

Patterns of Child and Adolescent Psychiatric Admissions Before and After the Onset of the COVID-19 Pandemic: Take Home Messages from a Clinical Population

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ABSTRACT

Background: This study from İstanbul aimed to compare the child and adolescent psychiatric admissions and diagnosis rates between the first 3 months of the pandemic, the previous 3 months in the same year, and the same months in the previous year.

Methods: Children and adolescents were grouped according to the admission dates. Group A, between March 11 and June 1, 2020; Group B, between January 1 and March 11, 2020; and Group C, between March 11 and June 1, 2019. Only clinical interviews and diagnoses according to Kiddie Schedule for Affective Disorders and Schizophrenia-Present and Lifetime Version (K-SADS-PL) interview were included.

Results: Autism spectrum disorder (ASD), obsessive-compulsive disorder (OCD)/tic disorder, and intellectual disability (ID) diagnoses were higher in group A than in groups B and C (for ASD, 6.4%, 4.3%, and 3.6%; for OCD/tic disorder, 2.9%, 1.8%, 1.7%; for ID, 3.7%, 2.5%, and 2.1%, respectively) ($P < .001$). Attention-deficit hyperactivity disorder (ADHD) diagnosis was higher in group A than in only group B (59.8% and 49.7%, respectively) ($P < 0.001$). Depression was higher in group A than in only group C (4.1% and 2.2%, respectively) ($P < .001$). Conduct disorder (CD) diagnosis was lower in group A than in only group B (3.6% and 6.4%, respectively) ($P < .05$).

Conclusion: Child psychiatry diagnosis rates were found to change significantly during the initial phase of the pandemic period. Among the referrals, ASD, OCD, Tic disorder, ID, ADHD, and depression admissions were significantly higher. The rate of pediatric neurodevelopmental disorders, particularly ASD, increased during the initial phase of the COVID-19 pandemic.

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INTRODUCTION

One of the most unexpected threats to mankind, COVID-19, has rapidly spread worldwide since the end of January 2020. All over the world, many countries have adopted strict quarantine measures to prevent the COVID-19 pandemic. In Türkiye, the first case was reported in İstanbul on March 11, 2020, and broad restrictions and lockdowns were imposed thereafter. With the emergence of new variants and upcoming new waves around the globe, it is largely uncertain if the pandemic, or currently re-defined as endemic, will ever finish.

In Türkiye, similar to many countries, restrictions and lockdowns may have affected 2 age groups more extensively. Home restrictions lasting months resulted in higher levels of

psychological distress among both the elderly and youth.^{1,2} First, those older than 65 years of age were restricted from going outside, with only a very limited time weekly; then the same measures were adopted for those younger than 20 years old. For children and adolescents, the concurrent closure of schools and the beginning of online education were the second main burden, besides many difficulties of their families had to take.

Children and adolescents with psychiatric conditions might have been among the most vulnerable populations throughout the pandemic. Pandemic-related changes, obligations, and restrictions in daily life not only affected their routines, outdoor activities, and peer relations but also

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restrained their access to mental health services.^{3,4} Most of the child and adolescent psychiatry clinics were restricted to only emergency admissions, and visiting hospitals was frightening for families due to the risk of facing the virus.

Many countries, especially those most affected by the pandemic, adopted several major public health measures to reduce the spread of the virus, including forced quarantine and healthcare systems' reorganization, with the redeployment of healthcare professionals from all disciplines to COVID-19 units, as needed.

Since the beginning of the pandemic, many studies have been conducted to investigate the differences in psychiatric admissions. Most of these studies simply reported a marked decrease in regular psychiatric admissions and emergency visits.^{5,6} To the best of our knowledge, very few studies comprehensively compared the rates of child psychiatry diagnoses among the very first months of the pandemic, just before the pandemic, and the previous year. Among those, a recent study conducted in Türkiye revealed that pandemic conditions had a significant impact on child psychiatry referrals. Despite a significant decrease due to restrictions, the presence of new-onset psychiatric conditions was reported.⁷ Therefore, in order to expand the current literature, this study aimed to compare the psychiatric admissions and diagnosis rates between the first phase of the pandemic, the previous 3 months, and the same month in the previous year, and the clinical and psychosocial correlates of psychiatric diagnosis among children and adolescents in Istanbul.

