



Sleep Problems and Influencing Factors in Children Aged 0-3 Years

0-3 Yaş Grubu Çocuklarda Uyku Sorunları ve Etkileyen Faktörler

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ABSTRACT

Objective: The aim of this study was to identify sleep problems in children aged 0-3 years and the factors influencing them.

Methods: This descriptive correlational study was conducted online with 366 parents of children aged 0-3 years. Children's sleep problems and influencing factors were assessed using a seven-question demographic form, and the Brief Infant Sleep Questionnaire was used to assess infant sleep.

Results: Children aged 0-3 years had a late bedtime (21:30) and were awake more than twice a night. They slept an average of 2 hours during the day and 5 hours of uninterrupted sleep at night. Regardless of gender, they slept a total of 10 hours per night. Children who did not have a regular bedtime (54.2%) and had late sleep onset (51.5%) had more sleep problems. In total, 21.5% of the children were awake more than three times a night, 12.7% were awake for more than one hour at night, 8.8% had a total sleep time of less than 9 hours and 34.4% had sleep problems. Children with a total sleep time of less than 9 hours were more likely to have sleep problems.

Conclusion: Children aged 0-6 months living in extended families and sleeping out of bed had more sleep problems. The results of the study shed light on factors such as the prevalence of sleep problems in children aged 0-3 years, sleep ecology and hygiene.

Keywords: Sleep, child sleep, parents, infant, toddler

ÖZ

Amaç: Bu çalışmanın amacı 0-3 yaş grubundaki çocukların uyku problemlerini belirlemek ve bu problemleri etkileyen faktörleri tespit etmektir.

Yöntemler: Bu tanımlayıcı korelasyonel tipteki çalışma 0-3 yaş arası çocuğu olan 366 ebeveyn ile çevrimiçi olarak yürütüldü. Çocukların uyku sorunları ve etkileyen faktörleri değerlendirmek için yedi sorudan oluşan bir demografik anket kullanıldı ve çocukların uyku durumunu değerlendirmek için Kısa Bebek Uyku Anketi kullanıldı.

Bulgular: Araştırma, çalışmaya dahil edilen 0-3 yaş aralığındaki çocukların geç yattığını (21:30) ve gece boyunca iki veya daha fazla kez uyandığını ortaya koydu. Ortalama gündüz uykusu süresi yaklaşık 2 saat iken, gece boyunca kesintisiz olarak ortalama 5 saat uyudukları görüldü. Cinsiyet fark etmeksizin, çocukların toplamda 10 saat uyudukları belirlendi. Özellikle düzenli yatma zamanı olmayan (%54,2) ve geç yatan çocukların (%51,5) daha yüksek oranda uyku sorunları yaşadığı görüldü. Toplamda çocukların %21,5'i gecede üç kereden fazla uyanık kalmakta, %12,7'si geceleri bir saatten fazla uyanık kalmakta, %8,8'inin toplam uyku süresi 9 saatten az olmakta ve %34,4'ü uyku sorunu yaşamaktaydı. Özellikle toplam uyku süresinin yetersiz olması (9 saatten az) ile uyku sorunları arasında güçlü bir ilişki saptandı.

Sonuç: Araştırma bulguları, geniş ailelerde yaşayan ve belirlenmiş yataklarının dışında uyuyan 0-6 aylık çocuklar arasında uyku sorunlarının daha yüksek bir yaygınlığını ortaya koymaktadır. Bu çalışma, 0-3 yaş grubundaki çocuklarda uyku sorunlarının yaygınlığını, uyku alışkanlıklarını ve hijyen uygulamalarını etkileyen faktörleri aydınlatmaktadır.

Anahtar Sözcükler: Uyku, çocuk uykusu, ebeveynler, süt çocuğu, oyun çocuğu

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Cite this article as: Azak M, Korkmaz N, Şahin K, Balcı S. Sleep Problems and Influencing Factors in Children Aged 0-3 Years. Bezmialem Science 2024;12(2):231-8



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Received: 24.08.2023

Accepted: 23.01.2024

Introduction

Sleep is an active neurophysiological process and the primary activity of the developing brain (1). It is a highly dynamic process with high inter-individual variability, particularly in the first year of life. Adequate sleep in infants and children is essential for physical growth, memory, language, executive function, and general cognitive development (2). In studies, 17% (3) and 35% (4) of parents reported that their infants and young children had sleep problems.

