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The Factors Associated with Sleeping Habits and Sleeping Problems of 3-12 Months Infants: A Cross-Sectional Study

3-12 Aylık Bebeklerin Uyku Alışkanlıkları ve Uyku Sorunları ile İlişkili Etmenler: Kesitsel Bir Çalışma

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This study was presented as an oral presentation at the 4th PNAE Children's Nursing Congress in Athens on June 1-2, 2018.

ABSTRACT Objective: This study was carried out to determine sleeping habits and sleeping problems and to examine factors the related to sleeping problems in infants aged 3-12 months. **Material and Methods:** This cross-sectional study included 252 infants aged 3-12 months selected through simple random sampling. Data collection was performed by using Parent-Infant Descriptive Form and Brief Infant Sleep Questionnaire. **Results:** The median frequency of waking up at night was three, duration of staying awake was 30 minutes, duration of daytime sleep was 30 minutes and the total duration of sleep was ten hours. Eleven-point nine percent (n=30) of the infants woke up more than three times a night, 30.2% (n=76) of the infants woke up and stayed awake for more than one hour a night, 35.7% (n=90) of the infants had less than nine hours sleep and 52.8% (n=133) of the infants had sleeping problems. When other factors were kept under control, mothers' being literate or primary school graduates (p=0.030), exclusive breastfeeding (p=0.001) and swinging infants to make them sleep (p=0.029) were found to be the factors which reduce sleeping problems. **Conclusion:** More than half of the infants aged 3-12 months had sleeping problems and maternal education status, type of infant nutrition and parental behavior of putting their infants to sleep had an influence on these problems. Having knowledge about risk factors of sleeping problems in infants younger than one year old will contribute to prevention or reduction of problems. Child health professionals (nurses, midwives, family physicians, pediatricians) should provide parents education about safe sleeping, sleeping ecology and behavior appropriate for prevention of sleeping problems.

Keywords: Infant; sleep; sleeping problems

ÖZET Amaç: Bu araştırma 3-12 aylık bebeklerin uyku alışkanlıklarını ve uyku sorunlarını belirlemek, uyku sorunları ile ilişkili etmenleri incelemek amacıyla yapıldı. **Gereç ve Yöntemler:** Kesitsel tipte olan bu çalışmaya basit rastgele örnekleme yöntemi ile seçilen 3-12 aylık 252 bebek alındı. Veriler Ebeveyn-Bebek Bilgi Formu ve Bebek (Kısa) Uyku Sorunları Tanılama Formu kullanılarak toplandı. **Bulgular:** Bebeklerin ortanca gece uyanma sıklığı 3 kez, gece uyanık kalma süresi 30 dakika, gündüz uyku süresi 2 saat ve toplam uyku süresi yaklaşık 10 saat olarak bulundu. Bebeklerin %11,9'unun (n=30) gecede üç kereden fazla uyandığı, %30,2'sinin (n=76) gece uyanarak bir saatten fazla uyanık kaldığı, %35,7'sinin (n=90) toplam uyku süresinin dokuz saatten daha az olduğu ve %52,8'inin (n=133) uyku sorunu yaşadığı saptandı. Diğer etmenler kontrol altına alındıktan sonra annenin okuryazar ya da ilkokul mezunu olmasının (p=0,030), bebeğin sadece anne sütü ile besleniyor olmasının (p=0,001) ve sallayarak uyutulmasının (p=0,029) uyku sorununu azaltan etmenler olduğu bulundu. **Sonuç:** Bu araştırmada 3-12 aylık bebeklerin yarısından fazlasında uyku sorunu görüldüğü; annenin eğitim düzeyi, bebeğin beslenme şekli ve anne-babanın uyutma davranışlarının bebeğin uyku sorununu etkilediği bulundu. Bir yaşın altındaki bebeklerde uyku sorunları ile ilişkili risk etmenlerinin bilinmesi, bebeklerde uyku sorunlarının önlenmesi ya da azaltılmasına katkı sağlayacaktır. Çocuk sağlığı ile ilgilenen profesyoneller (hemsireler, ebeler, aile hekimleri, pediatri hekimleri) anne- babalara güvenli uyku, uyku ekolojisi ve uyku sorunlarının önlenmesine yönelik uygun davranışlar konusunda eğitim ve danışmanlık vermelidirler.

