



IN THE SHADOW OF COVID-19: THE RELATIONSHIP BETWEEN SLEEP AND EMOTION IN SCHOOL-AGED CHILDREN

COVID-19'UN GÖLGESİNDE: OKUL ÇAĞI ÇOCUKLARINDA UYKU VE DUYGU İLİŞKİSİ

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Abstract

This descriptive and analytical study was conducted to determine the relationship between sleep patterns and emotional states of school-age children during the global pandemic. The sample of this descriptive and cross-sectional study consisted of 407 volunteer parents whose children were enrolled in a primary school in a province in the Western Black Sea Region. Data were collected online using the "Demographic Information Form," the "Children's Sleep Habits Questionnaire," and the "Strengths and Difficulties Questionnaire." The mean score for the Strengths and Difficulties Questionnaire was 16.69 ± 5.77 , while the mean score for the Sleep Habits Questionnaire was 57.31 ± 10.88 . Regarding the age variable, it was found that the 9-year-old group had significantly higher scores on both scales ($p < 0.001$). Children with low academic achievement demonstrated higher scores compared to those with moderate or high achievement levels ($p < 0.05$). Furthermore, a significant positive association was observed between increased emotional difficulties and heightened sleep-related problems ($F = 421.191$; $p < 0.05$). It was concluded that the pandemic period was associated with challenges in children's sleep hygiene and emotional well-being. These findings highlight the importance of implementing psychosocial protective measures and supportive nursing interventions during crisis periods to enhance children's health outcomes.

Keywords: Behavioral responses, Emotional well-being, Psychosocial impact, School-age children, Sleep pattern

Öz

Tanımlayıcı ve analitik nitelikteki bu araştırma, küresel salgın sürecinde ilkökul çağındaki çocukların uyku paternleri ile duygusal durumları arasındaki ilişkiyi belirlemek hedefiyle yürütülmüştür. Araştırmanın örneklemini, Batı Karadeniz Bölgesi'ndeki bir ilin merkez ilçesindeki bir ilkökulda kayıtlı çocukları olan 407 gönüllü ebeveyn oluşturmıştır. Veriler, "Sosyodemografik Bilgi Formu", "Çocuklarda Uyku ve Uyku Alışkanlıkları Anketi (ÇUAA)" ve "Güçler ve Güçlükler Anketi (GGA)" kullanılarak çevrimiçi ortamda toplanmıştır. Katılımcıların Güçler ve Güçlükler Anketi puan ortalaması 16.69 ± 5.77 ; Çocuk Uyku Alışkanlıkları Anketi puan ortalaması ise 57.31 ± 10.88 olarak saptanmıştır. Yaş değişkenine göre 9 yaş grubundaki çocukların her iki ölçekten de anlamlı derecede yüksek puan aldığı belirlenmiştir ($p < 0.001$). Okul başarısı düşük olan çocukların puanlarının, başarı düzeyi orta ve iyi olan akranlarına kıyasla istatistiksel olarak daha yüksek olduğu bulunmuştur ($p < 0.05$). Ayrıca, çocukların duygusal güçlük düzeylerindeki artışın, uyku sorunlarındaki artışla ilişkili olduğu tespit edilmiştir ($F = 421.191$; $p < 0.05$). Pandemi döneminin çocukların uyku hijyeni ve ruhsal iyi oluş halleriyle ilişkili olduğu belirlenmiştir. Bu bulgular, kriz dönemlerinde çocuklara yönelik koruyucu psikososyal stratejilerin ve destekleyici hemşirelik girişimlerinin geliştirilmesinin gerekliliğini ortaya koymaktadır.

Anahtar Kelimeler: Davranışsal tepkiler, Duygusal iyi oluş, Okul çağı çocukları, Psikososyal etki, Uyku düzeni

1. Introduction

Coronavirus disease (COVID-19), defined as a global pandemic by the World Health Organization (WHO) on March 11, 2020, is a large-scale health crisis resulting from the respiratory transmission of the SARS-CoV-2 virus (World Health Organization [WHO], 2022). The process, which began with cases first identified in a live animal market in Wuhan, rapidly spread worldwide and evolved into one of the most critical public health challenges in modern history (Ministry of Health of the Republic of Turkey, 2022). The COVID-19 pandemic not only threatened the physical health of individuals but also disrupted socioeconomic balances and psychosocial dynamics, profoundly shaking the quality of life and daily routines of people across all age groups (Üstüner Top & Cam, 2021).