MATERIALS AND METHODS

This study was a comparison between cross-sectional data and retrospective hospital files. The sample was recruited from children who were seen at the Child and Adolescent Psychiatry Clinic. Our study sample consisted of 3 groups: A, B and C. Group A included admissions in the initial pandemic period between March 11 and June 1, 2020; group B; January 1 and March 11, 2020; and group C included admissions between March 11 and June 1, 2019.

The inclusion criteria for group A were as follows: 1) age 2-18 years; 2) no known diagnosis of chronic medical or neurological disease; 3) clinical admission to the hospital with at least 1 parent (telepsychiatry-based diagnoses were

not included); 4) diagnosis according to K-SADS-PL interview. Children with motor and visual handicaps were excluded.

The inclusion criteria for groups B and C were as follows: 1) age 2-18 years; 2) no known diagnosis of chronic medical or neurological disease; 3) clinical admission to the hospital with at least 1 parent; 4) the presence of a full patient history in hospital records; 5) diagnosis according to K-SADS-PL interview. Children with motor and visual handicaps were excluded.

The parents of group A were informed about the study procedure in detail, and verbal/written informed consent was obtained from the patients/patient who agreed to take part in the study. The study protocol was approved by a 2-way procedure. First, our study design was approved by the Ministry of Health; then, by the University of Health Sciences, Erenkoy Mental and Neurological Diseases Training and Research Hospital Clinical Researches Ethics Committee (20.07.2020/35). Written informed consent was obtained from the parents and children who agreed to participate in the study.

The study groups consisted of both newly diagnosed children and those with previous diagnoses.

Statistical Analysis

The collected data were analyzed using the SPSS v22.0. Pearson's chi-square test was used for differences in ratios between categorical variables. Fisher's exact test was performed when there was an expected value problem. Cramer's V coefficient was used as a measure of effect size for the chi-square test. Cohen's h was used as a measure of effect size between 2 proportions. The analysis of variance test (ANOVA) was used to compare the 3 groups in terms of age. The Tukey test was utilized as a post hoc test. Cohen's d was used as a measure of effect size between 2 means. The critical value ($\alpha = 0.05$) was accepted to be statistically significant.

RESULTS

The total number of admissions for groups A, B and C were 1052, 5792, and 5800, respectively. The total number of admissions for group A was significantly less than the other groups ($P < .001$). In the mean age of the sample was 11.21 ± 3.77 years, and 66.2% of the participants were male, 33.8% females. In group B, the group B; mean age of the sample was 11.42 ± 3.91 years, and 65.7% of the participants were male, 34.3% females. In group B, the group C; mean age of the sample was 10.02 ± 3.87 years, and 66.1% of the participants were male, 33.9% females. The mean age of group A was significantly higher than the other groups ($P < .001$). There was no significant difference between the groups in terms of gender. The number of admissions, age, and gender distributions for all 3 groups are shown in Table 1.

MAIN POINTS

- Child and adolescent psychiatry admissions altered during the COVID-19 pandemic.
- Children diagnosed with neurodevelopmental disorders seem to be at the highest risk during this period.
- Autism spectrum disorder (ASD), obsessive compulsive disorder (OCD)/tic disorder, intellectual disability (ID), attention-deficit hyperactivity disorder (ADHD), and depression are among the diagnoses that increased in the initial period of the COVID-19 pandemic.

