ORIGINAL ARTICLE / ÖZGÜN ARAŞTIRMA

Translation into Turkish of the expanded version of the "Brief Infant Sleep Questionnaire" and its application to infants

Genişletilmiş "Bebek Kısa Uyku Anketi"nin Türkçe'ye çevirisi ve bebeklerde uygulanması

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ABSTRACT

Objective: Infant sleep problems are among the most common problems presented to pediatricians. The expanded version of the "Brief Infant Sleep Questionnaire" is a questionnaire developed by Sadeh for assessing sleep problems and their causes in early childhood. We have translated this questionnaire and assessed sleep problems and their causes among infants.

Patients and Methods: The translation process was undertaken with the consent of the author. The final translated questionnaire was evaluated using a sample of 121 infants.

Results: The parents of 11.6% of the infants considered their infants' sleep to be a very serious problem, 22.3% had a small problem, and 66.1% had no problem at all. According to the poor sleeper criteria suggested by Sadeh, 32.2% (39) infants were considered as poor sleepers. In a logistic regression analysis sleeping in the parent's bed was associated with sleeping poorly. The mother's perception of the infant's sleep as a problem correlated with infant's sleep problem criteria suggested by Sadeh.

Conclusion: Test results provide preliminary evidence that the Turkish translation is acceptable and understandable for assessing sleep problems during early childhood.

Keywords: Sleep, Questionnaire, Infant

ÖZET

Amaç: Bebeklik dönemi uyku sorunları pediatristlerin en sık karşılaştığı sorunlardan biridir. "Bebek Kısa Uyku Anketi"nin genişletilmiş hali, erken çocukluk döneminde uyku ortamı ve uyku sorunlarını değerlendirmek için Sadeh tarafından geliştirilen bir ankettir. Bu çalışmada, bu anket Türkçe'ye çevrilmiş ve bebeklerde uyku ortamı ve uyku sorunlarının değerlendirilmesi amaçlanmıştır.

Hastalar ve Yöntem: Sadeh'in onayı alındıktan sonra çeviri başladı. Anketin son hali 121 bebekte uygulanarak değerlendirildi.

Bulgular: Bebeklerin %11,6'sının ebeveynleri bebeklerinin uykusunu çok ciddi bir sorun olarak algılarken, %22,3'ü küçük bir sorun olduğunu, %66,1'inin ise uyku sorunu olmadığını düşündüğü görüldü. Kötü uyku kriterine göre %32,2 (39) bebek kötü uyuyan olarak kabul edildi. Lojistik regresyon analizine göre ebeveynin yatağında uyuma kötü uyku ile ilişkili bulundu. Bebeğin uyku sorunuyla ilgili annelerin algısı Sadeh tarafından ileri sürülen uyku sorunu kriterleriyle ilişkili bulundu.

Sonuç: Test sonuçları, anketin Türkçe çevirisinin erken çocukluk döneminde uyku ortamı ve uyku sorunlarını değerlendirmede kabul edilebilir ve anlaşılabilir olduğu konusunda ön kanıtlar sağlamıştır.

Anahtar Kelimeler: Uyku, Anket, Bebek

Introduction

Infant sleep problems are among the most common problems presented to physicians dealing with children. Infants go through rapid eye movement (REM) and non-REM sleep every 50 minutes, so they can wake up many times each night [1,2]. By about 4 months, many babies begin to sleep through the night and approximately 80% of infants sleep through the night by the time they are 6 to 9 months of age [1,2]. Parents often see the infant who is not sleeping through the night as having a sleep problem and search for solutions. About 20-30% of young children suffer from bedtime resistance (bedtime struggles, bedtime refusals) and frequent night awakenings [1-5]. They become dependent upon specific sleep onset associations (rocking,

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feeding, parental presence) in order to fall asleep at bedtime and to return to sleep during the night. This has been named "sleep onset association disorder" and is the most common pediatric sleep disorder in the first postnatal year.