Restrictions implemented during the pandemic, social isolation, and the temporary closure of schools disrupted the daily routines and social interactions of children in particular, negatively impacting their psychological health and development. During this period, children were confronted with increased anxiety, stress, and mood disorders (Orrù et al., 2020). Furthermore, pandemic conditions created distinct changes in the sleep habits of primary school-aged children; quarantine and isolation, altered daily routines, heightened anxiety, and increased digital media use negatively affected sleep duration, quality, and sleep hygiene (Akoğlu & Karaaslan, 2020; Zreik et al., 2021). Sleep problems significantly threaten mental health during this period by directly affecting children's mood, learning processes, and overall psychosocial well-being.

This study was conducted to examine the relationship between sleep habits and emotional states in primary school students during the pandemic process. The research specifically aims to reveal the dimensions of this relationship and to establish a scientific foundation for interventions supporting the mental health of primary school-aged children during crisis periods such as pandemics (Liu et al., 2021). Thus, the study both contributes to the academic literature and holds importance in terms of developing applied recommendations aimed at preserving the psychosocial well-being of primary school students. Although there are studies in the literature examining sleep and emotional-behavioral problems in primary school children on the basis of single variables, it is observed that studies revealing the extent to which these two constructs predict each other and how they interact with specific sociodemographic risk factors through a holistic model especially in the period following massive crisis periods such as global pandemics within a large sample group remain limited. By addressing

this literature gap, the present study aims to provide evidence-based data regarding the mental health and sleep hygiene of primary school children in the post-pandemic period, as well as to offer practitioners and field personnel a unique framework for identifying at-risk groups of children. This research possesses unique value in that it reveals the relationship between sleep problems and emotional-behavioral difficulties in primary school-aged children during the pandemic with empirical data in a simultaneous and large sample group, providing an empirical foundation for preventive nursing interventions.

1.1. Research Questions

- What are the levels of sleep habits and emotional-behavioral difficulties among primary school students during the COVID-19 pandemic?
- Is there a significant difference in the sleep habits and emotional-behavioral difficulty levels of primary school students according to their sociodemographic characteristics (age, gender, grade level, academic achievement, etc.)?
- Is there a significant relationship between the sleep habits and emotional-behavioral difficulty levels of primary school students?

2. Materials and Methods

2.1. Type of the Study

The study was designed as a descriptive and cross-sectional study to examine the relationship between sleep habits and emotional states of primary school students during the COVID-19 pandemic process.

2.2. Study Location

The study was conducted at a primary school located in the central district of a province in the Western Black Sea Region.

2.3. Population and Sample of the Study

The population of the study consisted of parents of students enrolled in a primary school in the central district of a province in the Western Black Sea Region (N = 569). The sample size and adequacy of the study were calculated based on the population size using the G*Power (v3.1.9.7) software. As a result of the analysis, the minimum sample size required to obtain reliable results at a significance level of $\alpha = 0.05$, a statistical power of 95% (power = 0.95), and a medium effect size ($d = 0.25$) was determined to be 230. The sample of the study comprised 407 parents who were reached among the parents of students attending a primary school in this central district using the snowball sampling technique a non-probability sampling method who volunteered to participate in the study and met the

inclusion criteria. Thus, the targeted minimum sample size was significantly exceeded, reaching 71.5% of the population and ensuring high statistical power for the study. The inclusion criteria were defined as: having a child at the primary school level (grades 1–4), volunteering to participate in the study, and completely filling out the digital data collection form.

2.4. Data Collection

Study data were collected between June 21, 2021, and December 31, 2022, using an online survey technique. The snowball sampling technique was used while structuring the sample group. In the first stage, the online survey link was delivered by the researchers to an initial group of parents with children in the primary school where the study was conducted; subsequently, these parents were asked to forward the form to other parents with children studying at the same school, thereby reaching the target sample group in a chain manner. The voluntary nature of the study was conveyed to the participants, and electronic informed consent was obtained. To prevent missing data in the dataset, answering all questions was set as a mandatory criterion in the digital form, thereby preserving the completeness of the dataset and the reliability of the results. The data collection instruments used in the study are detailed below.

2.4.1. Sociodemographic Information Form:

To determine the basic characteristics of the participants and their children, the Sociodemographic Information Form was prepared by the researchers through a review of the relevant literature (Akoğlu & Karaaslan, 2020; Üstüner Top & Cam, 2021). This form consists of a total of 13 questions covering information such as the parents' age, occupation, educational attainment, and income level, as well as the children's age, gender, and academic achievement.

