

## ORIGINAL ARTICLE

# Investigation of Depression and Anxiety Symptoms and Associated Factors in Children with Cerebral Palsy in the COVID-19 Pandemic: Parents' Perceived Social Support, Depression and Corona Anxiety

## COVID-19 Pandemisinde Serebral Palsili Çocuklarda Depresyon ve Anksiyete Belirtileri ve İlişkili Faktörlerin İncelenmesi: Ebeveynlerin Algılanan Sosyal Destek, Depresyon ve Korona Kaygısı Düzeyleri

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## How to cite ?

Özasan A. , Özbudak P. , Karaca Cengiz Ş. N. , Geniş B. , İşeri E. Investigation of Depression and Anxiety Symptoms and Associated Factors in Children with Cerebral Palsy in the COVID-19 Pandemic: Parents' Perceived Social Support, Depression and Corona Anxiety. Genel Tıp Dergisi. 2022; 32(5): 512-519

## ABSTRACT

**Objective:** There is little research on the impact of the COVID-19 pandemic on the mental health of children with cerebral palsy (CP). The primary aim of this study is to determine the level of anxiety and depression in children with CP during the COVID-19 pandemic. The secondary aim is to examine the relationship between perceived social support, depression and COVID-19 anxiety levels of parents of children with CP and anxiety and depression symptoms in children with CP.

**Material and Methods:** Data were gathered by snowball sampling method using an online survey. Depression and anxiety levels of children with CP were evaluated via Revised Child Anxiety and Depression Scale-Parent (RCADS-P). Depression, corona anxiety, and perceived social support levels of parents of children with CP were evaluated with Beck Depression Scale for Primary Care, Corona Anxiety Scale (CAS), and Multidimensional Scale of Perceived Social Support, respectively. The Pearson correlation test was employed to assess whether or not there was an interconnection amongst continuous variables and different independent samples under consideration. Total Anxiety Scale, Major Depressive Disorder and Total Internalizing Scale sub-dimension scores of the RCADS-P were evaluated as dependent variables according to the groups in the multiple linear regression analysis.

**Results:** The sample covered 102 children (61, %59.8 boys) with CP and their parents (67, %65.8 mothers). Predictors of the anxiety symptoms of children with CP, in order of importance, were the parents' corona anxiety total score ( $\beta=0.324$ ,  $p=0.003$ ) and the parents' depression total score ( $\beta=0.266$ ,  $p=0.025$ ). Only the parent' CAS total score predicted the depressive symptoms of children with CP ( $\beta=0.365$ ,  $p=0.001$ ).

**Conclusion:** Coronavirus anxiety of the parents was found to be the strongest predictor of anxiety and depression symptoms in children with CP. These results suggest that the COVID-19 pandemic has increased the mental health needs of both children with CP and their parents.

**Keywords:** cerebral palsy; children; anxiety; depression; parents; COVID-19

## ÖZ

**Amaç:** COVID-19 pandemisinin Serebral palsili (SP) çocukların ruh sağlığı üzerindeki etkisi hakkında çok az araştırma bulunmaktadır. COVID-19 pandemisinin SP'li çocukların ruh sağlığı üzerindeki etkisi hakkında çok az araştırma bulunmaktadır. Bu çalışmanın birincil amacı, COVID-19 pandemisinde SP'li çocuklarda anksiyete ve depresyon düzeyinin belirlenmesidir. Bu çalışmanın ikincil amacı ise SP'li çocukların ebeveynlerinin algılanan sosyal destek, depresyon ve COVID-19 anksiyetesi düzeyleriyle SP'li çocuklardaki anksiyete ve depresyon belirtileri arasındaki ilişkinin incelenmesidir.

