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HOW HAS THE COVID-19 PANDEMIC AFFECTED THE SLEEP OF CHILDREN AGED 6-18 YEARS?

COVID-19 PANDEMİSİ 6-18 YAŞ ARASINDAKİ ÇOCUKLARIN UYKUSUNU NASIL ETKİLEDİ?

Duygu DEMİR[1,2], Burcu SELVİ ÇALIŞKAN[2], Birsen MUTLU[3]

[1]Arş.Gör. Yalova Üniversitesi, Sağlık Bilimleri Fakültesi, Hemşirelik Bölümü, Çocuk Sağlığı ve Hastalıkları Hemşireliği Anabilim Dalı, Yalova
[2] Uzman Hemşire, İstanbul Üniversitesi-Cerrahpaşa, Lisansüstü Eğitim Enstitüsü, Çocuk Sağlığı ve Hastalıkları Hemşireliği Doktora Programı, İstanbul
[3]Doç. Dr. İstanbul Üniversitesi-Cerrahpaşa, Florence Nightingale Hemşirelik Fakültesi, Çocuk Sağlığı ve Hastalıkları Hemşireliği Anabilim Dalı, İstanbul

Abstract

Objective: This study was conducted to examine the sleep quality of children aged 6-18 years who stayed at home for an extended period during the COVID-19 pandemic.
Materials and Methods: The research was conducted in Turkey as a descriptive study with the participation of 412 mothers with children aged 6-18 years who agreed to participate. The data were collected on the internet through a questionnaire developed by the researchers using the "Google Docs" program.
Results: Of the children in the study, 51.7% were girls and their mean age was 9.86±3.21 years. Of the children, 61.7% stated that they were afraid of having COVID-19. In the study, it was determined that 63 children (17.5%) who did not have sleep problems before started to have sleep problems during this period. It was found that the rate of sleep problems in children who expressed fear and concern about the COVID-19 pandemic was higher than in children who did not have such concerns (χ^2=15.874; p<0.001). When the change in sleep problems experienced by children during the COVID-19 pandemic was compared with the pre-pandemic period, it was found that there was a statistically significant increase in the rates of difficulty in falling asleep (p<0.001), waking up frequently at night (p=0.002), not being able to wake up in the morning (p<0.001), not wanting to sleep alone (p=0.005), not wanting to sleep in the dark (p=0.005), and sleeping in the parents' bed (p=0.001).
Conclusion: It was found that children's sleep patterns changed and the rate of sleep problems increased during the COVID-19 pandemic. In this period, it is important for pediatric nurses to provide counseling and guidance to children and parents about reducing and preventing sleep-related problems, and to inform them about the guides published by relevant organizations.
Keywords: Child, Child health, COVID-19, Pandemic, Sleep