Table 1. General Characteristics of Admitted Patients within Study Groups

		Group			Effect Size	P
		A (n=1052)	B (n=5792)	C (n=5800)		
Age (Mean \pm SD)		11.21 \pm 3.77 ^A	10.42 \pm 3.91 ^B	10.02 \pm 3.87 ^C	Cohen's d for pairs d_{A-B} = 0.2057 d_{A-C} = 0.3156 d_{B-C} = 0.1028	<.001
Gender n (%)	Female	356 (33.8)	1985 (34.3)	1965 (33.9)	Cramer's V=0.004	.895
	Male	696 (66.2)	3807 (65.7)	3835 (66.1)		

There is a statistically significant difference between the average ages of the 3 groups ($P < .001$).

The distribution of girls and boys according to the application period is homogeneous ($P = .895$).

*Difference between superscripts indicates statistical significance between groups (posthoc: Tukey).

As seen in Table 2 and Figure 1; when group A was compared with groups B and C in terms of the diagnoses, it was found that the admission rates of patients with ASD, OCD/tic disorder, and ID diagnoses were higher in group A than in groups B and C (for ASD, 6.4%, 4.3%, and 3.6%; for OCD/tic disorder, 2.9%, 1.8%, 1.7%; for ID; 3.7%, 2.5%, 2.1%, respectively) ($P < .001$). Attention-deficit hyperactivity disorder diagnosis was higher in group A than in only group B (59.8% and 49.7%, respectively) ($P < .001$). Depression diagnosis was higher in group A than in only group C (4.1% and 2.2%, respectively) ($P < .001$). Conduct Disorder (CD) diagnosis was lower in group A than in only group B (3.6% and 6.4%, respectively) ($P < .05$). Adjustment Disorder (AD) and others were found to be present at lower rates in group A than in groups B and C (for AD, 0.7%, 3.1%, 3.4%; for others, 3.3%, 12.6%, 9.6%, respectively) ($P < .001$).

Additionally, we investigated the course of some specific complaints of these diagnoses in Group A. As seen in

Table 3; 23.2% of the patients with depression had sleep disturbances, 10.1% had appetite problems, 36.2% had increased sadness, and 14.5% had an increase in screen contact. 32.7% of the patients with OCD/tic disorder had an increase in current symptoms and 34.7% had an increase in obsessions. 33.3% of the patients with ASD had an increase in their current symptoms and had anger/aggression/irritability complaints. 40.7% of the patients with CD had an increase in their current symptoms and 44.7% had anger/aggression/irritability complaints.

DISCUSSION

Our findings in a large-scale clinical sample in Istanbul clearly indicate that the COVID-19 pandemic significantly changed the rates of psychiatric admissions and the distribution of diagnoses in children and adolescents. First, in line with the literature, despite an increase in

Table 2. Frequencies of Diagnoses Within Study Groups

	Group A N (%) (n=1052)	Group B N (%) (n=5792)	Group C N (%) (n=5800)	Cramer's V	Group A vs Group B P (Cohen's h effect size)	Group A vs Group C P (Cohen's h effect size)	Group B vs Group C P (Cohen's h effect size)
ADHD	629 (59.8)	2878 (49.75)	3347 (57.7)	0.084	<.001 (0.2023)	.208 (0.0427)	<.001 (0.1596)
Anxiety Disorders	116 (11)	642 (11.1)	705 (12.2)	0.017	.956 (0.0032)	.300 (0.0375)	.072 (0.0343)
ASD	67 (6.4)	251 (4.3)	206 (3.6)	0.039	.004 (0.0938)	<.001 (0.1297)	0.031 (0.0360)
Depression	43 (4.1)	194 (3.3)	129 (2.2)	0.039	.228 (0.0424)	<.001 (0.1100)	<.001 (0.676)
OCD/ Tic Disorder	30 (2.9)	102 (1.8)	96 (1.7)	0.024	.018 (0.0731)	.008 (0.0807)	.660 (0.0076)
ID	39 (3.7)	143 (2.5)	119 (2.1)	0.029	.022 (0.0696)	.001 (0.0963)	.131 (0.0267)
CD	38 (3.6)	372 (6.4)	135 (2.3)	0.097	<.001 (0.1297)	.015 (0.0773)	<.001 (0.2070)
AD	7 (0.7)	178 (3.1)	200 (3.4)	0.043	<.001 (0.1865)	<.001 (0.2034)	.256 (0.0169)
Learning Disability	24 (2.3)	157 (2.7)	157 (2.7)	0.007	.425 (0.0256)	.428 (0.0256)	.990 (0.0000)
Communication Disorder	13 (1.2)	105 (1.8)	108 (1.9)	0.013	.186 (0.0496)	.156 (0.0570)	.844 (0.0074)
Bipolar Disorder	6 (0.6)	23 (0.4)	22 (0.4)	0.008	.436* (0.0285)	.426* (0.0285)	.878 (0.0000)
Enuresis/Encopresis	1 (0.1)	12 (0.2)	12 (0.2)	0.007	.706* (0.0262)	.706* (0.0262)	.997 (0.0000)
Psychosis	4 (0.4)	6 (0.1)	7 (0.1)	0.020	.054* (0.0633)	.074* (0.0633)	.783 (0.0000)
Others	35 (3.3)	729 (12.6)	557 (9.6)	0.084	<.001 (0.3604)	<.001 (0.2647)	<.001 (0.0957)