**Gereç ve Yöntem:** Veriler kartopu örneklem yöntemiyle çevrimiçi anketler kullanılarak toplanmıştır. SP'li çocukların depresyon ve anksiyete düzeyleri Çocuklarda Anksiyete ve Depresyon Ölçeği-Yenilenmiş Ebeveyn formuyla (ÇADO-YE) değerlendirilmiştir. SP'li çocukların ebeveynlerinin depresyon, korona kaygısı ve algılanan sosyal destek düzeyleri sırasıyla Birinci Basamak İçin Beck Depresyon Ölçeği, Corona Anksiyete Ölçeği (KAÖ) ve Çok Boyutlu Algılanan Sosyal Destek Ölçeği ile değerlendirilmiştir. Sürekli değişkenler ve incelenen farklı bağımsız örnekler arasında bir bağlantı olup olmadığını değerlendirmek için Pearson korelasyon testi kullanılmıştır. Çoklu doğrusal regresyon analizinde, ÇADO-YE'nin Toplam Kaygı, Majör Depresif Bozukluk ve Toplam İçselleştirme Ölçeği alt boyut puanları gruplara göre bağımlı değişken olarak değerlendirilmiştir.

**Bulgular:** Örneklemi SP'li 102 çocuk (61, %59.8 erkek) ve ebeveynleri (67, %65.8 anne) oluşturmuştur. SP'li çocukların anksiyete belirtilerinin yordayıcıları önem sırasına göre ebeveynlerin korona kaygısı toplam puanı ( $\beta=0.324$ ,  $p=0.003$ ) ve ebeveynlerin depresyon toplam puanı ( $\beta=0.266$ ,  $p=0.025$ ) olmuştur. CP'li çocuklardaki depresif belirtileri yalnızca ebeveynin KAÖ toplam puanı yordamıştır ( $\beta=0.365$ ,  $p=0.001$ ).

**Sonuç:** Ebeveynlerin koronavirüs kaygısının, SP'li çocuklarda anksiyete ve depresyon belirtilerinin en güçlü yordayıcısı olduğu bulundu. Bu sonuçlar, COVID-19 pandemisinin hem SP'li çocukların hem de ebeveynlerinin ruh sağlığı ihtiyaçlarını artırdığını göstermektedir.

**Anahtar Kelimeler:** serebral palsi; çocuklar; anksiyete; depresyon; ebeveynler; COVID-19

## Introduction

In recent times, cerebral palsy (CP), a developing brain that does not culminate in further neurodevelopmental disorder, has become prevalent deterioration and is characterized by cognitive, in children. The conditions are caused by injury to a communication, perception, and behavior difficulties

(1). As a result of the associated social and physical risk factors, children with CP are at an increased risk of mental health problems (2). Recent researches have elucidated that children and adolescents with CP experience stress, anxiety, and depression because of their difficulty integrating into their communities (3). Furthermore, research has revealed that children with CP were not the only ones who suffer from depression and anxiety as these problems are also present among their parents (4). The problem stems from the fact that parents are typically the primary caregivers, responsible for caring for and assisting their children with CP, culminating in negative emotions including anxiety and distress (5). Consequently, it is ostensible that caring for a child with CP exposes parents to psychological issues, even under normal circumstances.

During the pandemic, those with special educational needs, including those with autism spectrum disorder (ASD), intellectual disability, and CP, were considered more susceptible to mental health problems than their typically developing peers (6). Compared to the period before the outbreak of the COVID-19 pandemic, more severe and frequent behavioral problems were detected in children with attention deficit hyperactivity disorder (ADHD) and ASD (7). Notably, countless families with children with ASD had inadequate education options during the pandemic, if any, as special remote education was limited, and most faced disruptions in behavioral, speech, and occupational therapy (8-10). As such, it has been shown that the closure of special education institutions due to the government's measures to curtail the virus' contagion had prevented children with CP from accessing requisite intervention essential for their physical and emotional health (11). However, the ramification of the pandemic on the accessibility of special education and the subsequent mental health status of children with CP remains elusive.

Along with the adverse repercussions attributed to the advent of the pandemic on children, governments' efforts to contain the virus' spread had a substantial negative impact on parents and other primary caregivers (12, 13). According to the findings of scholarly discourse in England, COVID-19 is correlated with an upsurge in anxiety and fear among households with children relying on special education (14). Furthermore, parents with children with disabilities who receive social support have been shown to experience less depression; as a result, social support for parents of these children is deemed invaluable (15). As per Fontanesi et al. (2020), parents of children with disabilities exhibited a higher probability of experiencing parental fatigue and perceived low social support (16). In general, studies have found that the pandemic has hampered the mental health of parents of these children. However, the effect of the decrease in social support resources in the COVID-19 pandemic on the depression and anxiety levels of the caregivers of children with CP is unknown.

