

EVALUATION OF SLEEP PATTERNS AND SLEEP DISTURBANCES IN CHILDREN: A PRELIMINARY STUDY IN KIRIKKALE

ÇOCUKLARDA UYKU ÖZELLİKLERİ VE UYKU BOZUKLUKLARININ DEĞERLENDİRİLMESİ: KIRIKKALE'DEN BİR ÖN ÇALIŞMA

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ÖZET

Amaç: Çalışmanın amacı, Kırıkkale'de yaşayan çocuklarda uyku düzeni ve alışkanlıklarının belirlenerek, uyku sorunlarının aydınlatılması, ailelerin uyku konusunda bilgilendirilmesidir.

Olgular ve Metod: İki ay-16 yaş arası 240 çocuk gelişme basamakları ve uyku özellikleri dikkate alınarak yaş gruplarına (2-5 ay, 6-11 ay, 12-17 ay, 18-23 ay, 2-4 yaş, 5-6 yaş, 7-10 yaş, 11-16 yaş) ayrıldı. Her gruba 30 çocuk alındı. Ebeveynler ve yedi yaş üzeri çocuklara, yüz yüze görüşme yöntemiyle uyku özellikleri, sorunları ve uykuyu etkileyebilecek faktörler hakkında çoktan seçmeli sorulardan oluşan anket yapıldı.

Bulgular: Toplam uyku süresi diğer ülkelerin verileri ile benzerdi. Odada elektromanyetik alet bulunması ile uyku düzeni ve bozukluğu arasında ilişki bulunmadı ($p>0.05$). İki yaşından büyük çocukların yaklaşık 1/3'ünün en az haftada bir kez kabus gördüğü saptandı. Uyku bozukluğu açısından, cinsiyet ve sosyoekonomik düzeyler arasında farklılık bulunmadı. En sık görülen uyku bozuklukları %8 horlama, %7 ağzı açık uyuma, %5 uykuda konuşma, %4 diş gıcırdatma, %3 horlama + apne olarak saptandı. Uyku bozukluğu olmayan çocukların okul başarısı daha yüksek olarak saptandı ($p<0.05$). Yatmadan önce diş fırçalama, kitap okuma, müzik dinleme gibi ritüelleri uygulayan annelerin eğitim düzeylerinin diğer annelere göre yüksek olduğu ($p<0.05$) ve uyku ritüelleri uygulanmayan çocuklarda okul başarısının daha düşük olduğu saptandı ($p<0.05$).

Sonuç: Ebeveynlerin çocuklarının uyku düzeni ve problemleri hakkında sorgulanması, alta yatan sorunların tespitinde önemli ip uçları verebilir. Aynı zamanda iyi uyku ve uyku hijyeni hakkında aileler bilgilendirilmelidir.

Anahtar Sözcükler: Uyku düzeni, uyku bozuklukları, çocuk

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ABSTRACT

Aim: The aim of this study was to determine the sleep patterns and habits of children in Kırıkkale to detect sleeping problems while informing the parents about sleep.

Methods: Two hundred forty children with the age range of 2 months-16 years were divided into eight groups with respect to age (2-5 months, 6-11 months, 12-17 months, 18-23 months, 2-4 years, 5-6 years, 7-10 years, 11-16 years). Each group contained 30 subjects. Parents and children older than 7 years were questioned for sleeping patterns, disorders and factors affecting their sleep by multiple-choice questions and using face-to-face interview technique.

Results: Total sleep duration was comparable with the duration of other countries. No correlation was found between the existence of electromagnetic devices in the room and the sleeping patterns and disorders ($p>0.05$). Nearly 1/3 children older than 2-years of age were found to have nightmares at least once a week. There were no differences in sleeping disorders between different genders and socioeconomic levels of the children ($p>0.05$). Sleeping disorders increased with age were snoring (8%), sleeping with open mouth (7%), talking in sleep (5%), teeth grinding (4%), snoring and apnea (3%). Children who do not have any sleeping disorders have school success higher than the others with sleeping disorders ($p<0.05$). The education levels of mothers who carry out sleep rituals including tooth brushing, reading book, listening music were higher than the other mothers ($p<0.05$) and school success of children who do sleep rituals were lower than the other children ($p<0.05$).

Conclusion: Parents should ask to their children about the sleeping patterns and disorders of the children, because this would be an important occasion to discover an underlying disorder. Furthermore, parents should be given information about sleep disorders and sleep hygiene.

