Psychology, Health & Medicine

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/cphm20

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To cite this article: Arzu Sarialioğlu, Gülsün Ayran & Semra Köse (2023): Determining the relationship between sleep disturbances in children and parental stress during COVID-19 pandemic, Psychology, Health & Medicine, DOI: 10.1080/13548506.2022.2163670

To link to this article: https://doi.org/10.1080/13548506.2022.2163670

Published online: 01 Jan 2023.

PSYCHOLOGY, HEALTH & MEDICINE
https://doi.org/10.1080/13548506.2022.2163670

Determining the relationship between sleep disturbances in children and parental stress during COVID-19 pandemic

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ABSTRACT

This study aimed to determine the relationship between child sleep disturbances and parental stress during the COVID-19 pandemic. This cross-sectional web-based study was conducted between February and April 2021 among 409 parents residing in Turkey who had children between the ages of 6 and 16 years. Data were collected online using the Sleep Disturbance Scale for Children (SDSC) and the Parental Stress Scale (PSS). In the study, there was a significant relationship found between the mean scores of the SDSC and PSS ($r = 0.499$, $p < 0.001$). In the multiple regression analysis, family type, socioeconomic status, occupation, the presence of sleep problems in the child before the pandemic, and the total score of the PSS significantly affected the total score of the SDSC. The presence of sleep problems in the child before the pandemic was significantly associated with the total score of the PSS ($p < 0.05$). Approximately 3.9% of the children had sleep disturbances (at scores over 70 points) during the COVID-19 pandemic. In conclusion, as the stress levels of parents increase, the rate of sleep disturbances in their children increases, and many demographic characteristics are associated with the occurrence of sleep disturbances in their children. It is important that parents do not reflect on their stress related to the pandemic and that their children maintain a normal sleep pattern whenever possible. School nurses should educate children and their parents about the importance of enough sleep and factors that contribute to inadequate sleep among children during the COVID-19 pandemic.

ARTICLE HISTORY
Received 8 November 2021
Accepted 22 December 2022

KEYWORDS
COVID-19; child; parents; stress; sleep disturbance

Introduction

The COVID-19 pandemic has both directly and indirectly affected individuals at the societal and personal levels. The negative effects on individuals are reflected in their social lives, including both family and social relationships, as well as in the economy, personal situations, and educational services (Alimoradi et al., 2022; Rajabimajd et al., 2021; Shirali et al., 2021; Çaykuş & Çaykuş, 2020).

There are both pharmaceutical and non-pharmaceutical measures taken against COVID-19, a disease that spreads rapidly and endangers the life of people (Budak &

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Korkmaz, 2020; Hossain et al., 2022). Apart from pharmaceutical measures, some restrictions such as limiting the general behavior of the society and regulating lifestyles have been imposed (Chen et al., 2020; Rajabimajd et al., 2021). This restriction has led to major disruptions in daily activities, leading to considerable changes in the routines of parents and children (Lim et al., 2021). Many measures taken have affected children and adolescents, including changes in the working hours of parents, closure of schools at all educational levels, transition to a distance educational system, imposure of a schedule when children can go out, and social distancing (Budak & Korkmaz, 2020).

Sleep is crucial for the health and well-being of all children. It is an essential component of a healthy life when the body and brain are rested and recharged. If children do not get enough sleep, they may become anxious. They may experience behavioral changes, attention difficulties, and memory problems. Insufficient sleep increases the risk of high blood pressure, obesity, depression, and diabetes (Stern et al., 2020). Children's sleep status is affected by many demographic factors. Sleep physiology and pathology differ among newborns, infants, pre-school and school children, and adolescents. A previous study has shown that as age increases, the nighttime bedtime increases significantly, which indicates that age affects the sleep status (Bülbül et al., 2010). Another factor is sex. In a study that examined sleep problems among students, it was found that girls had more sleep problems, lower sleep quality, and more nightmares than boys (Bülbül et al., 2010; Tekcan et al., 2020; Şenol et al., 2012). A meta-analysis of 30 studies on sleep patterns in healthy adolescents from 20 different countries showed that sleep duration varies by sex, age, and geographic region (Olds et al., 2010). While the pandemic continues, the certain extent of sleep problems and disturbance is still being investigated. Restrictions caused by the pandemic affect individuals' sleep duration and sleep quality (Yurteri & Sarıgedik, 2021; Zreik et al., 2021). Sleep deprivation in children can also cause functional and cognitive impairments (Fatima et al., 2015; Lim et al., 2021). Sleep disturbances are seen as both medically based (e.g. obstructive sleep apnea, restless leg syndrome, periodic limb movement disturbance, narcolepsy) and behavior based (e.g. behavioral insomnia in childhood and interpersonal relationships) (Akçay et al., 2020).