The "Brief Infant Sleep Questionnaire" (BISQ) is a tool for screening the sleep environment, including parental practices, daytime and nighttime routines, and sleep problems in early childhood, based on parental responses [3]. BISQ was validated and correlated significantly with sleep measures derived from actigraphy and sleep diaries [3,6]. Since a Turkish version of the questionnaire is not available, we translated this questionnaire and assessed the sleep environment, routines and sleep problems in a cohort of infants.

We hypothesized that the Turkish version of the questionnaire will be acceptable, understandable and reliable for assessing sleep measures and sleep problems during early childhood.

Patients and Methods

BISQ was developed by Sadeh based on subjective and objective measures of infant sleep [3]. It has 13 items, based on actigraphy and on the parents reports of infant's or toddler's sleep patterns and has been used to validate data. The BISQ has been correlated with daily-logs and parental reports of sleep. Its sensitivity for documenting developmental sleep trends has been well established [3].

The variables of the questionnaire included 1) nocturnal sleep duration (between the hours of 7 pm and 7 am); 2) daytime sleep duration (between the hours of 7 am and 7 pm); 3) number of night wakenings; 4) duration of wakefulness during the night hours (10 pm to 6 am); 5) nocturnal sleep-onset time (the time when the child falls asleep for the night); 6) settling time (latency to falling asleep for the night); 7) method of falling asleep; 8) location of sleep; 9) preferred body position; 10) age of child; 11) gender of child; 12) birth order; and 13) role of the responder who completed the BISQ. We also included the demographic characteristics of the study population, the presence of infantile colic in the babies, and the scores of the mothers on the Edinburgh Postnatal Depression Scale (EPDS) obtained from the babies' files. We used the EPDS scores administered at the routine 2 months well child visits.

The translation process started after the consent of the author was obtained and involved a first translation of the BISQ into Turkish and then a translation back into English and a review of the translations. The translated BISQ was completed face to face by a mother with a researcher. For a test-retest reliability (repeatability) evaluation, 30 parents

Table I. Demographic characteristics of the study population

	n	%
Gender		
Female	69	57
Male	52	43
Birth Order		
Only child	51	42.1
Youngest Child	66	54.5
Middle or a multiple child	4	3.4
Mother's age		
≤24	25	20.6
25-29	37	30.6
30-34	39	32.3
≥35	20	16.5
Father's age		
≤24	4	3.3
25-29	30	24.8
30-34	49	40,5
≥35	38	31,4
Mother's education		
Less than high school	76	62.8
High school	25	20.7
College education or postgraduate degree	20	16.5
Father's education		
Less than high school	54	44.6
High school	46	38
College education or postgraduate degree	21	17.4
Family type		
Nuclear	90	74.4
Extended	31	25.6

completed the BISQ twice, with a 3 week interval between the administrations. The test-retest reliability of the questionnaire measures was examined.

Assuming the rate of sleep problems as 30%, and margins of error as 10%, with a 95% confidence level, a minimum sample size of 81 was estimated. From February to May 2013, all the mothers of infants who attended the well child outpatient clinics when they were 9 months were invited to participate in the study.

If the child woke up more than 3 times per night, spent more than 1 hour in wakefulness during the night, or spent less than 9 hours in sleep (day and night), then they were considered as poor sleepers [3].

The research protocol was approved by the Ethics Committee of the Marmara University, School of Medicine. Informed consent was taken from each parent.

Statistical Analysis

Data analysis included: assessment of gender, birth order related differences, comparison of BISQ measures according to ratings of the severity of the infant sleep problem, assessing the role of sleeping location and soothing techniques. Categorical variables are presented as

Table II. Sleep environment (sleep location, methods of falling asleep)