Key words: Sleep patterns, sleep disorders, children

INTRODUCTION

Every living creature need sleeping for renovation though sleep characteristics in children vary both with age and influenced by ethnic and socio-cultural background (1,2). On the other hand, sleeping problems can occur in healthy children without any reason and may cause a decline in school success and affect future physical and psychological life. Thus, they must be identified and managed early (3,4). These problems can also be associated with some organic pathologies including mental retardation, blindness, asthma bronchiale, cystic fibrosis, sickle cell anemia, autism, and Tourette syndrome (5,6). The aim of this prospective study was to determine the sleep patterns and habits of children in a rural part of our country and to detect sleeping problems while informing the parents about sleep.

MATERIALS AND METHOD

A total of 240 children [51.7% girls ($n=124$), 48.3% boys ($n=116$)] with the age range of 2 months-16 years admitted to Pediatric Outpatient Departments of Kırıkkale University Hospital and Kırıkkale State Hospital for various reasons over a 6-month period were included in this study. The study was approved by the Research Ethics Committee of Kırıkkale University.

Since developmental stages and sleep properties were evaluated in this cross-sectional prospective study, the study group divided into 8 groups according to the age of the children (2-5 months, 6-11 months, 12-17 months, 18-23 months, 2-4 years, 5-6 years, 7-10 years, 11-16 years) and each group comprise 30 subjects. Children having chronic diseases or hospitalization for any reason were excluded from the study.

Table 1. Sleeping habits of the groups

Age groups	Laying position*			Breast feeding*			Pacifier use**			Application of sleep rituals			Bathing habits	
	Supine n (%)	Prone n (%)	Side n (%)	Yes n (%)	No n (%)	Mean duration months ± SD	Yes n (%)	No n (%)	Mean duration months ± SD	Regular n (%)	Irregular n (%)	Not applied n (%)	Once in a week n (%)	Twice or more in a week n (%)
2 - 5 month	14 (46.7)	7 (23.3)	9 (30)	30 (100)	-	3.4±1.1	11 (36.7)	19 (63.3)	0.9±1.3	3 (10)	8 (26.7)	19 (63.3)	16 (53.3)	14 (46.7)
6 - 11 month	8 (26.7)	8 (26.7)	14 (46.7)	28 (93.3)	2 (6.7)	7.1± 3	9 (30)	21 (70)	2.2±3.5	7 (23.3)	5 (16.7)	18 (60)	20 (66.7)	10 (33.3)
12 - 17 month	9 (30)	7 (23.3)	14 (46.7)	29 (96.7)	1 (3.3)	10.8± 4.9	11 (36.7)	19 (63.3)	4.3±6.6	2 (6.7)	10 (33.3)	18 (60)	21 (70)	9 (30)
18 - 23 month	11 (36.7)	9 (30)	10 (33.3)	29 (96.7)	1 (3.3)	11.8±7.1	6 (20)	24 (80)	3.0±6.9	6 (20)	5 (16.7)	19 (63.3)	24 (80)	6 (20)
2 - 4 years	9 (30)	9 (30)	12 (40)	28 (93.3)	2 (6.7)	13.5± 8.2	8 (26.7)	22 (73.3)	6.8±12.8	1 (3.3)	9 (30)	20 (66.7)	22 (73.3)	8 (26.7)
5 - 6 years	7 (23.3)	7 (23.3)	16 (53.3)	28 (93.3)	2 (6.7)	12.7±7.1	8 (26.7)	22 (73.3)	5.6±11.3	4 (13.3)	8 (26.7)	18 (60)	27 (90)	3 (10)
7 - 10 years	8 (26.7)	12 (40)	10 (33.3)	30 (100)	-	13.5±8.2	7 (23.3)	23 (76.7)	4.8±9.6	6 (20)	8 (26.7)	16 (53.3)	28 (93.3)	2 (6.7)
11 - 16 years	6 (20)	12 (40)	12 (40)	30 (100)	-	15.3±7.6	5 (16.7)	25 (83.3)	1.8±5.0	3 (10)	7 (23.3)	20 (66.7)	26 (86.7)	4 (13)

* During the first six months of life

** During the first year of life

After informed consent was taken, parents (mostly mothers) and children older than 7 years were questioned for sleeping properties, sleeping disorders, and other factors that could affect sleep besides sleeping disorders by multiple-choice questions and using face-to-face interview technique. Sociodemographical data were also recorded. Complete physical examination with a particular attention for tonsillar hypertrophy and adenoid vegetation was performed in all children. Each participating parent received oral and written information about properties of a good sleep, sleep rituals, and importance of sleep hygiene. All data were analyzed using the statistical package SPSS for Windows, release 12.0. Qui-square and variance (ANOVA) analysis were used for statistical analysis and a p value of ≤ 0.05 indicated statistical significance.

