

Effects of COVID-19 Outbreak on Children's Mental Health: A Comparative Study with Children Diagnosed and Isolated from Their Parents

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Abstract

Background

The current study aimed to compare the psychological responses of children exposed to different levels of stress during COVID-19 outbreak. Anxiety levels, negative thoughts, and quality of life of COVID-19 positive children (Child + group, n = 17), COVID-19 negative children who are isolated from their COVID-19 positive parent(s) (Parent + group, n = 59), and a control group (n = 64) were compared.

Methods

The participants completed a sociodemographic data form, the Screen for Child Anxiety and Related Disorders (SCARED), the Children's Negative Cognitive Errors Questionnaire (CNCEQ), and the Pediatric Quality of Life Inventory (PedsQL).

Results

The statistical analysis of the data obtained from the three groups revealed that the Parent + group recorded higher SCARED and CNCEQ scores and lower PedsQL scores in comparison to the control group. No statistically significant difference was found between the Child + group scores and the control group. It was observed that high CNCEQ scores and low PedsQL scores in the Parent + group predicted an increase in the SCARED scores.

Conclusions

Our study indicates that isolating children from their parents during the COVID-19 outbreak negatively influences their mental health and causes an increase in their anxiety levels. In addition, the results of the study highlight that preventive mental health measures should be applied for children separated from parents during pandemics.

Background

COVID-19 was first observed in December 2019. The virus has since rapidly spread across the world and has caused a pandemic [1]. The ongoing COVID-19 crisis has negatively influenced the physical and mental health of children and adolescents as well as adults [2]. The psychological responses of children to stressful events differ from the reactions of adults because they cannot appropriately express their emotions, and have not yet developed adequate coping skills [3]. The most common symptoms reported for children and adolescents during the pandemic period include behavioral problems, fears related to the infection of their loved ones by the disease, distractibility, and irritability [4].

It has been reported that children may have symptoms such as anxiety, depression, and loss of appetite when confronted with negative events that influence their environments [5]. The daily activities and habits of children and adolescents have been greatly transformed due to the home quarantine and school closures imposed during the outbreak [4]. The quarantine restricts social and physical interactions and impairs daily routines. Thus, children cannot participate in play and activities expected at their developmental level [5]. In addition, factors such as the length of the quarantine period, the fear of infection, the distancing from friends and teachers, and financial losses for the family could lead to mental health symptoms in children and adolescents, who may experience depression or anxiety disorder [6]. A study conducted in China to observe how outbreaks affected the mental health of children reported that 18.9% of the participants evidenced an increase in anxiety symptoms [6]. One study has suggested that the anxiety symptoms demonstrated by children and adolescents diagnosed with COVID-19 diverge depending on age and developmental levels [7].

Children and adolescents also exhibit varying psychological reactions to social and emotional difficulties [8]. The ways in which children interpret the events they must confront also influence their psychological responses [9]. Some children generate negative ideas about events because of cognitive errors such as personalization, generalization, and catastrophizing. These negative thoughts or interpretations cause them to ignore the positive aspects of the circumstances and to overemphasize the negativity [10]. Negative thoughts mediate the emotional and behavioral problems that may develop after critical life events [11–13]. Several studies have demonstrated that in children, negative thoughts are particularly associated with depression and anxiety disorder [14].

Measures taken to prevent the spread of the disease during an outbreak may also result in numerous lifestyle changes. Parental mental health may be influenced by economic problems and unemployment due to social isolation; in turn, these elements can impair the quality of life of children [15]. In addition, children feel an excessive sense of responsibility, and stressful life events at home may cause children to blame and punish themselves [16]. Such circumstances can also negatively influence the quality of life of children and adolescents.