2.4.2. Strengths and Difficulties Questionnaire (SDQ):

The Strengths and Difficulties Questionnaire was developed by Robert Goodman (1997) to evaluate emotional and behavioral problems in children, and its Turkish validity and reliability study was conducted by Güvenir et al. (2008). Although named a "questionnaire" in the literature, it is a Likert-type scale with proven psychometric properties. The scale is designed to be completed by the parents of children aged 3–17 years. Consisting of a total of 25 items, the scale comprises 5 subscales: Emotional Problems, Conduct Problems, Hyperactivity/Inattention, Peer Relationship Problems, and Prosocial Behavior. By summing the scores of the 4 subscales excluding the Prosocial Behavior subscale a "Total Difficulties Score"

ranging from 0 to 40 is obtained. In the scale evaluation, cut-off scores are classified as "normal" for 0–13 points, "borderline" for 14–16 points, and "clinically abnormal" for 17–40 points. In the adaptation study by Güvenir et al. (2008), the internal consistency coefficient of the parent form was reported as 0.73. In this study, the Cronbach's alpha internal consistency coefficient for the SDQ Total Difficulties Score was calculated as 0.80.

2.4.3. Children's Sleep Habits Questionnaire (CSHQ):

The Children's Sleep Habits Questionnaire was developed by Owens et al. (2000) to evaluate the sleep habits and potential sleep problems of school-aged children, and its Turkish validity and reliability study was conducted by Fiş et al. (2010). Although referred to as a "questionnaire" in the literature due to its original name, "Children's Sleep Habits Questionnaire (CSHQ)", it is a standard Likert-type scale with proven psychometric properties. The questionnaire consists of a total of 8 subscales and 33 items: Bedtime Resistance, Sleep Onset Delay, Sleep Duration, Sleep Anxiety, Night Wakings, Parasomnias, Sleep-Disordered Breathing, and Daytime Sleepiness. The scale, which uses a 3-point Likert format asking parents to recall the past week, yields a "Total Sleep Score" from the sum of the item scores. A score of 41 or above on the scale is considered to indicate the "presence of a clinically significant sleep problem". In the Turkish validity and reliability study, the Cronbach's alpha internal consistency coefficient was reported as 0.78. In the present study, the overall internal consistency coefficient (Cronbach's alpha) of the scale was calculated as 0.904.

2.5. Data Analysis

In the analysis stage, SPSS for Windows, Version 25.0 software was utilized. While continuous variables were presented as mean $\pm$ standard deviation ($X \pm SD$), categorical data were expressed as frequencies and percentages (%). The compliance of variables with normal distribution was evaluated by examining the skewness and kurtosis coefficients. Referencing Tabachnick and Fidell (2013), skewness and kurtosis values ranging between -1.5 and +1.5 were accepted as sufficient for the normal distribution assumption. In the analysis, the skewness value for the CSHQ was found to be 0.007 with a kurtosis value of -0.601; the skewness value for the SDQ was 0.044 with a kurtosis value of 0.005, determining that the data exhibited a normal distribution.

2.6. Ethical Considerations of the Study

Prior to the study, written approvals were obtained from the Zonguldak Bülent Ecevit University Non-Invasive Clinical Research Ethics Committee (Date:

18.06.2021, Number: 49795) and the relevant institution. Necessary permissions for the scale usage were secured through official correspondence. In this research, where data were collected online, electronic informed consent was obtained via the "Informed Consent Form" integrated into the first page of the digital survey form (Google Forms). The purpose of the study, data confidentiality, and the voluntary nature of participation were explicitly explained to the participants; the process was conducted by granting access to the survey questions only to parents who selected the "I agree to participate in the study" option at the beginning of the form.

3. Results

It was determined that the mean age of the parents included in the study was 34.99 ± 4.81 years. When examining the demographic profile of the

participants, it was identified that the vast majority were mothers (61.2%), and in terms of occupation, housewives (30.7%) and civil servants (30.7%) showed an equal distribution. Regarding educational status, 47.9% of the parents were high school graduates, while in terms of family structure, 96.6% were married and 39.1% had two children. When evaluating the data related to the children, it was identified that children in the 8-year-old age group constituted 26.0% of the sample. The gender distribution was 52.6% female and 47.4% male. In terms of grade level, it was determined that 26.0% of the children attended second grade and 26.0% attended fourth grade. Furthermore, it was identified that 88.0% of the children had their own room, 98.0% lived with their parents, and 95.3% were raised in a nuclear family structure (Table 1).