Özet

Amaç: Bu çalışma, COVID-19 salgını sürecinde uzun süre evde kalan 6-18 yaş aralığındaki çocukların uyku kalitesini incelemek amacıyla yapıldı.
Yöntem: Araştırma Türkiye'de araştırmaya katılmayı kabul eden 6-18 yaş aralığında çocuğu olan 412 annenin katılımı ile tanımlayıcı olarak gerçekleştirildi. Veriler "Google Docs" programı kullanılarak araştırmacılar tarafından geliştirilen anket formu aracılığıyla internet ortamında toplandı.
Bulgular: Araştırmadaki çocukların %51,7'si kız, yaş ortalamaları 9,86±3,21 yıldır. Çocukların %61,7'si COVID-19 olmaktan korktuğunu ifade etmiştir. Araştırmada daha önce uyku sorunu yaşamayan 63 çocuğun (%17,5) bu süreçte uyku sorunu yaşamaya başladığı saptandı. COVID-19 salgını sürecinde salgınla ilgili korktuğunu ve endişelendiğini dile getiren çocukların uyku sorunu yaşama oranlarının bu tür kaygıları olmayan çocuklardan yüksek olduğu bulundu *(χ^2=15,874; p=<0,001)*. COVID-19 salgını sürecinde salgın öncesine göre çocukların yaşadığı uyku sorunlarındaki değişim karşılaştırıldığında; uykuya dalmada güçlük çekme (p=<0,001), geceleri uykudan sık sık uyanma (p=0,002), sabahları uyanamama (p=<0,001), tek başına uyumak istememe (p=0,005), karanlıkta uyumak istememe (p=0,005), anne/babanın yatağında uyuma (p=0,001) oranlarında istatistiksel olarak anlamlı derecede yükselme olduğu bulundu.
Sonuç: COVID-19 salgını sürecinde çocukların uyku düzeninin değiştiği ve uyku sorunu yaşama oranlarının arttığı bulundu. Bu süreçte uykuya ilişkin sorunların azaltılması ve önlenmesi konusunda çocuk hemşirelerinin, çocuk ve ebeveynlere danışmanlık etmesi ve yol gösterici olması, konu ile ilgili kuruluşlar tarafından yayınlanan rehberler konusunda bilgilendirmesi önemlidir.
Anahtar Kelimeler: COVID-19, Çocuk, Çocuk sağlığı, Pandemi, Uyku

ORCID ID: D.D. 0000-0003-1245-4424; B.S.Ç. 0000-0002-1190-4924; B.M. 0000-0002-8708-984X
Sorumlu Yazar: Birsen MUTLU, Doç. Dr. İstanbul Üniversitesi-Cerrahpaşa, Florence Nightingale Hemşirelik Fakültesi, Çocuk Sağlığı ve Hastalıkları Hemşireliği Anabilim Dalı, İstanbul
E-mail: bdonmez@istanbul.edu.tr
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INTRODUCTION

The World Health Organization (WHO) provided information on pneumonia cases of unknown cause in December 2019 in Wuhan, China. On January 7th, 2020, Chinese authorities identified a new coronavirus and tentatively named it "2019-nCoV". The new virus was later named serious acute respiratory syndrome coronavirus 2 (SARS-CoV-2).” Due to the rapid increase in the number of cases outside of China, the WHO described this situation as a “pandemic” (1). With the first patient with coronavirus disease 2019 (COVID-19) seen in Turkey on March 11th, 2020, the Ministry of Health and the Ministry of National Education started to take measures against the pandemic. Some of these measures were the suspension of education as of March 16th, 2020, in all institutions and children aged under 18 years were obliged to stay at home except for limited hours (2,3). Although all these measures are very important in preventing the spread of COVID-19, it brings to mind the concern that prolonged stay at home may adversely affect the physical and psychological health of children (4,5).

Sleep is very important for child and adolescent health. Insufficient and non-restful sleep negatively affects the immune system and cognitive functions of individuals, especially children (6,7). Disruption of sleep patterns can be in different forms such as difficulty in trasitioning to and falling asleep, frequent interruption of sleep, and inability to sleep again (6-8). The sleep process can be affected by psychological, physiologic, and environmental factors (9). Therefore, the potential for the emergence of sleep problems or the worsening of existing problems during the pandemic period is high (9,10). In addition, due to staying at home and not going to school for an extended period, children's sleeping and waking times may change. This can negatively affect sleep patterns. Decreased peer relations, more phone and social media use, especially in adolescents, may also affect sleep patterns (9). The European Cognitive Behavioral Therapy for Insomnia Academy (European CBT-I Academy) made recommendations, especially for mothers and children in the guide, for coping with sleep problems when obligated to stay at home (10). They stated that the pandemic period could be particularly challenging for children and adolescents, and they might experience sleep-related and cognitive problems. In this period, it is recommended that parents provide sleep hygiene, draw attention more positively to reducing children's stress, exhibit attitudes towards reducing stress, and be role models for their children (10,11).