Among the other stressors experienced during the ongoing COVID-19 outbreak, changes in family life can affect the mental health of children [17]. The most significant transformation is felt by the presence of an individual diagnosed with COVID-19 within the family. Getting diagnosed, being treated in a hospital, and being isolated after the treatment necessarily separate parent(s) from child(ren). When faced with stressors, children tend to observe the emotions and behaviors of their parents to accordingly regulate their emotions and shape their behaviors [18]. Therefore, children need the guidance of their parents to be able to normalize their emotions and adjust their behaviors during outbreak. Hence, children who are prohibited from contact with their parents due to quarantine measures may be at increased risk of developing a psychiatric disorder [18].

Clinicians can better determine treatment strategies if they can comprehensively understand the mental health impacts of diseases or negative life events comprehend the risk factors. A review of the literature

reveals that limited research has been conducted on the etiology of potential mental health problems that may be triggered in children and the factors that could exert a negative impact on the mental health of children during outbreaks of diseases [18]. In addition, only a few studies have examined the negative thoughts children may experience in times of health-related crises. The mental health problems of children caused by COVID-19 have not been examined in detail before. Although an increase in the general anxiety levels has been reported, the relationship between anxiety levels and quality of life has not been studied to the best of the knowledge of the authors of the present paper. Negative life events such as the ongoing outbreak can influence the mental health of entire communities; however, the risk of developing a mental health problem is exacerbated by personally falling ill or having someone in the family contract the disease. The present study thus intends to evaluate the mental characteristics of children exposed to varying levels of stress during the ongoing COVID-19 outbreak. To accomplish this purpose, this study aimed to compare the anxiety levels, negative thoughts, and quality of life of COVID-19 positive children, COVID-19 negative children who are isolated from their COVID-19 positive parent(s), and a control group.

Methods

Participants

The sample consisted of 140 children aged between 8 and 14 years, residing in Sakarya province. There were three groups of children in which children diagnosed with COVID-19 (Child+ group, n=17) from March 15 to May 15, 2020, COVID-19 negative children whose parent(s) were COVID-19 positive and isolated from their parent(s) (Parent+ group, n=59), and a randomly selected control group from the community sample (n = 64). The participants in the Child+ group had either one or both parents tested as Covid-19 positive. Only laboratory confirmed cases (SARS CoV-2 RNA detected by molecular method) were included in the study. The exclusion criteria were the presence of a neurological disease affecting cognitive functions, mental disability, and autism spectrum disorders. Figure 1 outlines the process of sample selection in all three groups.

Measures

Sociodemographic Data Form

The form was prepared by the researchers to examine sociodemographic variables that may be related to the influences of COVID-19 outbreak on mental health. The form includes questions such as age, gender, and education status.

The Screen for Child Anxiety and Related Disorders (SCARED)

The SCARED is a self-report scale containing 41 items that measures anxiety disorders in children developed by Birmaher et al. [19]. To fill the scale, either the child is asked to read the items or someone else reads the items to the child and marks the most suitable option. The scale includes five factors:

somatic/panic, generalized anxiety, social phobia or social anxiety, separation anxiety, and school phobia. Çakmakçı has established the reliability and validity of the Turkish version of the SCARED [20].

Children's Negative Cognitive Errors Questionnaire (CNCEQ)

The CNCEQ was developed by Leitenberg et al. [21] and derived from cognitive theory that measures for types of cognitive errors: catastrophizing, overgeneralization, personalizing, and selective abstraction. CNCEQ is a Likert type scale and high scores indicate high levels of cognitive errors. Karakaya et al. [22] has established the reliability and validity of the Turkish version of the CNCEQ.

Pediatric Quality of Life Inventory (PedsQL)

The PedsQL, developed by Varni et al., evaluates the general quality of life of children and adolescents aged between 2 and 18 [23]. There are four different forms for different age groups and the current study used 8-12 age form for 8-12 age group and 13-18 age form for 13-14 age group. The PedsQL includes four subscales: physical functioning (8 items), emotional functioning (5 items), social functioning (5 items), and school functioning (5 items). Çakın has established the reliability and validity of the Turkish version of PedsQL [24, 25].

