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Anxiety in Paediatric Patients Diagnosed with COVID-19 and the Affecting Factors

Abdullah Solmaz, PhD, MD,[1] Hülya Karataş ⬤ , PhD, RN,[2]
Tuğba Meliha Fatma Ercan, PhD, MD,[3]
Tuğba Erat ⬤ , PhD, MD,[4] Filiz Solmaz, Msc,[5] *and*
Hasan Kandemir, PhD, MD[6]

[1]Department of Pediatrics, Faculty of Medicine, Harran University, Sanliurfa, Turkey
[2]Pediatric Nursing Department, Faculty of Health Sciences, Harran University, Sanliurfa, Turkey
[3]Pediatrics Department, Sanliurfa Provincial Health Directorate, Sanliurfa, Turkey
[4]Department of Pediatric Infectious Diseases, Sanliurfa Egitim ve Arastirma Hastanesi, Sanliurfa, Turkey
[5]Department of Nursing, Faculty of Health Sciences, Harran University, Sanliurfa, Turkey
[6]Department of Child and Adolescent Psychiatry, Celal Bayar University, Manisa, Turkey
Correspondence: Hülya Karataş, Pediatric Nursing Department, Faculty of Health Sciences, Harran University, Sanliurfa, Turkey.
E-mail <hkaratas@harran.edu.tr>.

ABSTRACT

Objective: Children may be greatly affected by events that increase stress in individuals in general and are reported as the vulnerable groups during the coronavirus disease-19 (COVID-19) pandemic. But most of the studies in the literature investigating the mental effects of the pandemic on children were conducted with healthy children and limited study has evaluated the effect on children diagnosed with COVID-19. The aim of this study is to determine the anxiety level in paediatric patients diagnosed with COVID-19 and the affecting factors.

Methods: This descriptive study was conducted with 292 children aged 8–18 years who were diagnosed with COVID-19. Data were collected using the Descriptive Characteristics Questionnaire and the Screen for Child Anxiety Related Emotional Disorders (SCARED). Interviews were held by phone.

Results: Males were 51.4% of participants, the mean age was 16.04 ± 1.93. 84.1% of them had a chronic disease; the transmission source was family/relatives/friends for 41.1%. By social isolation, 49.3% were affected and 33.2% were affected by disease symptoms the most in this process. The most common symptoms were headache (61.6%), and asthenia (59.9%). Mean anxiety scale score was 25.5 ± 14.37. The effect of gender, number of symptoms and transmission source on anxiety score was significant ($p < 0.05$).

Conclusion: Paediatric patients diagnosed with COVID-19 were found to have high anxiety levels. It is recommended to re-evaluate the duration of children's social participation and support the management of COVID-19 symptoms that affect their anxiety level.

KEYWORDS: adolescent, anxiety, child, COVID-19, pandemic

INTRODUCTION

Coronavirus disease-19 (COVID-19) is an infectious disease caused by the SARS-CoV-2 virus. COVID-19 was first seen with unidentified pneumonia symptoms in Wuhan, China towards the end of 2019 and then became a pandemic by spreading all over the world. According to the World Health Organization (WHO) report dated 17 November 2021, there are 254 256 432 COVID-19 cases in the world and 5 112 461 people have died due to this infection [1]. COVID-19 showed a rapid spread in the entire world at the beginning of 2020 and in Turkey, the first case was reported on 13 March 2020. The current total number of cases is 8 388 542 according to data dated 18 November 2021 and 73 342 deaths were reported [2]. The first child COVID-19 case was confirmed on 20 January 2020 [3] and it was reported on 31 January 2020 that 20 children were infected in China [4]. According to the current Turkish report dated 8 November 2020, 0.76% of the cases are aged under five, 3.6% are between 5 and 14 aged, and 15.3% are aged between 15 and 24 [2].