The Centers for Disease Control and Prevention reported the incidence of COVID-19 in children aged 5-17 years was 10.3% and the death rate was 0.1% (12). Although COVID-19 is less common in children than in adults and the elderly, most infected children are asymptomatic (11-13). Although children are not seriously infected with the virus physically, children's daily routines may be affected due to the closure of schools, long-term confinement at home, reduced exposure to daylight, increased use of digital media devices, and decreased physical activity, causing changes in their mood, behavior, and sleep patterns (5,7,9). It is very important to understand the emotions and reactions of children to meet their needs (11). In the literature, in children who had to stay at home, in addition to psychological symptoms such as difficulty in concentration, feelings of loneliness, stress, inattention, and anxiety (13-16), changes in sleep patterns and circadian rhythms were also reported (15,16). During the obligatory stay-at-home period, changes such as going to bed later and getting up later, increasing the time spent in bed, and difficulty in falling asleep occurred in children's sleep patterns (15). When all these reasons are considered, especially during the pandemic period when stress levels are high, children who spend the whole day at home increase their need for sleep and rest, but possible sleep problems require attention. It is very important for pediatric nurses to know the importance of sleep in the development of children, to evaluate sleep, to create a nursing plan to solve problems, and to give advice to parents.

Despite the rapid increase in the literature examining the effects of COVID-19 and the obligation to stay at home on children's sleep habits (4,6,15-18). There are insufficient studies with large numbers of patients examining the sleep habits of children in Turkey before and during the pandemic. The life patterns of children who could not go to school and had to stay at home for an extended

period due to the COVID-19 pandemic changed, and this caused children to experience anxiety. This study was planned to examine the sleep patterns of children aged 6-18 years during the COVID-19 pandemic.

In line with the purpose of the study, answers to the following questions were sought:

• Has the process of the COVID-19 pandemic seen sleep problems in children?

• What are the sleep problems seen in children during the COVID-19 pandemic?

• What are the causes of sleep problems in children during the COVID-19 pandemic?

• What are the measures taken by children/parents to address sleep problems during the COVID-19 pandemic?

MATERIALS AND METHODS

This study was planned as a descriptive study to examine the sleep quality of children aged 6-18 years during the COVID-19 pandemic. The study was conducted on the internet with the survey method between July and August 2020 (2 months).

The population of the study consisted of mothers with children aged 6-18 years living in Turkey. No sample calculation was made in the study; a sample of 412 mothers with children aged 6-18 years was formed to whom questionnaires were able to be sent via an online link with the "Google Docs" program.

Inclusion Criteria:

• Mothers with children aged 6-18 years who could speak Turkish and volunteered to participate in the study

• Mothers who knew how to use the internet and could be reached online

Data Collection Tools

In the data collection, a 39-question “Data Collection Form” was used, which was created by the researchers based on the literatüre (8,19), questioning the socio-demographic characteristics of the parents and children and the sleep quality of the children between the pre-COVID-19 pandemic period and during the pandemic. An “Informed Voluntary Consent Form” was sent to the mothers along with the survey. The participants answered the questions 'before' the pandemic by retrospective recollection.

Data Collection Method

After obtaining permission from the Ministry of Health Scientific Research Studies Commission on COVID-19 and Haliç University Non-Interventional Clinical Research Ethics Committee (Decision No: 26/06/2020-105), the online link of the questionnaire form was sent to social media groups or to phones via WhatsApp (the snowballing method) between July and August 2020. We shared a text with general information about the study and a link to the survey. In the first step of the survey, the respondents had to read a full description of the study and explicitly agree to participate through an online informed consent form. In the questionnaire, an "I have read the Informed Volunteer Participation Form explained above. I agree to participate in the study” statement was included and mothers who marked “Yes” in response to this statement were considered to have approved to participate in the study. Thus, consent was given online and the questionnaire was completed by the mothers according to their statements. The time required to complete the online survey was approximately 5 minutes.