Procedures

The date of birth, diagnosis dates, and contact information of all COVID-19 patients were obtained from the Sakarya Provincial Health Directorate after the necessary permission was obtained for the study. Clinical psychologists contacted the parents of subjects whose age range matched the research criteria via phone and informed them about the study. Parental consent for participation was collected using an online form. Parents were required to fill in the sociodemographic questionnaire and children were asked to fill in the other instruments. Video calls were used to support subjects who faced difficulties in filling up their forms. Data compiled from the responses of 140 children were used for the statistical analyses performed for the study.

Data Analyses

Statistical Program for Social Sciences 16 (SPSS 16) was used for data analysis. The suitability of numerical variables (numerical data) to normal distribution was investigated by visual (histograms analysis) and analytical (Kolmogorov–Smirnov Test and Shapiro–Wilk Tests) methods. The Mann–Whitney-U test was performed for the statistical evaluation of numerical data unsuitable for normal distribution between two sample groups, and the Kruskal–Wallis test was performed for the evaluations performed between more than two groups. The Bonferroni corrected Mann-Whitney U test was used in the event of significant differences ($p < 0.05$) found via the Kruskal–Wallis Test. Pearson Correlation Analysis was conducted to examine the associations between normally distributed numerical variables. Research data were evaluated considering a significance level of $p < 0.05$. Linear regression analysis was employed to examine the predictability of sociodemographic variables and the SCARED questionnaire scores of the Parent+ group that reported high anxiety levels. The independent variables in the model

were selected from variables that met the criteria of evincing normal distribution conditions and demonstrating within-group p values less than 0.25 in statistical analyses.

Results

Table 1 presents the outcomes of the comparative analysis of the sociodemographic characteristics of the groups and the scales used in the study. The three groups were similar in terms of age range and gender ($p > 0.05$). No significant differences were found between groups in terms of place of residence and the frequency of exposure to stressful situations within the family except for illness attributed to the COVID-19 outbreak ($p > 0.05$). Statistically significant differences were found between groups in the SCARED, CNCEQ, and PedsQL scores ($p = 0.013$, $p = 0.019$, $p = 0.024$, respectively). Post-hoc analyses were conducted to observe the differences among the groups. The PedsQL scores were found to be lower and the SCARED and CNCEQ scores were found to be higher in the Parent+ group than the control group.

Table 1: Comparison of sociodemographic factors and scores of the scales used in the study between study groups

	I	II	III	p	post Hoc analysis results
	Child+ Group (n=17)	Parent+ Group (n=59)	Healthy Control (n=64)		
Age in years	11.35±2.09	10.87±1.88	10.96±2.00	.639**	
mean.±SD	(10.90)	(10.67)	(10.60)		
(median)					
Gender (n, %)					
	8 (47.1%)	36 (61.0%)	29 (45.3%)	.198*	
Girl					
Boy	9 (52.9%)	23 (39.0%)	35 (54.7%)		
Place of Residence (n, %)					
Village / Town	10 (58.8)	38 (64.4%)	31 (48.4%)	.199*	
City	7 (41.2%)	21 (35.6%)	33 (51.6%)		
PedsQL	81.59±16.19	77.88±11.85	83.80±9.43	.019**	III>II
mean.±SD	(82.00)	(79.00)	(85.50)		
(median)					
SCARED	19.12±17.59	24.12±9.97	19.33±10.22	.013**	II>III
mean.±SD	(14.00)	(23.00)	(19.00)		
(median)					
CNCEQ	34.53±10.52	36.92±6.36	34.33±6.26	.024**	II>III
mean.±SD	(30.00)	(36.00)	(34.00)		
(median)					

*Chi-square test ** Kruskal Wallis test

SCARED scores were compared in terms of sociodemographic variables in Parent+ group and findings are presented in Table 2. No statistically significant differences in the SCARED scores were noted between the groups with regard to gender, residence, parental history of hospitalization, and exposure to a stressful situation in the family apart from the disease during the COVID-19 outbreak ($p > 0.05$).

