on patients' lives.

The responsiveness of the adapted questionnaire was evaluated in a cohort of pediatric patients who underwent adenotonsillectomy. Notably, the statistically significant reduction in OSA-18 scores postoperatively highlights the tool's sensitivity to changes resulting from therapeutic interventions. In the Italian version of the questionnaire, a marked reduction in the mean OSA-18 score from 76.36 to 26.89 was observed, reaffirming its responsiveness to the surgical intervention. In our study using the Turkish version, we similarly found a substantial reduction in the mean OSA-18 score from 73.53 to 33.9 postoperatively, demonstrating the questionnaire's effectiveness in detecting treatment-related improvements (19). This outcome indicates that the adapted OSA-18 questionnaire can effectively reflect improvements in QoL following surgical procedures for OSAS.

In our study, we found that physical symptoms (items 5–8) were rated as the most severe domain, followed by sleep disturbances (items 1–4). Interestingly, in children from the United States and Portugal, sleep disturbances were identified as the primary concern based on the existing literature, with physical symptoms ranking second (12-14). In contrast, in our research, daytime function (items 12–14) and emotional distress (items 9–11) were rated as the least severe domains, which aligns with previous research findings (11-14).

The primary drawback of our study is the absence of polysomnography (PSG) as a diagnostic tool. PSG is the gold standard for diagnosing OSAS, but it is expensive, time-consuming, and has limitations in predicting the risk of adverse outcomes or response to treatment (13). In our study, the diagnosis of pediatric OSAS was made on a clinical basis. As an alternative to PSG, the use of tonsil and adenoid grade and the Friedman–Mallampati score have been proposed. Since parent-reported surveys to assess childhood OSAS depend on caretakers' observation ability, these surveys are inherently limited. Parent responses may not fully capture the child's subjective experience, potentially introducing bias in the data. It is important to recognize these when interpreting our findings and consider future research to address these issues.

QoL surveys have become increasingly important in the diagnosis and follow-up of various diseases. Various assessment tools, including both general and disease-specific questionnaires, have been employed to evaluate QoL in children diagnosed with OSA. Disease-specific instruments, such as the OSD-6 survey, the Tonsil and Adenoid Health instrument, the PSQ, and the OSA-18, have been specifically developed and validated for assessing QoL in pediatric OSAS. These instruments are utilized to measure the impact of OSAS on QoL and to evaluate treatment outcomes. Among these instruments, the OSA-18 is most commonly utilized in both research and clinical settings, which was developed for the English-speaking population. The OSA-18 is a reliable and valid survey that is quick and easy to administer (12-15).

The OSA-18 survey can be used by physicians of various specialties, not only otolaryngologists, to assess the neurobehavioral statements and problems of children affected by OSAS. This survey allows physicians to better understand the impact of OSAS on the QoL of affected children and their caregivers when combined with other clinical parameters.

Conclusion

Our study validates the Turkish version of the OSA-18 questionnaire as a reliable, valid, and responsive tool for assessing QoL in children with OSAS. This adapted questionnaire holds promise for facilitating further research on OSAS in the Turkish-speaking population, aiding in the comprehensive evaluation of pediatric OSAS and its impact on QoL. As the field of sleep medicine continues to advance, the adapted OSA-18 questionnaire will contribute to enhanced understanding and improved care for children with OSAS in Turkey.

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Informed Consent: Informed consent was obtained from the caregivers of all participants, allowing for the processing of personal data and publication of study results.

Authorship Contributions

Surgical and Medical Practices: Z.M.Y., F.B.B., B.K.İ., M.A.A., İ.S., Concept: Z.M.Y., F.B.B., B.K.İ., M.A.A., İ.S., Design: Z.M.Y., F.B.B., B.K.İ., M.A.A., İ.S., Data Collection and/or Processing: Z.M.Y., F.B.B., B.K.İ., M.A.A., İ.S., Analysis and/or Interpretation: Z.M.Y., F.B.B., B.K.İ., M.A.A., İ.S., Literature Search: Z.M.Y., F.B.B., B.K.İ., M.A.A., İ.S., Writing: Z.M.Y., F.B.B., B.K.İ., M.A.A., İ.S.