AD, Adjustment Disorder; ADHD, Attention-Deficit Hyperactivity Disorder; ASD, Autism Spectrum Disorder; CD, Conduct Disorder; ID, Intellectual Disability; OCD, Obsessive-Compulsive Disorder.

*Fisher's exact test is used.

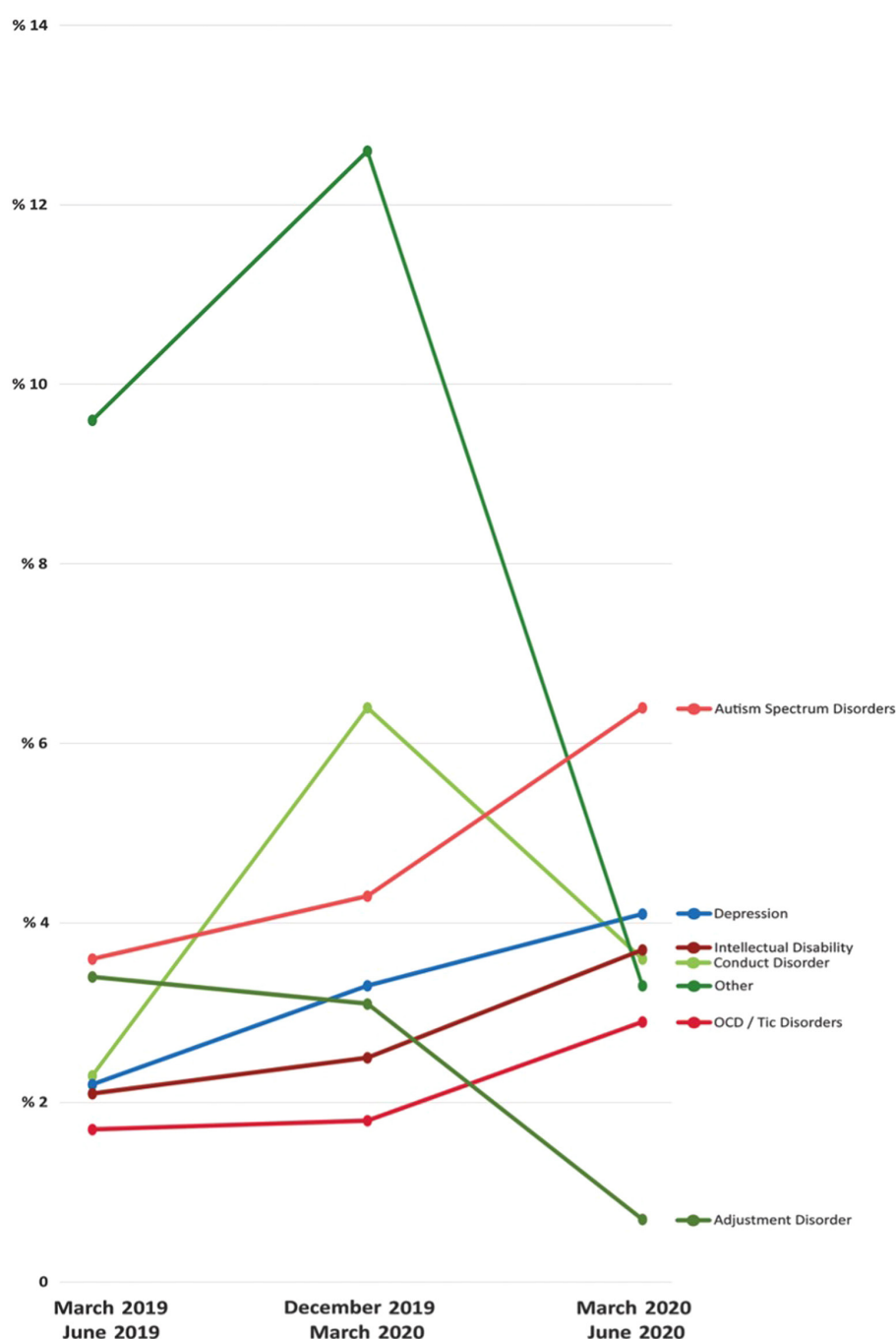


Figure 1. Percentages of the diagnoses during study periods are given. Each psychopathology is indicated in a different color.

psychiatric symptoms, a notable drop in total admissions was reported. This was not surprising in light of the lockdowns and the reductions in clinical capacity. In our study, no gender difference was detected; however, previous research revealed an increase in the proportion of female patients.^{6,8} Moreover, our data corroborated the finding that the median age of referrals had risen significantly.⁸ In the literature, adolescents demonstrated higher levels of anxiety, depressive, and somatic symptoms and may be more vulnerable to psychiatric manifestations.^{6,9} Secondly, studies indicate an alteration in the diagnosis patterns

in children and adolescents during the pandemic period. It was outlined that the most prevalent diagnoses during the pandemic period were for externalization disorders and neurodevelopmental disorders.