Sleep problems are defined as nightly sleep that is at least one standard deviation below normal (5). Sleep disturbance is typically defined as sleep onset latency, short nocturnal sleep, and frequent nocturnal awakenings reported by parents (5). The most common sleep problems are night waking in infancy (40.8%) and difficulty sleeping alone at 2-3 years of age (20.0%) (3). Studies have reported many negative effects of sleep problems on children's development. Late bedtimes and less 24-hour sleep have been associated with anxiety, depression, distractibility, behavioural problems and academic performance (6). Evidence shows that short sleep duration and late bedtimes are associated with childhood overweight and obesity (7). In addition, infant sleep problems can lead to maternal sleep problems (8). This situation may increase the risk of postpartum depression in mothers (9).

Cross-cultural differences have been found in both child sleep problems and parents' perceived distress due to these problems (10,11). Limited studies have examined sleep problems and factors affecting children (12-14) aged 0-3 years in Türkiye. Identifying infant sleep problems reported by mothers during infancy and early childhood, and the factors associated with them, may contribute to the development of early diagnosis and intervention strategies. This study was conducted to determine the sleep problems of 0-3 year old children and the factors affecting them.

Research Questions

What are the sleep habits of 0-3 year old children?

What are the sleep problems of 0-3 year old children?

What factors cause sleep problems in 0-3 year old children?

Methods

Study Design and Sample

This descriptive correlational study was conducted online between January 2021 and January 2022. The study population consisted of parents with a 0-3 year old child living in Türkiye who agreed to participate. The snowball sampling method, a non-probability sampling method, was used in the study. According to the snowball sampling method, individuals were reached through online platforms, intermediaries, and other participants. The study sample consisted of 366 parents who were reached through online platforms who agreed to participate

and whose child did not have an acute illness in the past week. Three children with chronic diseases (hypothyroidism, ALL, chronic heart disease) were excluded from the study because their sleep duration and quality would be affected. As a result, 363 parents were included in the study.

Data Collection Tools

Information form included 26 questions about child, family, and sleep habits, as well as demographic questions designed to be consistent with existing literature (12-15).

Brief Infant Sleep Questionnaire (BISQ) was developed by Sadeh (16) to assess sleep behaviors and problems in early childhood. The BISQ consists of 29 questions to be answered by the parent regarding the sleep pattern of a child aged 0-3 years. There are seven variables as sleep criteria in the Turkish BISQ: 1) nighttime sleep duration, 2) daytime sleep duration, 3) number of nighttime awakenings, 4) duration of wakefulness during nighttime hours, 5) time of nighttime sleep onset, 6) settling time, 7) total sleep time (16).

By evaluating these criteria obtained from the BISQ, the total sleep time is calculated by adding the nighttime and daytime sleep time and subtracting the nighttime wake time. If at least one of the following three conditions is observed, the child is considered to have sleep problems; 1) nocturnal awakening more than three times per night, 2) nocturnal awakening for more than one hour, 3) total sleep duration of less than 9 hours (16). In the Turkish validity and reliability study conducted by Dasedemir and Temel (17), the time-dependent invariance of the questionnaire was $r=0.35-0.85$.

Procedure

The study was conducted online. A total of 366 parents agreed to participate in the study online. Parents were asked to complete the study forms considering their children's sleep status during the previous week. Parents who had a child with an acute illness in the previous week were not included in the study. Parents first completed the child and parent information form and then the BISQ.

Statistical Analysis

The SPSS for Windows (Statistical Package for Social Sciences for Windows, version 23.0) was used to analyze the data. The number percentage distribution was used to describe demographic characteristics, descriptive statistics were used to describe continuous variables (mean, standard deviation, minimum, median, maximum), and the Kolmogorov-Smirnov test was used to assess the conformity of the data with the normal distribution. Categorical variables were analyzed using the chi-square test. The Kruskal-Wallis test was used to compare three or more sets of quantitative data that were not normally distributed. Logistic regression analyses were performed using sleep ecology and demographic variables as predictors of sleep, and a p-value <0.05 was considered significant.

Ethical Issues

Ethical approval was obtained from the Social and Human Sciences Research Ethics Committee of a İstanbul University-Cerrahpaşa, (decision no: 2020/282, date: 05.01.2021). Parents participating in the study were informed online, and sent an informed consent form.