Table 1. Distribution of the Demographic Characteristics of the Participants

Characteristics	<i>n</i>	%
	X ± SD	
Mean age of parents (Years)	34.99 ± 4.809	
Parental role		
Mother	249	61.2
Father	149	36.6
Other	9	2.2
Occupation		
Homemaker	125	30.7
Civil servant	125	30.7
Tradesman / Business owner	48	11.8
Worker / Employee	80	19.7
Self-employed	29	7.1
Educational status		
Primary	33	8.1
Middle	20	4.9
High school	195	47.9
Associate	26	6.4
University+	128	32.6
Income status		
Income less than expenses	217	53.3
Income equal to expenses	147	36.1
Income more than expenses	43	10.6
Number of children		
1 child or none	97	23.8
2 children	159	39.1
3 children	111	27.3
4 or more children	40	9.8
Marital status		
Married	393	96.6
Single / Divorced	14	3.4
Child's age ($\bar{x}$ ± SS)	8.40 ± 1.359	
6	49	12.0
7	53	13.0
8	106	26.0
9	93	22.9
10	96	23.6

11	10	2.5
Child's gender		
Female	214	52.6
Male	193	47.4
Child's grade level		
1st grade	93	22.9
2nd grade	106	26.0
3rd grade	102	25.1
4th grade	106	26.0
Child's own room status		
Yes	358	88.0
No	49	12.0
Child's academic performance		
Poor	32	7.9
Moderate	229	56.3
Good	146	35.9
Child living with both parents		
Yes	399	98.0
No	1	0.2
Other	7	1.7
Family structure		
Nuclear family	388	95.3
Extended family	19	4.7

*n: Frequency, %: Percentage, $\bar{X}$: Mean, SD: Standard Deviation.

According to the findings obtained from the measurement instruments used in the study, the mean total score for the Strengths and Difficulties Questionnaire (SDQ) was determined to be 16.69 ± 5.74 , while the mean overall score for the Children's Sleep Habits Questionnaire (CSHQ) was observed to be 57.31 ± 10.88 . In the examination conducted across the subscales of the CSHQ, the children's

mean bedtime was identified as $21:20 \pm 5.20$, mean total sleep duration as 9.53 ± 1.29 hours, mean night waking duration as 13.40 ± 10.84 minutes, and mean wake-up time in the morning as $08:10 \pm 1.24$. Furthermore, it was determined that the vast majority of the sample (90.9%) scored above the clinical cut-off score of 41 points on the total CSHQ (Table 2).

Table 2. Distribution of the scale means

Scales	Median	Min	Max		SD
SDQ	18.00	3.00	34.00	16.69	5.74
CSHQ	58.00	36.00	86.00	57.31	10.88
CSHQ bedtime	22.00	20.00	01.00	21.20	5.20
CSHQ sleep duration (hours)	10.00	6.00	15.00	9.53	1.29
CSHQ night wakings (min)	10.00	0.00	60.00	13.40	10.84
CSHQ morning wake-up time	8.00	6.00	23.00	8.10	1.24
CSHQ score distribution		n		%	
Below 41 points		37		9.1	
41 points and above		370		90.9	

* n: Frequency; %: Percentage; Min: Minimum; Max: Maximum; $\bar{X}$: Mean; SD: Standard Deviation; SDQ: Strengths and Difficulties Questionnaire; CSHQ: Children's Sleep Habits Questionnaire.

As a result of the correlation analysis conducted to determine the interaction between the variables, a statistically significant, positive, and high-level relationship was identified between children's sleep habits (CSHQ) and the difficulties they experienced (SDQ) ($r = 0.714$; $p < 0.001$). According to the regression analysis data performed to examine the predictive level of children's emotional and behavioral difficulties on sleep problems, SDQ

scores had a statistically significant effect on the CSHQ total score ($p < 0.001$). The findings indicate that as children's difficulty scores increase, their sleep-related problems also tend to increase. When examining the model results, it was determined that the SDQ score explained 50.9% of the variance in the total CSHQ score (Adjusted $R^2 = 0.509$; $F = 421.191$; $p < 0.001$; Beta = 0.714) (Table 3).

Table 3. Simple linear regression analysis of the effect of SDQ on CSHQ

Dependent Variable	Independent Variable	β	t	p	Beta	F	Model (p)	Adj. R ²
CSHQ	Constant	34.740	29.871	< 0.001		421.191	< 0.001	0.509
	SDQ	1.352	20.523	< 0.001	0.714			

*CSHQ: Children's Sleep Habits Questionnaire; SDQ: Strengths and Difficulties Questionnaire, β : Unstandardized coefficient, t: t- test statistic, p: Significance level, Beta: Standardized coefficient, F: F- test statistic, Model (p): Statistical significance level of the model, Adjusted R²: Adjusted coefficient of determination.