Parents/caregivers should pay attention to the sleep status of their children. The sleep status can be attributed to physical and social isolation, as sleep difficulties and nightmares cause fears and uncertainties during their stay at home (Guo et al., 2021; So et al., 2022). The potential for sleep problems and a worsened sleep status is high in children who are constantly at home, whose routines are disrupted, and who spend time solely with family members (Bruni et al., 2022). Daily routine deterioration, decreased physical activity, increased screen time owing to distance education, and increased exposure to factors such as video games, online games, and social media affect the sleep duration and quality among children (Bruni et al., 2022; Chen et al., 2019; Ghosh et al., 2020). Even the working hours, schedules, behaviors, and stressful situations of parents contribute to earlier sleep – wake times in children (Becker & Gregory, 2020; Lee et al., 2019; Lim et al., 2021; Zreik et al., 2021). While restriction, social isolation, reduced physical activity, and less daylight exposure can affect health and well-being, they can increase the stress level. These factors can affect daily activities as well as sleep – wake routines and the circadian rhythm (Altena et al., 2020). In the study conducted by Becker and Gregory on the possible effects of the COVID-19 pandemic on children's and adolescents' sleep habits

and sleep habit changes, such changes had a lasting effect on sleep habits, and insomnia or other sleep problems persisted even after the normalization process was initiated (Becker & Gregory, 2020).

Children's sleep patterns develop in the family and are influenced by relationships within the family. The relationship between sleep problems in children and family functions may be bidirectional: Parental behavior affects child sleep, and child sleep affects parental mental health, hence affecting family functions (El-Sheikh & Kelly, 2017). Along with the pandemic, parents have encountered many challenging conditions at home for themselves and their children. Parents who have more than one child have encountered many stressful situations, such as supporting their education at home, controlling the relationships of family members who stay at home for a longer time, keeping up with changing working conditions, ensuring economic order, and ensuring that family members comply with hygiene conditions; accordingly, parental behaviors toward their children may differ. The COVID-19 pandemic has affected the sleep habits of primary and secondary school children in particular (Çağlar, 2021). Hence, this study aimed to determine the relationship between child sleep disturbances and parental stress during the pandemic.

Research questions

- What are the factors affecting the sleep disorder level of children and the stress level of parents during the COVID-19 pandemic?
- Is there a relationship between the sleep disorder level of children and the stress level of parents during the COVID-19 pandemic?

Research hypothesis

- H1: There is a linear relationship between child sleep disturbances and parental stress during the pandemic.

Materials and methods

Study population

This cross-sectional web-based study was conducted to determine the relationship between child sleep disturbances and parental stress during the COVID-19 pandemic. It was performed among parents who had children between the ages of 6 and 16 years living in Erzurum in Türkiye, who were reached through social media (i.e. WhatsApp, Facebook, and Instagram) from February to April 2021.

The population of the study comprised parents who had children aged 6–16 years living in Erzurum during the study period, who had internet access, and who volunteered to participate in the study. In the post hoc power analysis performed using the G*Power 3.1.9.2 program to determine whether the sample size was sufficient, the effect size was determined to be 0.1760 at a 95% power and a 0.05 significance level. These values showed that the sample size of 409 participants was sufficient (Çapık, 2014).

Data collection tools

The data of the study were collected using a sociodemographic characteristics form, the Sleep Disturbance Scale for Children (SDSC), and the Parental Stress Scale (PSS).

