IMPACT OF COVID-19 PANDEMIC ON CHILDRENS SLEEP HYGIENE

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Abstract

It is essential to study the impact of the pandemic in children referring to the sleep disturbances, having in consideration that they may trigger neurobehavioral disorders or increase the frequency of occurrence of a present, existent disease. The effect on sleep in elementary school age, healthy children during the pandemic has been studied in various online survey studies with varied conclusions. Hence we believed that there is a need to comprehensively study the repercussions of the pandemic and the safety measures on children's sleep hygiene. This study provides us with the opportunity to conceive a general idea about children's sleep quality or sleep disruptions that will be used as guidelines on lifestyle behavior recommendations and psychotherapeutic approaches for the children.

No research study has been conducted in our country to examine the impact of the pandemic on the prevalence of sleep problems among the elementary school age children therefore the present study is focused on exploring the sleep patterns, sleep disturbances and other associated factors during COVID-19 pandemic outbreak in elementary school children.

From the research we were able to come to conclusions that children age 7-8, are more prone to experiencing few sleep subscales that relate to common sleep problems such as: bedtime resistance, sleep anxiety, night waking, and parasomnia while children at age 10-11 would perform more sleep onset delays than younger ones. Sleep anxiety correlates positively and impacts the bedtime resistance significantly, and children who have night waking sleep issues are those who also suffer more from parasomnia sleep symptoms.

Key Words: *children mental health, sleep patterns, sleep health, sleep disruptions, COVID-19.*

Introduction

Quality and appropriate sleep are valuable for the growth and development of children. Referring to the latest findings and studies which have been conducted to research about the impact of current pandemic on childrens sleep hygiene and their overall wellbeing have found frequent alterations in sleep habits; increased total sleep duration and negative impact on sleep quality.

Sleep disorders bring many problems along with them. Therefore, many correlated risk factors of distress have been investigated as independent variables, where many authors have come to an understanding that there is an increase in sleep disorders that significantly impact the quality of childrens life and mental wellbeing (Dondi, 2021).[1]

The psychological distresses due to the pandemic outbreak have become part of all major stages of human life circle, without excluding the children. Especially during the lockdown, as a safety measure, which confined the children to their homes for an extended period of time, with schools remaining closed and students only allowed to follow online lessons, in order to reduce contagion and pressure on the healthcare system, there have always been concerns that because of the prolonged home confinement during a disease outbreak may affect physical and mental health of children (Wang, 2020)[2], and not only them.

For the sake of children's wellbeing and in order to maintain their potential at doing their assessments, it is crucial for them that they have a good quality of sleep at night. During the home confinement the sleep issues emerge, which only triggers an increase in stress and anxiety levels and which may possibly bring a decrease in the overall quality of their life,

The loss of social contacts; the reduction of physical activity; the need to play with their school-mates in order to achieve their social development skills; the lack of sunlight exposure which may as well intrude with the flexibility in wake/sleep time, socio-emotional struggles due to changes in their family dynamic and overall mood among the family members due to various factors, the increase of screen-time and the changes in their eating habits, and many more to count, are enough

[1] Dondi, A., Fetta, A., Lenzi, J. *et al.* Sleep disorders reveal distress among children and adolescents during the Covid-19 first wave: results of a large web-based Italian survey. *Ital J Pediatr*, 47, 130. https://doi.org/10.1186/s13052-021-01083-8

[2] Wang,C., Pan, R., Wan, X. (2020). Immediate psychological responses and associated factors during the initial stage of the 2019 coronavirus disease (COVID-19) epidemic among the general population in China. IJERPH.;17:1729. doi: 10.3390/ijerph17051729.

reasons to doubt that the children in our place are facing with not so common sleeping problems. These changes can not only impact daily activities as well as the sleep/wake pattern and circadian rhythmicity.[3]

Having in mind that sleep disorders may trigger many other psychological issues along with them, and that the quality of sleep is very important for children's growth and development, we find it very crucial to study the prevalence of sleep disruptions during the pandemic COVID-19 among children.

Purpose

The purpose of the present study is to provide detailed data of the impact of COVID-19 pandemic outbreak on children sleep patterns and sleep disturbances, as well as highlighting the importance of the link between sleep health and family related factors.

With this survey, we aimed to evaluate the effects of COVID-19 pandemic on sleep quality as an indicator of psychological well-being among children living in North Macedonia. Secondly, we aimed to identify potential familial, socioeconomic, and personal risk factors for their occurrence.