Anahtar Kelimeler: Bebek; uyku; uyku sorunları

Sleep is an important activity which allows infants to grow, develop, learn and rest since higher amounts of the hormone melatonin are secreted during sleep, which strengthens the immune system and stimulates the hypophysis to release more growth hormone. All muscles of infants work, and energy

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stores are refreshed during sleep and infants become more energetic when they wake up. Sufficient sleep does not only develop infants' brains but also help the information collected before sleeping to be recorded more properly.[1-3]

Infants younger than one year old experience more sleeping problems, which decrease with age.[4] Factors related to parents, infants and the environment play a role in development of sleeping problems in infants. Among these factors are socio-economic status of families, education levels of parents, traditional practices of caregivers, behavior of putting infants into sleep, being the first child, physical environment (noise, lights, presence of a TV set), sharing bed and room with infants, colic or teething discomfort, gastroesophageal reflux, sleep apnea, various lung diseases, maternal postpartum depression, neurological problems, time to go to bed and wake up and sleeping periods.[5-8] There is not a universal definition of sleeping problems in the infantile period. This is because duration of sleep needed is shaped by various cultural and social values and has not been clearly determined yet. Parents are asked about their experiences to determine whether their infants need sleep. The suitability of parents' expectations about sleeping needs of their infants should be evaluated by an expert by taking account of age of infants.[9]

Sleeping problems which appear in the infantile period may lead to different problems in later developmental stages, i.e. emotional, psychosocial, behavioral, academic and physical problems.[10] Findings obtained in many studies in the last 20 years have shown a gradual decrease in the mean sleeping time by about 30-60 minutes from the infantile period to adolescence.[11] Studies on children have revealed that short sleeping time and chronic insufficient sleep are associated with negative health and developmental outcomes.[12,13] The mechanisms and behavior underlying the relation between insufficient sleep and negative health outcomes remain to be revealed. Inadequate sleep both has a negative behavioral, emotional and social effects on individuals and caregivers and affects neuromotor functions.[10,13]

There have been studies about sleeping problems in children from different countries.[14-17] Although sleeping problems in Turkish adults have been described well, there have been very few studies on sleeping problems in children, especially infants aged younger than one year old.[4] *(Gündüz S. 0-5 yaş arası çocukların uyku özelliği ve bunu etkileyen faktörler. Ankara Üniversitesi, Sağlık Bilimleri Enstitüsü Sosyal Pediatri Yüksek Lisans, Tez No: 431840, Ankara, 2016).* In the present study, sleeping habits and sleeping problems in the infantile period were determined and factors related to sleeping problems were investigated. It is important that child health professionals (nurses, midwives, family physicians, pediatricians) should be aware of the factors affecting sleep in each childhood stage. Nurses should encourage parents to display useful behavior of putting their babies to sleep and inform them about the effects of harmful practices on child development and health. This can contribute to solution of sleeping problems in children.

It has been shown in the literature that the leading factor affecting growth and development of children aged one-three years is high quality sleep.[4,18] The current study was performed to reveal sleeping habits and problems and to investigate the factors related to sleeping problems in 3-12-month-old infants.

Questions of the Research

- What are the sleeping habits in infants aged 3-12 months?
- What are the sleeping problems of infants aged 3-12 months?
- What are the factors related to sleeping problems in infants aged 3-12 months?

MATERIAL AND METHODS

STUDY DESIGN, SETTINGS AND SAMPLE

This is a cross-sectional study conducted in ten family healthcare centers between September 2016 and July 2017. Simple random sampling was utilized to access families of infants from each of ten family healthcare centers selected through stratified sampling from 17 family healthcare centers in Aydın.

There were 3075 infants aged 3-12 months offered care by ten family healthcare centers included in the study. The sample size was determined by using the formula $n= Nt^2pq / d^2(N-1) + t^2pq$. The size of the sample with a known study population was considered as 247 and when a loss of 10% (n=25) was taken into consideration, the study sample was planned to reach 272 infants. In addition, taking account of the fact that sleeping problems most often occur in the first year of life and that the sleeping-waking pattern and recognition of daytime and night time start to appear in the third month of life, infants aged 3-12 months were included into the sample. A total of 20 infants were excluded since 15 mothers declined to participate in the study and five mothers had excuses developing during data collection (having to leave urgently and not wanting to make their spouses wait). As a result, 252 infants were included into the study.