Table 2: Correlation between scales, age and COVID-19 related variables in Parent+ Group

	1	2	3	4
1-Age	-			
2-SCARED	-.243	-		
3-PedsQL	.072	-.610**	-	
4-CNCEQ	-.182	.938**	-.529**	-
5-Days after the parent's diagnosis	-.064	-.026	-.051	-.057

**p<.01

The correlation between the scale scores and the age variables in the Parent+ group was examined and a significant positive strong correlation was observed between SCARED scores and CNCEQ scores ($r = 0.938$), and a significant moderate negative correlation was observed between SCARED scores and PedsQL scores ($r = -0.610$). There was a negative relationship between SCARED scores and age ($r = -0,243$), but no significant difference was noted between them. In addition, no statistically significant difference was noted between the SCARED scores and the time elapsed after the diagnosis of the parent ($r = 0.071$). Table 3 summarizes the results obtained from the correlation analysis between the SCARED scores and other variables in the Parent+ group.

Table 3: Comparison of children's SCARED scores based on sociodemographic variables and COVID-19 related variables in Parent+ Group

		SCARED	p
		Mean.±SD	
		(Median)	
<i>Gender (n, %)</i>			.205*
	Boy	25.50±9.56	
		(23.50)	
	Girl	21.96±10.42	
		(20.00)	
<i>Place of Residence (n, %)</i>			
	Village / Town	23.97±10.89	.739*
		(22.00)	
	City	24.38±8.29	
		(24.00)	
<i>Parent's history of in-Patient Treatment for COVID-19 (n, %)</i>			
	No	24.47±9.43	.854*
		(24.00)	
	Yes	23.98±10.28	
		(23.00)	
<i>Presence of a stressful situation in family except disease during COVID-19 outbreak (n, %)</i>			
	No	23.55±9.51	.782*
		(23.50)	
	Yes	25.14±10.92	
		(23.00)	

*Mann Whitney U test

The results of the linear regression analysis applied to examine the factors predicting the SCARED scores in the Parent+ group are shown in Table 4. The regression model, it was found that the CNCEQ and PedsQL scores predicted the SCARED scores and the corrected R² value was calculated at 0.889.

Table 4: Results of the linear regression analysis with SCARED scores as outcome variable in Parent+ Group

	B	Standard Error	Beta	t	p
Constant	-9.280	6.163		-1.506	.138
CNCEQ	1.314	.079	.838	16.691	.000
PedsQL	-.136	.042	-.162	-3.264	.002
Age	-.415	.226	-.078	-1.836	.072

Adjusted R²=.898

Discussion

The current study compared the anxiety levels, negative thoughts, and quality of life of children diagnosed with COVID-19 along with parent(s), COVID-19 negative children isolated from parent(s) who were diagnosed with COVID-19, and a control group. The study also scrutinized factors predicting high anxiety levels in the group of children separated from their parent(s) who tested positive for COVID-19.

The literature review yielded limited information about the ways in which negative thoughts and anxiety affect children and parents diagnosed and quarantined during epidemics. An extant study that evaluated the psychological influences of quarantine during epidemics on different age groups indicated that negative emotions and ideas increased during quarantine experiences. In addition, the study posited that the psychological effects caused by the quarantine experience are higher in younger age groups [26]. Another study reported that 30% of the children who were isolated and quarantined during the H1N1 outbreak of 2009 exhibited high post-traumatic stress symptoms. The same study also evidenced that generalized anxiety and adjustment disorders were frequent psychiatric difficulties faced by individuals who received mental health services after that outbreak [27]. The current study found that children isolated from their parents demonstrated higher anxiety levels compared to the control group. It is also striking that there no difference in anxiety levels was found between COVID-19 positive children with COVID-19 positive parent(s) and the control group. Since all children diagnosed with COVID-19 in the present study had at least one parent diagnosed with COVID-19, and were not isolated from their parents. The potential impact of isolation is highlighted by this result. Most children diagnosed with COVID-19 have been reported to be asymptomatic [28]. Therefore, the higher anxiety levels and increased negative thoughts evidenced in the present study during the current outbreak could result from the children's fear of leaving or losing parents rather than being themselves afflicted.