Sociodemographic characteristics form

In the information form prepared by the researchers in line with the relevant literature (Ağadayı et al., 2020; Fidancı et al., 2021; Keleşoğlu & Karduz, 2020), there were questions about age, sex, number of children, living place, family type, educational level, profession, socioeconomic status, and the presence of sleep problems in the child before the pandemic.

Sdsc

The SDSC was developed by Bruni et al. (1996), and its validity and reliability in Turkish were validated by Ağadayı et al. (2020). The scale evaluates sleep disorders that occur in children aged 6–16 years in the last 6 months based on the parents' perspective. The Likert-type scale consists of 26 items and 6 sub-dimensions. These sub-dimensions are as follows: sleep initiation and resumption problems, sleep breathing disorders, wakefulness reactions disorders, sleep – wake transition disorders, excessive sleepiness disorders, and excessive sweating during sleep. Questions are answered between 'never' (1 point) and 'always' (5 points). A total minimum of 26 points and maximum of 130 points can be obtained from the scale. High scores indicate sleep disturbance. In addition, there is a T-score table in the original scale to guide clinicians. According to this table, those with a T-score of > 70 points show symptoms of sleep disturbance (Ağadayı et al., 2020). The Cronbach's alpha value of the scale was 0.79 in its original form and 0.87 in this study.

Pss

Developed by Özmen and Özmen in Özmen and Özmen (2012), the PSS consists of 16 items and only 1 dimension. A four-point Likert-type rating (always = 4, often = 3, sometimes = 2, never = 1) is used in the scale. The lowest and highest scores that can be obtained from the scale are 16 and 64 points, respectively. A high score indicates a high parental stress level (Özmen & Özmen, 2012). The Cronbach's alpha value of the scale was 0.85 in its original form and 0.89 in this study.

Data collection

After obtainment of legal permissions, a survey link including the sociodemographic characteristics form, SDSC, and PSS used in the study was created through Google Forms. The survey link was sent to the social media (WhatsApp, Facebook, and Instagram) used by the parents, and the parents were asked to fill out the survey completely. They were also asked to share the survey link with other parents using the snowball method. It took approximately 10–15 minutes for the survey to be filled out completely.

Data analysis

The SPSS 25.0 software was used for the statistical analysis of the data. The data were presented as percentages or means and evaluated using independent samples t-test, ANOVA, Pearson correlation analysis, and multiple regression analysis. The dependent variables were the SDSC and PSS scores, while the independent variables were age, sex, living place, family type, number of children, social security status, socioeconomic status, educational status, profession, and the presence of sleep problems in the child before the pandemic. Data normality was evaluated using the Shao method to obtain statistical results. Accordingly, the skewness value was 0.806, and the kurtosis value was 0.315 for the SDSC score. Meanwhile, the skewness value was 0.825, and the kurtosis value was 1.135 for the PSS score; the score was found to have a normal distribution between −3 and +3.

Ethical considerations

To conduct the study, we obtained ethics committee approval (date: 26 February 2021, number: 03–16) from our Human Research Ethics Committee and written permission from the Ministry of Health. The principle of 'Respect for Autonomy' was preserved by stating that they were free to participate in the study before starting the survey; informed consent was obtained from the participants electronically, following the principle of 'Confidentiality and Protection of Confidentiality' by stating that the information of the participants would be kept confidential. Those who were willing to participate in the study were included. Since individual rights must be protected in the study, the Declaration of Helsinki was followed during the study.

Results

The distribution of the parents according to their descriptive characteristics is shown in Table 1. Approximately 46.5% of the parents were between the ages of 35 and 44 years; 80.2% were women; 80.2% lived in the city center; 87.3% had elementary families; 88.5% had one to three children; 90% had social security; 60.1% had equal incomes and expenditures; 53.3% were university graduates; 51.3% were unemployed; and 81.9% had children with no sleep problems before the pandemic.

According to the descriptive characteristics of the parent participants, the mean scores of the SDSC and PSS were compared. We found that family type, socioeconomic status, educational status, and the presence of sleep problems before the pandemic affected the total score of the SDSC. Furthermore, the presence of sleep problems in the child before the pandemic influenced the total PSS score ($p < 0.05$) (Table 1).