In the literature, although there are studies investigating the mental health of caregivers of children with CP during the COVID-19 pandemic, a few studies have been found on the mental health of children with CP, which is a vulnerable group against mental diseases (17). Determining factors influencing anxiety and depression levels of children with CP is crucial to prepare appropriate intervention programs aiming to reduce anxiety and depression symptoms in COVID-19 pandemic. The first aim of this study is to determine the level of anxiety and depression symptoms in children with CP during the COVID-19 pandemic. The secondary aim is that to examine the relationship between perceived social support, depression and COVID-19 anxiety levels of parents of children with CP and anxiety and depression symptoms in children with CP. We generated several hypotheses; first, we hypothesized that there would be significant positive relationships between the anxiety and depression levels of children with CP and both depression and corona anxiety levels of parents. Second, Perceived social support level of parents has a significantly negative correlation with the corona anxiety and depression levels of parents. Third, the corona anxiety levels of parents would significantly predict depression and anxiety levels of children with CP.

## Material and Methods

An observational and cross-sectional clinical trial was undertaken between May 2020 and June 2020. The data was gathered using an online survey developed through Google forms software. The survey was first distributed to parents of children with CP; these participants were retrieved from Gazi University's Child Neurology Department database and were contacted via social networking sites (e.g., WhatsApp) and requested to forward the survey to other caregivers. The inclusion criteria for caregivers were as follows: They had to be 18 years or older, had a child with CP aged 8 to 18 years, had primary responsibility for the child with CP, shared a residence with the child, and were at least a primary school graduate. Participants in this study gave their informed permission (online) after being fully informed of the study's objectives and procedures. Demographic information of the children with CP and their parents was recorded in the sociodemographic data form. Depression and anxiety levels of children with CP were evaluated via Revised Child Anxiety and Depression Scale-Parent (RCADS-P). Depression, corona anxiety, and perceived social support levels of parents of children with CP were evaluated with Beck Depression Scale for Primary Care, Corona Anxiety Scale (CAS), and Multidimensional Scale of Perceived Social Support, respectively.

## Measures

### Revised Child Anxiety and Depression Scale (RCADS-P)

Children and adolescents with anxiety and depression can be assessed using this instrument as it conforms

with the requirements of the DSM-IV diagnostic manual. Forms for both parents and children are available. Six subscales and 47 items are used to diagnose anxiety disorders, with six focusing on general anxiety disorder, seven on separation anxiety disorder, nine on panic disorder, six on obsessive-compulsive disorder (OCD), nine on social anxiety disorder, and ten on major depressive disorder (10 items). Higher scores obtained RCADS-P indicate high anxiety, depression and total internalizing symptoms. It has been shown by Görmez et al. to be a valid and reliable tool for children and adolescents aged 8-17 years with anxiety and depression in Turkey. (18). All subscales of the RCADS-P except the OCD subscale were used to determine the anxiety and depression levels of children with CP.

### Beck Depression Scale for Primary Care (BDI-PC)

The tool was transcribed into Turkish by Aktürk et al. and was leveraged to ascertain depressive symptoms through its seven through seven constructs: sadness, pessimism, past failures, self-loathing, self-blame, loss of interest, and suicidal ideation or desire. To meet the maximal criterion for depression diagnosis, the study participants were asked about their emotions in the "last two weeks, including today." The constructs of the scales each encompass four-digit ratings from 1 to 3. The final score is computed by summing up each construct's score, and a maximum of 21 points can be obtained in total. Despite the lack of a cutoff point, scores of 4 and higher are 90% likely to result in depression. (19). BDI-PC was used to determine depression levels of the parents of children with CP.

### Coronavirus Anxiety Scale (CAS)

Another important scale used during the study is the CAS, which is the brainchild of Lee (2020). The foundation of the scale is to ascertain the levels of anxiety towards COVID-19 in adults (30). The elements in the scale are scored in a 5-point Likert-type scale, with values spanning from 0 to 4. CAS has been deemed effective in detecting physical symptoms concerning COVID-19 fear and anxiety (Cronbach's alpha coefficient: 0.95) (20). The higher the ratings on scale are displayed the person feels more corona anxiety and fear. Significantly, it is worth noting that the scale was translated into Turkish by Bicer et al. (2020), and it has been proved to be credible and accurate among adults (21). CAS was used to determine the corona anxiety levels of parents.