Table 4. Distribution of CSHQ and SDQ Scores According to Parental Sociodemographic Characteristics

	CSHQ					SDQ Score				
	Median	Min.	Max.	$\bar{X}$	SD	Median	Min.	Max.	$\bar{X}$	SD
Parental age										
30 and under (1)	54.00	36.00	83.00	53.99	10.73	14.00	4.00	33.00	14.78	6.40
31-40 (2)	60.00	36.00	85.00	58.50	10.48	18.00	4.00	34.00	17.48	5.43
41+ (3)	54.50	37.00	86.00	55.48	12.31	17.50	3.00	23.00	14.98	5.43
F	6.104					9.378				
p	= 0.002*					< 0.0001				
Bonferroni	1 < 2					1 < 2; 3 < 2				
Parental role										
Mother (1)	55.00	36.00	84.00	55.28	10.63	16.00	3.00	33.00	15.71	5.74
Father (2)	63.00	36.00	86.00	61.42	9.98	19.00	4.00	34.00	18.72	5.11
Other (3)	46.00	38.00	56.00	45.33	7.66	10.00	4.00	15.00	10.00	3.43
KW	44.457					40.359				
p	< 0.0001*					< 0.0001*				
Bonferroni	3 < 1; 3 < 2; 1 < 2					3 < 1; 3 < 2; 1 < 2				
Parental occupation										
Homemaker (1)	58.00	36.00	81.00	56.18	10.30	16.00	3.00	28.00	15.64	5.39
Civil servant (2)	49.00	37.00	83.00	51.80	10.21	14.00	4.00	33.00	14.02	5.63
Tradesman (3)	63.00	36.00	86.00	63.54	9.54	19.50	11.00	32.00	19.21	4.48
Worker (4)	63.00	39.00	85.00	62.40	8.66	20.00	10.00	34.00	20.08	4.32
Self-employed (5)	64.00	42.00	84.00	61.55	10.94	20.00	7.00	32.00	19.17	6.04
KW	74.835					72.648				
p	< 0.0001*					< 0.0001*				
Bonferroni	1 < 3; 1 < 4; 2 < 1; 2 < 3; 2 < 4; 2 < 5					1 < 3; 1 < 4; 1 < 5; 2 < 3; 2 < 4; 2 < 5				
Parental educational status										
Primary (1)	59.00	38.00	82.00	59.67	10.02	18.00	4.00	30.00	18.21	5.15
Middle (2)	58.00	38.00	73.00	55.95	9.09	17.50	8.00	32.00	17.70	5.98
High school (3)	61.00	36.00	86.00	60.51	10.00	19.00	3.00	34.00	18.25	5.29
Associate (4)	50.00	37.00	81.00	51.54	10.53	11.50	4.00	31.00	12.00	5.25
University+ (5)	53.00	37.00	83.00	53.36	10.99	15.00	4.00	33.00	14.78	5.58
KW	46.677					52.049				
p	< 0.0001*					< 0.0001*				
Bonferroni	4 < 1; 4 < 3; 5 < 1; 5 < 3					4 < 1; 4 < 2; 4 < 3; 5 < 1; 5 < 3				

*Min: Minimum; Max: Maximum, $\bar{X}$: Mean, SD: Standard Deviation, SDQ: Strengths and Difficulties Questionnaire; CSHQ: Children's Sleep Habits Questionnaire. KW: Kruskal-Wallis test statistic, p: Significance level. F: One-Way Analysis of Variance (ANOVA) test statistic, t: Independent samples t-test statistic, z: Mann-Mann-Whitney U test statistic.