The mean scores of the SDSC according to the descriptive characteristics of the parents are compared in Table 1. In the *t*-test for the comparison of family type according to the mean scores of the SDSC, the parents with an extended family had higher scores than their counterpart. In the ANOVA for the comparison of the socioeconomic status according to the mean scores of the SDSC, socioeconomic status affected the total score of the SDSC ($p < 0.05$). In the post hoc test conducted to determine which group the difference originates from, the parents with less income than their expenses showed

Table 1. Comparison of SDSC and PSS Scores According to Descriptive Characteristics ($n = 409$).

			SDSC		PSS	
	n	%	M±SD	Test p	M±SD	Test p
Age						
25-34	178	43.5	45.80 ± 11.73	F:1.617	28.66 ± 8.04	F:0.402
35-44	190	46.5	45.10 ± 11.98	p:0.123	28.38 ± 7.51	p:0.670
45-55	41	10.0	51.43 ± 10.83		29.56 ± 6.60	
Gender						
Female	328	80.2	46.13 ± 12.12	t:0.319	28.66 ± 8.07	t:0.272
Male	81	19.8	45.66 ± 10.89	p:0.750	28.45 ± 5.70	p:0.786
Living place						
City center	328	80.2	45.21 ± 11.44	F: 1.036	28.43 ± 7.78	F: 1.025
District	67	16.4	48.47 ± 12.13	p:0.125	29.00 ± 7.21	p:0.360
Village	14	3.4	53.85 ± 16.60		31.28 ± 6.71	
Family type						
Nuclear family	357	87.3	45.36 ± 11.23	**t:-2.493**	28.57 ± 7.60	t:-0.377
Extended family	52	12.7	50.73 ± 14.92	**p:0.015***	29.00 ± 8.07	p:0.720
Number of children						
1-3	362	88.5	45.61 ± 11.74	t:-2.017	28.43 ± 7.73	t:-1.369
4 and above	47	11.5	49.31 ± 12.51	p:0.054	30.06 ± 7.00	p:0.172
Social security status						
Available	368	90.0	45.76 ± 11.63	t:-1.432	28.51 ± 7.65	t:-0.845
No	41	10.0	48.56 ± 13.79	p:0.153	29.58 ± 7.78	p:0.399
Socioeconomic status						
Less than expenditure[a]	76	18.6	50.36 ± 13.98	**F/Welch: 6.841**	29.23 ± 7.80	F: 1.357
Equal income and expenditure[b]	246	60.1	45.43 ± 11.28	**p:0.006***	28.84 ± 7.51	p:0.259
More than expenditure[c]	87	21.3	44.00 ± 10.69	**Tamhane's a>b. a>c**	27.45 ± 7.90	
Educational status						
Illiterate[a]	5	1.2	47.20 ± 5.40	**F/Welch: 4.810**	32.20 ± 6.18	F:2.280
Primary school[b]	53	13.0	51.69 ± 14.14	**p: 0.039***	30.15 ± 8.27	p:0.079
Secondary school[c]	133	32.5	44.91 ± 11.12	**Tamhane's b>c. b>d**	27.42 ± 7.52	
Faculty [d]	218	53.3	45.33 ± 11.50		28.90 ± 7.54	
Profession						
Unemployed	210	51.3	45.48 ± 12.13	F:1.817	28.20 ± 8.23	F:0.900
Civil servant/worker	163	39.9	45.89 ± 11.42	p:0.143	29.08 ± 7.06	p:0.441
Self-employment	33	8.1	49.42 ± 11.14		29.45 ± 6.61	
Retired	3	.7	56.33 ± 21.57		24.00 ± 7.81	
The presence of sleep problems in the child before the pandemic						
Yes	74	18.1	52.63 ± 10.53	**t:5.456**	31.52 ± 8.27	**t:0.586**
No	335	81.9	44.58 ± 11.67	**p:0.001***	27.98 ± 7.37	**p:0.001***

SDSC: Sleep Disturbance Scale for Children PSS: Parental Stress Scale*p<0.05

higher scores in the SDSC than did the students whose income was equal to their expenses and whose income was higher than their expenses. In the ANOVA for the comparison of educational status according to the mean scores of the SDSC, educational status influenced the total score of the SDSC ($p < 0.05$). In the post hoc test conducted to determine which group the difference originated from, the parents who graduated from primary school had higher scores in the SDSC than the parents who were secondary school graduates and university graduates. In the *t*-test for the comparison of the presence of sleep problems in their child before the pandemic according to the mean scores of the SDSC, the parents who had a child with sleep problems before the pandemic scored higher on the SDSC than did their counterpart.