Ethical Considerations

Ethical approval was obtained from the Ethics Committee for Non-Interventional Research at Aydın Adnan Menderes University Medical School (Approval number: 2016/946; date: 01.08.2016). Approval was also obtained from the family healthcare centers where the study was conducted, and oral informed consent was taken from the mothers of the infants enrolled into the study. This study was carried out in accordance with the Helsinki Declaration Principles.

Measurements

Data were gathered by the first researcher and two interviewers with Parent-Infant Descriptive Form and Brief Infant Sleep Questionnaire.

Parent-Infant Descriptive Form is composed of 29 questions about demographic features of infants and their parents and other independent variables about them. The questions are about age, education, employment status and health insurance of mothers, family type, the place where they lived for the longest and number of living children, family income, smoking at home, taking alcohol or substance abuse, type of home, type of heating, presence of a room for the infant at home, planned/unplanned pregnancy and presenting to a healthcare center during pregnancy. In addition, there are questions about infants' date of birth, gender and the birth order, type of delivery, person responsible for putting the infant to sleep, use of a pacifier, type of nutrition, time to start complementary feeding, wakings, movements during sleep and sleeping in a place other than home.

Brief Infant Sleep Questionnaire is composed of 29 questions and was developed by Sadeh et al. to determine sleeping problems in infants and children.[8,18] Its validity and reliability for Turkish infants and children were tested by Daşdemir and Temel.[4] In the present study, 22 questions of the questionnaire were used to collect data about daytime and nighttime sleep patterns, sleeping behavior, preparing the infant for sleep, sleeping time routines and parental behavior. The questions are about presence of sleeping problems, time of starting to sleep, time to fall asleep, frequency of night wakings, duration of wakings, duration of night sleep, duration of daytime sleep and total sleep time. In the validity and reliability study by Daşdemir and Temel, time-dependent invariance of the questionnaire was found to be r=0.35–0.85 and the questionnaire was reported to be reliable.[4] Daşdemir also reported a positive relation between the questionnaire (posttest) and seven parameters obtained from the sleep diary (r=0.51-0.90).[4]

Data Collection

Data collection was performed at face to face interviews with the mothers of healthy infants presenting to the family healthcare centers for well-child visits and accepting to participate in the study. The mothers were informed about the study. The interviews took place in a silent available room provided by the administrators of the family healthcare centers and took about 10-15 minutes.

Data Analysis

Total sleep time was calculated by subtracting duration of wakings from the total time of daytime and nighttime sleep. Presence of at least one of the parameters waking more than three times a night, staying awake for more than one hour a night and total sleep time of fewer than nine hours was considered as a sleeping problem.[18]

Obtained data were analyzed with Statistical Package for the Social Sciences (SPSS) Version 18 and evaluated with descriptive statistics (frequency, percentage, mean, median), Kolmogorov-Smirnov test and Chi-square test. In addition, binary logistic regression analysis was made to determine factors likely to be related to dependent variables. A p value of <0.05 was accepted as significant.[19,20]

RESULTS

GENERAL CHARACTERISTICS OF THE PARTICIPANTS

Out of all the infants included in the study, 38.1% (n=96) were aged 3-5 months and 57.5% (n=145) were female. Of all the mothers, 42.9% (n=108) were high school graduates, 81.7% (n=206) lived in a city for the longest time, 57.5% (n=145) had an income equal to their expenses and 42.9% (n=108) reported that their family members smoked at home.

Of all the infants, 52.8% (n=133) were delivered through cesarean section, 52% (n=131) had one or more siblings, 54.4% (n=137) were fed on food in addition to breastmilk and 69.8% (n=176) were using a pacifier. Besides, 45.2% (n=114) of the infants were sleeping in the supine position and 52.8% (n=133) of the infants fell asleep in 16-30 minutes (Table 1).

FINDINGS ABOUT SLEEP PATTERN

The infants woke up three times a night on average and stayed awake for about 30 minutes. The longest time during which the infants stayed awake was 270 minutes. The infants slept continuously for about 240 minutes a night and for about 120 minutes during daytime. The total sleep time a day was 617.50 minutes (Table 2).

FINDINGS ABOUT SLEEPING PROBLEMS

Of all the infants, 11.9% (n=30) woke up more than three times, 30.2% (n=76) stayed awake for more than one hour after waking at night and 35.7% (n=90) had a total sleep time of fewer than nine hours. Therefore, 52.8% (n=133) of the infants had at least one of these parameters. This showed that they had a sleeping problem (Figure 1).