Some literature data showed that COVID-19 is seen in children in all age groups starting from the neonatal period and in both gender. It is also reported that the prevalence in children is 2.4% and 90% of children are asymptomatic [5, 6]. In a systematic review in which 45 studies were examined, it was stated that the prevalence of infection in children ranged between 1% and 5% [7]. The course of COVID-19 is mild or moderate in children and the symptoms differ from adults. However, there is no enough scientific evidence regarding the use of drugs used in the treatment of COVID-19 in children. It was reported that some drugs used in the treatment of COVID-19 are not used in certain age groups among children [8]. The most common COVID-19 symptoms in children are fever and cough [9]. Although child cases have been reported all over the world, there are some unexplained situations regarding the effect of the infection on children [10].

Children and adolescents are highly vulnerable to the effect of constant stress sources since they are in sensitive developmental periods. Therefore, it is important to monitor and evaluate them mentally during and after the pandemic. A study examining the impacts of the pandemic on the mental health of children and adolescents reported that the pandemic has multidimensional impacts, pandemic stressors may trigger neuroinflammation and behavioural disorders and these stressors may lead to neuropsychiatric outcomes in adulthood. Also the study indicated that social isolation related to the pandemic may lead to neuroimmunoendocrine changes and measures are to be taken against mental health [11, 12]. After the COVID-19 pandemic, various psychological health problems such as anxiety and depression have emerged in societies and emotional disorders have increased [13–18].

Studies have been conducted related to the impacts of COVID-19 since it was declared a pandemic. But in the literature, most of the studies in the literature investigating the mental effects of the pandemic on children were conducted with healthy children and limited study has evaluated the effect on paediatric patients with COVID-19. For all this reasons, this study was designed to establish anxiety levels in paediatric patients aged 8–18 who were diagnosed with COVID-19 and the affecting factors, to determine the symptoms of the disease and to appoint change of anxiety levels according to some socio-demographic variables in children with COVID-19.

MATERIAL AND METHODS

Design and population of the study

This descriptive and cross-sectional study was carried out between October 2020 and February 2021 in two big hospitals, which are located in the town where COVID-19 patients receive treatment in the province of Sanliurfa located in southeastern Turkey. Although the number of healthcare personnel working in the COVID-19 clinics of hospitals varied according to the course of the epidemic, at the time of the study, 10 nurses and 3 doctors were working in the service with a capacity of 16 beds. Since the number of paediatric patients in the study was lower than that of adult patients, no sample selection was made and all patients who were reached were included in the study. The sample of the study consisted of 292 paediatric patients aged 8–18 who were diagnosed with COVID-19.

Data collection tools

The data were collected using the Descriptive Characteristics Questionnaire and the Screen for Child Anxiety Related Emotional Disorders (SCARED). The Descriptive Characteristics Questionnaire consists of 27 questions and 2 sections. The first section includes questions for children and their parents (age, gender, parents' educational status, number of siblings, etc.) and the second section consists of questions about the COVID-19 process (the duration of the child's hospitalization, the belief that the COVID-19 process will end, the history of the child's admission to intensive care, the history of a relative's admission to intensive care or death due to COVID-19, level of knowledge about COVID-19, etc.).

In the study, the data were collected by phone calls since the children with COVID-19 were obliged to be isolated at the hospital/home. Phone calls were made within the week following the end of the quarantine period when the child and his family were available. Considering that the duration of discharge may affect the anxiety score, all children were interviewed at the same time period after discharge. Information on children isolated at home was obtained through retrospective examination of hospital records. Before starting to collect the data, children and their parents were informed about the study and their informed consent was obtained. All interviews were conducted by a paediatric nursing specialist who was among the authors of the study. Before the interview, the opinion of the child mental health specialist, who is among the authors of the study, was taken.

The questions in the data collection forms were prepared online and the link was sent to children's and/or their parents' phones. After receiving parents' permission about their children's involvement in the study, a link including the questionnaires was sent and the children were asked to answer the questions (Fig. 1).

Screen for child anxiety related emotional disorders (SCARED)

The SCARED was developed by Birmaher *et al.* [19] to screen childhood anxiety disorders and its Turkish validity and reliability study was conducted by Karaceylan Cakmakci [20]. The SCARED comprises 41 items that are rated on a 3-point scale with responses: not true or hardly ever true (0 point), somewhat true or sometimes true (1 point) and very true or often true (2 point). The total anxiety score is the simple sum of all items and it is between 0 and 82 point. Birmaher *et al.* [19] reported the Cronbach alpha reliability coefficient as 0.74–0.93 for the general scale and subscales. In this study, the Cronbach alpha for the total scale score was 0.92.