¹⁰ In our study, the frequencies of ASD-diagnosed children's admissions increased compared to previous months and the previous year's admissions. Several factors should be taken into account to interpret our findings. In the literature, ASD was reported to be the most affected group compared to children with other neurodevelopmental disorders.¹¹ Stereotypic and self-injurious behaviors of children with

Table 3. The Course of Some Specific Complaints in Group A

	ADHD n (%)	Depression n (%)	OCD/Tic Disorder n (%)	ASD n (%)	CD n (%)	ID n (%)
Increase in current symptoms	141 (19.7)	17 (24.6)	16 (32.7)	25 (33.3)	50 (40.7)	3 (33.3)
Anger/aggression /irritability	115 (16.1)	17 (24.6)	8 (16.3)	25 (33.3)	55 (44.7)	1 (11.1)
Sleep disturbances	39 (5.5)	16 (23.2)	2 (4.1)	9 (12)	14 (11.4)	2 (22.2)
Appetite problems	30 (4.2)	7 (10.1)	2 (4.1)	2 (2.7)	4 (3.3)	0 (0)
Anxiety symptoms	51 (7.1)	11 (15.9)	9 (18.4)	2 (2.7)	9 (7.3)	1 (11.1)
Behavioural problems	80 (11.2)	6 (8.7)	5 (10.2)	14 (18.7)	50 (40.7)	1 (11.1)
Sadness	22 (3.1)	25 (36.2)	2 (4.1)	2 (2.7)	6 (4.9)	0 (0)
Obsessions	12 (1.7)	3 (4.3)	17 (34.7)	3 (4)	4 (3.3)	0 (0)
Pathological internet use	25 (3.5)	4 (5.8)	3 (6.1)	4 (5.3)	2 (1.6)	0 (0)
Increase in screen contact	36 (5)	10 (14.5)	4 (8.2)	5 (6.7)	6 (4.9)	0 (0)

AD, Adjustment Disorder; ADHD, Attention-Deficit Hyperactivity Disorder; ASD, Autism Spectrum Disorder; CD, Conduct Disorder; ID, Intellectual Disability; OCD, Obsessive-Compulsive Disorder.