### Multidimensional Scale of Perceived Social Support (MSPSS)

The MSPSS, which is the development of Zimet et al. (1988), was deployed in the work to assess how much people feel supported by their family members, friends, and other significant persons in their lives, through 12-items (22). The items on the scale were responded to on a 7-point Likert scale, with 1 denoting strong disagreement and 7 signaling strong agreement. The higher the ratings on each component, the more

social support one feels from family, friends, and other important individuals. The MSPSS scale was reworked with adults to reflect the Turkish cultural context by Eker and Arkar (1995) (23). All of the subscales of MSPSS were applied to evaluate perceived social support levels of parents.

### Statistical Analysis

SPSS version 23.0, which was leveraged to analyze data that was collected from the investigation, was used in this study. Descriptive statistics were expressed in terms of percentages, the mean, and the standard deviation. Because the numerical variables' skewness and kurtosis values fluctuated between  $\pm 1$ , it was presumed that the data were distributed normally. The Pearson correlation test was employed to assess whether or not there was an interconnection amongst continuous variables and different independent samples under consideration. To compare continuous variables amongst groups, the t-test was used. The Total Anxiety Scale, Major Depressive Disorder, and Total Internalizing Scale sub-dimension scores of the RCADS were evaluated as dependent variables according to the groups in the multiple linear regression analysis. Considering the Durbin-Watson, Condition index, VIP, and Tolerance values observed while using this method, it was determined that no multicollinearity problem was observed in the analysis. Internal reliability coefficients (Cronbach's alpha) were used for the reliability analysis of the scale. The level of statistical significance was accepted as  $p < 0.05$ .

### Results

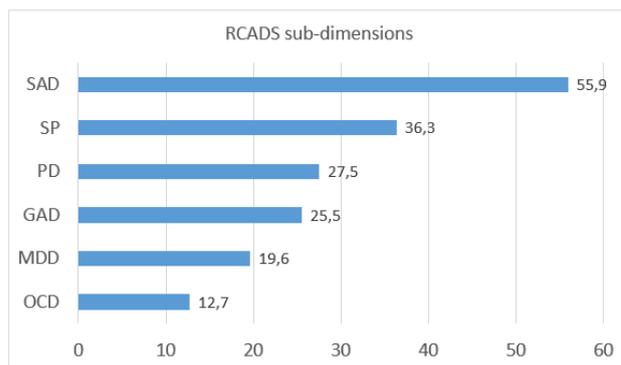
In the present study the sample comprised 102 children (61, %59.8 male) with CP aged 8 to 18 years and their parents (67, %65.8 mother). The parents were between the ages 27 to 61 (M age =  $39.60 \pm 8.01$ ). Most of the parents recruited in the study were married (91.10 %), had at least a high school degree (53.06%), and did not suffer from chronic disease such as diabetes or cancer (68.71%). The sociodemographic characteristics of the children and their parents, who are the primary caregiver, in the sample are shown in Table 1. 40.2% (n=41) of the children were girls, 30.4% (n=31) were in the 5th grade, and their mean age was  $11.39 \pm 2.48$  years. While 45.1% (n=46) of the parents reported that their children received special education during the pandemic period, 39.6% (n=17) stated that the special education period was less than two hours a week and this period was less than the pre-pandemic period.

The distribution of psychiatric disorders in children with CP according to RCADS is shown in Figure 1. Accordingly, the most common psychiatric disorder among children with CP was separation anxiety disorder (SAD) (55.9%), while the least common psychiatric disorder was Obsessive Compulsive Disorder (OCD) (12.7%). The results show that one out of two (55.9%) children with CP had SAD, one out of four (27.5%) had panic disorder (PD), and one out of five (19.6%) had major depressive disorder (MDD).

