



The effects of anxiety about their parents getting COVID-19 infection on children's mental health

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Abstract

Although the effects of COVID-19 on children's physical health are relatively less serious, it is known that pandemic has serious effects on children's mental health. Anxiety and related symptoms increase among children during this period. The main purpose of this study is to measure children's anxiety about their parents and themselves with structured scales. Children who applied to the pediatric outpatient clinic were included in the study. Participants were asked questions about their parents' and their own concerns about getting COVID-19. Psychiatric symptoms of the participants were evaluated with the Revised Child Anxiety and Depression Scale, the Coronavirus Anxiety Scale, and Anxiety Sensitivity Index for Children. Increased social phobia, separation anxiety, generalized anxiety, total anxiety, total internalizing disorder scores, increased anxiety sensitivity, and increased coronavirus anxiety were detected among children who have increased subjective anxiety for themselves about getting COVID-19. In addition, increased social phobia, depression, separation anxiety, generalized anxiety, total anxiety, total internalizing disorder scores, and anxiety sensitivity were also detected among children who have increased subjective anxiety for their parents about getting COVID-19. In logistic regression, panic, separation anxiety, and generalized anxiety scores significantly predicted children's anxiety for their parents, and separation anxiety and generalized anxiety were shown to predict anxiety for themselves.

Conclusion: Children who have increased subjective anxiety about their parents and themselves also have increased anxiety, anxiety sensitivity, and coronavirus anxiety scores. This is the first study which determines that children who are worried about their parents and themselves have higher levels of anxiety, depression symptoms, and anxiety sensitivity.

What is Known:

- Although COVID-19 pandemic's negative effects on the mental health of children and adolescents has been investigated and consistently demonstrated, the children's anxiety about their parents getting infection were less researched.

What is New:

- Children's anxiety about their parents getting SARS-Cov-2 infection was investigated with the questionnaires.
- The scale scores of the children who expressed their anxiety with open-ended questions were statistically significantly higher.

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During the writing process, the affiliation of Dr. Acikel has changed; this study was conducted in Dr. Sami Ulus Maternity and Children's Health and Diseases Training and Research Hospital, Ankara, Turkey.

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Abbreviations

COVID-19	Coronavirus disease 2019
SARS-CoV-2	Severe acute respiration distress syndrome-coronavirus-2
RCADS-CV	Revised Child Anxiety and Depression Scale – Child Version
OCD	Obsessive–compulsive disorder
CAS	The Coronavirus Anxiety Scale
CASI	Anxiety Sensitivity Index for Children

Introduction

There are several psychological consequences of COVID-19 among children, although the clinical course of COVID-19 among children is relatively milder, even asymptomatic, when compared to adults. Rather than simply the course of the disease among the children themselves, the illness of their parents, their being infected with SARS-CoV-2, and the quarantine practices and measures applied during the pandemic process leave children vulnerable to the negative psychological effects of the pandemic process [1]. During the pandemic, the prevalence of depression and anxiety disorders among children and adolescents has doubled compared to the pre-pandemic period [2]. In a recent meta-analysis, increased stress, worry, helplessness, and social and risky behavioral problems have been reported among children and adolescents [3]. In various studies, it has been shown that children, who are worried about the SARS-Cov-2 contamination to themselves and their families, are concerned about the uncertainty of the end of the pandemic, do not like the strict social distancing and quarantine measures, and feel isolated due to the closure [4, 5]. Parents' stress about COVID-19 and other related conditions could increase the current anxiety of children [4].

Earlier studies conducted during previous pandemic periods (SARS, Ebola virus, and Middle-East respiratory syndrome) suggested an increased prevalence of adverse psychological consequences among both adults and children [6]. The COVID-19 outbreak was also found to cause increased anxiety and depression [7, 8], and children were also seen to be worried about their family members [9]. In addition to the fact that anxiety and depression levels have increased among children during the COVID-19 period, anxiety sensitivity also plays an important role in being affected by the panic and environment of fear. Anxiety sensitivity is a concept that determines an individual's sensitivity to situations that cause anxiety and the degree of fear of these situations [10]. Anxiety sensitivity expresses to what extend individuals are disturbed by anxiety-related sensations and to what extend

they perceive these sensations as a physical, psychological, or social threat. Anxiety sensitivity is described as being different from state and trait anxiety in that it predicts an anxiety disorder that might occur in the future and expresses a relatively unchanging structural feature [11].