Research methods

For the assessment of the sleep patterns and disturbances among children we have used the Children Sleep Habits Questionnaire which is a parent – rated questionnaire that evaluates common pediatric sleep difficulties. For data collection we have used the 'snowball' sampling technique, which is an online software platform, the one we used is called Survey Planet. The data were analyzed with the SPSS statistical software version 22.

We have selected the participants of this study by the so called cluster sampling" in the city of Struga, in a public elementary school, North Macedonia. The survey included 85 respondents divided by their school year (2^{nd} and 5^{th} grade).

Hypothesis:

[3] Altena E., Baglioni C., Espie C.A. Dealing with sleep problems during home confinement due to the COVID-19 outbreak: practical recommendations from a task force of the European CBT-I Academy. J Sleep Res. 2020;29 doi: 10.1111/jsr.13052.

H1. 2nd grade children experience higher levels of sleep disruptions than 5th graders in all sleep subscales.

H2. Younger school age children experience more sleep disturbances and anxiety than older one's.

H3. Sleep anxiety and bedtime resistance positively correlate with one another.

H4. Sleep anxiety impacts the onset of bedtime resistance behaviors in elementary school children.

H5. Children who experience night waking are more predisposed to experience parasomnia issues.

Findings and results

Regarding the data that we have analyzed, we have been able to come to these findings which indicate that 2nd graders experience higher moderate levels of sleep disruptions, while high levels of these disruptions weren't met in representative percentage to be mentioned.

We have come to conclusion that children at age 7-8 that experience moderate levels of sleep anxiety are (%= 48.8) of our population, while only (%=27.3) from 5th graders are experiencing moderate levels of sleep anxiety. Bedtime resistance is also more present at 2nd graders (%=43.90)whose percentage of those who exhibit these issues in moderate levels exceed those of 5th graders (%=27.27) significantly. Night waking issues are expressed in a moderate level at younger pupils in (%29.27), while 10-11 years old pupils (%18.18) exhibit such sleep issues. For parasomnia disorders we have found out that such symptoms are detected at (%=29.27) of 2nd graders and in (%=13.64) of 5th graders. Daytime sleepiness disorder hasn't been shown to be a concern in our population, since more than 92% of the respondents haven't met it's symptoms in their everyday life. The only sleep disruption in which 5th graders exceed with percentage of the sleep issues presence in moderate level, the 2nd graders, is sleep onset delay, on which 5th graders achieve (%=38.64) and 2nd graders have (%=26.83).

Through the implementation of this study we have been able to come to a finding that sleep anxiety and bedtime resistance are positively correlated with one another. The correlation is (r=0.731) which indicates strong correlation between these two variables, meaning that with an increase in sleep anxiety the children's probability of bedtime resistance with also grow, and vice versa.

Correlations

		SleepAnxiety	Bedtime resistance
SleepAnxiety	Pearson Correlation	1	.731**
	Sig. (2-tailed)		.000
	N	85	85
Bedtime resistance	Pearson Correlation	.731**	1
	Sig. (2-tailed)	.000	
	N	85	85

**. Correlation is significant at the 0.01 level (2-tailed).

Regression test has confirmed our hypothesis that sleep anxiety does influence the onset of bedtime resistance issues. Through our findings we were able to come to the following findings:

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.731[a]	.534	.528	2.247

a. Predictors: (Constant), SleepAnxiety

b. Dependent Variable: Bedtime resistance

The *R* value represents the simple correlation and is R=0.73 which indicates a high degree of correlation, while looking at the adjusted R square data, we come to an understanding that R^2 (0.53*100)= 53% of the variance in bedtime resistance is predicted by sleep anxiety.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	480.192	1	480.192	95.109	.000[b]
	Residual	419.055	83	5.049		
	Total	899.247	84			

a. Dependent Variable: Bedtime resistance

b. Predictors: (Constant), SleepAnxiety

This table indicates that the regression model predicts the dependent variable significantly well. The model is significant F(1.83)=96.11, (p=0.00<0.01), which indicates that, overall, the regression model statistically significantly predicts the outcome variable. Sleep anxiety accounted

for 53% of the explained variability in bedtime resistance. The regression equation was: predicted bedtime resistance = 2.43+9.21 x (sleep anxiety).

The table of the test of equality if covariance matrices, provides evidence that equal variance assumption is satisfied since (p=0.655 >0.01).