**Table 1.** Sociodemographic characteristics of parents and children in the sample

Variables	n	%
<b>Primary Caregiver</b>		
Mother	67	65.7
Father	35	34.3
<b>Parent marital status</b>		
Married	93	91.2
Divorced/Widowed	9	8.8
<b>Parent education status</b>		
Middle school and below	22	21.6
High school	49	48.0
College education	31	30.4
<b>Parent' chronic disease status</b>		
Yes	32	31.3
No	70	68.7
<b>Number of children in the family</b>		
1	29	28.4
2	40	39.2
3	25	24.5
≥ 4	8	7.9
<b>Gender of the child</b>		
Girls	41	40.2
Boys	61	59.8
<b>Child's class</b>		
3rd grade	12	11.8
4th grade	16	15.7
5th grade	31	30.4
6th grade	10	9.8
7th grade	20	19.6
8th grade	10	9.8
10th grade	3	2.9
<b>Status of receiving special education during the pandemic period</b>		
Yes	46	45.1
No	56	54.9
<b>Duration of special education received during the pandemic period (n=46)</b>		
≤ 2 hours per week	17	36.9
3-5 hours per week	15	32.6
≥ 6 hours per week	14	30.5
<b>Parent age</b>		
Mother (mean ± sd)	37.91	7.59
Father (mean ± sd)	42.85	7.89
Whole sample (mean ± sd)	39.60	8.01
<b>Child's age</b>		
Girls (mean ± sd)	11.78	2.30
Boys (mean ± sd)	11.13	2.58
Whole sample (mean ± sd)	11.39	2.48

sd: standard deviation



**Figure 1.** Distribution of Internalizing Disorders by RCADS

RCADS: Revised Child Anxiety and Depression Scale, Separation anxiety disorder: SAD, SP: Social phobia, PD: Panic disorder, GAD: Generalized anxiety disorder, MDD: Major Depressive Disorder, OCD: Obsessive compulsive disorder

**Table 2.** Comparison of children who received and did not receive special education during the pandemic period in terms of total scores of RCADS, BDI, CAS and MSPSS

RCADS sub-dimensions	Special Education Yes (n=46)		Special Education No (n=56)		Statistical analysis		
	M	SD	M	SD	t	p	Cohen's d
Separation anxiety disorder	66.91	11.17	60.71	13.58	2.480	<b>0.015</b>	0.49
Social phobia	54.15	12.69	46.62	12.40	3.018	<b>0.003</b>	0.60
Generalized anxiety disorder	59.89	12.10	53.41	12.66	2.623	<b>0.010</b>	0.52
Panic disorder	62.58	14.85	58.10	13.64	1.585	0.116	0.31
Obsessive compulsive disorder	58.95	13.26	54.50	11.88	1.788	0.077	0.35
Total Anxiety Scale	62.80	12.39	54.94	13.87	2.984	<b>0.004</b>	0.59
Major depressive disorder	64.93	10.59	58.55	12.82	2.701	<b>0.008</b>	0.54
Total Internalizing Scale	64.00	11.35	56.03	13.63	3.161	<b>0.002</b>	0.63
BDI	4.52	4.37	2.78	3.75	2.155	<b>0.034</b>	0.42
CAS	5.08	4.98	2.85	2.93	2.810	<b>0.006</b>	0.54
<b>MSPSS sub-dimensions</b>							
Family	20.47	5.79	21.03	6.65	-0.446	0.657	-0.08
Friends	20.36	5.40	19.51	6.00	0.745	0.458	0.14
Significant Order	17.65	7.08	17.32	7.06	0.235	0.815	0.04

M: Mean, SD: Standard Deviation, RCADS: Revised Child Anxiety and Depression Scale

**Table 3.** Evaluation of the relationships between the scales applied in the study

Variable	M	SD	BDI	CAS	MSPSS		
					Fam	Fri	SO
RCADS- SAD	63.50	12.87	0.315**	0.438**	-0.103	-0.321**	-0.221*
RCADS- SP	50.01	13.02	0.417**	0.497**	-0.054	-0.099	-0.080
RCADS- GAD	56.33	12.77	0.473**	0.416**	-0.160	-0.113	-0.068
RCADS- PD	60.12	14.30	0.272**	0.361**	-0.078	-0.161	-0.159
RCADS- OCD	56.50	12.65	0.435**	0.358**	-0.011	-0.111	-0.042
RCADS- TAS	58.49	13.73	0.439**	0.468**	-0.096	-0.188	-0.126
RCADS- MDD	61.43	12.23	0.304**	0.415**	-0.213*	-0.285**	-0.225*
RCADS- TIS	59.62	13.21	0.431**	0.479**	-0.137	-0.228*	-0.156
BDI	3.56	4.12	1	-	-	-	-
CAS	3.86	4.12	0.582**	1	-	-	-
MSPSS- Fam	20.78	6.25	-0.348**	-0.205*	1	-	-
MSPSS- Fri	19.90	5.72	-0.430**	-0.256**	0.441**	1	-
MSPSS- SO	17.47	7.04	-0.275**	-0.126	0.259**	0.577**	1