Statistical analysis

The independent variables of the study were children's age, gender, number of symptoms, allergy status, and presence of a disease other than COVID-19, transmission source, and loss of relatives due to COVID-19. The dependent variable of the study was the mean total anxiety scale score. The data were analysed with SPSS v.23. Descriptive statistics were presented as number, percentage, mean and standard deviation. Homogeneity of the variables was examined using the Levene's test. The effects of some variables on participants' anxiety total scores were tested using the linear regression (enter step). The significance level was taken as $p < 0.05$.

Ethical aspects

Prior to the study, written permission was obtained from the Ministry of Health (2020-07-14T15_46_45), Harran University Ethics Committee (ethics committee approval dated 28 September 2020 and numbered 20.17.07), and the Provincial Directorate of Health. Before the study, the children and their parents were informed and their verbal and written consent was taken and patient data is anonymized.

RESULTS

The mean age of the children was 16.04 ± 1.93 (min: 9, max: 17). Of the children, 51.4% were male; 48.6% were female; 78.8% were in the 15–18 age range; 21.2% were aged 14 years and below. When the educational status of the mothers was examined, it was determined that 37% of the mothers and 27.7% of the fathers were primary school graduates. Of them, 52.7% had poor/inadequate income. Of the participants, 88.4% had received all of their
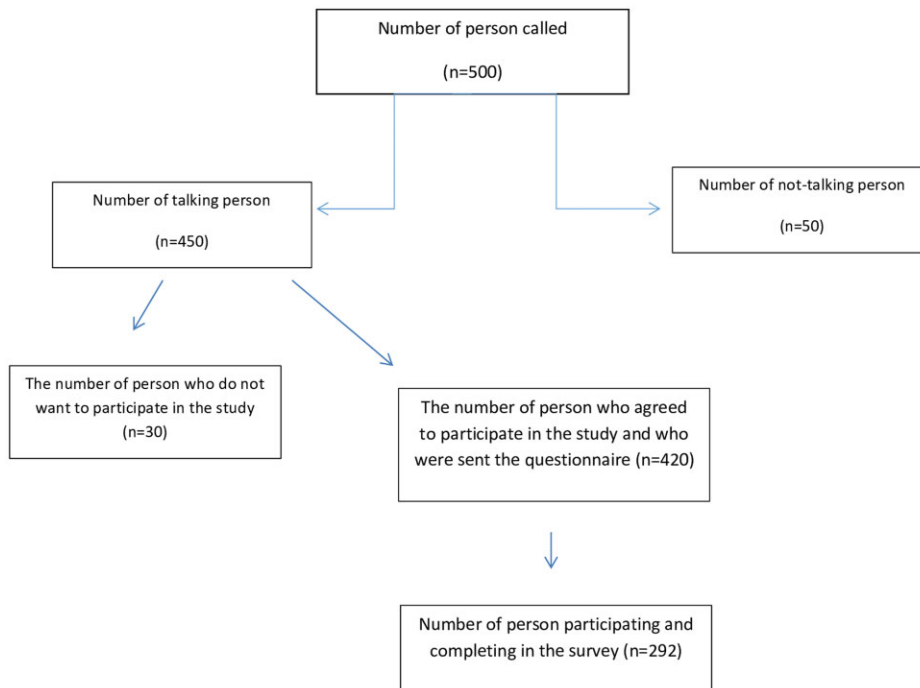
Fig. 1. Data collection process.

vaccinations according to the age group; 2.1% had not received any vaccination; 82.9% stated that they had no allergy. The most common symptom was headache (61.6%), followed by asthenia (59.9%) and cough (50%). Table 1 shows the distribution of the answers given by children to the questions regarding the COVID-19 diagnosis.