Results

There was a significant difference between the children's age and the family type and having sleep problems ($p < 0.05$). A total of 67.2% of children aged 0-7 months and 51.9% of children living in extended families had sleep problems. There was a significant difference between whether the child watched television, played with a phone/tablet, or watched videos/cartoons and whether the child had sleep problems ($p < 0.05$). A total of 41.8% of children who did not watch television, 37.2% of those who did not play

games with a phone/tablet, and 41.1% of those who did not watch videos/cartoons with a phone/tablet had sleep problems. It was found that there was a significant difference ($p < 0.05$) between the place where the children usually slept and the state of having sleep problems, and 42.5% of the children who slept in their parents' bed had sleep problems. There was a significant difference ($p < 0.05$) between the children's way of falling asleep, sleeping at the same time, difficulty of falling asleep and sleep problems. A total of 53.3% of the children who slept on their laps, 54.2% of the children who slept at the same time never/1-2 nights per week, and 51.5% of the children who had very late sleep onset times had sleep problems. There was a significant difference between the child's diet and sleep problems ($p < 0.05$). Of breastfed children 51.1% had sleep problems. There was no significant difference between gender, maternal work status, maternal education status and sleep problems ($p > 0.05$) (Table 1).

Table 1. The comparison of children's demographic characteristics and sleep problems (n=363)

Demographic characteristics	n	%	Sleep problems		x ² /p
			Yes n (%)	No n (%)	
Age of children (month)					
0-6	70	19.3	34 (48.6)	36 (51.4)	54.591/0.000*
7-12	61	16.8	41 (67.2)	20 (32.8)	
13-24	100	27.5	27 (27.0)	73 (73.0)	
25-36	132	36.4	23 (17.4)	109 (82.6)	
Gender					
Girl	162	44.6	49 (30.2)	113 (69.8)	2.273/0.132
Boy	201	55.4	76 (37.8)	125 (62.2)	
Mother's working status					
Yes	179	49.3	59 (33.0)	120 (67.0)	0.340/0.560
No	184	50.7	66 (35.9)	118 (64.1)	
Mother's education level					
High school or below	76	21	31 (40.8)	45 (59.2)	2.375/0.305
Bachelor	227	62.5	77 (33.9)	150 (66.1)	
Postgraduate	60	16.5	17 (28.3)	43 (71.7)	
Family type					
Nuclear	336	92.6	111 (33.0)	225 (67.0)	3.919/0.048*
Extended	27	7.4	14 (51.9)	13 (48.1)	
Child watching television					
Yes	165	54.5	56 (28.3)	142 (71.7)	7.303/0.007*
No	198	45.5	69 (41.8)	96 (58.2)	
Child playing with a phone or tablet					
Yes	73	20.1	17 (23.3)	56 (76.7)	5.029/0.025*
No	290	79.9	108 (37.2)	182 (62.8)	
Child watching videos/cartoons with a phone or tablet					
Yes	156	43.0	40 (25.6)	116 (74.4)	9.371/0.002*
No	207	57.0	85 (41.1)	122 (58.9)	
Where the child usually sleeps					

Table 1. continued

Demographic characteristics			Sleep problems		x ² /p
	n	%	Yes n (%)	No n (%)	
In his/her room	170	46.9	44 (25.9)	126 (74.1)	10.410/0.005*
In the parents' room	127	35.0	54 (42.5)	73 (57.5)	
In another room of the house	66	18.1	27 (40.9)	39 (59.1)	
Where the child sleeps most of the time					
In his/her own bed	322	88.7	106 (32.9)	216 (67.1)	3.983/0.137
In the parent's bed	29	8.0	12 (41.4)	17 (58.6)	
Other (swing, pram, etc.)	12	3.3	7 (58.3)	5 (41.7)	
The way of falling asleep					
Sucking	132	36.4	53 (40.2)	79 (59.8)	13.226/0.010*
Rocking/stroller etc.	83	22.8	28 (33.7)	55 (66.3)	
Lap	30	8.3	16 (53.3)	14 (46.7)	
Alone in bed	28	7.7	5 (17.9)	23 (82.1)	
In a room with the family	90	24.8	23 (25.6)	67 (74.4)	
Sleeping at the same time at night					
None/1-2 nights a week	48	13.2	26 (54.2)	22 (45.8)	11.088/0.011*
3-4 nights a week	93	25.6	34 (36.6)	59 (63.4)	
5 nights a week	108	29.8	32 (29.6)	76 (70.4)	
Nightly	114	31.4	33 (28.9)	81 (71.1)	
The difficulty level of sleep-onset time					
Very easy	33	9.1	6 (18.2)	27 (81.8)	14.866/0.005*
A little easy	58	16.0	18 (31.0)	40 (69.0)	
Neither easy nor difficult	148	40.7	43 (29.1)	105 (70.9)	
A little difficult	91	25.1	41 (45.1)	50 (54.9)	
Very difficult or difficult	33	9.1	17 (51.5)	16 (48.5)	
Nutrition type					
Breast milk	47	12.9	24 (51.1)	23 (48.9)	33.082/0.000*
Breast milk + formula	17	4.7	6 (35.3)	11 (64.7)	
Breast milk + complementary food	145	39.9	65 (44.8)	80 (55.2)	
Formula	13	3.6	6 (46.2)	7 (53.8)	
Formula + complementary food	25	6.9	6 (24.0)	19 (76.0)	
Complementary food	116	32.0	18 (15.5)	98 (84.5)	
	Mean ± SD			Min-Max	
Mother's age	31.14±4.44			21.00-58.00	
Father's age	33.89±4.79			25.00-62.00	