Although there have been several studies about both parental and children's anxiety during the COVID-19 pandemic [1, 12], little is known about the changes in the psychological status of children concerning about their parents being infected by COVID-19. The aim of this study is to investigate the predictor of children's anxiety about their parents becoming infected and to assess the impact of concerns of children for their parents about getting infected during the COVID-19 pandemic on children's mental health. The assessment is done by using validated scales and a self-administered survey questionnaire to provide timely services for affected children. In addition, anxiety sensitivity has also been investigated in the study because it has an important contribution to the development of anxiety disorders. To the best of our knowledge, this is the first study that simultaneously measures children's anxiety about both themselves and their parents, via structured scales.

Materials and methods

This study was conducted at Dr. Sami Ulus Maternity and Children's Health and Diseases Training and Research Hospital, between October 2021 and January 2022. The study was approved by the *** Maternity and Children's Health and Diseases Training and Research Hospital Ethical Committee (Approval number: 2020-KAEK-141/226). One hundred ninety-nine children who had been admitted to our hospital were included in the study. Children having a history of psychiatric problems were not included in the study as it was accepted as an exclusion criterion. For this study, face-to-face and one-on-one interviews, lasting for approximately 30 min, were performed. Children were asked to complete a questionnaire including open-ended, yes/no, and multiple-choice questions created by the authors. A socio-demographic form was completed to obtain information about their socio-demographic data including the age, gender, age of both parents, and parental educational level.

To detect children's anxiety about COVID-19, we asked: "Are you worried about being diagnosed with COVID-19?", "Are you worried about your parents being diagnosed with COVID-19?". We presented two answer choices for these questions: yes or no. We used the Revised Child Anxiety and Depression Scales – Child Version to determine symptom levels, the Children Anxiety Sensitivity Index to measure anxiety sensitivity and the Corona Virus Phobia Scale to measure anxiety about COVID-19.

Tools

Revised Child Anxiety and Depression Scale – Child Version (RCADS-CV): The RCADS is a self-report questionnaire consisting of 47 items which is developed to measure DSM-IV-based symptoms of anxiety disorders and depression among children [13]. The subscales of this scale measure separation anxiety disorder, social phobia, generalized anxiety disorder, panic disorder, OCD, and major depressive disorder. Validity and reliability studies of RCADS-CV for Turkish children have been conducted [14].

The Coronavirus Anxiety Scale (CAS): The CAS is a 5-item scale that is used to measure anxiety concerning the virus among adults [15]. It has been determined to be an effective and valid tool for clinical research and practice. This scale consists of 5 items concerning anxiety about Coronavirus which can be scored as Not at all, Rarely, For less than a day or two, For several days, For more than 7 days, or Nearly every day over the last 2 weeks. A reliability and validity study has been conducted in Turkish for adults [16].

Anxiety Sensitivity Index for Children (CASI): The Anxiety Sensitivity Index for Children was created by Silverman et al. [17] by adjusting the anxiety sensitivity index of Reiss et al. [18] in accordance with children. It is an eighteen-item self-report scale. The scale questions the feelings of children after internal and external stimuli that might cause anxiety. Unlike the adult scale, it was arranged as a 3-point Likert type scale to increase intelligibility instead of four. CASI is scored as none (1), a little (2), a lot (3). By this way, even children as young as 7 years old can easily understand it. A minimum of 18 points and a maximum of 54 points can be obtained. Substances can be evaluated under three main headings; physical, non-physical, and mixed. In the validity and reliability study conducted by Silverman et al. [17], it was found to be a valid and reliable scale. A reliability and validity study was conducted in Turkish for children [19].

Statistical analysis of the data obtained was made by using SPSS software. Descriptive statistics were used to

analyze demographic variables. Normality of the data was assessed according to the skewness and kurtosis value. The study groups were divided into two according to feeling anxiety about getting a positive COVID-19 diagnosis themselves or their parents. Independent sample *T* test was used to analyze the differences between the groups. Pearson correlation analysis was used to analyze the correlations. Chi-square test was used to analyze the differences between categorical variables. Logistic regression analysis was used to determine the predictors of children's anxiety. A two-tailed *p* value of 0.05 was considered to be statistically significant.