Box's Test of Equality of Covariance Matrices[a]

Box's M	1.665
F	.540
df1	3
df2	1483448.696
Sig.	.655

Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups.

a. Design: Intercept + Q1

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	.974	1540.112[b]	2.000	82.000	.000	.974
	Wilks' Lambda	.026	1540.112[b]	2.000	82.000	.000	.974
	Hotelling's Trace	37.564	1540.112[b]	2.000	82.000	.000	.974
	Roy's Largest Root	37.564	1540.112[b]	2.000	82.000	.000	.974
School grade	Pillai's Trace	.152	7.365[b]	2.000	82.000	.001	.152
	Wilks' Lambda	**.848**	**7.365[b]**	**2.000**	**82.000**	**.001**	**.152**
	Hotelling's Trace	.180	7.365[b]	2.000	82.000	.001	.152
	Roy's Largest Root	.180	7.365[b]	2.000	82.000	.001	.152

a. Design: Intercept + Q1

b. Exact statistic

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Sq

Corrected Model	TotalSleep	655.933[a]	1	655.933	10.978	.001	.117
	SleepAnxiety	458.512[b]	1	458.512	14.780	.000	.151
Intercept	TotalSleep	155199.604	1	155199.604	2597.524	.000	.969
	SleepAnxiety	40518.230	1	40518.230	1306.135	.000	.940
School year	**TotalSleep**	**655.933**	**1**	**655.933**	**10.978**	**.001**	**.117**
	SleepAnxiety	**458.512**	**1**	**458.512**	**14.780**	**.000**	**.151**
Error	TotalSleep	4959.172	**83**	59.749			
	SleepAnxiety	2574.782	**83**	31.021			
Total	TotalSleep	160296.000	85				
	SleepAnxiety	43298.000	85				
Corrected Total	TotalSleep	5615.106	84				
	SleepAnxiety	3033.294	84				

a. R Squared = .117 (Adjusted R Squared = .106)

b. R Squared = .151 (Adjusted R Squared = .141)

There was a significant difference between younger (7-8 y.o) and older pupils (10-11y.o) when considered jointly on the variables of sleep issues in general and sleep anxiety, Wilks Λ=0.85,F=7.36, ρ=0.01,partial η2=0.15. A separate ANOVA was conducted or each dependent variable, with each ANOVA evaluated at an alpha level of .025. There was a significant difference between 2nd and 5th graders on general sleep disruptions F(1.83)= 10.98, partial η2=0.12, with 2nd graders(M=45.54) scoring higher than 5th graders (M= 39.98). Also there was a significant difference between 2nd and 5th graders on general on sleep anxiety F(1.83)=14.78, partial η2=.0.15 with means with 2nd graders(M=24.17) scoring higher than 5th graders (M= 19.52).

A linear regression established that night waking could significantly predict parasomnia issues F(1.83)=70.57, p=0.001<0.01 and night waking accounted for 45% of the explained variability in parasomnia sleep disorders.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.678[a]	.460	.453	2.120

a. Predictors: (Constant), Nightwakenings

b. Dependent Variable: Parasomniatotal

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coeffi			95.0% Confidence Interval for B	
		B	Std. Error	Beta	T	Sig.	Lower Bound	Upper Bound
1	(Constant)	3.492	.707		4.942	.000	2.087	4.897
	Nightwakenings	.912	.109	.678	8.402	.000	.696	1.128

a. Dependent Variable: Parasomniatotal

These findings confirm our hypothesis that "children who experience night waking are more predisposed to experience parasomnia sleep issues".

Conclusions

Regarding our findings we have ended up with the following conclusions:

Second graders experience higher moderate levels of these sleep disruptions: sleep anxiety; bedtime resistance; night waking and parasomnia, in comparison to 5th graders who exceed them at only one sleep subscale which is: sleep onset delay. On the subscale of daytime sleepiness disorder, weren't found any significant differences between the respondents because the majority of each group of respondents didn't manifest any symptoms correlated to this sleep disorder.

We came to a conclusion that sleep anxiety and bedtime resistance are positively correlated with each other, meaning that the pupils that experience higher levels of anxiety are those who are more highly predisposed to exhibit bedtime resistance as well.

Throughout the implementation of the linear regression test we came to a finding that 53% of the variance in bedtime resistance is predicted by sleep anxiety.

We also came to an interesting finding through the MANOVA tests, that there was a significant difference between 2nd graders (7-8 y.o) and pupils on 5th grade (10-11y.o) when considered jointly on the variables of sleep issues in general and sleep anxiety, having the 2nd graders in advantage, scoring higher in both mentioned variables.

And the last but not the least conclusion brings us to an understanding that the sleep subscale of night waking can significantly predict the parasomnia sleep disorders for 45%.

In summary, our research study findings have highlighted the importance of children sleep health during the pandemic outbreak. I think that future studies should include assessment of other factors that could be related to sleep disruptions such as health concerns, academic performance during the period through e-learning, the family financial stability, social anxiety due to social isolation etc. in order to further explore and contribute in children's mental health.

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