The current study found children whose parent(s) were diagnosed as COVID-19 positive and were isolated from them during the quarantine period exhibited more negative thoughts. The findings of the conducted analyses indicated that children experienced a heightening of negative feelings such as hopelessness or weakness that led to a sense of insecurity when their parents were infected by a sudden, life-threatening, and unknown disease [29, 30]. Remaining with the parent(s) during the health crisis accords children with confidence and reduces their anxiety [31]. However, the strict visiting restrictions and not being able to see parent(s) during illnesses such as COVID-19 causes children to feel excluded and lonely [32]. Children do not receive adequate and correct information about the medical condition of their parent(s) seem to bridge the gaps left by the missing information with negative thoughts and ruminatively focus on these

unconstructive ideas [33]. Despite the fact that we have limited knowledge regarding the information about the conditions in which the children remained in quarantine when they were isolated from the parents and factors caused the increase of negative thoughts in the isolation process, the diagnosis of COVID-19 among parent(s) and the isolation from the parents may be an important factor that leads to the increase of negative thoughts in children.

In the current study, it was revealed that children whose parent(s) were diagnosed with COVID-19, had lower levels of quality of life compared to control group. It was suggested that when parents contract an acute illness, it leads sudden changes in the family's daily life and children may have difficulties in adapting these changes in a short time [34]. Adjustment problems increase especially in cases of hospitalization and need for intensive care unit because of the illness [35]. The literature review did not yield any study on the influences exerted by quarantines on the quality of life of children whose parents had contracted an infectious illness. Our results suggest that separation from parents during the outbreak plays a crucial role in the decrease observed in the children's quality of life.

A decrease in quality of life and an increase in negative thoughts leading to elevated anxiety levels were noted in children whose parent(s) was diagnosed with COVID-19. A negative correlation was previously evidenced between anxiety levels and the quality of life of children whose parents were diagnosed with life-threatening physical diseases such as cancer [36]. Decreased social support or restricted physical activities during a parent's illness cause children to become more anxious [37]. Previous studies have also reported that children need people who are close to them in order to feel safe during stressful life events. Anxiety levels are increased and quality of life is negatively influenced for children who are forced to stay away from their parents in such times [38]. Further, studies have shown that it is easier for children to cope if they maintain their daily routines and do not confront changes related to schooling or friends [39, 40]. Measures to prevent the spread of the COVID-19 outbreak have applied fundamental changes and restrictions that may pose adaptation-related difficulties for children. All these factors may play role in the increase of the level of negative thoughts and decrease in quality of life of children.

No significant relationship was found between the sociodemographic characteristics and the treatment and quarantine periods of the group of children who were separated from parents diagnosed as COVID-19 positive. To our knowledge, no study has yet evaluated the influences of isolation periods on the mental health of children. The review of extant literature revealed that children of parents diagnosed with a serious illness react in different ways depending on their ages [41]. Nevertheless, just like the present study, some previous researches have reported the absence of a relationship between anxiety levels evinced by children during parental illness and the children's age or gender [36]. The very small number sample of COVID-19 negative children whose parents were diagnosed with COVID-19 may also distort the accuracy of the comparison of anxiety levels in relation to each sociodemographic variable.

The study has a few limitations. The most important one is that face-to-face interviews were not plausible due to the risk of infection. Other important limitations are that individuals' overall hospital records could not be evaluated in terms of treatment variables. Particularly, the facts that parents of a

small number of children diagnosed with COVID-19 agreed to participate in the study and the limited number of children diagnosed with COVID-19 may have affected our results. However, previous studies have generally been conducted with community sample. In addition, number of studies with children who have been diagnosed with COVID-19 and whose parents have been diagnosed with COVID-19 are very limited. The sample of COVID-19 positive children and COVID-19 negative children isolated from their parent(s) makes this study valuable. To the best of our knowledge, the present study differs from others because it is the first to compare anxiety, quality of life, and negative thoughts of both children of COVID-19 patients and children diagnosed with COVID-19.