Sleep Location/Position	n (%)
In his/her own room	29 (23.9)
Room sharing with parents	80 (66.1)
Other	12 (10.0)
In his/her crib/own bed	64/38 (52.9/31.4)
Bed sharing with parents	19 (15.7)
On his/her back	39 (32.2)
On his/her belly/side	26/56 (21.5/46.3)
Bed time routines/Sleep onset associations	
Bath	12 (9.9)
Massage	6 (4.9)
Read books	6 (4.9)
Rocked	76 (62.8)
Watch TV	4 (3.3)
Have a dinner or a snack	10 (8.3)
Have a bottle, drink, or nurse	87 (71.9)
Run around	7 (5.8)
Brush teeth	3 (2.5)
Play	23 (19.0)
Cuddle	13 (10.7)
Say prayers	5 (4.1)
Sing songs	38 (31.4)
Listen to music	13 (10.7)
Soothing techniques at night awakenings (positive reinforcement)	
Pick up my child and hold, rock until asleep	27 (22.3)
Bottle feed, breastfeed	24/87 (19.8/72)
Give a pacifier	11 (9)
Change diaper	14 (11.6)
Play, watch TV	7 (5.8)
Rub but do not pick up	5 (4.1)
Comfort verbally	3 (2.5)
Let him/her cry and fall back to sleep by himself/herself	3 (2.5)
	6 (5)
Give a few min to see if he/she falls back to sleep	8 (6.6)

frequencies and percentages, continuous variables are presented as mean±sd, median and percentiles. Spearman correlations were calculated for the sleep measures obtained from repeated administrations of the BISQ.

Continuous variables between three groups (serious problem - small problem - no problem groups) were compared with the Kruskal-Wallis test. Categorical variables were compared with the Chi-square or Fisher's tests. Stepwise Logistic Regression analysis was carried out in order to assess the predictor variables (gender, birth rank, sleeping location and position, presence of colic, parents'

age and educational status, family type and maternal depression) for the presence of sleep problems. The strength of associations is presented as odds ratios (OR) and 95% confidence intervals (CI). $p<0.05$ was set as the level for statistical significance.

Results

For a test-retest reliability evaluation, 30 parents completed the BISQ twice, with a 3 week interval between the administrations. The test-retest reliability of the questionnaire measures was examined. Spearman correlations were calculated for the sleep measures obtained from repeated administrations of the BISQ. Strong correlations were found between the repeated sleep measures for nocturnal sleep duration ($r=0.71$), daytime sleep duration ($r=0.73$), number of night wakings ($r=0.82$), duration of nocturnal wakefulness ($r=0.77$), nocturnal sleep-onset time ($r =0.81$), and settling time ($r =0.63$). All correlations were significant at $p<0.001$.

Of the 130 participants invited, 93% (n=121) agreed to participate. The final questionnaire was evaluated using a sample of 121 infants and their parents who attended the well child outpatient clinics when the child was 9 months. Mean maternal age was 29.2±5.4 years (18-44) and mean paternal age was 32.5±5.2 years (18-48). Sixty three percent of mothers had less than a high school education. Our hospital mostly serves a socioeconomically disadvantaged population in a suburban area of Istanbul. Demographic characteristics are presented in Table I.

Based on the recommended daily sleep amounts for their age group (13 hours), 31.4% (38) of infants had a sufficient amount of sleep, whereas 68.6% (83 infants) had less than the recommended amount. Sleep locations and methods of falling asleep are presented in Table II. Since the respondent was asked to mark all that apply for sleeping arrangements, bedtime rituals and other parental interventions (both in the sleep initiation and in response to nocturnal awakenings), we have not given the percentages in Table II.

While 66.1% of the infants shared a room with the parents, bed sharing was only 15.7%. Parents were more likely to place their infants on a separate sleeping surface within the same room. When sleep onset associations were evaluated most common practices were nursing or using other feeding practices (71.9%) and rocking (62.8%). Parents also used the same practices as soothing techniques when their infants woke up at night. Mothers were breastfeeding or bottle feeding for 91.7% of the infants. Only 14% of the parents were using different approaches

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Table III. BISQ measures

Measures	Median	25th-75thpercentile
Time to start the child's bedtime routine	22:00	21:30-22:30
Time to put the child to bed at night	22:10	21:45-23:00
Night wakening, no	3	2-3.3
Nocturnal wakefulness, (min)	15.0	10.0-30.0
Longest stretch of time the child is asleep during night, (min)	240.0	180.0-345.0
Nocturnal sleep duration, (min)	570.0	480.0-600.0
Naps/day, no	2	2-3
Daytime sleep duration, (min)	150.0	120.0-210.0
Total sleep duration, (min)	720.0	660.0-780.0