TABLE 1: The distribution of the infants and mothers by their socio-demographic features (n=252).

Socio-demographic features of the infants	Number (n)	Percentage (%)
Age group		
3-5 months	96	38.1
6-8 months	92	36.5
9-12 months	64	25.4
Gender		
Female	145	57.5
Male	107	42.5
Mothers' education levels		
Literate/ primary school *	33	13.1
Secondary school	48	19.0
High school	108	42.9
University	63	25.0
The place where the mothers lived the longest		
City	206	81,7
Small town †	46	18,3
Income		
Income lower than expenses	88	35.0
Income equal to expenses	145	57.5
Income higher than expenses	19	7.5
Smoking status		
Yes	108	42.9
No	144	57.1
Type of delivery		
Vaginal	119	47.2
Cesarean section	133	52.8
Number of siblings		
One or more	131	52.0
None	121	48.0
Type of nutrition		
Exclusive breastfeeding	53	21.0
Breastfeeding + formula	40	15.9
Breastfeeding+ complementary feeding	137	54.4
Formula	22	8.7
Use of a pacifier		
Yes	176	69.8
No	76	30.2
Position during sleeping		
Prone position	34	13.5
Lateral position	104	41.3
Supine position	114	45.2
Time to fall asleep		
Less than 5 min	18	7.1
5-15 min	65	25.8
16-30 min	133	52.8
31-60 min	24	9.5
Higher than 60 min	12	4.8
Total	252	100

*Two literate mothers were added to the group of primary school graduates.
†Fifteen mothers living in a village were added to the group of mothers living in a town or city.

TABLE 2: The distribution of the infants by their sleeping habits (n=252).

Sleeping Habits	Median	IR (25-75p)	Minimum	Maximum
Time of starting to sleep	22:00	20:33-23:00	18:00	02:30
Frequency of night waking	3.00	2.00-4.00	0	9
Duration of night waking (min)	30.00 (1/2hrs)	15.00-90.00	0	270
Duration of continuous sleep (min)	240.00 (4hrs)	180.00-300.00	0	780
Duration of daytime sleep (min)	120.00 (2hrs)	90-180	12	360
Total duration of sleep (min)	617.50 (~10hrs)	450.00-735.00	65	1245

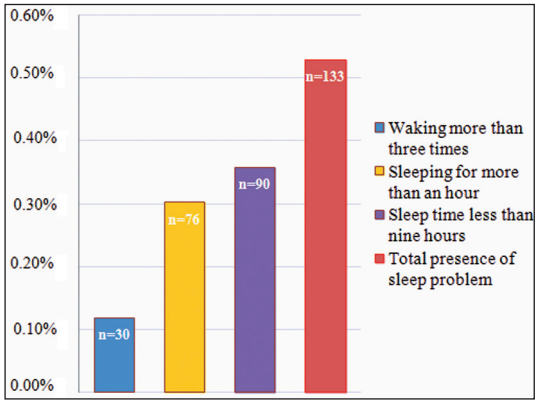

FIGURE 1: The distribution of the infants by indicators of presence of sleeping problems (n=252).

FINDINGS ABOUT PRESENCE OF SLEEPING PROBLEMS AND FACTORS RELATED TO THESE PROBLEMS

Fifty-seven point eight percent (n=37) of infants 9-12 months old, 55.9% (n=81) of female infants, 53.4% of those born by cesarean section (n=71), 53.1% of those without siblings (n=64) and 54.8% (n=57) of the babies sleeping in the lateral position were found to have sleep problems. There was not a significant difference in presence of a sleeping problem in terms of age groups, gender, type of delivery and number of siblings (p>0.05). Seventy percent of the infants fed on breastmilk and formula (n=28), 56.9% (n=78) of breastmilk and complementary-fed-infants, and %50 (n=11) of formula-fed-infants had sleeping problems. There was a significant difference in having a sleeping problem in terms of type of nutrition. The infants who were fed on exclusive breastfeeding significantly differed from the ones who were fed on breastmilk and formula (p<0.001) and the ones who were fed on breastmilk and food other than formula (p=0.001). This showed that the infants who had exclusive breastfeeding experienced fewer sleeping problems than the others (Table 3).