ASD increased, and their social interaction and self-care skills were negatively affected during the pandemic period.¹² In another study, it was found that children with ASD faced many challenges in adapting to pandemic-related regulations. Moreover, the number of hours they slept lessened while the anxiety levels of their caregivers significantly increased.¹³ These alterations in daily life may be associated with deterioration in symptoms due to inflexibility in adherence to routines. However, the negative effects of these restrictions may be alleviated by increased shared family time and continuity in online educational assistance.¹⁴

If the psychiatric diagnosis most likely to get worsened and/or increase during an infectious disease pandemic is asked, the answer would definitely be OCD. In correlation with this assumption, many studies have reported an increase in OCD-related complaints and OCD diagnoses in psychiatry clinics, both in adults and children.^{3,15-18} Our findings also indicate that admissions with a primary diagnosis of OCD significantly increased during the pandemic. Given the parents' overt fears of contracting COVID-19 and the prevalent prevention practices commonly represented in the more than enough representation of prevention practices in media; an increase in OCD-related cleaning compulsions is not surprising. However, it is not completely known whether the increased OCD-related admissions are new diagnoses or a worsening of previously diagnosed patients. Our experiences show that a significant proportion of the child and adolescent OCD cases were new diagnoses, which had subclinical symptoms prior to the pandemic. Secondly, those with compulsions other than cleaning, such as controlling, aggressive, and religious compulsions, might not necessarily have worsened during the pandemic. A recent study on adolescents with OCD also reported a similar finding.¹⁸

Maybe the most striking result of the present study is the pronounced increase in the rate of admissions of patients with ASD to our clinics. This finding, which was also shown

in other countries, is in contrast with the opinions that children with ASD already are spending their lives at home with their strict routines and have a very limited number of people in social contact; and the pandemic might not affect them as much as children with other diagnoses like ADHD, which have significant bonds with society.^{8,19} Since the early days of the pandemic, we had phone calls from families reporting their children with ASD were more irritable, having more frequent repetitive behaviors, experiencing difficulties in getting to sleep, and, in some kids, less interest in verbal and non-verbal communication. These experiences of our clinic were correlated with our study findings. Most of these families, even though they had a chance to report their problems via telepsychiatry, chose to come to our clinic even in the first weeks of the pandemic. This reflects both the severity of the symptoms in children and the anxiety parents are facing for their children. On the other hand, in the initial months of the pandemic, most of the special education centers were either closed or provided online education for developmental disabilities. The absence of educational interventions might also have led to an increased frequency of problematic behaviors in children with ASD. Taken together, children with ASD, given their insistence on sameness and marked difficulties in flexibility, struggled significantly in the new life conditions of the pandemic. Our findings also indicate that children with ID also had an increased rate of admission during the first 3 months of the pandemic. It should be speculated that, in addition to the factors mentioned above, home lockdowns and the lack of social communication might result in a higher frequency of problematic behaviors in these children.

One might think that it would be very hard for a child with ADHD to spend days, even weeks at home without going to playgrounds, playing with friends, and participating many energetic activities outside the home. In light of the lack of teachers' control and motivational support, online education is also especially hard for youth with

ADHD. The available research on the psychological well-being of children with ADHD appears to be mixed, varying according to age. A recent study from Australia reported that decreased levels of physical activity were associated with feelings of depressive mood and loneliness in ADHD.²⁰ Another study from India showed that hyperactivity, impulsivity, and externalized behavior problems as a whole tended to increase during the pandemic; while lower parental control and insufficient parental rules were associated with worsening in ADHD symptoms.²¹ Adolescents may be classified as a unique subgroup in ADHD. A study from the US found that adolescents with ADHD suffered from isolation, difficulty concentrating on online education sessions, and a lack of motivation for school responsibilities.²² A study from Türkiye revealed that spending less time outdoors and increased media use had an impact on symptom severity in children with ADHD.²³ Another study, however, reported that core symptoms did not change significantly in the pandemic.²⁴