Table IV. Parental perception of sleep problem

	n	%
How difficult is bedtime for the child (Bedtime struggle)		
Very easy	45	37.2
Somewhat easy	15	12.4
Neither easy nor difficult	17	14.1
Somewhat difficult	27	22.3
Very difficult	17	14
Frequency of bedtime struggle		
Every night	13	10.7
5-6 nights/week	6	5
3-4 nights/week	11	9.1
1-2 nights/week	22	18.2
1-3 nights/month	7	5.8
Less than once a month	12	9.9
Never	50	41.3
Night wakenings frequency		
Every night	92	76.1
5-6 nights/week	8	6.6
3-4 nights/week	11	9.1
1-2 nights/week	4	3.3
1-3 nights/month	1	0.8
Less than once a month	1	0.8
Never	4	3.3
How well he sleeps at night		
Very well	26	21.5
Well	50	41.3
Fairly well	26	21.5
Fairly poor	5	4.1
Poorly	12	9.9
Very poorly	2	1.7
Consider child's sleep as a problem		
A very serious problem	14	11.6
A small problem	27	22.3
Not a problem at all	80	66.1

for night time wakening like letting the baby cry till falling asleep or soothing the baby without picking it up.

Parents reported instituting a bedtime routine every night for 76 infants (62.8%) and for most nights of the week for 78.5% of the infants. BISQ measures are presented in Table III.

The parents of 11.6% (n=14) of the infants considered their infants' sleep to be a very serious problem, the parents of 22.3% (n=27) of the infants considered their sleep to be a small problem, and the sleep of 66.1% (n=80) of the infants was considered not to be a problem at all. Bedtime struggles and the latencies for falling asleep greater than 30 minutes was associated with the mother's perception of sleep as problem (p<0.001, p=0.012). Parental perception of sleep problem is presented in Table IV and BISQ sleep measures according to sleep problem severity ratings in Table V.

The parents of 88.8% of the infants, who were waking ≤3 times per night considered that their infants' sleep was not a problem at all. Parents who did not consider their infant's sleep as a problem had infants who were sleeping 12 hours a day, 2.75 hour during the day and 9.5 hours per night (median values are given). Infants whose sleep was considered as a problem by the parents had a greater number of night wakenings per night (p<0.001), more time spent in wakefulness during the night (p<0.001), shorter stretches of time during which the child was asleep at night (p=0.012), shorter nocturnal sleep durations (p=0.024) and shorter total sleep duration (p=0.008). Having infantile colic or higher scores on EPDS at 6 weeks postpartum were not associated with poor sleep at 9 months of age.

According to the poor sleeper criteria used, 32.2% (95% CI: %24.0–%41.3) were considered as poor sleepers. In the univariate analysis, gender, birth rank, sleeping position of the baby, presence of infantile colic, parents' age and educational status, family type (nuclear and extended) and mother's depression were not associated with infants' sleep problems (data not shown). Univariate anaysis revealed that babies who were sleeping in their parents' bed were more likely to have sleep problems compared to the others (p=0.006). In the logistic regression analysis when babies sleeping in a cradle were taken as the reference category, the OR of having sleep problems was 0.94 (95%CI: 0.31-2.88, p=0.92) among the ones who were sleeping in their own beds and 6.78 (95%CI: 1.89-24.29, p=0.003) among the ones who were sleeping in their parents' bed.

Parental perception of sleep problems correlated with the infant's sleep problem according to the criteria suggested by Sadeh [3] (p<0.001, Table VI).