M: Mean, SD: Standard Deviation, BDI: Beck Depression Inventory, CAS: Coronavirus Anxiety Scale, RCADS: Revised Child Anxiety and Depression Scale, Separation anxiety disorder: SAD, SP: Social phobia, GAD: Generalized anxiety disorder, PD: Panic disorder, OCD: Obsessive compulsive disorder, TAS: Total Anxiety Scale, MDD: Major depressive disorder, TIS: Total Internalizing Scale, MSPSS: Multidimensional Scale of Perceived Social Support, Fam: Family, Fri: Friends, SO: Significant Order

\*\* Correlation is significant at the 0.01 level (2-tailed). \* Correlation is significant at the 0.05 level (2-tailed).

**Table 4.** Evaluation of RCADS scale sub-dimensions with multiple linear regression analysis

		Unstandardized Coefficients		95% CI		Standardized Coefficients		
		Estimate	SE	LL	UL	Beta (β)	t	p
Total Anxiety Scale <sup>a</sup>								
	BDI	0,887	0,390	0,113	1,661	0,266	2,274	<b>0,025</b>
	CAS	1,079	0,359	0,366	1,791	0,324	3,005	<b>0,003</b>
	MSPSS- Fam	0,161	0,218	-0,272	0,594	0,073	0,738	0,463
	MSPSS- Fri	-0,018	0,287	-0,587	0,551	-0,008	-0,063	0,950
	MSPSS- SO	-0,052	0,209	-0,467	0,364	-0,027	-0,247	0,805
Major Depressive Disorder <sup>b</sup>								
	BDI	-0,016	0,359	-0,728	0,696	-0,005	-0,045	0,964
	CAS	1,082	0,330	0,427	1,738	0,365	3,279	<b>0,001</b>
	MSPSS- Fam	-0,130	0,201	-0,529	0,268	-0,067	-0,650	0,517
	MSPSS- Fri	-0,227	0,264	-0,751	0,296	-0,106	-0,862	0,391
	MSPSS- SO	-0,176	0,193	-0,558	0,206	-0,101	-0,915	0,362
Total Internalizing Scale <sup>c</sup>								
	BDI	0,682	0,374	-0,061	1,425	0,213	1,821	0,072
	CAS	1,113	0,345	0,429	1,797	0,347	3,229	<b>0,002</b>
	MSPSS- Fam	0,078	0,209	-0,338	0,493	0,037	0,370	0,712
	MSPSS- Fri	-0,097	0,275	-0,644	0,449	-0,042	-0,353	0,725
	MSPSS- SO	-0,072	0,201	-0,471	0,327	-0,038	-0,358	0,721

CI = Confidence Interval; LL = Lower Limit; UL = Upper Limit, BDI: Beck Depression Inventory, CAS: Coronavirus Anxiety Scale, RCADS: Revised Child Anxiety and Depression Scale, MSPSS: Multidimensional Scale of Perceived Social Support, Fam: Family, Fri: Friends, SO: Significant Order

a Durbin-Watson=1.916, Condition Index=13.778, Tolerance=0.535-0.775, VIF=1.291-1.870

b Durbin-Watson=2.262, Condition Index=13.778, Tolerance=0.535-0.775, VIF=1.291-1.870

c Durbin-Watson=1.960, Condition Index=13.778, Tolerance=0.535-0.775, VIF=1.291-1.870

The distribution of internalizing disorders in children with CP according to RCADS is shown in Figure 1. Accordingly, the most common psychiatric disorder was separation anxiety disorder (SAD) (55.9%), while the least common psychiatric disorder was obsessive compulsive disorder (OCD) (12.7%). The results show that one out of two (55.9%) children have SAD one out of four (27.5%) have panic disorder (PD), and one out of five (19.6%) have major depressive disorder (MDD).