Table 5. Distribution of CSHQ and SDQ Scores According to Children's Characteristics

	CSHQ					SDQ Score				
	Median	Min.	Max.	$\bar{X}$	SD	Median	Min.	Max.	$\bar{X}$	SD
Child's age										
6 ages	47.00	36.00	65.00	47.59	6.57	11.00	4.00	23.00	11.78	4.72
7 ages	52.00	37.00	81.00	54.81	12.91	15.00	3.00	32.00	15.96	6.77
8 ages	60.00	37.00	82.00	59.44	10.24	18.00	5.00	33.00	17.35	5.99
9 ages	63.00	36.00	86.00	61.45	10.57	20.00	6.00	34.00	19.85	4.99
10 ages	60.00	37.00	77.00	58.68	8.31	17.00	5.00	23.00	16.26	3.78
11 ages	41.50	37.00	55.00	43.80	6.78	11.50	5.00	17.00	12.30	3.77
KW	78.617					75.793				
p	< 0.0001*					< 0.0001*				
Bonferroni	1 < 2; 1 < 3; 1 < 4; 1 < 5; 2 < 4; 6 < 3; 6 < 4; 6 < 5					1 < 2; 1 < 3; 1 < 4; 1 < 5; 2 < 4; 3 < 4; 5 < 4				
Child's gender										
Female	59.00	36.00	86.00	57.60	10.62	18.00	3.00	34.00	16.73	5.61
Male	57.00	37.00	84.00	56.98	11.18	17.00	4.00	33.00	16.64	5.90
t	0.568					0.169				
p	> 0.570					> 0.866				
Child's grade level										
1st grade (1)	49.00	36.00	81.00	51.35	11.30	13.00	3.00	32.00	14.06	6.29
2nd grade (2)	60.00	37.00	82.00	59.58	9.89	18.00	5.00	33.00	17.42	5.98
3rd grade (3)	62.00	36.00	86.00	60.15	11.27	20.00	5.00	34.00	19.04	5.56
4th grade (4)	59.00	37.00	77.00	57.53	9.01	17.00	5.00	23.00	15.99	3.85
F	14.457					14.601				
p	< 0.0001*					< 0.0001*				
Bonferroni	1 < 2; 1 < 3; 1 < 4					1 < 2; 1 < 3; 4 < 3				
Child's own room status										
Yes	59.00	36.00	86.00	57.27	10.95	18.00	3.00	34.00	16.81	5.63
No	56.00	40.00	81.00	57.55	10.41	15.00	4.00	33.00	15.80	6.50
t	-0.167					1.160				
p	> 0.867					> 0.247				
Child's academic performance										
Poor (1)	67.00	50.00	86.00	67.38	9.27	20.00	11.00	33.00	21.63	5.33
Moderate (2)	60.00	36.00	85.00	59.83	9.02	18.00	4.00	34.00	17.69	4.60
Good (3)	49.00	36.00	79.00	51.14	10.69	13.00	3.00	32.00	14.03	6.24
F	54.879					36.255				
p	< 0.0001*					< 0.0001*				
Bonferroni	2<1; 3<1; 3<2					2<1; 3<1; 3<2				

*Min: Minimum, Max: Maksimum, $\bar{X}$: Mean, SD: Standard Deviation, SDQ: Strengths and Difficulties Questionnaire; CSHQ: Children's Sleep Habits Questionnaire. KW: Kruskal–Wallis test statistic, p: Significance level. F: One-Way Analysis of Variance (ANOVA) test statistic, t: Independent samples t-test statistic, z: Mann–Mann–Whitney U test statistic.

When examining the distribution of the mean CSHQ and SDQ scores according to the sociodemographic characteristics of the parents, a statistically significant difference was found between the scores of both scales in terms of the variables of parental age, parental role, occupation, educational attainment, income level, number of children, and marital status ($p < 0.05$). It was determined that the sleep and emotional problem scores were significantly higher in children of parents in the 31–40 age group, fathers, those in the tradesperson/worker/self-employed occupational group, high school graduates, and families whose income was less than their expenses. Furthermore,

in the analyses conducted, the mean CSHQ (57.50 ± 10.77) and SDQ (16.80 ± 5.70) scores of children of married parents were found to be significantly higher compared to those of children of single/divorced parents (52.00 ± 12.89 and 13.64 ± 6.30 , respectively; $p < 0.05$). In the Bonferroni post-hoc test performed according to income status, the scale scores of children in the group whose income was less than their expenses were observed to be significantly higher than those of the other groups ($p < 0.0001$). Similarly, the mean sleep and difficulty scores of children of parents with 3 or more children were determined to be significantly higher than

those of children of parents with a single child ($p < 0.0001$) (Table 4).