*p<0.05, x²: Chi-square test, SD: Standard deviation, Min-Max: Minimum-Maximum

The distribution of criteria for determining sleep problems in children according to the BISQ was examined. Of the children, 21.5% were awake more than three times per night, 12.7% were awake for more than one hour per night, and 8.8% had a total sleep duration of less than 9 hours. Considering all these data, it was found that 34.4% (n=238) of the children had sleep problems.

There was a significant difference between the median frequency of nighttime awakenings according to the age groups of the children (p<0.05). The median of children aged 7-12 months was higher than that of other age groups. The median of children aged 0-6 months and 13-24 months was higher than that of children aged 25-36 months. A significant difference was found between the medians of nocturnal wake duration according to the

age groups of children ($p < 0.05$). It was found that the median of children aged 0-6 months was higher than the median of children aged 13-24 and 25-36 months, and the median of children aged 13-24 months was higher than the median of children aged 25-36 months. The median of children aged 7-12 months was higher than that of children aged 25-36 months. There was a significant difference between the medians of uninterrupted nighttime sleep duration according to the age groups of the children ($p < 0.05$). The median of children aged 7-12 months was lower than that of other age groups, and the median of children aged 0-6 months and 13-24 months was lower than that of children aged 25-36 months. There was a significant difference between the medians of total nocturnal sleep duration according to the age groups of the children ($p < 0.05$). The median of children aged 0-6 months was lower than that of children aged 13-24 and 25-36 months. There was a significant difference between the medians of daytime sleep duration according to the age groups of the children ($p < 0.05$). The median of infants aged 0-6 months was higher than the other age groups, and the median of infants aged 7-12 months was higher than that of children aged 13-24 months and 25-36 months. The median of children aged 13-24 months was higher than that of children aged 25-36 months. There was a significant difference between the medians of total sleep duration according to the age groups of the children ($p < 0.05$). The median of children aged 0-6 months, 7-12 months, and 13-24 months was higher than that of children aged 25-36 months (Table 2).

The percentage of explanation of the seven-variable logistic regression model, which predicting the children's sleep problems, was calculated as to be 21%. The model's initial -2 Log likelihood value of the model was 467.495 (Initial -2 Log-Likelihood: 467.495). The -2 Log likelihood value of the generated model was lower as 407.990. Of the two variables that predicted their children's sleep problems, the strongest predictor was the child's age, with sleep problems in 0-6 month/7-12 month children odds ratio (OR): 5.00 [95% confidence interval (CI): 2.610-9.601] times higher. The second predictor variable was where

the child usually slept. Sleep problems were OR: 2.24 (95% CI: 1.376-3.648) times higher in children who slept in their parents' bed/in another room (Table 3).

Discussion

Sleep problems in young children are common and often persistent, which can lead to negative outcomes in later life (3). The current literature has reported that the rate of children with sleep problems is increasing daily (18). Considering the results of this study, children aged 0-3 years had late bedtimes (9:30 pm) and nighttime awakenings more than two times per night. They sleep an average of 2 hours during the day and 5 hours of uninterrupted sleep at night. Regardless of gender, they sleep a total of 10 hours per night. Children aged 0-3 years (11.8) had shorter sleep duration compared to children in Caucasian (13.0) and Asian (12.3) countries, while they had similar sleep duration with children in the Middle Eastern (11.7) countries (19). According to a multinational study, the total sleep duration in 0-3 year old children is 11.6 ± 1.5 hours, and they sleep an average of 2.2 ± 0.7 hours during the day (10). Sadeh (16) showed significant differences between countries and cultures in sleep patterns, parental behaviors, and sleep context. It is believed that the differences in the results are due to the differences that can be seen in the sleep patterns and sleep habits of children living in culturally different countries/regions.