According to our findings, the admission rate of ADHD-diagnosed children increased when compared to the previous 3 months but not to the previous year. Imagine a child with combined ADHD at home; parental control and rules appear to have a huge impact on behavioral control and school motivation. We speculate that families who could monitor their children more accurately and implement the daily rules and responsibilities more efficiently might manage their children with ADHD more effectively. Adolescents with ADHD, with recklessness and a higher risk of conflicts with parents, might be harder to handle for families.

In our study, the frequency of admissions with depression was found to have increased when compared to the previous year but not the previous 3 months. Since our findings reflect only the initial months of the pandemic, we speculate that, in the later months, some children and adolescents might develop depression symptoms secondary to loss of social interaction, feelings of isolation, the highly routine days of home lockdowns, and lack of self-control. Another explanation is that depression and general anxiety symptoms (were not found to be different among study periods) might be considered largely expected by families. Parents may have used their own resources to solve emotional problems instead of coming to psychiatry clinics. Some of the diagnostic groups were found to be less prevalent among our patients in the early pandemic months. Among these, AD and CD deserve special attention. Lower rates of admissions for AD might be partly explained by the lower probability of some negative life events, including family system changes, divorce, migration, and school changes. Regarding CD, home lockdowns might be relatively protective against some severe problematic behaviors, e.g., physical fights, stealing, and staying out at night. On the other hand, some aggressive behaviors could be managed by the collaboration of the whole family and/or denied in the middle of the pandemic fears.

In the present study, we also investigated the course of some specific symptoms and complaints among admissions in the initial COVID pandemic. Between one-fifth and one-third of all diagnostic groups reported a worsening in disorder-related symptoms, while children with ASD, OCD, and CD had the highest rates. Children with ASD and CD differed from the other groups by the marked increase in anger/aggression/irritability problems. It is interesting that CD, despite having a lower frequency in admission rates, appears to be negatively affected in the pandemic. We speculate that many families of children with CD chose to solve their problems at home and did visit outpatient clinics until the condition was extremely worse. Another finding to be concerned about is that those with depression had the highest increase in screen contact. These findings indicate that diagnostic groups have their own unique risk factors for accompanying symptoms and problems.

In conclusion, our results show that the diagnosis rates of child and adolescent psychiatry and related healthcare needs changed significantly during the first period of the pandemic. It is seen that especially children and adolescents with neurodevelopmental disorders were affected more than the other diagnostic groups. In a study, it has been reported that irritability, hyperactivity, stereotyped behavior, and delayed sleep phase were among the most common challenges in children with neurodevelopmental disorders.¹¹ These findings suggest that clinicians should pay more attention when evaluating children and adolescents with psychiatric problems, especially those with neurodevelopmental disorders, during extraordinary times like COVID-19 pandemic.

There are some limitations in our study. The small sample size and retrospective nature of the study limit the generalizability of the data obtained. Since the data were analyzed retrospectively, the number of parameters that could be analyzed was limited. However, our study, which reflects the very first reaction of children and adolescents to the pandemic, is considered to contribute to future studies in this field and provide a new perspective. One of the strengths of our study is that by comparing the pandemic data with that of the previous 3 months and previous season of the last year, we controlled both seasonal and between-year effects on the study findings. Further studies examining the long-term consequences of the COVID-19 pandemic in children and adolescents are needed.

Ethics Committee Approval: This study was approved by the Ethics Committee of Erenkoy Mental Health and Nervous Diseases Research and Training Hospital (Approval No: 35; Date: 20.07.2020).

Informed Consent: Written informed consent was obtained from the patients/patient who agreed to take part in the study.

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