Logistic regression analysis was made to determine the relation between presence of a sleeping problem and educational status of mothers, family income, nutritional status of infants and behavior the parents exhibited before putting their infants to sleep. When other factors were zeroed, mothers' being literate and graduating from primary school (p=0.030), exclusive breastfeeding (p=0.001) and putting infants to sleep by swinging them (p=0.029) were found to be the factors inversely affecting sleeping problems. However, such variables as having an income lower than expenditures (p=0.051) and singing a song or making the infants listen to music (p=0.079) were not found to affect presence of sleeping problems (Table 4).

DISCUSSION

In the present study, the median frequency of wakings a night was three, which is consistent with the literature *(Gündüz S. 0-5 yaş arası çocukların uyku özelliği ve bunu etkileyen faktörler. Ankara Üniversitesi, Sağlık Bilimleri Enstitüsü Sosyal Pediatri Yüksek Lisans, Tez No: 431840, Ankara, 2016)*.[4] Sadeh (2004) reported that infants waking and staying awake for more than one hour had a sleeping problem.[18] In the present study, the infants were found to stay awake for about one hour a night. When compared to the results of a study by Gündüz and Ulukol (2016) on infants aged 3-11 months, the infants in the present study were found to stay awake three times longer at night *(Gündüz S. 0-5 yaş arası çocukların uyku özelliği ve bunu etkileyen faktörler. Ankara Üniversitesi, Sağlık Bilimleri Enstitüsü Sosyal Pedi-*

TABLE 3: The distribution of infants with sleeping problems by their socio-demographic features (n=252).

	Presence of sleeping problems					
	Yes (n=133)		No (n=119)			
Socio-demographic features	**n**	**%**	**n**	**%**	**χ^2**	**p**
Age group						
3-5 months	46	47.9	50	52.1		
6-8 months	50	54.3	42	45.7	1.652	0.438
9-12 months	37	57.8	27	42.2		
Gender						
Female	81	55.9	64	44.1		
Male	52	48.6	55	51.4	1.303	0.254
Type of delivery						
Vaginal	62	52.1	57	47.9		
Cesarean section	71	53.4	62	46.6	0.041	0.839
Number of siblings						
One or more	69	52.5	61	47.5		
None	64	53.1	58	46.9	0.010	0.922
Type of nutrition						
Exclusive breastfeeding	16	30.2	37	69.8		
Breastfeeding + formula	28	70.0	12	30.0		
Breastfeeding + complementary feeding	78	56.9	59	43.1	16.629	0.001
Formula	11	50.0	11	50.0		
Position during sleeping						
Prone position	17	50.0	17	50.0		
Lateral position	57	54.8	47	45.2	0.325	0.850
Supine position	59	51.8	55	48.2		

TABLE 4: Results of the logistic regression analysis for factors related to presence of sleeping problems in infants (n=252).

						95%Confidence Interval (CI)
Factors	**β**	**SE***	**t**	**p**	**Odds Ratio Exp(B)**	**Min -Max**
(Constant)	1.156	0.267	18.767	0.000	0.315	
Being literate -graduating from primary school †	-0.973	0.449	4.694	**0.030**	2.645	1.097-6.378
Income lower than expenses †	-0.583	0.298	3.818	0.051	1.791	0.998-3.213
Exclusive breastfeeding †	-1.154	0.347	11.039	**0.001**	3.170	1.605-6.260
Swinging †	-0.619	0.284	4.743	**0.029**	1.857	1.064-3.241
Singing/listening to music †	-0.709	0.404	3.082	0.079	2.032	0.921-4.486

*SE= Standard Error; CI= Confidence Interval †Dummy Coding = 1 = Yes, 0 = No (Model = 1, Method= Enter, p=0.000, R2 = 0.134, Corrected R2 = 0.179).

atri Yüksek Lisans, Tez No: 431840, Ankara, 2016). The median duration of continuous sleeping in the current study was four hours a night, which was congruent with the results of a study by Daşdemir and Temel (2015).[4]

The daytime sleep duration was found to be about two hours. It was compatible with that of the infants at the same age in two studies reported by Gündüz and Sadeh, but about two hours shorter than that of the infants in a study by Daşdemir *(Gündüz S. 0-5 yaş arası çocukların uyku özelliği ve bunu etkileyen faktörler. Ankara Üniversitesi, Sağlık Bilimleri Enstitüsü Sosyal Pediatri Yüksek Lisans, Tez No: 431840, Ankara, 2016)*.[4,18]