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Main Points

- The study aimed to culturally adapt and validate the Turkish version of the Obstructive Sleep Apnea-18 (OSA) questionnaire to assess the quality of life (QoL) in Turkish-speaking children with obstructive sleep apnea syndrome (OSAS), an important aspect of pediatric health.
- The Turkish adaptation of the OSA-18 questionnaire demonstrated excellent reliability and validity, with a Cronbach's alpha coefficient of 0.929, and it was found to be responsive to changes following adenotonsillectomy, making it a valuable tool for assessing OSAS impact and treatment outcomes in Turkish-speaking children.
- The primary domains affected by OSAS in Turkish-speaking children, as indicated by OSA-18 scores, were physical symptoms and sleep disturbances, while daytime function and emotional distress were rated as the least severe.
- The Turkish version of the OSA-18 questionnaire holds promise for enhancing research on OSAS in Turkey, contributing to a better understanding of its impact on pediatric QoL and improving care for affected children.

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Appendix. Turkish Version of the OSA-18

	Hiçbir Zaman	Çok Nadiren	Nadiren	Bazen	Genellikle	Çoğu Zaman	Her Zaman
Uyku Sorunları							
Geçtiğimiz 4 hafta içerisinde çocuğunuz/çocuğunuzun ne sıklıkla…							
1) Sesli horladı?	1	2	3	4	5	6	7
2) Gece nefes tutma atağı veya solunum duraksaması yaşadı?	1	2	3	4	5	6	7
3) Uyurken boğulma veya nefes nefese kalma sesi çıkardı?	1	2	3	4	5	6	7
4) Dinlendirmeyen uykusu veya sık uyanması oldu?	1	2	3	4	5	6	7
Fiziksel Belirtiler							
Geçtiğimiz 4 hafta içerisinde çocuğunuz/çocuğunuzun ne sıklıkla…							
5) Burun tıkanıklığı nedeniyle ağızdan nefes aldı?	1	2	3	4	5	6	7
6) Nezle veya üst solunum yolu enfeksiyonu geçirdi?	1	2	3	4	5	6	7
7) Burun akıntısı oldu?	1	2	3	4	5	6	7
8) Yutmada zorluk yaşadı?	1	2	3	4	5	6	7
Duygusal Belirtiler							
Geçtiğimiz 4 hafta içerisinde çocuğunuz/çocuğunuzun ne sıklıkla…							
9) Ruh hali değişiklikleri veya öfke krizi oldu?	1	2	3	4	5	6	7
10) Agresif veya hiperaktif davranışları oldu?	1	2	3	4	5	6	7
11) Disiplin problemi oldu?	1	2	3	4	5	6	7
Günlük İşlev							
Geçtiğimiz 4 hafta içerisinde çocuğunuz/çocuğunuzun ne sıklıkla…							
12) Gündüz aşırı uyku hali oldu?	1	2	3	4	5	6	7
13) Dikkatini vermede veya konsantre olmada zorluk yaşadı?	1	2	3	4	5	6	7
14) Sabah uyanmada zorluk yaşadı?	1	2	3	4	5	6	7
Aile/Bakım Veren Kaygıları							
Geçtiğimiz 4 hafta içerisinde yukarıdaki problemler ne sıklıkla…							
15) Çocuğunuzun genel sağlığı hakkında sizi endişelendirdi?	1	2	3	4	5	6	7
16) Çocuğunuzun yeterli nefes alamadığını düşündürüp sizi endişelendirdi?	1	2	3	4	5	6	7
17) Günlük işlerinizi yapmanıza engel oldu?	1	2	3	4	5	6	7
18) Sizi hüsrana uğrattı?	1	2	3	4	5	6	7
İsim Soyisim:		Puan:					
Tarih:							
İmza:							