The comparison of children who received and did not receive special education during the pandemic period in terms of RCADS sub-dimensions is shown in Table 2. It was determined that the RCADS Separation anxiety disorder ( $t(100)=2.480$ ,  $p=0.015$ ), Social phobia ( $t(100)=3.018$ ,  $p=0.003$ ), Generalized anxiety disorder ( $t(100)=2.623$ ,  $p=0.010$ ), Total Anxiety Scale ( $t(100)=2.984$ ,  $p=0.004$ ), Major depressive disorder ( $t(100)=2.701$ ,  $p=0.008$ ), and Total Internalizing Scale ( $t(100)=3.161$ ,  $p=0.002$ ) sub-dimension scores of the children who received special education during the pandemic period were higher than the children who did not receive special education. While no significant difference was found between the groups in terms of MSPSS sub-dimension total scores, BDI-PC ( $t(100)=2.155$ ,  $p=0.034$ ) and CAS scores ( $t(100)=2.810$ ,  $p=0.006$ ) were found to be significantly higher in parents of children who received special education during the pandemic period.

The evaluation of the relationships between the scales applied in the study is shown in Table 3. There was a significant positive correlation between all RCADS sub-dimensions and BDI-PC and CAS scale ( $p<0.01$  for each). It was determined that there was a significant negative correlation between the MSPSS all sub-dimension scores and BDI-PC total scores ( $p<0.01$  for each). In addition, it was observed that there was a negative significant relationship between the CAS scores and the family ( $r=-0.205$ ,  $p=0.038$ ) and friend ( $r=-0.256$ ,  $p=0.009$ ) sub-dimension scores of the MSPSS.

Predictors of the RCADS total anxiety sub-dimension, in order of importance, were the CAS total score ( $\beta=0.324$ ,  $p=0.003$ ) and the BDI-PC total score ( $\beta=0.266$ ,  $p=0.025$ ). In this model, while the predictors explained 26% of the variance, the created model was significant ( $F(101)=6.962$ ,  $p<0.001$ ). Only the CAS total score predicted the major depressive disorder subscale of the RCADS. ( $\beta=0.365$ ,  $p=0.001$ ). In this model, the predictors explained 21% of the variance, and the forming model was significant ( $F(101)=5.322$ ,  $p<0.001$ ). Similarly, only the CAS total score predicted the total anxiety and depression score of the RCADS. ( $\beta=0.347$ ,  $p=0.002$ ). The predictors in this model explained 26%, and the forming model was significant ( $F(101)=7.043$ ,  $p<0.001$ ). Evaluation of RCADS sub-dimensions by multiple linear regression analysis is shown in Table 4.

## Discussion

In this study, it was found that the children who received special education during the COVID-19 pandemic had

higher separation anxiety, social phobia, generalized anxiety, depression, and total internalizing symptoms than those who did not. While the parent's coronavirus anxiety level was a predictor of the child's anxiety, depression, and internalizing symptoms, the parent's depressive symptoms were found to be the predictor of the anxiety symptoms in the children.

In our study, we found separation anxiety in 55.9%, social anxiety in 36.3%, a panic disorder in 27.5%, generalized anxiety in 25.5%, and depression symptoms in 19.6% of children with CP during the COVID-19 pandemic. In a study conducted before the pandemic, it was reported that 43.7% of children with CP had separation anxiety, 35% had social phobia, and 42.5% had generalized anxiety symptoms (24). In a study during the COVID-19 pandemic, it was shown that both children with special needs and their parents experienced anxiety associated with the negative effects of the pandemic (25). The fact that anxiety disorder symptoms were higher in our results compared to pre-pandemic studies supports the studies showing the negative effects of the pandemic on the mental health of children with neurodevelopmental disorders (6, 17).

In a study examining the impact of COVID-19 on the families of children with special educational needs, parents stated that they were worried about the continuity of their children's education, their future, and the problems that social changes would bring (26). In our study, it was determined that half of the children with CP did not go to special education, and the children who received special education had higher separation anxiety, social phobia, generalized anxiety, total anxiety scores, depressive symptoms, and total internalizing symptoms compared to those who did not. The depressive symptoms and coronavirus anxiety of the parents of the children who went to special education were found to be higher than the parents of the children who did not. These results can be interpreted in several different ways. The decrease in stress factors such as performance expected situations and peer bullying when educational institutions are not attended may explain the lower anxiety and internalizing symptoms in children with CP who do not attend special education. The fact that parents of children with CP who attend special education have more depressive and coronavirus anxiety symptoms than those who do not attend may have led to a biased evaluation of anxiety, depression, and total internalizing symptoms of children with CP attending special education.