Regarding the adequacy of sleep duration, children in Türkiye tend to sleep close to the recommended time [11 h (toddlers) and 12 h (infants)] for their age group (11.8 h) (20). The results of the current study are consistent with studies of sleep in similar age groups. In the study of Kahraman and Ceylan (13) the mean nighttime sleep duration of children was 9 h and above, the mean daytime sleep duration was 2 h, and the mean total sleep duration was 10.83 ± 3.04 h. Kahraman Berberoğlu and Çalışır (14) reported that the total sleep duration of infants aged 3-12 months was approximately 10 hours. The uninterrupted

Table 2. Children's sleep measurements according to BISQ and age groups (n=363)

	0-36 months	0-6 months (a)	7-12 months (b)	13-24 months (c)	25-36 months (d)	KW/p
	Median (IR 25-75p)	Median (IR 25-75p)	Median (IR 25-75p)	Median (IR 25-75p)	Median (IR 25-75p)	
Number of night wakings	2.00 (1.00-3.00)	3.00 (2.00-4.00)	4.00 (2.00-4.00)	2.00 (1.00-3.00)	1.00 (0.00-2.00)	85.074/0.000* b>a=c>d†
Nocturnal wakefulness (min.)	10.00 (5.00-30.00)	30.00 (10.00-60.00)	15.00 (2.50-60.00)	15.00 (5.00-30.00)	10.00 (0.00-30.00)	35.419/0.000* a>c>d†, b>d†
Uninterrupted sleep duration (hour)	5.00 (3.50-9.00)	5.00 (3.00-7.00)	3.00 (2.75-5.00)	5.25 (3.12-9.87)	8.00 (5.00-10.00)	59.777/0.000* b<a=c<d†
Nocturnal sleep duration (hour)	10.00 (9.00-11.00)	9.00 (8.00-11.00)	10.00 (9.00-10.75)	10.00 (9.50-11.00)	10.00 (9.12-11.00)	13.840/0.003* a<c=d†
Daytime sleep duration (hour)	2.00 (1.50-3.00)	4.00 (3.00-5.00)	2.50 (2.00-3.25)	2.00 (1.50-2.00)	1.50 (0.31-2.00)	147.264/0.000* a>b>c>d†
Total sleep duration (hour)	11.83 (10.75-12.91)	12.66 (11.00-14.00)	12.41 (11.00-13.58)	11.91 (10.75-12.89)	11.25 (10.41-12.00)	30.990/0.000* a=b=c>d†

* $p < 0.05$, KW: Kruskal-Wallis test, †: P-value obtained as a result of Bonferroni correction $p < 0.008$, BISQ: Brief Infant Sleep Questionnaire

Table 3. Regression model for some demographic characteristics predicting children's sleep problems (enter method)

Sleep problems Nagelkerke $R^2=0.209$
(0: No, 1: Yes)

Independent variables	β	S.H	Wald	SD	p	Exp (β) %95 CI
Constant	-2.004	0.381	27.665	1	0.000	0.135
Age (0: 13-24 month/25-36 ay, 1: 0-6 ay/7-12 month)	1.611	0.332	23.498	1	0.000	5.006 (2.610-9.601)
Watching TV (0: No, 1: Yes)	0.251	0.286	0.769	1	0.380	1.285 (0.733-2.253)
Playing games with a phone/tablet (0: No, 1: Yes)	0.039	0.365	0.011	1	0.916	1.039 (0.508-2.127)
Watching videos/cartoons with a phone/tablet (0: No, 1: Yes)	-0.133	0.306	0.188	1	0.665	0.876 (0.481-1.595)
Falling asleep (0: Alone in bed/room, in bed with family, 1: While suckling, rocking/stroller, etc., on lap)	0.083	0.292	0.081	1	0.776	1.087 (0.613-1.927)
Sleeping at the same time (0: Every night, 5-nights a week, 1: Never/1-2 nights a week, 3-4 nights a week)	0.251	0.255	0.969	1	0.325	1.286 (0.780-2.120)
Where the child usually sleeps (0: In his/her room/bed, 1: In the parents' bed, in another)	0.807	0.249	10.508	1	0.001	2.240 (1.376-3.648)

SD: Standard deviation, CI: Confidence interval

sleep duration was 4 hours at night and 2 hours during the day. Taşdemir and Temel (12) stated that the average total sleep duration in the first 3 years of life was 11.32 ± 3.0 hours, the uninterrupted sleep duration at night was 4 hours, and the daytime sleep duration was 2.33 hours.