In this study, the children's mean anxiety scale score was 25.5 ± 14.37 (min 0–max 69). The subscale mean scores of the scale were determined as 5.87 ± 4.84 for panic/somatic (0–25), 6.79 ± 4.7 (0–18) for general anxiety, 4.96 ± 3.08 (0–14) for separation anxiety, 6.15 ± 3.68 (0–14) for social phobia, and 1.8 ± 1.7 (0–8) for school phobia.

Table 2 examines the effect of gender, number of symptoms, age, allergy, presence of a comorbid disease, transmission source and loss of a relative due to COVID-19 variables on the anxiety scores of children diagnosed with COVID-19. The effect of gender ($p < 0.001$), number of symptoms ($p = 0.001$) and transmission source ($p < 0.001$) values on the anxiety score was significant. The mean anxiety score was 29.54 for girls and 21.71 for boys. The effect of

age (two groups; 9–14 and 15–18), allergy (two groups; yes and no), presence of a comorbid disease (two groups; yes and no) and loss of a relative due to COVID-19 (two groups; yes and no) on the anxiety score was not statistically significant ($p > 0.05$).

The effect of the number of symptoms experienced by children due to the diagnosis of COVID-19 on the anxiety score was important. The score was 22.42 in children with 0–5 symptoms, 27.63 in children with 6–10 symptoms, and 30.89 in children with 11 symptoms or above. According to the number of symptoms, the group with the highest anxiety score consisted of children with 11 symptoms and above and the group with the lowest score consisted of children with 0–5 symptoms (Table 3).

A score difference of 3.182 was found between the mean scores of those with 0–5 symptoms and those with 6–10 symptoms. A score difference of 7.806 was found between the mean scores of those with 0–5 symptoms and those with 11 symptoms. There was a difference of 4.624 between the mean scores of those with 6–10 symptoms and those with 11 symptoms (Table 3).

Table 1. Distribution of participants' some descriptive characteristics regarding COVID-19

Variables ($n = 292$)	n	%
Presence of a disease other than COVID-19		
Yes	44	15.1
No	248	84.9
Medication used regularly		
Yes	16	5.5
No	276	94.5
COVID-19 transmission source		
One of the family members	67	22.9
Close relatives	35	12.0
Friends	18	6.2
Unknown	115	39.4
Other (public transport, shopping mall, public places)	57	19.5
CT result		
Negative	16	5.5
Positive	35	12.0
Not performed	240	82.2
The most common symptom		
Headache	180	61.6
Asthenia	175	59.9
Cough	146	50
Loss of taste	144	49.3
Loss of smell	140	47.9
Joint pain	131	44.9
Hospitalization status		
Yes	19	6.5
No	272	93.2
Following the hand washing rule during the COVID-19 process		
Always	201	68.8
Often	75	25.7
Sometimes	11	3.8
Rarely	5	1.7
Following the mask wearing rule during the COVID-19 process		
Always	204	69.9
Often	62	21.2
Sometimes	19	6.5
Rarely	7	2.4
Following the social distancing rule during the COVID-19 process		
Always	186	63.7
Often	70	24.0
Sometimes	27	9.2
Rarely	9	3.1
Hospitalization in intensive care due to COVID-19		
No	292	100.0

(continued)

Table 1. (continued)

Variables ($n = 292$)	n	%
Having a relative hospitalized in intensive care due to COVID-19		
Yes	73	25.0
No	219	75.0
Loss of a relative/contact due to COVID-19		
Yes	40	13.7
No	248	84.9
Degree of deceased person ($n = 40$)		
First degree (mother, father, sister)	1	2.5
Second degree (grandmother, grandfather, aunt, uncle)	15	37.5
Third degree (first cousins, great-grandparents, aunt, uncle, etc.)	3	7.5
Fourth degree or no kinship	21	52.5
Believing that the COVID-19 pandemic will end		
Yes	149	51.0
No	143	49.0
Having sufficient knowledge about COVID-19		
Yes	205	70.2
No	26	8.9
Indecisive	61	20.9
The most affecting situation during the COVID-19 diagnosis process[a]		
Social isolation, staying home	144	49.3
Disease symptoms	97	33.2
Getting behind with school and education life	53	18.2
Fear of death or death of relatives	32	11.0
Fear of not being able to overcome the disease	27	9.2
Fear of infecting others	26	8.9
Increased economic troubles	7	2.4