Evaluation of Data

The Statistical Package for the Social Sciences (SPSS) package program version 25.0 (IBM Corp., Armonk, NY, USA) was used for the statistical analysis of the data. In addition to descriptive statistical methods (number, percentage, mean, standard deviation) when evaluating the study data, the independent sample t-test was used in quantitative comparisons between groups, Chi-square tests (Pearson’s test, continuity correction, Fisher's exact test) were used in categorical comparisons, and the McNemar test (categorical comparisons) and the dependent sample t-test (quantitative comparisons) were used in repeated measurements. The results were evaluated at the 95% confidence interval and the significance level was accepted as $p<0.05$.

Ethical Aspect

All procedures performed in studies involving human participants comply with the 1964 Declaration of Helsinki and the ethical standards and subsequent amendments of the institutional and/or national research

committee. Before the study, the necessary permissions were obtained from the Scientific Research Studies Commission of the Turkish Ministry of Health on COVID-19 (dated 10.06.2020 and numbered 2020-06-10T01_21_44) and the Haliç University Non-Interventional Clinical Research Ethics Committee (Decision No: 26/06/2020-105). In addition, an "Informed Volunteer Consent Form" was sent to mothers along with the questionnaire form. At the beginning of the questionnaire "I read the Informed Volunteer Consent Form described above. Those who marked "Yes" box in "I agree to participate in the study" section was deemed to have approved the informed volunteer consent form. The identity information of individuals is not shared in any way.

RESULTS

The study was conducted with 412 mothers with children aged 6-18 years in Turkey between July and August 2020.

Of the children, 51.7% were girls and the mean age was 9.86±3.21 years. The mean age of the mothers was 39.72±5.18 years, and the mean age of the fathers was 42.79±5.55. Of the families, 87.1% were nuclear families. Before the curfew, 60% of mothers and 96% of fathers were working. During the restriction period, 28.2% of mothers and 57.8% of fathers continued working at their place of work.

In the study, 80% of the children watched news/discussion programs about the COVID-19 pandemic, 64.7% expressed their fear/concern about the COVID-19 pandemic through behaviors or verbally, 57.8% stated that they or their family were afraid of getting sick due to the COVID-19 pandemic, and 61.7% were afraid of being infected with COVID-19 (Table 1).

In the study, it was found that 63 (17.5%) children who did not have sleep problems before started to have sleep problems during this period. It was found that the rate of having sleep problems during the pandemic period was statistically significantly higher in children who expressed fears and concerns about the pandemic through words or behaviors (n=233, 64.7%) than in children who did not express fears and concerns (n=127, 35.3%) (23.6% vs. 6.3%), (χ2=15.874; p<0.001) (Table 1).

Table 1. The Distribution of Children's Sleeping Problems During the COVID-19 Pandemic and Associated Characteristics (n=360)

		Sleep Problems in the COVID-19 Pandemic			
	Total	**Yes (n=63)**	**No (n=297)**	***Significance***	
Expressions	**n (%)**	**n (%)**	**n (%)**	***t/χ²***	***p***
Child's status of following news/discussions about the COVID-19 pandemic					
Yes	288 (80.0)	51 (17.7)	237 (82.3)	0.001[a]	0.972
No	72 (20.0)	12 (16.7)	60 (83.3)		
The child's verbal or behavioral expression of fear/concern about the COVID-19 pandemic					
Yes	233 (64.7)	55 (23.6)	178 (76.4)	**15.874[a]**	**<0.001***
No	127 (35.3)	8 (6.3)	119 (93.7)		
The child's level of anxiety about the the COVID-19 pandemic (0-10 points) (Mean±SD)	6.31±2.16	6.64±2.07	6.21±2.18	1.289[b]	0.199
The child's expression of fear that he/she or his/her family will become ill due to the COVID-19 pandemic					
Yes	208 (57.8)	41 (19.7)	167 (80.3)	1.326[a]	0.250
No	152 (42.2)	22 (14.5)	130 (85.5)		
The child's need for professional psychological support during the COVID-19 pandemic					
Yes	8 (2.2)	3 (37.5)	5 (62.5)	-[a]	0.149
No	352 (97.8)	60 (17.0)	292 (83.0)		