Results

The study sample consisted of 199 children including 114 girls and 85 boys. The mean age of the girls was 176.18 ± 26.16 months and boys was 171.28 ± 25.34 . There was no significant difference between the groups in terms of age ($p = 0.185$). The sample was divided into two groups according to the answer to the question "Are you worried about being diagnosed with COVID-19?" (yes vs. no) and "Are you worried about your parents being diagnosed with COVID-19?" (yes vs. no), and scale scores were compared between these two groups. There was no significant difference between these two groups in terms of age, gender, monthly parental income, and maternal educational levels. Demographic data is presented in Table 1.

Of the participants, 96 answered "yes" and 103 answered "no" to the question "Are you worried about being diagnosed with COVID-19." One hundred eleven participants answered "yes" and 88 answered "no" to the question "Are you worried about your parents being diagnosed with COVID-19."

Increased social phobia ($p = 0.007$), separation anxiety ($p < 0.001$), generalized anxiety ($p < 0.001$), total anxiety ($p = 0.001$), total internalizing disorder ($p = 0.001$) scores, increased anxiety sensitivity total scores ($p = 0.014$), and increased coronavirus anxiety scores ($p = 0.047$) were

Table 1 Comparison of demographics

	<i>Are you worried about being diagnosed with COVID-19?</i>				Statistics	
	Yes		No		<i>t</i>	<i>p</i>
	Mean	SD	Mean	SD		
Age	173.94	26.77	174.23	25.12	0.080	0.936
	<i>N</i>	%	<i>N</i>	%	<i>X</i> ²	<i>p</i>
Gender (male/female)	44/59	57.3/42.7	41/55	57.3/42.7	0	1
	<i>Are you worried about your parents being diagnosed with COVID-19?</i>				Statistics	
	Yes		No		<i>t</i>	<i>p</i>
	Mean	SD	Mean	SD		
Age	173.14	27.31	175.30	24.02	0.584	0.560
	<i>N</i>	%	<i>N</i>	%	<i>X</i> ²	<i>p</i>
Gender (male/female)	46/65	47.4/63.6	39/49	44.3/55.7	0.166	0.773

Table 2 Comparison of scale scores

	<i>Are you worried about being diagnosed with COVID-19?</i>					
	Yes		No		Statistics	
	Mean	SD	Mean	SD	<i>t</i>	<i>p</i>
RCADS-CV separation anxiety disorder	5.26	3.26	3.45	3.26	-3.895	<0.001***
RCADS-CV social phobia	9.91	4.82	7.85	5.71	-2.731	0.007**
RCADS-CV generalized anxiety disorder	6.62	3.08	4.88	3.41	-3.770	<0.001***
RCADS-CV panic disorder	6.25	3.86	5.45	4.94	-1.255	0.211
RCADS-CV depression	8.75	5.92	7.13	5.88	-1.928	0.055
RCADS-CV obsessive-compulsive disorder	6	3.23	5.46	3.59	-1.091	0.277
RCADS-CV total anxiety score	34.30	13.31	27.11	17.10	-3.271	0.001**
RCADS-CV total internalizing dis. score	43.25	20.15	32.62	19.05	-3.145	0.002**
CAS	1.62	2.19	1	2.13	-2.003	0.047
CASI	30.13	6.17	28.01	5.82	-2.486	0.014
	<i>Are you worried about your parents being diagnosed with COVID-19?</i>					
	Yes		No		Statistics	
	Mean	SD	Mean	SD	<i>t</i>	<i>p</i>
RCADS-CV separation anxiety disorder	5	3.39	3.47	3.18	-3.231	0.001**
RCADS-CV social phobia	9.99	5.29	7.40	5.20	-3.438	0.001**
RCADS-CV generalized anxiety disorder	6.68	3.43	4.51	2.86	-4.769	<0.001***
RCADS-CV panic disorder	6.19	4.50	5.38	4.39	-1.276	0.203
RCADS-CV depression	8.92	6.28	6.63	5.23	-2.746	0.007**
RCADS-CV obsessive-compulsive disorder	6.13	3.49	5.20	3.28	-1.915	0.057
RCADS-CV total anxiety score	34.22	15.65	25.98	14.81	-3.761	<0.001***
RCADS-CV total internalizing dis. score	43.25	20.15	32.62	19.05	-3.771	<0.001***
CAS	1.50	2.23	1.05	2.09	-1.442	0.151
CASI	30.12	6.29	27.67	5.53	-2.882	0.004**

RCADS-CV Revised Child Anxiety and Depression Scales – Child Version, CAS coronavirus anxiety scale, CASI Anxiety Sensitivity Index for Children

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

detected among children who answered “yes” to the question “Are you worried about being diagnosed with COVID-19?” Detailed statistics are provided in Table 2.