Table 2. Examination of the effects of some variables on participants' anxiety levels

Source	Unstandardized coefficients		Standardized coefficients	t	p value
	B	Standard error			
Gender	−6.104	1.594	−0.213	−3.828	**<0.001***
Number of symptoms	3.859	1.118	0.189	3.453	**0.001***
Age	1.400	1.950	0.040	0.718	0.473
Allergy	3.749	2.093	0.099	1.791	0.074
Presence of a disease	3.778	2.188	0.094	1.726	0.085
Transmission source	−3.582	0.902	−0.224	−3.970	**<0.001***
Loss of a relative due to COVID-19	0.676	2.273	0.016	0.297	0.766

Linear regression model. *$p<0.05$ were represented in bold.
$R^2 = 0.183$ (Adjusted R Squared $= 0.163$).

Table 3. Descriptive statistics for anxiety scores according to gender and number of symptoms

	Girl	Boy	Total
0–5 symptoms	26.44 ± 1.77	19.89 ± 1.44	22.42 ± 1.15
6–10 symptoms	31.47 ± 1.65	21.21 ± 1.84	27.63 ± 1.32
11 symptoms and above	31.65 ± 4.16	30.29 ± 3.26	30.89 ± 2.55
Total	29.54 ± 1.18	21.71 ± 1.11	25.52 ± 0.84

Table 4. Descriptive statistics of some variables of the participants

Variables		Mean ± S.D.
Age	9–14 years	26.05 ± 1.81
	15–18 years	25.38 ± 0.95
Allergy	Yes	29.44 ± 2.15
	No	24.71 ± 0.91
Presence of a disease	Yes	29.84 ± 2.06
	No	24.75 ± 0.91
Transmission source	Family, friends	29.17 ± 1.26
	Public places	27.26 ± 1.93
	Unknown	20.85 ± 1.28
Loss of a relative due to COVID-19	Yes	24.78 ± 2.29
	No	25.65 ± 0.91

The mean score was 31.42 in the group who reported transmission from family and friends, 29.63 in the group who thought they were infected in public places and 22.99 in the group who did not know the transmission source. The highest anxiety score was obtained in the group who reported transmission from family and friends (Table 4).

DISCUSSION

Adolescence is the transition period from childhood to adulthood. During this period, significant changes are seen in biological, psychological, social and other areas [21, 22]. In the COVID-19 process, the focus has been more on older people, and the psychosocial and emotional states of adolescents have been given less attention. However, it is stated that in this process, the physical and mental health, peer relationships, and future plans of the adolescents are affected in an unpredictable way [23]. Paediatric patients are exposed to much negative information from the media or from the conversations of adults nearby during the coronavirus pandemic. Furthermore, they experience changes in their daily routines and socialization processes with their peers are interrupted due to quarantines. Besides many effects, it is stated that the COVID-19 pandemic can cause many psychological effects in paediatric patients such as anxiety, fear and concerns [24, 25]. For instance, in the COVID-19 epidemic, measures such as physical distance, quarantine and staying away from the school environment negatively affect the development of adolescents. Many children are anxious due to isolation and fear and worry about losing their relatives or their own health due to the virus. In addition, there is an increase in anxiety about adolescents' failure and failure to plan for the future [21].

In this study, 78.8% of the children are between the ages of 15–18. In the study, the mean anxiety scale score of the participants was 25.5 ± 14.76; 50% of them scored 25, the cut-off score of the scale, or above and their anxiety levels were high. It is thought that the high anxiety scores in the study are due to

the fact that the majority of the sample consists of adolescents between the ages of 15–18 and this age group is more inclined experiencing these anxiety than others. In a study conducted with high school students in China during the outbreak, the prevalence of anxiety symptoms was 37.4% [17]. In another study conducted with 7143 university students, the prevalence of anxiety was 24.9% [26]. The anxiety rate was reported to be 33.06% in a group aged between 8 and 17 in Turkey [27]. The anxiety rate was reported higher in a group aged between 17 and 19 in Italy [23]. The rate of anxiety in children and adolescents during the pandemic is higher compared to the pre-pandemic period [17, 28]. The results of our study, which is the only study conducted on the anxiety level of paediatric patients diagnosed with COVID-19, show that the rate of anxiety during diagnosis is higher.