Table V. BISQ sleep measures according to sleep problem severity ratings

Measures	Mother's perception of sleep as a problem								
	Severe Problem			Small Problem			No Problem		
	25th p	50th p	75th p	25th p	50th p	75th p	25th p	50th p	75th p
Time to start the child's bedtime routine	21:00	21:15	23:00	21:00	21:45	22:45	21:30	22:00	22:00
Time to put the child to bed at night	21:30	21:45	23:00	21:41	23:00	24:00	22:00	22:15	23:00
Night wakenings, no*	2.3	4.0	4.8	3.0	3.0	5.0	1.0	2.0	3.0
Nocturnal wakefulness, min*	22.5	45.0	67.5	10.0	25.0	45.0	6.0	15.0	30.0
Longest stretch of time the child is asleep during night min**	120.0	180.0	262.5		180.0	300.0	180.0	240.0	360.0
Nocturnal sleep duration, min***	330.0	480.0	600.0	476.3	540.0	600.0	480.0	570.0	630.0
Naps/day, no	2.0	2.0	3.5	2.0	2.0	3.0	2.0	2.0	3.0
Daytime sleep duration, min	97.5		225.0	90.0	120.0	180.0	120.0	165.0	213.8
Total sleep duration, min****	525.0	637.5	720.0	600.0	682.5	750.0	660.0	720.0	840.0

*p<0.001, **p=0.012, ***p=0.024, ****p=0.008

Table VI. Mother's perception of the infants sleep versus sleep problem according to the criteria suggested by Sadeh [ ]

Mother's perception of the infants sleep	Poor sleeper (%)
Very serious problem	9 (64.2%)
Small problem	17 (62.9%)
Not a problem	13 (16.2%)

Discussion

Understanding the parents'sleep practices both in sleep initiation and in response to nocturnal waking is important both for understanding the infant's sleep problem and for the development of interventions. It has been shown that early sleep patterns and maternal sleep-related perception during infancy are significant predictors of sleep quality of pre-school children [7]. There was a need for developing a screening tool for infant sleep problems in Turkish that can be used for problems in infants. We found that the Turkish version of the BISQ can be used for screening sleep environment, parental practices, daytime and nighttime routines, and sleep problems in early childhood.

Mindell et al. studied cultural differences in sleep patterns and problems in children from birth to 36 months of age, and found a wide range (11% to 76%) in the percentage of parents who perceived their child to have a sleep problem [8, 9]. In the current study, 33.9% of the parents perceived their child as having a sleep problem. According to the criteria suggested by Sadeh [3] rate of sleep problems in our study was 32.2% (95%CI: 24.0%-41.3%) and there was a significant relationship between the two criteria used in this study.

Night waking has been associated with a "difficult temperament" [10,11], and previous studies suggested that it might also be associated with infantile colic. Such an association was not found in this study. Parental stress and psychopathological conditions have also been associated with sleep problems [12-14]. However, in this study, babies of mothers with higher scores on EPDS did not have sleep problems with their 9 month-old infants. This can be explained by the fact that a high EPDS score is a consequence of child sleep problem rather than being a cause. It can also be speculated that EPDS scores taken previously did not correlate with the infant sleeping problems.

In this study, the percentage of parents reporting nursing or bottle feeding at night was very high, which can explain the frequent night waking. After six months of age breastfeeding spacing at night is not associated with lactation failure and daytime nursing is sufficient for the babies' needs. In babies having sleep problems, frequent daytime nursing and spacing of breastfeeding at night can be recommended to overcome this problem.

We also found that sleeping in the parent's bed was associated with sleeping poorly, but sleeping in the parent's room was not. Room sharing without bed sharing is recommended during the first year for prevention of sudden infant death [15] and our findings showed that this recommendation is not associated with infants' poor sleeping patterns. The infants should sleep in the same room as the parents, but not in the same bed.

Another important finding of this study is that rocking which is an undesirable parenting practice is frequently used for sleep initiation, which can explain the bedtime struggle encountered.

Limitations of the study were: This was a hospital based study and the sample was largely from a population of low socioeconomic status, so findings may not be generalizable to the general population. We also defined the presence of a problem based on parental report and objective measures such as actigraphy were not used.

Test results provide preliminary evidence that the Turkish translation is acceptable, understandable and reliable for assessing sleep environment, routines and sleep problems in infants. Bedtime struggles and night time waking seem to be associated with undesirable parenting practices. Frequent night waking leading to interrupted sleep of the parents influences parental perception of their infant's sleep. Availability of a screening tool will facilitate regular screening by the health professionals, so early detection and intervention will be possible. Further studies are needed to examine the child's and the parent's variables and sleep measures on large-scales to determine the unique contribution of each factor.

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