The average PSS score according to the descriptive characteristics of the parents is compared in Table 1. In the *t*-test for the comparison of the presence of sleep problems in their child before the pandemic according to the average PSS score, the parents who had

Table 2. Mean scores of SDSC and PSS ($n = 409$).

Scale	Sub-Scale	Min-Max	M±SD
SDSC	Sleep initiation and resumption problems	7-28	15.24 ± 4.36
	Sleep breathing disorders	3-11	4.19 ± 1.62
	Wakefulness reactions disorder	3-11	4.11 ± 1.58
	Sleep-wake transition disorders	6-24	10.66 ± 3.62
	Excessive sleepiness disorders	5-20	8.12 ± 3.11
	Excessive sweating during sleep	2-10	3.68 ± 1.87
	Total Score	27-86	46.04 ± 11.87
PSS	Total Score	16-60	28.62 ± 7.66

SDSC: Sleep Disturbance Scale for Children PSS: Parental Stress Scale.

a child with sleep problems before the pandemic scored higher on the PSS than did their counterpart.

The mean SDSC and PSS scores are shown in Table 2. The mean total score of the SDSC was 46.04 ± 11.87. The mean score of the sub-dimensions of the SDSC was 15.24 ± 4.36 for sleep initiation and resumption problems, 4.19 ± 1.62 for sleep breathing disorders, 4.11 ± 1.58 for wakefulness reactions disorder, 10.66 ± 3.62 for sleep – wake transition disorders, 8.12 ± 3.11 for excessive sleepiness disorders, and 3.68 ± 1.87 for excessive sweating during sleep. The rate of sleep disturbance among the children was 3.9% at over 70 points. The mean total PSS score was 28.62 ± 7.66.

We also examined whether there was a relationship between sleep disturbance in the children and the stress levels of the parents during the COVID-19 pandemic. We found that there was a significant relationship between the total PSS score and the total SDSC score ($r = 0.499$, $p < 0.01$).

In the regression analysis in Table 3, the significance level corresponding to the F value was examined: The model established was significant ($F = 18.333$; $p < 0.05$). Considering the β coefficient, t value, and significance level of the independent variable, family type, socioeconomic status, educational status, the presence of sleep problems in the child before the pandemic, and the total score of the PSS significantly affected the total score of the SDSC ($t = 2.665$, $p < 0.05$; $t = -2.695$, $p < 0.05$; $t = 2.517$, $p < 0.05$; $t = -4.168$, $p < 0.05$; and $t = 10.638$, $p < 0.05$, respectively). Family type, socioeconomic status, educational status, the presence of sleep problems in the child before the pandemic, and the total score of the PSS could explain 31.8% of the change in the total score of the SDSC (adjusted $R^2 = 0.318$). A 1-unit increase in the family type led to an increase of 4.123 (β = 4.123) in the total score of the SDSC; a 1-unit increase in the socioeconomic status led to a decrease of 2.272 (β = −2.272); a 1-unit increase in the educational status led to an increase of 2.185 (β = 2.185); a 1-unit increase in the presence of sleep problems in the child before the pandemic led to a decrease of 5.457 (β = −5.457); and a 1-unit increase in the total PSS score led to an increase of 0.691 (β = 0.691). There was no autocorrelation problem in the established model. The Durbin – Watson statistic was between 1.5 and 2.5 (DW = 2.052).

In the regression analysis in Table 4, the significance level corresponding to the F value was considered: The model established was significant ($F = 1.971$; $p < 0.05$). Considering the β coefficient, t value, and significance level of the independent variable, the presence of sleep problems in the child before the pandemic significantly affected the total PSS score ($t = -3.611$, $p < 0.05$). The presence of sleep problems in the child before the

Table 3. Multiple regression results on the effect of descriptive characteristics on the SDSC total score ($n = 409$).