When evaluating the distribution of scale scores according to the sociodemographic characteristics of the children, a statistically significant difference was found between the child's age, attended grade level, and academic achievement status and their CSHQ and SDQ scores ($p < 0.05$). According to the age variable, the scores obtained on both scales by children in the 9-year-old group and those attending the fourth grade were found to be significantly higher ($p < 0.001$). Furthermore, it was identified that the sleep and mood difficulty scores of students with "poor" academic achievement were markedly higher compared to children with "moderate" and "good" achievement levels. It was observed that the child's gender and having their own room created no significant difference in scale scores ($p > 0.05$). In the evaluation conducted according to family structure (nuclear or extended family), no statistically significant difference was identified between the CSHQ (57.41 ± 10.78) and SDQ (16.79 ± 5.75) scores of children in nuclear families and the CSHQ (55.16 ± 12.89) and SDQ (14.63 ± 5.39) scores of children in extended families ($p > 0.05$) (Table 5).

4. Discussion

Social restrictions and variations in routines (peer relationships, social life, nutrition, and study habits) implemented during the COVID-19 pandemic negatively affected children's sleep patterns, which are of critical importance for their healthy development (Gregory & Sadeh, 2016; Becker & Gregory, 2020). One of the main findings of this study is that 90.9% of the CSHQ scores exceeded the cut-off score of 41 points; this situation indicates that clinically significant sleep problems were widespread among school-aged children during the pandemic process. This result parallels the findings of studies conducted by Dağ et al. (2021) and Curatola et al. (2022). Literature reviews and empirical studies (Aishworiya et al., 2021; Çağlar, 2021; Bruni et al., 2022) also demonstrate that the pandemic created distinct negative effects on children's sleep habits, leading to problems such as late bedtime onset and disruptions in wake-up schedules in particular. Furthermore, a study by Bucak et al. (2021) noted that sleep disorders were observed at higher rates in children of healthcare worker parents; this finding emphasizes the decisive role of parental factors on children's sleep patterns. Indeed, current literature reports that although the acute phase of the pandemic has ended, sleep disorders and circadian rhythm disruptions emerging in children have evolved into persistent health issues (Alfonsi et al., 2024; Cardoso et al., 2025). In research conducted by Çimen et al. (2023), sleep disorders were found to be quite common in

children during the pandemic period, and this condition was directly related to anxiety levels. The high prevalence obtained in the present study (90.9%) indicates a tendency for sleep hygiene disruptions to become chronic.

One of the most striking findings of our study is that, according to the regression analysis results, emotional and behavioral difficulties in children (SDQ) accounted for 50.9% of the variance in sleep problems (CSHQ) on its own ($R^2 = 0.509$; $p < 0.001$). This situation demonstrates the direct and strong predictive effect of psychological and emotional difficulties experienced by children during the pandemic on their sleep quality and patterns. The literature also reports a bidirectional and strong interaction between childhood emotional and behavioral problems and sleep disorders (Cellini et al., 2021; Jusienė et al., 2021). Indeed, Segre et al. (2021) identified that heightened psychosocial stress and emotional burden in children during the pandemic directly triggered specific sleep problems, such as bedtime resistance and night wakings. This high explanatory rate obtained in our study indicates that interventions aimed at improving sleep hygiene in children must be conducted concurrently with emotional and behavioral support programs.

In our study, it was identified that children's ages showed a significant difference with CSHQ and SDQ scores. In particular, it is noteworthy that both the sleep and emotional difficulty scores of children in the 9-year-old group were significantly higher compared to other age groups ($p < 0.001$). Aligning with Piaget's developmental perspective, this finding reflects the cognitive sensitivity of the age of 9 in the transition from concrete operational to formal operational thought. Indeed, Alfonsi et al. (2024), in their study examining the long-term effects of the pandemic, reported that cognitive developmental stages directly determine psychological responses during moments of crisis and that children's sleep architecture is more vulnerable to environmental stressors during these transition periods. On the other hand, the absence of age-related differences in studies such as Yaylacı and Güller (2022) suggests the cultural variability of the results.

When academic achievement was examined, it was determined that the CSHQ and SDQ scores of the group reporting their academic achievement as "poor" were significantly higher ($p < 0.05$). However, due to the cross-sectional design of our study, although a definitive cause-and-effect relationship cannot be established between these variables, it is known in the literature that a bidirectional relationship exists among sleep problems, psychological difficulties, and academic perception. Indeed, Cardoso et al. (2025) draw attention to the

fact that academic difficulties and disruptions in sleep quality can create a mutually reinforcing "cognitive load". This association obtained from our study suggests that children experiencing academic difficulties may represent a potential risk group that needs to be closely monitored in terms of sleep and mental health parameters.