When the sample was divided into two according to their answers about children’s concerns about their parents being diagnosed with COVID-19, increased social phobia ($p = 0.001$), depression ($p = 0.007$), separation anxiety ($p = 0.001$), generalized anxiety ($p < 0.001$), total anxiety ($p < 0.001$), total internalizing disorder ($p < 0.001$), and increased anxiety sensitivity total scores ($p = 0.004$) were detected among those who answered yes to this question. Detailed statistics are given in Table 2.

Logistic regression analysis was conducted in order to determine the predictors of children’s anxiety about themselves and their parents. Their answers relating to the children’s worries about being diagnosed with COVID-19 and the children’s concerns about their parents being diagnosed with COVID-19 were determined as dependent variable, and two different analyses were made. RCADS-CV separation anxiety disorder, social phobia, generalized anxiety disorder, panic disorder, OCD and major depressive disorder, total internalizing disorder, and total anxiety disorder scores were

determined as independent variables in both analyses. According to the results, panic, separation anxiety, and generalized anxiety scores significantly predicted children’s anxiety about their parents, and separation anxiety and generalized anxiety were shown to predict anxiety about themselves (Table 3).

Discussion

In this study, it has been demonstrated that children who have worries about being diagnosed with COVID-19 both for themselves and their parents have increased anxiety scores, increased coronavirus anxiety scale scores, and increased anxiety sensitivity. Increased anxiety scores were observed in separation anxiety, social phobia, generalized anxiety, the total anxiety score and the total internalizing disorder score obtained by RCADS-CV, the coronavirus anxiety score obtained by CAS, and anxiety sensitivity.

Although COVID-19 causes a mild/moderate clinical symptom among children and young people, this age group has been significantly affected psychosocially with the onset of the pandemic. Restrictions in areas such as daily

Table 3 Logistic regression analysis to determine predictors of children's anxiety about themselves

	β	SE β	Wald's χ^2	p	OR
RCADS-CV social phobia	0.012	0.043	0.071	0.790	1.012
RCADS-CV panic	-0.105	0.055	3.677	0.055	0.900
RCADS-CV depression	0.047	0.039	1.497	0.221	1.048
RCADS-CV separation anxiety	0.180	0.060	8.970	0.003**	1.197
RCADS-CV generalized anxiety	0.184	0.075	5.970	0.015*	1.202
RCADS-CV obsessive-compulsive disorder	-0.117	0.064	3.370	0.066	0.889
CASI score	0.004	0.034	0.015	0.901	1.004
CAS score	0.057	0.080	0.512	0.474	1.059
Constant	-1.310	0.810	2.615	0.106	0.270

RCADS-CV Revised Child Anxiety and Depression Scales – Child Version, CAS coronavirus anxiety scale, CASI Anxiety Sensitivity Index for Children

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

routine activities, school attendance, and social relationships increased the symptoms of depression and anxiety in this age group [20]. Due to the cleaning and hygiene effort that comes with the pandemic, specific types of anxiety, including specific phobias, obsessive-compulsive disorder, and generalized anxiety related to unpredictable and frightening situations might also be exacerbated. In addition to this increase, children's worries about their parents might also increase [1]. In our study, this increased anxiety of children about their parents has been demonstrated via validated measuring tools (for social phobia, $p = 0.001$; for depression, $p = 0.007$; for separation anxiety, $p = 0.001$; for generalized anxiety, $p < 0.001$; for total anxiety, $p < 0.001$) for total internalizing disorder, $p < 0.001$). In addition, it has been found that the anxiety sensitivity ($p = 0.004$) of those children who showed concern about their parents also increased.

In another study that examined the psychological effects of the COVID-19 pandemic among children, the most common symptoms were stated as anxiety, depression, and stress. In this study, protective factors were also investigated, and it was stated that being able to discuss the pandemic with their parents was such a protective factor [21].