Establishing a regular bedtime routine is a crucial parental practice to promote healthy sleep (21). Late sleep onset or bedtime negatively affects nighttime sleep duration (22). In the current study, children who did not have regular bedtime (54.2%) and had late sleep onset (51.5%) had more sleep problems. Consistent with this study in the literature, common sleep problems in young children include nocturnal insomnia, difficulty falling asleep, number of nighttime awakenings, and late sleep onset (18).

In the current study, 21.5% of the children had night waking more than three times a night, 12.7% had night waking for more than one hour, 8.8% had total sleep duration less than 9 hours, 34.4% had sleep problems. At the same time, it was found that children with a total sleep duration of less than 9 hours had more sleep problems. Wearick-Silva et al. (23) reported that 58.6% of children aged 0-3 years had sleep problems during the Coronavirus disease 2019 pandemic. They found that children most commonly had problems with night waking more than three times per night (23.1%), night waking (39.4%), and total sleep time less than 9 hours (30.7%). The number of nocturnal awakenings in the current study is similar to that of Wearick-Silva et al. (23). However, other results were higher in Wearick-Silva et al. (23) because research data were collected early in the

pandemic (7th week of quarantine). In the present study, data were collected later in the pandemic.

Sleeping in their own bed or elsewhere, especially with their parents, affects children's sleep differently. While some parents have reported that co-sleeping with their child reduces the child's sleep quality and crying duration, some studies have suggested that bed-sharing may be associated with more awakenings and shorter sleep duration during the night (24). Studies have reported that children who sleep in the same bed with their parents rather than in their own bed have more sleep problems (18,19). In the current study, sleep problems were 2.24 times more common in children who slept in their parents' bed or in another room. In total, 53.3% of the children who slept on their laps and 42.5% of the children who slept in their parents' bed had sleep problems. The results of the current study are therefore compatible with other studies.

Emond et al. (25) reported that increased screen exposure in infants aged 3-12 months was associated with decreased nighttime sleep. Various studies have shown a significant impact of screen time on sleep problems in children, resulting in problems such as short sleep duration, poor sleep quality, and irregular bedtimes (26-28). Screens of touch-sensitive handheld devices have been found to contribute to increased screen time for children and to disrupt sleep by distracting them (26). In a study of the same age group, 33.3% of children given tablets or phones experienced sleep problems (13). In the current study, 28.3% of children who watched television, 23.3% of children who played games on phones or tablets, and 25.6% of children who watched cartoons

on phones or tablets reported experiencing sleep problems. The lower prevalence of sleep problems in our study compared to the literature was likely due to the higher educational level of the mothers (62% with a bachelor's degree).

While the need for sleep is highest in the neonatal period, this rate gradually decreases in subsequent months and ages. Valla (29), in the study of sleep problems in 1,555 infants aged 6-12 months, found that 3-14% of infants aged 6-24 months had sleep problems reported by their parents at a maximum of 6 months and at least 24 months. In the study by Yılmaz-Kurt et al. (30), the highest rate of sleep problems was reported in children aged 0-12 months (65.1%). Similar to the literature, in our study, 48.6% of infants aged 0-6 months and 67.2% of infants aged 7-12 months had sleep problems.

There are different sleep-wake cycles, especially in the neonatal period (31). In the current study, there was a significant difference between the age groups of the children and the medians of the frequency of nocturnal wakings, duration of nocturnal awakenings, and uninterrupted nocturnal sleep, total nocturnal sleep, daytime sleep, and total sleep. The decrease in daytime sleep duration is mainly explained by the age of the child (16). In the current study, total sleep duration in children was 12.66 hours in the first six months and 11.91 hours between 13 and 24 months. A systematic review (32) found this rate to be 12.9 hours for the first six months and 12.6 hours for the 24 months. Paavonen et al. (33) found sleep duration of 13.7 hours in children aged 0-6 months and 11.9 hours at 24 months. While the total sleep duration by age obtained in the current study was similar to that of Galland et al. (32), it was lower than that of Paavonen et al. (33). The sample size, different definitions of sleep problems in different cultures, and different measurement instruments used may affect the frequency of sleep problems in children (34). Based on this, the different results obtained in the current study might be because the 0-6 month group was smaller in proportion, cultural differences, and individual sleep had different normative characteristics.

Study Limitations

The sampling method of this study was the first limitation. Despite the large number of participants and data from different provinces, the study participants could not be generalized to the Turkish population. The second limitation was that the participants were not proportionally sampled from all regions of the country. The third limitation was the use of online platforms for data collection. This provided access to all segments of society. However, this might allow only those interested in the topic to participate in the study. Accordingly, the fourth limitation was that parents who did not have an internet connection or a smartphone did not have access to this study.