*****: p<0.05; a(**χ^2**) = Chi-square test; **b(*t*)** = Independent samples t-test

It was determined that a total of 102 children had sleep problems; 39 of the 52 children who had sleep problems before COVID-19 continued to have sleep problems during the COVID-19 pandemic, and 63 children started to have sleep problems during the pandemic. It was found that there was a statistically significant difference between the rate of children having sleep problems during the COVID-19 pandemic and pre-COVID-19 period [pre-COVID-19: 12.6% (n=52) vs. COVID-19 period: 24.8% (n=102)] based on the McNemar test results (χ^2=31.592; p<0.001) (Table 2).

When the types of sleep problems experienced by children and their change compared with the pre-pandemic period were examined, it was determined that the rate of children having difficulty falling asleep increased from 6.8% to 17% (p<0.001), the rate of waking up frequently at night increased from 2.7% to 6.8% (p=0.002), the rate of not waking up in the morning increased from 2.2% to 9.2% (p<0.001), the rate of not wanting to sleep alone increased from 7.5% to 12.1% (p=0.005), the rate of not wanting to sleep in the dark increased from 3.2% to 7% (p=0.005), and the rate of sleeping in the parent's bed increased from 5.3% to 10.2% (p=0.001), all of which were statistically significant (Table 2).

Table 2. Comparison of Children's Sleep Problems Before and During the COVID-19 Pandemic (N=412)

	Before COVID-19	**During COVID-19**	***Significance***	
Features	**n (%)**	**n (%)**	χ^2	***p***
Child feeling sleepy during the day	38 (9.2)	52 (12.6)	3.250	0.071
Child daytime sleeping	29 (7.0)	32 (7.8)	-[a]	0.690
Having sleep problems	52 (12.6)	102* (24.8)	31.592	**<0.001****
Child's sleep problems				
Difficulty falling asleep	28 (6.8)	70 (17.0)	31.130	**<0.001****
Frequent waking at night	11 (2.7)	28 (6.8)	9.481	**0.002****
Talking during sleep and waking up with nightmares	5 (1.2)	8 (1.9)	-[a]	0.549
Not being able to wake up in the morning	9 (2.2)	38 (9.2)	25.290	**<0.001****
Not wanting to sleep alone	31 (7.5)	50 (12.1)	7.902	**0.005****
Not wanting to sleep in the dark	13 (3.2)	29 (7.0)	8.036	**0.005****
Asking someone to wait until they fall asleep	24 (5.8)	32 (7.8)	1.750	0.186
Asking parent to sleep next to them	29 (7.0)	34 (8.3)	0.552	0.458
Sleeping in parent's bed	22 (5.3)	42 (10.2)	10.618	**0.001****
Bed wetting at night	0 (0)	2 (0.5)	-	-

***** Of the total 102 children who had sleep problems, 39 had problems before COVID-19 and continued during the pandemic, and 63 children started to have new sleep problems during the pandemic

******: p<0,05; χ^2= McNemar Test**; a=** The binomial distribution was used.

Table 3. Comparison of Children's Sleep Problems Before and During the COVID-19 Pandemic