The total sleep duration was found to be about ten hours in the present study. Sadeh (2004) reported

that infants sleeping for fewer than nine hours have a sleeping problem.[18] Therefore, in the present study, the median sleeping duration was above this threshold. American Pediatric Academy (APA) recommends that infants aged 4-13 months should sleep for 12-16 hours a day.[21,22] There have been several studies showing that infants aged 3-12 months sleep for 14-16 hours on average.[22,23] In light of the results of these studies, the infants in the present study sleep less compared to other infants reported *(Gündüz S. 0-5 yaş arası çocukların uyku özelliği ve bunu etkileyen faktörler. Ankara Üniversitesi, Sağlık Bilimleri Enstitüsü Sosyal Pediatri Yüksek Lisans, Tez No: 431840, Ankara, 2016)*.[4,18] The difference in duration of night wakings, duration of continuous sleep and duration of daytime sleep between the infants in the present study and those in other studies *(Gündüz S. 0-5 yaş arası çocukların uyku özelliği ve bunu etkileyen faktörler. Ankara Üniversitesi, Sağlık Bilimleri Enstitüsü Sosyal Pediatri Yüksek Lisans, Tez No: 431840, Ankara, 2016)*.[4,18] can be attributed to the differences in age, temperament, nutritional characteristics, rituals of putting infants to sleep and other parental behavior and regional and socio-cultural features.

In the current study, about one fifth of the infants woke up more than three times per night, about one third of the infants stayed awake for more than one hour per night and the total sleep time was fewer than nine hours. This meant that 52.8% of the infants had a sleeping problem. Compatible with this finding, several epidemiological studies have shown that about half of the infants experience sleeping problems.[14-17] Similarly, 49.6% of the infants younger than one year old in a study by Daşdemir and Temel (2015) and 55% of the infants aged 5-6 months in a study by Reem et al. (2014) were reported to have a sleeping problem.[4,24] Unlike the present study and the above mentioned studies, Başkale and Turan reported that one third of the children had a sleeping problem.[25] This can be explained by the fact that age groups and data collection tools differ between the studies and that only mothers' perceptions were taken into account in Başkale and Turan's study to determine sleeping problems.[25]

Sleeping problems in infants may result from parental, infantile and environmental factors. Parental anxiety in infancy, parental behavior while infants fall asleep and/or when they wake up at night, infants' temperament, growth spurts, teething, colic, type of nutrition, infants' sleeping in the same room or bed as their parents, anxiety about separation and environmental factors such as room temperature, light and noise can affect infants' sleeping patterns.[6,8,16,18] It is important that parents should carefully observe factors likely to cause problems in infants' waking and falling asleep and should be aware of the fact that physiological changes typical of infantile developmental stages can interrupt sleep in infants.

In the present study, although there was not a significant difference in presence of sleeping problems in terms of age, gender, sleeping positions, type of delivery and number of siblings, a significant difference was found in terms of nutrition types. The infants aged 9-12 months had more sleeping problems. But this difference was not statistically significant. It has been shown in the literature that sleeping problems more frequently appear in infants younger than one year old than in other age groups and that as age increases, sleeping problems decrease *(Gündüz S. 0-5 yaş arası çocukların uyku özelliği ve bunu etkileyen faktörler. Ankara Üniversitesi, Sağlık Bilimleri Enstitüsü Sosyal Pediatri Yüksek Lisans, Tez No: 431840, Ankara, 2016)*.[4,18] This can be due to different features of the developmental stages. They can result in restlessness, continuous crying and frequent night wakings.

The infants included in the present study were found to sleep in the supine and lateral positions most frequently. Consistently with this finding, Wennergren et al., Çelik et al., Çalışır et al. and Alm et al. reported that infants mostly slept in the supine position.[26-29] In addition, in the current study, one fourth of the mothers were found to prefer to put their infants in the prone position, which causes a risk of sudden infant deaths. Sleeping in the prone position increases hypoxia and hypercapnia due to inhaling the same air and decreases cerebral oxygenation due to changes in autonomic control of the cardiovascular system. It is of importance that infants should be

put in the supine position to reduce the risk of sudden infant deaths.[21,22]

In the current study, the infants with exclusive breastfeeding experienced the least sleeping problems while the infants having formula or other food in addition to breastmilk experienced the most sleeping problems. However, in a study by Ramamurthy et al., the breastfed infants were found to wake up at night more frequently.[30] Another study revealed that although the breastfed infants had more night wakings, they fell asleep in a shorter time compared to those fed with a feeding bottle. It was concluded that breastfeeding contributed to reduction of sleeping problems.[31] Montgomery-Downs et al., also showed that the breastfed babies had considerably fewer impaired respiration related problems during night sleep due to infections and adenoid hypertrophy in infants.[31] It was proven that breastmilk had a positive influence on growth, development and general health status of infants and was the most appropriate food for the digestive system.[32] Since it is easily digested, it helps infants to fall asleep more easily while it may indirectly cause infants to feel hungry and wake up more frequently since it leaves the stomach faster.[33,34] It is worth noting that although breastfed infants more frequently wake up at night, they less frequently catch diseases, which leads to fewer sleep related problems.