RESULTS

All children [51.6% girls (n=124), 48.4% boys (n=116)] were divided into 8 groups according to their ages (2-5 months, 6-11 months, 12-17 months, 18-23 months, 2-4 years, 5-6 years, 7-10 years, 11-16 years). Obesity was not observed in any of the groups. Table 1 shows the sleeping habits of the groups. Recommended supine position was performed by nearly half of the mothers' of children aged 2-5 months. This compliance decreases to 1/4 of the mothers' of children aged 11-16 years.

Exclusive breast feeding during the first 6 months of life is approximately 100% in all age groups. Nearly 1 of 3 children uses pacifiers during the first year of life in the younger age groups, whereas this ratio again decreases to 1 of 6 children in the older age groups. Application of

sleep rituals regularly was not frequent in all age groups. Most of the children in all age groups has taken a bath only once a week.

The rate of sleeping in parents' bed (33.3%) was found to be higher in the group of 18-23 months. Ninety three percent of all children included in this study were found to share their room with parents or siblings. Sharing the room was very frequent in the group of 2-5 months (96.7% with parents), whereas it was also frequent in the group of 11-16 years (80% with siblings). Existence of one or more devices emitting electromagnetic waves in the rooms was found to be 59.5% of all children included in the study. No correlation was found between the existence of electromagnetic devices in the sleeping rooms and time of going to sleep, waking frequency, and sleeping disorders ($p>0.05$) (Table 2).

found to have nightmares at least once a week (Table 4). Children having nightmares refused to go to bed and refusal rate was higher in the group of 5-6 year ($p<0.05$). These children were tired and their school success rate was lower than the other children ($p<0.05$).

In this study, sleeping disorders were increased with age (Table 4). Sleeping disorders were snoring (8%), sleeping with open mouth (7%), talking in sleep (5%), teeth grinding (4%), snoring and apnea (3%), insomnia (2.5%), enuresis (2.5%), sleep-walking (0.8%), sleep terror (0.8%). No significant difference was found between the sleeping disorders, mean body mass indexes, gender, and socioeconomic status of the children in different age groups ($p>0.05$). There were also no significant relationship between the sleeping disorders, pacifier use, and bed sharing.

Table 2. Sleeping places and the existence of electromagnetic devices in these places

Age groups	Own bed n (%)	Parents' bed n (%)	Other n (%)	Own room n (%)	Sharing the room with parents n (%)	Sharing the room with siblings n (%)	Electromagnetic devices in the room	
							Present n (%)	None n (%)
2-5 months	24 (80)	5 (16.7)	1 (3.3)	-	29 (96.7)	1 (3.3)	14 (46.7)	16 (53.3)
6-11 months	26 (86.7)	4 (13.3)	-	-	28 (93.3)	2 (6.7)	20 (66.7)	10 (33.3)
12-17 months	22 (73.3)	8 (26.7)	-	-	28 (93.3)	2 (6.7)	14 (46.7)	16 (53.3)
18-23 months	18 (60)	10 (33.3)	2 (6.7)	-	26 (86.7)	4 (13.3)	18 (60)	12 (40)
2 - 4 years	20 (66.7)	8 (26.7)	2 (6.7)	-	11 (36.7)	19 (63.3)	19 (63.3)	11 (36.7)
5 - 6 years	6 (20)	7 (23.3)	17 (56.7)	4 (13.3)	-	26 (86.7)	20 (66.7)	10 (33.3)
7 - 10 years	2 (6.7)	-	28 (93.3)	6 (20)	-	24 (80)	20 (66.7)	10 (33.3)
11- 16 years	4 (13.3)	-	26 (86.7)	6 (20)	-	24 (80)	18 (18)	12 (40)
Total	122 (50.8)	42 (17.5)	76 (31.7)	16 (6.7)	122 (50.8)	102 (42.5)	143 (59.5)	97 (40.5)

Other (sofa, temporary floor mattress)

Sleeping patterns including sleeping times during the day and night, times of going to sleep at night, waking up in the morning, regularity of sleeping at night and performance of sleep rituals of the families according to the age groups are shown in Table 3.