In our study, negative correlations were found between depression symptoms in children with CP and all sub-dimensions of their parents' perceived social support. In addition, a negative correlation was found between parents' coronavirus anxiety levels and perceived social support from friends and significant people. Parallel to our study, it was reported that the perceived social support level of parents of children with special needs was a protective factor for

excessive anxiety during the COVID-19 pandemic (27). These results suggest that improving the social support systems of the parents of children with CP may have a positive effect on both the depression, anxiety, and internalizing symptoms of the children with CP, as well as the coronavirus anxiety and depressive symptoms of the parents.

In a study that evaluated the relationship between parents' worry and children's internalizing and externalizing symptoms during the COVID-19 pandemic in 2021, a positive correlation was shown between the worry of parents and their children's internalizing symptoms (28). In line with the results of previous studies conducted during the pandemic period, our results show that parents' depressive symptoms and coronavirus anxiety are the predictors of anxiety symptoms in children with CP. In addition, it was determined that the coronavirus anxiety of the parents was the strongest predictor of the depressive symptoms and total internalizing symptoms of children with CP. These results indicate that mental health professionals who deal with children with CP who have high anxiety, depression and internalizing symptoms during the pandemic should keep in mind that the parents of these children may also have high coronavirus anxiety and/or depressive symptoms.

The results of this study should be evaluated in the light of several methodological limitations that should be addressed for future research. First limitation is the cross-sectional design of the study and therefore the inability to establish a cause-effect relationship between the findings. Although the descriptive features such as type of CP, verbalization skills, and mental capacity of the patients with follow-up in our clinics were recorded, the descriptive features of the children with CP reached by snowball sampling method were obtained only from the statements of the parents. In this study, due to the differences in data sources, the variables of the study were not evaluated according to types of CP, verbalization skills, and mental capacities, which is considered as a major limitation. Although CP is frequently seen together with both psychiatric and other medical diseases, the lack of data on the medical diseases or psychiatric disorders of the children with CP in the sample is another limitation of the study. The last of our limitations is that the data of the study were obtained from a single source and with self-report scales. It is recommended that future studies be planned using different data collection approaches and structured psychiatric assessment to minimize the limitations mentioned above and biases that may have affected the current findings.

Despite the above-mentioned limitations, the present findings offer important implications for research and practices. The results of this study are valuable as it is the first study to our knowledge that examines the relationship between anxiety and depression symptoms of children with CP and aforementioned factors in the COVID-19 pandemic. In this study,

the detection of higher anxiety and depression symptoms in children with CP compared to pre-pandemic studies highlights the negative impact of the COVID-19 pandemic on the mental health of children with CP. It is claimed that tele-psychiatry practices are very effective in meeting the increased mental health needs of children with special needs in the COVID-19 pandemic (29). In addition, the fact that the coronavirus anxiety and depression levels of the parents of children with CP who attend special education are higher than the parents of those who do not attend special education shows that additional precautions should be taken for this population. For instance, planning online psychological training in special education institutions to help both children with CP and parents of children with CP to protect their mental health can be considered as the first step. It is very important in clinical practice to consider that parents of children with CP who have high anxiety and depression symptoms may have high depressive symptoms as well as coronavirus anxiety because the mental health of the parents of children with CP is directly related to the quality of care for these children (30). In this pandemic, parents of children with CP should be encouraged to use psychological help resources provided by the government and non-governmental organizations that aim to alleviate the symptoms of coronavirus anxiety and depression.

## Conclusion

Coronavirus anxiety of the parents was found to be the strongest predictor of anxiety and depression symptoms in children with CP. These results suggest that the COVID-19 pandemic has increased the mental health needs of both children with CP and their parents. Assessing both children with CP and their parents' mental health and their associated factors should be a focal point of any evaluation.

**Role of funding source:** None.

**Conflict of interest:** No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, shareholding and similar situations in any firm.

**Ethical approval:** The study was approved by the Gazi University Ethics Board (Number: 2020/05).

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