Model	β	Std. Error	Beta	t	p	Partial	Part	Tolerance	VIF	%95 Confidence İnterval Upper	Lower
Constant* (Sleep Disturbance Scale for Children)	33.363	6.084		5.484	**0.001**					21.402	45.323
**Age	0.761	0.838	0.042	0.907	0.365	0.045	0.037	0.790	1.265	−0.888	2.409
**Gender	−0.899	1.378	−0.030	−0.652	0.515	−0.033	−0.027	0.780	1.283	−3.608	1.810
**Living place	1.701	1.039	0.071	1.636	0.103	0.082	0.067	0.882	1.134	−0.343	3.744
**Family type	4.123	1.547	0.116	2.665	**0.008**	0.133	0.109	0.885	1.130	1.082	7.165
**Number of children	−0.470	1.689	−0.013	−0.278	0.781	−0.014	−0.011	0.810	1.234	−3.792	2.851
**Social security status	0.010	1.737	0.000	0.006	0.995	0.000	0.000	0.864	1.158	−3.405	3.426
**Socioeconomic status	−2.272	0.843	−0.121	−2.695	**0.007**	−0.134	−0.110	0.832	1.202	−3.930	−0.615
**Educational status	−0.721	0.824	−0.046	−0.874	0.382	−0.044	−0.036	0.609	1.642	−2.342	0.900
**Profession	2.185	0.868	0.123	2.517	**0.012**	0.125	0.103	0.695	1.438	0.478	3.892
**The presence of sleep problems in the child before the pandemic	−5.457	1.309	−0.177	−4.168	**0.001**	−0.205	−0.170	0.926	1.080	−8.031	−2.883
**PSS Total	0.691	0.065	0.445	10.638	**0.001**	0.471	0.435	0.953	1.050	0.563	0.818

Dependent Variables: Sleep Disturbance Scale for Children (SDSC) **Independent Variables PSS: Parental Stress Scale R: 0.580 R^2: 0.337 F:18.333 *p < 0.05 DurbinWatson:2.052.

pandemic could explain 2.3% of the change in the total PSS score (adjusted $R^2 = 0.023$). A 1-unit increase in the presence of sleep problems in the child before the pandemic resulted in a decrease of 3.592 (β=−3.592). There was no autocorrelation problem in the established model. The Durbin – Watson statistic was between 1.5 and 2.5 (DW = 1.890).

Discussion

The COVID-19 pandemic is a risk factor for insomnia (Zhang et al., 2020). The pandemic has drastically changed the normal sleep patterns of children. If children do not get enough sleep, they may become anxious and experience behavioral changes, attention difficulties, and memory problems (Stern et al., 2020). Depression, anxiety, stress, and other mental health-related factors have been found to be important factors that jeopardize sleep quality and physical health (Alimoradi et al., 2022). To our knowledge, this study is the first to determine the relationship between sleep disturbance in children and parental stress levels during the COVID-19 pandemic.

In the study, the mean total score for child sleep disturbances during the COVID-19 pandemic was 46.04 ± 11.87. In the study by Ustuner and Cam, the mean total score for child sleep disturbances was 43.68 ± 7.58. In the study by Fidancı et al., the mean total score was 40.80 ± 9.13. Bruni et al. found that the rate of sleep disturbances increased in children. Moreover, the mean total score was determined by Ağadayı et al. as 40.6 ± 10.1 and Akcay et al. as 34.54 ± 8.08. The results of the present study are similar to those of relevant studies in the literature (Akçay et al., 2020; Ağadayı et al., 2020; Bruni et al., 2022; Fidancı et al., 2021; Ustuner Top & Cam, 2022).

Table 4. Multiple regression results on the effect of descriptive characteristics on the pss total score ($n = 409$).