	Before COVID-19	**During COVID-19**	***Significance***	
Features	**n (%)**	**n (%)**	χ^2	***p***
Ways to fix the child's sleep problems				
Watching TV	5 (1.2)	11 (2.7)	-[a]	0.070
Listening to music	10 (2.4)	22 (5.3)	-[a]	**0.004***
Getting up and walking	2 (0.5)	7 (1.7)	-[a]	0.125
Taking sleeping pills	0 (0)	0 (0)	-	-
Drinking warm drinks	7 (1.7)	16 (3.9)	-[a]	**0.035***
Chatting	29 (7.0)	60 (14.6)	20.930	**<0.001***
Reading	28 (6.8)	59 (14.3)	19.149	**<0.001***
Making the room dark	13 (3.2)	25 (6.1)	-[a]	**0.023***
Providing dim light with night light	25 (6.1)	36 (8.7)	3.448	0.063
Taking a hot shower	6 (1.5)	18 (4.4)	-[a]	**0.004***
I am not implementing a method	7 (1.7)	14 (3.4)	-[a]	0.092

*: p<0.05; χ^2 = McNemar Test**; a** = Binomial distribution was used.

When the change rates of the parents' methods of solving the sleep problems experienced by their children compared with the pre-pandemic period were examined, it was determined that the rate of having the child listen to music increased from 2.4% to 5.3% (p=0.004), the rate of drinking warm drinks increased from 1.7% to 3.9% (p=0.035), the rate of reading a book to or with the child increased from 6.8% to 14.3% (p<0.001), the rate of taking a hot shower before going to bed increased from 1.5% to 4.4% (p=0.004), the rate of chatting with the child increased from 7% to 14.6% (p<0.001), and the rate of ensuring that the room where the child slept was dark increased from 3.2% to 6.1% (p=0.023), all of which were statistically significant (Table 3).

Table 4. Sleep Time of Children Before and During the COVID-19 Pandemic (N=412)

	Before COVID-19	**During COVID-19**	***Significance***	
Children's Sleep Times	**Mean±SD**	**Mean±SD**	***t***	***p***
Weekday bedtime	22:17±1:34	23:38±1:35	20.766	**<0.001***
Weekend bedtime	23:04±1:39	24:16±1:33	14.367	**<0.001***
Time to fall asleep at night (min)	17.42±10.77	25.41±24.89	7.515	**<0.001***
Weekday wake up time	8:28±1:06	9:45±1:54	18.777	**<0.001***
Weekend wake up time	9:31±1:23	10:33±1:55	11.170	**<0.001***
Total sleep time per night (hours)	9.31±1.15	9.67±3.97	1.839	0.067

:** p<0.05; ***t = İndependent t-test

It was observed that the average bedtime of the children increased from 22:17±1:34 to 23:38±1:35 on weekdays (t=20.766; p<0.001), the average bedtime of the children increased from 23:04±1:39 to 24:16±1:33 on weekends (t=14.367; p<0.001), the average weekday waking time of children increased from 8:28±1:06 to 9:45±1:54 (t=18.777; p<0.001), and the average weekend time in bed of children increased from 9:31±1:23 hours to 10:33±1:55 hours

(t=11.170; p<0.001) during the pandemic compared with before the pandemic (Table 4). It was found that the mean time of falling asleep in children before the pandemic statistically significantly increased from 17.42±10.77 to 25.41±24.89 minutes during the pandemic (t=7.515; p<0.001).

The average daily nighttime sleeping time of children before the pandemic increased from 9.31±1.15 hours to 9.67±3.97 hours during the pandemic, but this difference was not statistically significant (t=1.839; p=0.063) (Table 4).

Table 5. Causes of Child's Sleep Problems During COVID-19 Pandemic According to Parents

Reasons for the child's sleep problems during the COVID-19 pandemic*	**n (%)**
Inability to expend energy during the day	66 (16.0)
Using the phone/internet for a long time	66 (16.0)
Not going to school	59 (14.3)
Obligation to stay at home	54 (13.1)
Watching television for a long time	32 (7.8)

*: More than one option was marked.

According to the parents, it was determined that the most common causes of sleep problems experienced by the child during the COVID-19 pandemic were the child's inability to use energy during the day (16%) and long-term phone/internet use (16%) (Table 5).

DISCUSSION

The study was planned as a descriptive study to examine the sleep quality of children between the ages of 6-18, who had to stay at home in Turkey during the COVID-19 pandemic.