Conclusion

In conclusion, the study compared the mental health of children exposed to different levels of stress during COVID-19 outbreak. It was observed that levels of anxiety and negative thoughts were high and quality of life were low among children whose parents were diagnosed with COVID-19 and isolated from them. It was determined that high negative thoughts and low quality of life in this group predicted high level of anxiety.

Declarations

Ethics approval and consent to participate

To conduct the study, permissions were obtained from the Ethics Committee of the Faculty of Medicine of Sakarya (71522473/050.01.04/163) and the Republic of Turkey Ministry of Health COVID-19 Scientific Research Board (2020-05-01T18_42_03).

Consent for publication

Not applicable.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Not applicable.

Authors' contributions

ŞK, EE, EY, and MA analyzed and interpreted the data, FTA,ÖN, ET, OK collected the data. All authors read and approved the final manuscript.

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Figures

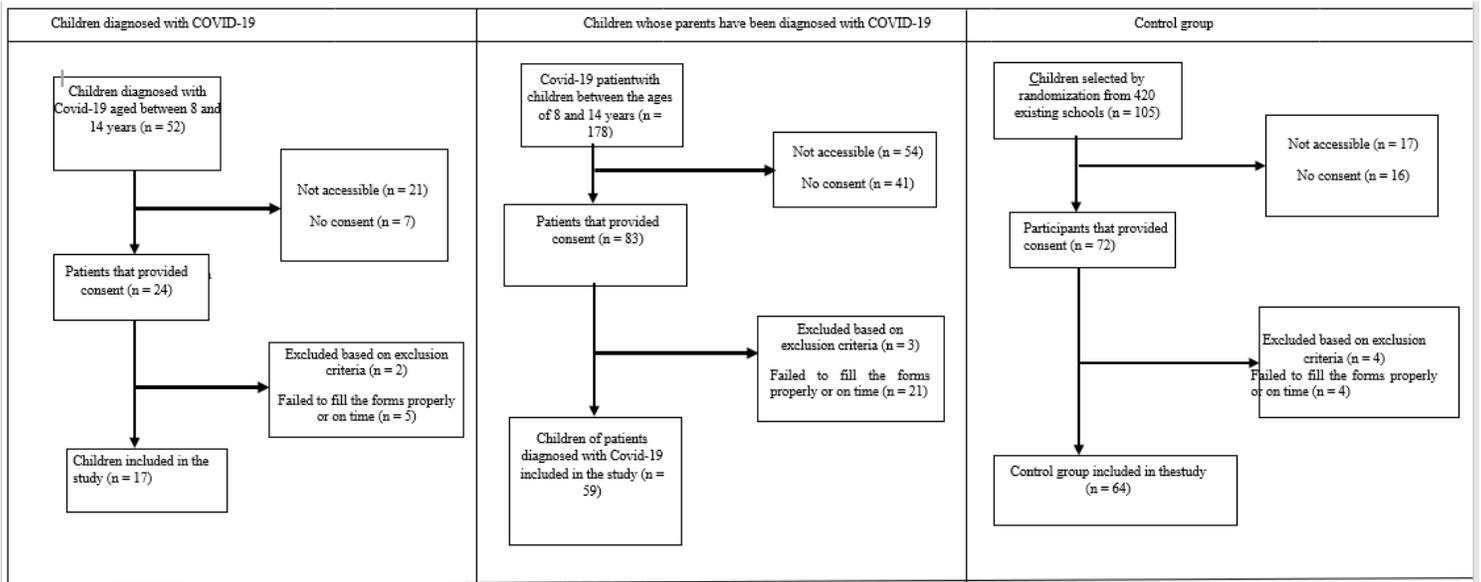


Figure 1

Sample Selection of Groups