Model	β	Std. Error	Beta	t	p	Partial	Part	Tolerance	VIF	%95 Confidence İnterval Upper	Lower
Constant* (Parental Stress Scale)	32.242	4.410		7.312	**0.001**					23.573	40.911
**Age	0.173	0.647	0.015	0.268	0.789	0.013	0.013	.791	1.265	−1.099	1.446
**Gender	−0.409	1.064	−0.021	−0.384	0.701	−0.019	−0.019	0.780	1.282	−2.500	1.682
**Living place	0.422	0.802	0.027	0.527	0.599	0.026	0.026	0.883	1.133	−1.155	1.999
**Family type	0.011	1.194	0.000	0.009	0.993	0.000	0.000	0.885	1.130	−2.337	2.359
**Number of children	1.470	1.302	0.061	1.129	0.260	0.056	0.055	0.813	1.231	−1.090	4.030
**Social security status	0.632	1.341	0.025	0.472	0.638	0.024	0.023	0.864	1.157	−2.004	3.268
**Socioeconomic status	−0.996	0.649	−0.082	−1.535	0.126	−0.077	−0.075	0.837	1.195	−2.272	.280
**Educational status	0.381	0.636	0.037	0.598	0.550	0.030	0.029	0.610	1.640	−0.870	1.631
**Profession	0.623	0.670	0.054	0.930	0.353	0.047	0.045	0.697	1.435	−0.694	1.939
**The presence of sleep problems in the child before the pandemic	−3.592	0.995	−0.181	−3.611	**0.001**	−0.178	−0.177	0.956	1.046	−5.547	−1.636

Dependent Variables: Parental Stress Scale (PSS) **Independent Variables R: 0.217 R2: 0.047 F:1.971.
*p < 0.05 DurbinWatson:1890s.

The rate of sleep disorder among the children during the COVID-19 pandemic was 3.9% at over 70 points in the current study. The rate was 2.6% in the study by Fidancı et al. and 4.9% in the study by Ağadayı et al., similar to the present results. In the study conducted by Zhou et al., the prevalence of insomnia symptoms was 18% in secondary school students and 25.3% in high school students (Zhou et al., 2020). The prevalence of insomnia was 37.80% among Chinese adolescents during the pandemic (Chi et al., 2021). In a study in Iran, 26.7% of elementary school students reported experiencing sleep disturbances (Amizadeh et al., 2021). The prevalence of insomnia was 34.9% among Chinese adolescents during the pandemic (Lu et al., 2020). The prevalence of sleep disturbances among 6–12-year-old children during the COVID-19 pandemic in Turkey was 55.5% (Ustuner Top & Cam, 2022). It was found that children's sleep patterns changed, and the rate of sleep problems increased during the COVID-19 pandemic (Demir et al., 2022). In this study, a notable finding was that the rate of sleep disorder among the children during the COVID-19 pandemic was not high.

Herein, the mean total score for sleep disturbance was higher in the children living in extended families than in their counterpart. Bulbul et al. stated that as the number of people living at home increases, the probability of having sleep problems will also increase. No significant differences were found between sleep disturbances and family type (Ustuner Top & Cam, 2022). This may be attributed to the fact that children living in extended families do not have their own room or have a louder environment and an unsuitable sleeping environment or that parents in extended families have less time taking care of their children individually to monitor their sleep patterns.

The mean total score for sleep disturbance among the children with a low socio-economic level was high in the study. Aguilar-Farias et al. observed that the sleep quality of children from families with higher incomes was better (Aguilar-Farias et al., 2021). Fiş

et al. found that the sleep scale scores increased, as the socioeconomic level decreased (Fiş et al., 2010). No significant differences were found between sleep disturbances and parents' educational level (Ustuner Top & Cam, 2022). The results of the present study are similar to those of Aguilar-Farias et al. and Fiş et al., which may be attributed to the more opportunities that children from high-income families have.

In the study, the mean total score for sleep disturbance was higher in the children of parents with a low educational level. Çevik and Ayar found a significant relationship between parental education and sleep change (Çevik & Ayar, 2022). Gültekin et al. stated that there was a significant difference between the educational level of the mother and the sleep status of the children (Gültekin & Bayık-Temel, 2020. No significant differences were found between sleep disturbances and family income (Ustuner Top & Cam, 2022). This finding has been interpreted in the literature by the high level of awareness of educated families (Owens & Jones, 2011).