Thirty per cent of children at 2-4 year group, 60% of children at 5-6 year group, 40% of children at 7-10 year group, and 26.7% of children at 11-16 year group were

DISCUSSION

Sleep is an important physiological need in human life and its quality affects physical and mental health. Regulation of sleeping times in children is a part of sleep hygiene which is a neurodevelopmental process theoretically begins during infancy (2,4).

Cultural differences in practices of infant care have previously been reported (7-9). Pacifier use varied be-

Table 3. Sleeping patterns of the groups

Age groups	Total sleeping time (hrs, mean±SD)	Sleeping time during the day (hrs, mean±SD)	Sleeping time during night (hrs, mean ± SD)	Time of going to sleep at night (hrs, mean)	Time of waking up in the morning (hrs, mean)	Regularity of sleep at night	
						Regular n (%)	Irregular n (%)
2-5 months	13.7 ± 2.5	4.5 ± 2.1	9.2 ± 1.3	20:30	07:20	11(36.7)	19 (63.3)
6-11 month	12.5 ± 1.6	3.5 ± 1.5	9 ± 1.2	22:00	06:50	20 (66.7)	10 (33.3)
12-17 mont	12.5 ± 1.8	3 ± 1.1	9.5 ± 1.4	20:40	07:40	18 (60)	12 (40)
18-23 mont	12.2 ± 1.7	2.6 ± 1.2	9.7 ± 1.2	20:45	08:00	25 (83.3)	5 (16.7)
2 - 4 years	11.7 ± 1.2	1.9 ± 1.2	9.8 ± 1	22:00	08:00	23 (76.7)	7 (23.3)
5 - 6 years	10.8 ± 1.2	0.6 ± 1	10.2 ± 1	21:00	08:30	22 (73.3)	8 (26.7)
7 - 10 years	10.5 ± 2.2	0	10.5 ± 2.2	21:00	08:20	26 (86.7)	4 (13.3)
11-16 years	9.2 ± 1.2	0	9.2 ± 1.2	21:20	07:20	20 (66.7)	10 (33.3)

Table 4. Distribution of sleeping disorders with respect to age groups

Age	Normal	Snoring	Sleep apnea	Sleeping with open mouth	Bruxism	Sleep talking	Sleep walking	Insomnia	Enuresis	Sleep terror	Nightmares
2 - 5 months	27	1	-	-	NA	NA	NA	2	NA	NA	-
6 - 11 months	29	-	-	1	-	NA	NA	-	NA	NA	-
12 - 17 months	25	3	-	1	-	-	-	1	NA	-	-
18 - 23 months	24	1	2	2	-	-	-	1	NA	-	-
2 - 4 years	20	2	-	3	1	3	-	-	-	1	10
5 - 6 years	13	3	3	3	2	3	-	1	2	-	18
7 - 10 years	11	7	1	2	4	2	-	-	3	-	12
11 - 16 years	8	4	1	5	3	4	2	1	1	1	8
Total	157	21	7	17	10	12	2	6	6	2	

NA: Non applicable

tween 16.7-36.7% and the rate of pacifier use was the lowest in the older age group in our study, whereas two fold increased rate of pacifier use was reported in Turkish children living in Netherlands (7). However, the recommended supine laying position was not equally carried out in the same study.

It is known that, in some societies, co-sleeping is accepted as a traditional process and encouraged being a standard behaviour (2,10-12). However it might sometimes be used by the parents as a way for the management of a sleeping disorder (13). Bed sharing in the first 4 years of life is reported to be 6-70%, whereas it

is difficult to give a definite prevalence because of the great differences among cultures (2,10,14). In our study, bed sharing was frequent in the groups of 18-23 months (33%) and 2-4 years (27%). Only half of the children have been sleeping in their own bed and only 7% of them had their own room; which could reflect the low income of the population.

Environmental conditions like sound, light, and electromagnetic fields should be arranged for a good sleep as they inversely affect sleeping. Electromagnetic wave emitting devices (e.g. cellular phone, television, computer, etc.) are reported to have negative effects on chil-

dren. These devices may cause aggressive behaviour, decreased activity, and consuming junk food; which lead to obesity, impairment of verbal cognitive performance, and sleep disorders (2,15,16). In our study, although one or more electromagnetic devices were present in the rooms of 59.5 % of children, no correlation was found between sleeping disorders and presence of electromagnetic devices ($p>0.05$).