In this study, the infants swung by their parents were found to experience fewer sleeping problems. It is important to maintain rituals which help infants to fall asleep calmly and peacefully. In Turkey, one of the most frequent traditional practices performed by mothers is to put babies to sleep by swinging. Experiences and observations of the researchers conducting this study and the data obtained showed that the mothers put their infants to sleep by swinging while standing, in the swing or in their arms. Slow, calm and rhythmic swinging movements utilized while putting infants to sleep can help them to relax, decrease their restlessness and have them fall asleep faster. However, fast and sharp swinging movements can be harmful and may be even deadly in infants who cry and have difficulty in falling asleep. It is recommended that infants should be put to sleep without swinging, which may lead to shaken baby syndrome. In the present study, presence of fewer sleeping problems in the infants put to sleep by swinging can be attributed to their decreased restlessness and relaxation and their falling asleep more easily.

In the current study, infants of the mothers with lower education levels experienced fewer sleeping problems than those of the mothers with higher education levels. Similarly, in Karaçal and Boran's study, mothers' educational status was found to affect infants' sleep.[35,36] Unlike the present study, Daşdemir and Temel reported that infants of mothers who were literate and graduating from primary school had more sleeping problems.[4] It seems that mothers with lower education levels do not have a job providing an income and spend more time with their babies during daytime. Therefore, these infants do not experience anxiety related to their mothers' leaving home every morning and do not need to spend time with their mothers at night. This may suggest that infants whose mothers do not work sleep more comfortably and peacefully and suffer from fewer sleeping problems.

LIMITATION OF THE STUDY

This study only included infants presenting to family healthcare centers for vaccination or well-child visits. Infants unable to come to family healthcare centers could not be accessed. Also, the study sample was confined to the infants who were aged 3-12 months, who referred to the family healthcare centers during the study period and whose mothers accepted to participate in the study. Therefore, the results of this study can only be generalized to the study sample. In addition, inability to investigate physiological changes likely to cause sleeping problems in the infants aged 3-12 months, developmental processes and medical conditions such as gastroesophageal reflux, colic, atopic dermatitis and teething can be considered as another limitation of this study.

CONCLUSION

In this study, 3-12-month-old infants were shown to sleep for a median of ten hours, wake up three times at night and stay awake for one hour. Fifty-two-point eight percent of the infants suffered from a sleeping

problem. This suggests that a notable rate of the infants face a sleeping problem. Mothers' education and behavior of putting their infants to sleep and nutrition type of infants are the factors affecting presence of sleeping problems.

PRACTICAL IMPLICATIONS

It can be recommended that pediatric nurses should routinely evaluate sleeping habits and problems of infants. They should inform mothers about safe and correct methods of putting infants to sleep and sleeping problems. In addition, they should offer counseling to mothers for solutions of sleeping problems and support for beneficial practices and inform mothers about effects of harmful practices on growth, development and health status of infants. Finally, prospective studies directed towards examining factors influencing sleeping problems in infants and experimental and quasi-experimental studies revealing methods to reduce these problems should be conducted.

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Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: *Bircan K. Berberoğlu, Hüsniye Çalışır;* ***Design:*** *Bircan K. Berberoğlu, Hüsniye Çalışır;* ***Control/Supervision:*** *Bircan K. Berberoğlu;* ***Data Collection and/or Processing:*** *Bircan K. Berberoğlu;* ***Analysis and/or Interpretation:*** *Bircan K. Berberoğlu;* ***Literature Review:*** *Bircan K. Berberoğlu;* ***Writing the Article:*** *Bircan K. Berberoğlu;* ***Critical Review:*** *Hüsniye Çalışır;* ***References and Fundings:*** *Bircan K. Berberoğlu;* ***Materials:*** *Bircan K. Berberoğlu.*

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