The mean total score for sleep disturbance was higher in the children with sleep problems before the pandemic in this study. The potential for sleep problems and a worsened sleep status is high in children who are constantly at home and whose routines are disrupted during the pandemic (Bruni et al., 2022). This is attributed to the continuation of sleep disturbance during the pandemic and the additional stress arising from the pandemic.

Herein, the mean stress level of the parents during the COVID-19 pandemic was 28.62 ± 7.66. In the study by Keleşoğlu and Karduz, the mean parental stress score was 32.08 ± 8.82. During the COVID-19 pandemic, the parenting stress levels experienced by parents have also increased (Calvano et al., 2022; Johnson et al., 2022). Cluver et al. stated that the child-related stress of parents increased during the COVID-19 pandemic owing to the needs that arise depending on the developmental level of children (Cluver et al., 2020). In this study, a notable finding was that the stress level of the parents during the COVID-19 pandemic was not high.

The mean stress score was higher in the parents of children who had sleep problems before the pandemic in this study. This is attributed to both the pre-pandemic sleep problem in children and the pandemic itself being a source of stress for parents.

In the study, there was a significant relationship between sleep disturbances in the children and parental stress levels during the COVID-19 pandemic. As the stress levels of the parents increased during the COVID-19 pandemic, the rate of sleep disturbances in their children increased. Children's sleep patterns develop in the family and are influenced by relationships within the family. The relationship between sleep problems in children and family functions may be bidirectional: Parental behavior affects child sleep, and child sleep affects parental mental health, hence affecting family functions (El-Sheikh & Kelly, 2017). Perceived stress levels are significantly higher in parents of children with sleep disorders (Yoruk & Ersin, 2022). Poor mental health in parents is related to sleep disturbances in school children (Ustuner Top & Cam, 2022). The promotion of harmonious parent – child interactions is critical to enhance children's sleep quality and healthy development physically and mentally (Chi et al., 2021). Byars et al. found that parenting stress was significantly associated with child sleep problems. The present results are similar to those of relevant studies in the literature (Byars et al., 2011; Chi et al., 2021; Martin et al., 2019;Ustuner Top & Cam, 2022; Yoruk & Ersin, 2022).

Limitations

First, the low number of fathers participating in the study was a limitation of the study. Second, the cross-sectional design does not allow inferences from being made on the causality of any associated factor. More comprehensive longitudinal studies are needed to better understand the complex and potentially reciprocal relationship between the variables (i.e. stress and insomnia symptoms). Third, the self-reported information may cause bias owing to the social desirability effect and memory error. Fourth, we selected the snowball sampling strategy because the resources available were limited, and the COVID-19 pandemic was time dependent. The snowball sampling strategy was not based on random selection of the sample, nor did the study population represent the actual pattern of the general population. Studies with larger sample sizes and objective measures are highly recommended in the future.

Conclusion

The rate of sleep disturbance among children is 3.9% at over 70 points during the COVID-19 pandemic. As the stress levels of parents increase, the rate of sleep disturbances in their children increases. Many demographic characteristics of parents are related to the occurrence of sleep disturbances in their children. Family type, socioeconomic status, educational status, and the presence of sleep problems in the child before the pandemic, which are descriptive features, influence the total score of the SDSC. Furthermore, the presence of sleep problems in the child before the pandemic affects the total PSS score. There is a significant relationship between the total PSS score and the total SDSC score.

Practice implications

It is important that parents do not reflect on their stress related to the pandemic and that their children maintain a normal sleep pattern whenever possible. School nurses should educate children and their parents about the importance of enough sleep and factors that contribute to inadequate sleep among children during the COVID-19 pandemic.

Acknowledgement

The authors gratefully would like to thank the parents participating in the research.

Author contributions

1.Study design: A.S., G.A., S.K.
2.Data collection: A.S., G.A., S.K.
3.Data analysis: G.A.
4. Study supervision: A.S., G.A., S.K.
5.Manuscript writing: A.S., G.A., S.K.
6. Critical revisions for important intellectual content: A.S., G.A., S.K.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

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Ethical approval

This study received 26 February 2021 dated and 03–16 numbered approval was taken from Erzincan Binali Yildirim University Human Research Ethics Committee.

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