When anxiety scores were evaluated according to gender, similar to our study, girls were reported to have higher anxiety scores [17, 23, 29]. In a study, on the other hand, no difference was found between gender in terms of anxiety scores [26]. In our study, there was no significant difference when the effect of the age variable on the anxiety score was examined. In the literature, when children and adolescents were compared, some data showed that the anxiety scores increased as age increased [17, 29]. In our study, no significant change was observed in the anxiety levels of the individuals in the presence of another comorbid disease. However, some studies showed that the anxiety level increases in the presence of a chronic disease during the COVID-19 process [30, 31].

In the study, the most common symptoms were determined as headache, asthenia and cough (61.6%, 59.9% and 50%), respectively. In the literature, there are different results regarding the symptoms but fever and cough generally appear as the predominant clinical characteristics. However, the data on the prevalence of cough and other upper respiratory tract symptoms support our study [32–34].

As in many studies, the most common transmission source was one of the family members who shared the same house with the child. Many studies reported that the most important transmission source was, similarly, one of the family members, especially the parents [32, 35]. These results showed that children were less effective in transmission and were less likely to be infected by someone outside the home. The fact that the studies were conducted after the schools were closed may have affected the results. Further studies on the subject and interventions should be conducted in this process to prevent the negative effects of social isolation and being away from school and friends on children and adolescents [25].

The rate of those who were asymptomatic was 10.1% and similar results were reached when the literature was examined. In the literature, the rate of those who were asymptomatic ranges between 4% and 23% [32, 36]. When the effect of the number of symptoms on the total scale score was examined, it was found that the increase in the number of symptoms affected the anxiety scale score and that the anxiety score increased as the number of symptoms increased (Tables 2 and 3; $p < 0.05$). Although the rate of children and adolescents who were asymptomatic was high, the participants stated that the disease symptoms (33.1%) were the most affecting factor during the process after social isolation, being away from friends and relatives when they were asked 'What affected you the most in this process?' These results revealed that the symptomatic group was psychologically most affected by COVID 19 symptoms and that both physicians and nurses should focus more on symptom management in this group.

Since the children and young individuals are in isolation during the COVID-19 process, they suddenly lost many activities that form their daily routines such as school, non-class activities, social interactions, and physical activity, which allow them to be together with their peers and social circles. These can be the important factors that increase their anxiety considering that anxiety disorders occur in the absence of interpersonal communication [37]. Anxiety symptoms are the most common clinical diagnoses in children and adolescents and are considered a risk factor for other psychiatric disorders in adulthood. Facing disruptions in the increasingly complex social environment during the pandemic and deteriorations in various living areas can worsen anxiety and increase social costs for families [29]. For this reason, more attention should be paid to the

mental health of children and adolescents and necessary measures should be taken in this process.

This study has some limitations, also. The study was actualized only with COVID-19 paediatric patients. In the study to be done in future, to better evaluate effects of COVID 19 on anxiety levels in children, it will be better to add a control group, trying to match with the patient group as much as possible. On the other hand, in the literature, it is seen that there is not enough data about anxiety levels and reasons of children with COVID-19 and this study presents important information on this subject. In this way, it is thought that the results of the study will guide health services provided for children diagnosed with COVID-19.

In this study, it was determined that paediatric patients diagnosed with COVID-19 had high anxiety levels. Although the prevalence of COVID-19 is lower in children than in adults, symptoms caused by COVID-19, compulsory isolation, etc. affect the mental state of children. Therefore, it is recommended to re-evaluate the duration of social involvement for children and make appropriate interventions on the management of COVID-19 symptoms, which is an issue that affects the anxiety level and is neglected by health professionals and parents.

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