It is known that sleeping patterns might vary according to the age. However, a biocultural approach is warranted for sleeping. The children in our study went to bed before 22:00, woke up before 08:00 with a median total sleeping time of 9.5 hours, whereas Italian school children are reported to go to bed late and get up early (17). Half of the 3 years old Japanese children fell asleep at 22:00 or later that is the second latest time after Italian children for going to bed and they have a 9.5 ± 0.6 hour of night sleep (3). Similarly, the 3 years old children in our study have a comparable sleep onset and duration. Bharti et al reported that Indian school children with a mean age of 5.76 ± 1.89 years have 10.32 ± 1.18 hours of total sleep duration with sleep onset time at 22:00 and wake up time as 07:00 (18). Although, children with the same age in our study had similar total sleep duration, they woke up later probably due to living in a rural area. While one might suggest a negative effect of urbanization on sleep duration, which might not be the case as in a large study from Switzerland by Iglowstein et al. In that study, the sleep duration is longer for children before 7 years of age than the sleep duration of children in our study, whereas during adolescence period the pattern changes in Turkish adolescents with a mean sleep duration of 9.2 ± 1.2 hours. In adolescent age groups, a consistent decrease in sleep duration is uniformly reported in the other studies (17,19-21).

On the other hand, irregular sleeping times may also affect sleep quality including bedtime resistance, difficulty in getting into sleep, and waking up frequently. In our study, 2-18 months old babies with irregular sleeping times at night were found to result in wake up more frequently at night ($p<0.05$).

Sleeping disturbances like nightmares also causing resistance to go to sleep and problems in waking up in the morning are common in 4-12 years old children. Recent studies have found that 80% of children in this group

have nightmares at least once a month (22, 23). The highest frequency of nightmares (60%) was detected in the group of 5-6 years in our study. When children with or without nightmares were compared, children having nightmares refused to go to sleep ($p<0.05$). Nightmares of children are generally associated with a movie or a cartoon watched and it is thought that children should be avoided from elements including visual violence.

Generally sleeping disorders of arousal (parasomnias) like somnambulism (sleep walking), night terror, enuresis, and somniloquy (sleep talking) or sleeping problems of snoring, sleeping with open mouth, and bruxism (teeth grinding) are not taken into account by the parents unless asked by the doctor. In a large study from Canada, parasomnias were found to be frequent in 3-13 years old children with 78% of all children having at least one parasomnia (24). On the other hand, Agargun et al found that there were 14.4% of parasomnias in preadolescent school aged Turkish children, especially at a high rate in 9-10 years old group (25). Surprisingly, parasomnias were most frequent sleeping disorder in our adolescent group (73%), which could probably be an effect of ruralization. One or more sleeping disorders were found in 35% of the children included in this study. The most common sleeping disorders detected in this study were snoring, sleeping with open mouth, sleep talking, bruxism, and sleep apnea. Sleep apnea was at a low rate, probably due to the exclusion of adenoid vegetation and lack of obesity. It is remarkable that although we did not exclude obesity, all children in our study had normal body mass indexes which reveal the lack of obesity problem at least in this part of our country. Sleep apnea was found to be the most frequent sleeping disorder in group of 5-6 years; snoring, enuresis, and bruxism were other frequent sleeping disorders in school age children; talking in sleep was most common sleeping disorder in adolescence period. Petit et al found that sleep talking is the most frequent parasomnia in children less than 6 years old (26). We could not find a significant correlation between sleeping disorders and gender and socioeconomical level of the family consistent with the literature (27).

To our knowledge, this is the first study that shows the sleep characteristics of Turkish children in Kırıkkale. However, there are some limitations in this study. Firstly; although we tried to include numerous factors that in-

terfere with sleep, several parameters could have been missed in this study.

Secondly; information obtained here is personal measures and it is obvious that information obtained with objective methods would be more accurate. This should be performed especially for children with serious sleeping disorders. Further studies from the country and similar cultures are needed to address these issues.

In conclusion, as a current and rapidly developing field, pediatric sleep medicine deserves more attention for pediatricians. They must be sensitive and alert to ask the parents about the sleeping patterns and sleeping problems of the children, since the parents might not express this information unless they are asked. This would be an important occasion also to give information about properties of good sleep and sleep hygiene.

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