In our sample group, the child's gender and family structure were observed to create no significant difference; this finding is in complete agreement with the results obtained in a clinical sample in Turkey by Çimen et al. (2023). This situation can be interpreted as environmental stressors emerging during global crisis periods such as the pandemic including social restrictions, uncertainty, and increased digital screen usage, creating a homogeneous and pervasive negative impact on all children regardless of gender or family structure. When parental characteristics are addressed, it was determined that parental role, educational attainment, and income level variables showed significant differences with CSHQ and SDQ scores. The higher scores among parents in the 31–40 age group compared to the group aged 30 and under, as well as fathers having the highest scores in terms of parental role, may point to the psychological burden created by the multiple responsibilities assumed by parents during the pandemic. Indeed, Alimoradi et al. (2024) report that circadian rhythm disruptions and anxiety experienced by parents directly impair children's sleep hygiene and emotional stability through a "crossover" effect. The group reporting an income less than their expenses having the highest CSHQ score ($p < 0.05$) can be interpreted as economic stress increasing intra-familial adaptation problems. This situation confirms the cycle of "inequality of opportunity" emphasized in the literature; as noted by Cardoso et al. (2025), children from families with low socioeconomic status remain disadvantaged in accessing basic resources such as a healthy sleep environment and digital educational support during crisis periods like pandemics, exhibiting higher levels of behavioral difficulties. Studies by Bucak et al. (2021) and Yaylacı and Güller (2022) also support the results of our study by revealing the decisive role of parental education and income status on children's problems.

4.1. Limitations:

The study is limited to the self-reports of parents who have school-age children and voluntarily participated in the research. The fact that the study was conducted in a single center, combined with the use of online data collection and snowball sampling techniques, constitutes the main methodological limitations of the research in terms of the inability to reach parents lacking digital literacy or access to

complete online surveys, representativeness of the target population, selection bias, and volunteer bias. In addition, the fact that the data collection period covered a broad 18-month timeframe between June 2021 and December 2022 represents another limitation of the study. Experiencing different phases of the pandemic during this period such as lockdowns, gradual normalization, and the full transition to face-to-face education may have periodically influenced the sleep patterns and psychological difficulty dynamics of children and parents in varying ways. Nevertheless, to minimize the margin of error and ensure the complete submission of the forms during data collection, the mandatory response feature of the digital survey platform was actively utilized. Thus, data loss was prevented by precluding participants from proceeding to the next section without fully completing the previous one. Furthermore, because the data were collected online and participants remained anonymous, parental reports were assumed to be objective and accurate.

5. Conclusion

This study reveals the relationship between the COVID-19 pandemic and children's sleep habits and emotional states. The finding that the vast majority of CSHQ scores (90.9%) were at the level of clinical significance is associated with the high prevalence of sleep problems during this period. In particular, it was determined that children in the 9-year-old group, students with low academic achievement, and children from economically disadvantaged families carried a higher risk in terms of emotional and sleep-related problems. In light of the obtained findings, the following recommendations are presented:

Increasing Parental Awareness: Parents' ability to recognize early signs of negative sleep habits, irregular bedtime routines, and associated emotional-behavioral difficulties in children should be supported. For this purpose, information and awareness programs should be organized within primary healthcare services.

Interventions Targeting Inequality of Opportunity: Children with low academic achievement and those from families with low socioeconomic status should be identified as a "priority risk group." School health nurses should intensify home visits and individual counseling processes to enhance sleep hygiene and psychological resilience in these children.

Promoting Regular Routines and Sleep Hygiene: To reorganize circadian rhythms in the post-pandemic period, guidance should be provided to families regarding consistent sleep schedules, screen time management, and bedtime routines.

Strengthening School Health Nursing: School health nurses should assume a key role in school-based

psychosocial support mechanisms. To improve sleep quality, which is closely associated with children's academic performance, periodic screenings should be conducted in schools, and students identified as at-risk should be referred to school guidance services or relevant specialized units at an early stage.

Ethical Considerations

To conduct this study, necessary ethical approval was obtained from the Zonguldak Bülent Ecevit University Non-Invasive Clinical Research Ethics Committee (Date: 18.06.2021, Number: 49795). Additionally, written permissions were secured from the institution where the research was conducted. All stages of the study adhered strictly to the principles of the Declaration of Helsinki.

Conflict of Interest

The authors declare that there is no conflict of interest regarding this study.

Author Contributions

Conceptualization and design of the study: M.T., M.K.; Data acquisition, analysis, and interpretation: M.T., M.K.; Drafting of the manuscript and critical revision for intellectual content: M.T., M.K.; Final approval and agreement to be accountable for all aspects of the work: M.T., M.K.

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Author Note

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