In this study, it was mentioned that the crucial role of open communication between parents and children emerges related to the terms stress and crisis. The mitigating role of discussion about the pandemic on depression, anxiety, and stress was suggested. In our study, it has been found that children who were anxious about their parents had higher levels of objective anxiety and depression symptoms. These findings show that increasing discussion and the interaction of these children with their parents might be beneficial in reducing their already high levels of anxious and depressive symptoms. The findings of our study are compatible with the other study on the subject mentioned above. We have also found that panic ($p = 0.011$), separation anxiety ($p = 0.027$), and generalized anxiety ($p = 0.001$) scores significantly predict children's anxiety about their parents and separation anxiety and generalized anxiety predict anxiety about themselves. Only panic scores have a negative β value. A potential possible explanation of this data could be that panic symptoms cannot be clearly differentiated in the childhood age group and trying to measure it via scales might give relatively inaccurate results (Table 4).

Table 4 Logistic regression analysis to determine predictors of children's anxiety about their parents

	β	SE β	Wald's χ^2	p	OR
RCADS-CV social phobia	0.14	0.46	0.092	0.761	1.014
RCADS-CV panic	-0.145	0.057	6.516	0.011*	0.865
RCADS-CV depression	0.073	0.042	2.966	0.085	1.076
RCADS-CV separation anxiety	0.134	0.060	4.908	0.027*	1.143
RCADS-CV generalized anxiety	0.252	0.079	10.182	0.001**	1.286
RCADS-CV obsessive-compulsive disorder	-0.089	0.065	1.872	0.171	0.915
CASI score	0.005	0.035	0.020	0.888	1.005
CAS score	0.022	0.083	0.070	0.791	1.022
Constant	-1.259	0.832	2.287	0.130	0.284

RCADS-CV Revised Child Anxiety and Depression Scales – Child Version, CAS coronavirus anxiety scale, CASI Anxiety Sensitivity Index for Children

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Anxiety sensitivity is a concept that determines an individual's sensitivity to situations that cause anxiety and the degree of fear of these situations. There are studies investigating the effect of anxiety sensitivity on psychological problems during the COVID-19 pandemic. Manning et al. found a statistically significant interaction between COVID-19 perceived stress and anxiety sensitivity with global anxiety symptom severity, anxious arousal symptom severity, and functional impairment. They have found in post hoc analysis that COVID-19 perceived stress was associated with an increased likelihood of clinically significant global anxiety symptom severity and anxious arousal symptom severity at higher levels of anxiety sensitivity [22]. In another study, it was found that anxiety sensitivity was significantly related to COVID-19 distress and disability with a moderate effect. Also, it was mentioned that anxiety sensitivity was longitudinally associated with higher COVID-19 worry and depression ($p = 0.046$) [23]. Both of the studies were conducted among adult population, and as far as we know, there have been no studies investigating the association between anxiety sensitivity and anxious symptoms among children during the COVID-19 pandemic. In this study, it has been shown that children who have worry for being diagnosed with COVID-19 both for themselves ($p = 0.014$) and their parents ($p = 0.004$) have increased anxiety sensitivity, which is different from previous studies. We could not find an association between anxiety sensitivity and children's anxiety about themselves and parents in logistic regression analysis.

This study has certain limitations. First, the data was collected in one center. This is clearly a limitation when generalizing results for the whole population. It is a cross-sectional study, so the results might lack the ability to infer causality and/or risk. Further prospective studies are needed to clarify the association between the COVID-19 pandemic and mental health. Second, a structured diagnostic evaluation was not conducted with children but instead self-report measuring tools were used. This could be considered as a methodological limitation which might interfere with the results. Moreover, open-ended questions were formed in a part of the study. This can also be noted as a limitation.

As a result, there is no study specifically conducted into children's anxiety about both themselves and their parents during the COVID-19 pandemic, which has caused significant psychosocial difficulties among children and adolescents. Our study is important in terms of determining that children who are worried about their parents and themselves have high levels of anxiety, depression symptoms, and anxiety sensitivity. It is thought that there is a need for studies investigating the effects of psychosocial difficulties in the post-pandemic period in which diagnostic evaluations are also conducted.

Authors' contributions All authors contributed to the study conception and design. Material preparation and data collection were performed by Harun Terin and Mehmet Mustafa Yılmaz. Data analysis was performed by Sadettin Burak Açıknel. The first draft of the manuscript was written by Sadettin Burak Açıknel and Harun Terin. Final revision and supervision of draft was made by Saliha Şenel. All authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

Data availability De-identified individual participant data will not be made available.

Declarations

Ethics approval Ethical committee approval was taken for the study.

Consent to participate Informed consent was taken from all participants.

Consent for publication Consent for publication was taken from all authors.

Conflict of interest The authors declare no competing interests.

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