Conclusion

In conclusion, this study found that children aged 0-6 months living in extended families and sleeping outside their beds had more sleep problems. The results of the study provide insight into factors such as the prevalence of sleep problems in children aged

0-3 years, sleep ecology, and hygiene. The results are expected to contribute to studies on the diagnosis, evaluation and prevention of sleep-related problems that may occur at an early age. In the future, it is recommended to carry out studies that test attempts to prevent sleep problems in children aged 0-3 years.

Nurses, who play an active role in the development of health, can identify and evaluate situations that may cause sleep problems in children, in collaboration with the family, at all levels of the health system, using standardized measurement tools appropriate for different cultures. Depending on the cause, this study can also support the planning of counseling and education services for families. These counseling and education services should focus on normative sleep duration, healthy sleep habits, sleep ecology, and hygiene according to age groups.

Ethics

Ethics Committee Approval: Ethical approval was obtained from the Social and Human Sciences Research Ethics Committee of a İstanbul University-Cerrahpaşa, (decision no: 2020/282, date: 05.01.2021).

Informed Consent: Parents participating in the study were informed online, and sent an informed consent form.

Authorship Contributions

Concept: M.A., N.K., K.Ş., S.B., Design: M.A., N.K., K.Ş., S.B., Data Collection or Processing: M.A., N.K., K.Ş., S.B., Analysis or Interpretation: M.A., N.K., K.Ş., S.B., Literature Search: M.A., N.K., K.Ş., S.B., Writing: M.A., N.K., K.Ş., S.B.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study received no financial support.

References

1. Bathory E, Tomopoulos S. Sleep Regulation, Physiology and Development, Sleep Duration and Patterns, and Sleep Hygiene in Infants, Toddlers, and Preschool-Age Children. *Curr Probl Pediatr Adolesc Health Care* 2017;47:29-42.
2. Tham EK, Schneider N, Broekman BF. Infant sleep and its relation with cognition and growth: a narrative review. *Nat Sci Sleep* 2017;9:135-49.
3. Williamson AA, Mindell JA, Hiscock H, Quach J. Child sleep behaviors and sleep problems from infancy to school-age. *Sleep Med* 2019;63:5-8.
4. Mindell JA, Collins M, Leichman ES, Bartle A, Kohyama J, Sekartini R, et al. Caregiver perceptions of sleep problems and desired areas of change in young children. *Sleep Med* 2022;92:67-72.
5. Field T. Infant sleep problems and interventions: A review. *Infant Behav Dev* 2017;47:40-53.
6. Sadeh A, De Marcas G, Guri Y, Berger A, Tikotzky L, Bar-Haim Y. Infant Sleep Predicts Attention Regulation and Behavior Problems at 3-4 Years of Age. *Dev Neuropsychol* 2015;40:122-37.