It was determined that 61.7% of the children in the study expressed to their parents that they were afraid of being infected with COVID-19. Orgilés et al. (2020) (16) showed that 23.1% of children aged 3-18 years were afraid of being infected with COVID-19. There may be many reasons why this rate was lower than in our study. Many situations such as statements made to children and watching the news about COVID-19 alone can cause children to be negatively affected by the pandemic. In our study, it was determined that 80% of the children watched news-talk programs about COVID-19.

In the study, the rate of sleep problems of children who expressed fear and anxiety about the COVID-19 pandemic was higher than those who did not express such concerns (Table 1). It was found that children who did not have sleep problems before, started to have sleep problems during the COVID-19 pandemic. Casagrande et al. (2020) (17) reported that women and younger people who reported fear of being infected with COVID-19 were more prone to sleep disturbances and feeling anxiety. Idoiaga et al. (2020) (13) reported that especially older children (6-12 years) were worried about the transmission of COVID-19, and they were more concerned about the transmission of COVID-19 to their grandparents.

During the COVID-19 pandemic, the rate of children having sleep problems was higher than before the pandemic. The data revealed that the children had difficulty falling asleep, woke up frequently at night, could not wake up in the morning, did not want to sleep alone, did not want to sleep in the dark, and wanted to sleep in their parents' bed (Table 2). Similar to our study, Bruni et al. (2021) (20) found that sleep disorders increased in other age groups, except for adolescents, in their

study on children aged 1-18 years. They also stated that difficulties in falling asleep, having anxiety before going to bed, waking up at night, having nightmares, and daytime sleepiness were also increased. In their study, Yurteri and Sarıgedik (2021) (21) stated that during the pandemic, children experienced sleep problems such as not being able to sleep, going to bed late, waking up at night, feeling sleepy during the day, and that the COVID-19 outbreak might affect their sleeping habits and quality of life. Orgilés et al. (2020) (16) also reported that children were afraid of sleeping alone. Dellagiulia et al. (2020) (18) stated that there were changes in the sleep patterns of children aged 3-6 years due to the COVID-19 pandemic and that sleep quality was adversely affected. In the study of Pisano, Galimi, and Cerniglia (2020) (22), in which they examined the effect of the COVID-19 pandemic on children aged 4-10 years, about 20% experienced sleep problems such as difficulty falling asleep and waking up frequently, and around one-quarter of the children slept in their parents' bed. According to the results of our study, it was seen that many similar problems related to sleep were experienced in children during the COVID-19 pandemic.

Considering the change rates of parents' methods of solving the sleep problems experienced by their children during the COVID-19 pandemic, compared with the pre-pandemic period, the rates of using methods of making the child listen to music, drinking warm drinks, chatting, reading, keeping the room dark, and taking a hot shower before going to bed increased (Table 3). Jiao et al. (2020) (11) reported that parents used methods of playing media entertainment, physical exercise, and reading entertainment to relieve their children's anxiety during the pandemic. It is thought that attempts to fall asleep may be affected by parental attitudes, child's preferences, and cultural differences.

In the study, significant changes were observed in the sleep habits of children during the COVID-19 pandemic, such as going to bed later on weekdays and weekends, waking up later in the morning, and having a prolonged time to falling asleep compared with the pre-pandemic period (Table 4). This change may be associated with the inability of children to fulfill their daily routines such as going to school/park and not being able to spend energy adequately at home. Similar to our study; Cellini, Di Giorgio, Mioni, and Di Riso (2021) (15) conducted a study on children aged 6-10 years, and Di Giorgio et al. (2021) (4) on children aged 2-5 years, and they found that children went to bed later, twoke up later, and their sleep quality decreased during the pandemic period. Liu et al. (2021) (6) conducted a study on children aged 4-6 years, Lim et al. (2021) (7) on children aged 3-16 years, and Bruni et al. (2021) (20) on children aged 1-18 years and they stated that children went to bed later and woke up later during the COVID-19 pandemic. These data were similar to our findings. The reason why no difference was found between bedtime and wake-up time in the study of Shinomiya et al. (2021) (23) on children aged 18-30 months during the pandemic period might be because the children were younger and did not go to school. However, in that study, the time to falling asleep was prolonged, similar to our results.