7. Roy M, Haszard JJ, Savage JS, Yolton K, Beebe DW, Xu Y, et al. Bedtime, body mass index and obesity risk in preschool-aged children. *Pediatr Obes* 2020;15:e12650.
8. Mersky JP, Lee CP, Gilbert RM, Goyal D. Prevalence and Correlates of Maternal and Infant Sleep Problems in a Low-Income US Sample. *Matern Child Health J* 2020;24:196-203.
9. Ma W, Song J, Wang H, Shi F, Zhou N, Jiang J, et al. Chronic paradoxical sleep deprivation-induced depression-like behavior, energy metabolism and microbial changes in rats. *Life Sci* 2019;225:88-97.
10. Mindell JA, Sadeh A, Wiegand B, How TH, Goh DY. Cross-cultural differences in infant and toddler sleep. *Sleep Med* 2010;11:274-80.
11. Sadeh A, Mindell J, Rivera L. "My child has a sleep problem": a cross-cultural comparison of parental definitions. *Sleep Med* 2011;12:478-82.
12. Taşdemir F, Temel A. Yaşamın ilk üç yılında uyku sorunları ve etkili uyku ekolojisi etmenleri. *Ege Üniversitesi Hemşirelik Fakültesi Dergisi* 2015;31:119.
13. Kahraman Ö, Ceylan Ş. Determining the Sleeping Habits of Toddlers Aged 0-3. *Journal of History Culture and Art Research* 2018;7:60720.
14. Kahraman Berberoğlu B, Çalısır H. The Factors Associated with Sleeping Habits and Sleeping Problems of 3-12 Months Infants: A Cross-Sectional Study. *Türkiye Klinikleri Journal of Pediatrics* 2020;29:8291.
15. İşsever O, Akçay N, Yılmaz H. Çocuk Bakımında Önemli Bir Konu: Güvenli Uyku ve Uyku Eğitimi. *İzmir Katip Çelebi Üniversitesi Sağlık Bilimleri Fakültesi Dergisi*. 2021;6:15761.
16. Sadeh A. A brief screening questionnaire for infant sleep problems: validation and findings for an Internet sample. *Pediatrics* 2004;113:e570-7.
17. Dasdemir F, Temel AB. Reliability and Validity of the Turkish Version of Brief Infant Sleep Questionnaire and Daily Sleep Log. *Int J Caring Sci* 2018;11:1822.
18. Chen X, Ke ZL, Chen Y, Lin X. The prevalence of sleep problems among children in mainland China: a meta-analysis and systemic-analysis. *Sleep Med* 2021;83:248-55.
19. Mindell JA, Sadeh A, Kohyama J, How TH. Parental behaviors and sleep outcomes in infants and toddlers: a cross-cultural comparison. *Sleep Med* 2010;11:393-9.
20. Paruthi S, Brooks LJ, D'Ambrosio C, Hall WA, Kotagal S, Lloyd RM, et al. Recommended amount of sleep for pediatric populations: a consensus statement of the American Academy of Sleep Medicine. *J Clin Sleep Med* 2016;12:785-6.
21. Schlieber M, Han J. The Role of Sleep in Young Children's Development: A Review. *J Genet Psychol* 2021;182:205-17.
22. Zhang Z, Sousa-Sá E, Pereira JR, Okely AD, Feng X, Santos R. Correlates of Sleep Duration in Early Childhood: A Systematic Review. *Behav Sleep Med* 2021;19:407-25.
23. Wearick-Silva LE, Richter SA, Viola TW, Nunes ML; COVID-19 Sleep Research Group. Sleep quality among parents and their children during COVID-19 pandemic. *J Pediatr (Rio J)* 2022;98:248-55.
24. Andre CJ, Lovallo V, Spencer RMC. The effects of bed sharing on sleep: From partners to pets. *Sleep Health* 2021;7:314-23.
25. Emond JA, O'Malley AJ, Neelon B, Kravitz RM, Ostbye T, Benjamin-Neelon SE. Associations between daily screen time and sleep in a racially and socioeconomically diverse sample of US infants: a prospective cohort study. *BMJ Open* 2021;11:e044525.
26. Cheung CHM, Bedford R, Saez De Urabain IR, Karmiloff-Smith A, Smith TJ. Daily touchscreen use in infants and toddlers is associated with reduced sleep and delayed sleep onset. *Sci Rep* 2017;7:46104.
27. Vijakkhana N, Wilaisakditipakorn T, Ruedeekhajorn K, Pruksananonda C, Chonchaiya W. Evening media exposure reduces night-time sleep. *Acta Paediatr* 2015;104:306-12.
28. Thompson DA, Christakis DA. The association between television viewing and irregular sleep schedules among children less than 3 years of age. *Pediatrics* 2005;116:851-6.
29. Valla L, Wentzel-Larsen T, Slinning K. Prevalence of Sleep Problems in Infancy and Developmental Outcomes From 6 to 24 Months. *ResearchSquare* 2021;118.
30. Yılmaz-Kurt F, Aytekin A, Çelebi A. 0-3 Yaş Çocuklarda Uyku Sorunlarının Belirlenmesi. *Zeynep Kamil Tıp Bülteni* 2018;49:25963.
31. Zhou Y, Aris IM, Tan SS, Cai S, Tint MT, Krishnaswamy G, et al. Sleep duration and growth outcomes across the first two years of life in the GUSTO study. *Sleep Med* 2015;16:1281-6.
32. Galland BC, Taylor BJ, Elder DE, Herbison P. Normal sleep patterns in infants and children: a systematic review of observational studies. *Sleep Med Rev* 2012;16:213-22.
33. Paavonen EJ, Saarenpää-Heikkilä O, Morales-Munoz I, Virta M, Häkälä N, Pölkki P, et al. Normal sleep development in infants: findings from two large birth cohorts. *Sleep Med* 2020;69:145-54.
34. Hense S, Pohlabein H, De Henauw S, Eiben G, Molnar D, Moreno LA, et al. Sleep duration and overweight in European children: is the association modified by geographic region? *Sleep* 2011;34:885-90.