Although there were changes in the sleep habits of children before the COVID-19 pandemic, and the daily sleep time was increased, no statistically significant difference was found (Table 4). Similar to our study, Eyüboğlu et al. (2021) (24) stated that children and their families slept later than before COVID-19, but there was no change in the daily sleep duration and the time to falling asleep after going to bed. Shinomiya et al. (2021) (23) also reported that there was no change in sleep duration in their study. By contrast, Cellini, Di Giorgio, Mioni, and Di Riso (2021) (15) conducted a study on children aged 6-10 years, Liu et al. (2021) (6) on children aged 4-6 years, and Lim et al. (2021) (7) on children aged 3-16 years, and they reported that the duration of sleep increased

statistically during the COVID-19 pandemic, whereas Orgilés et al. (2020) (16) reported that the sleep duration of children aged 3-18 years decreased. The different assessment tools used and the fact that the studies were conducted in different age ranges might explain these differences.

According to the parents in the present study, it was determined that the most common causes of sleep problems experienced by the child during the COVID-19 pandemic were the child's inability to spend energy during the day and long-term phone/internet use (Table 5). Similarly, in the study by Lim et al. (2021) (7), parents stated that the first three factors affecting children's sleep were the absence of time waking for school, time going to and from school, and the increase in internet use. Shinomiya et al. (2021) (23) stated that the duration of use of phones and watching TV increased and this might have impacted the sleep latency of children.

To cope with sleep problems in the COVID-19 pandemic, European CBT-I Academy recommended that children went out in the sun, performed exercise, did relaxing activities before going to bed, limited the use of media, did not use the bed for activities other than sleeping (e.g. eating, playing, doing homework), and especially complied with regular sleep times (10).

Limitations

The study was limited to the number of participants who could be reached on the internet. Therefore, the fact that the study findings cannot be generalized to the whole population is the limitation of the study.

Conclusion and Recommendations

During the COVID-19 pandemic, the children in the present study started to have sleep problems at a very high rate, there was an increase in sleep problems, children who expressed their fear/worry about the COVID-19 pandemic through behaviors or verbally had more sleep problems, and there were changes in bedtime and wake-up times. In the opinion of mothers, many factors related to the COVID-19 pandemic caused children to have sleep problems.

These results are important in terms of revealing the sleep problems experienced by children who spend all day at home during the pandemic when stress levels are high. Pediatric nurses have important roles for children to return to the pre-pandemic routine regarding sleep. Pediatric nurses should provide holistic care to the child and parents and guide parents within the scope of family-centered care. In this context, pediatric nurses should also question the child's sleep status while taking a story during diagnosis and advise the child and parents if they are at an age to understand. These recommendations may be aimed at improving the child's sleep status or solving the problem they are experiencing. In children who have sleep problems, first of all, the factor causing the problem (looking at the screen for a long time, phone, etc.) should be tried to be eliminated. In this process, parents must listen to their children and inform them correctly about their concerns about the pandemic. In addition, it may be recommended to limit the child's phone/television and internet use, to do educational activities with the child, to do indoor activities to relieve their energy, and to plan outdoor activities during the hours outside restrictions. It is thought that it would be beneficial for all health disciplines dealing with child health to follow the recommendations of the relevant societies/organizations, to inform children and parents about this issue, and guide them to get help when necessary in terms of reducing and preventing sleep-related problems, which are very important for children's health. In future studies, it is recommended to research the solution of detected sleep problems.

Conflicts of interest

The authors declare that they have no conflict of interest.

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