RESEARCH PAPER

COVID-19'S IMPACT ON ADHD KIDS AND THEIR CAREGIVERS/FAMILIES

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ABSTRACT

Introduction: Children with attention deficit hyperactivity disorder (ADHD) and other vulnerable populations were disproportionately affected by the COVID-19 pandemic's extensive disruption of daily routines, healthcare services, and schooling. Behavioral regulation, academic achievement, and emotional well-being were all greatly impacted by abrupt school closures, social isolation, and changes in therapy services. Routine disruptions and higher caregiving duties also led to a rise in stress for families and caregivers.

Aims: To assess the impact of the COVID-19 pandemic on behavioural, emotional, and functional outcomes among children with ADHD.To evaluate the effect of the pandemic-related changes on the stress, coping strategies, and quality of life of caregivers/families of children with ADHD.

Materials and Methods: This observational study was conducted among children diagnosed with ADHD and their caregivers. Data were collected using structured questionnaires assessing behavioral changes, academic performance, screen time, sleep patterns, and caregiver stress levels during the pandemic period. Pre-pandemic and during-pandemic comparisons were analyzed using descriptive and inferential statistics.

Result: Most kids showed worsening signs of ADHD, such as increased hyperactivity, irritability, and inattention. In most cases, the difficulties associated with distant learning resulted in a drop in academic achievement. While physical activity declined, screen time dramatically soared. In addition to having less access to psychological and medical support services, caregivers reported higher levels of stress, anxiety, and difficulties controlling children's behavior.

Conclusion: Children with Attention-Deficit/Hyperactivity Disorder (ADHD) and their caregivers experienced significant challenges during the COVID-19 pandemic, with worsening behavioural symptoms and increased psychological stress within families. Strengthening telepsychiatry services, caregiver support systems, and structured home-based interventions is essential to improve resilience and ensure effective management of ADHD during future public health disruptions.

Keywords: Neurodevelopmental Disorders, Attention-Deficit/Hyperactivity Disorder, ADHD Children, COVID-19 Pandemic, Child Mental Health, Behavioural Problems, Emotional Symptoms.

How to cite this article: Mandal IR, Singh M., COVID-19's Impact on ADHD Kids and Their Caregivers/Families. Int J Drug Deliv Technol. 2026;16(90s): 110-123; DOI: 10.25258/ijddt.16.90s.12

INTRODUCTION

Families around the world are facing serious difficulties as a result of the COVID-19 pandemic's severe disruption of normal life. Children with Attention-Deficit/Hyperactivity Disorder (ADHD) and their caregivers are among those most impacted, since they have encountered particular and exacerbated challenges throughout this crisis. A significant percentage of children suffer from ADHD, a common neurodevelopmental disease

marked by impulsivity, hyperactivity, and inattention that frequently places difficult demands on family dynamics and caregiving [1].

Long-standing patterns that are essential to the wellbeing of kids with ADHD have been disrupted by the pandemic's public health measures, such as extended school closures, social isolation, and the switch to remote learning. This vulnerable population's behavioral symptoms and psychological distress have been made worse by these sudden changes. For example, research from Canada shows that children with ADHD have higher levels of anxiety and depression symptoms, which are linked to lifestyle disturbances such irregular sleep schedules, less exercise, and excessive screen time [2]. Stress has been exacerbated by difficulties adjusting to online learning, with many kids finding it difficult to participate and parents complaining that virtual learning formats don't provide enough support [3].

During the pandemic, caregivers have experienced a significant psychological strain in addition to the children themselves. Managing their child's conduct, enforcing COVID-19 preventive measures, and adjusting to changes in daily routines and academic obligations have all been linked to poor mental health in caregivers [4,5]. Increased emotional symptoms in children, domestic disputes, and the difficulty of juggling caregiving with other pandemic-related demands are the main causes of the elevated familial stress. These stressors highlight the interdependent relationship between child symptomatology and caregiver well-being, demonstrating that the pandemic has had a substantial impact on caregiver mental health and family functioning in addition to children with ADHD [6].

Families dealing with ADHD have also experienced increased emotions of anxiety and disconnection due to the larger psychosocial context, which is characterized by social isolation, unpredictability, and limited access to outside resources. Lack of regularity, decreased social connection, and widespread fear are often cited by parents as obstacles to preserving mental health at this extraordinary time [7]. The cycle of suffering has been exacerbated by sleep abnormalities, which are quite common among children with ADHD even in normal situations. These disturbances have gotten worse during the epidemic and are associated with lower outcomes for both children and caregivers [8].

MATERIALS AND METHODS

Study design: longitudinal study

Place of study: Shri Venkateswara University, Gajraula, Uttar Pradesh (from where I'm doing my PhD)

Period of study: 3 years, from 2022 till 2025.

Study Population: The study population includes children diagnosed with ADHD during the COVID-19 pandemic and their primary caregivers/family members.

Sample size: Children between the ages 6 to 10 years of age with ADHD and their caregivers/ parents.

Inclusion Criteria:

- Children diagnosed with Attention-Deficit/Hyperactivity Disorder (ADHD) according to standard diagnostic criteria.
- Children belonging to the age group 6–18 years.
- Children with ADHD who experienced the COVID-19 pandemic period and related restrictions (school closure, online education, social distancing).
- Parents/caregivers of children

diagnosed with ADHD who are involved in daily care.

- Families willing to participate in the study and provide informed consent.
- Children with ADHD receiving or not receiving pharmacological/non-pharmacological treatment.
- Participants available for assessment of behavioural, emotional, academic, and family-related changes during the pandemic.

Exclusion criteria:

- Children without a confirmed diagnosis of ADHD.
- Children with severe intellectual disability or major developmental disorders affecting assessment.
- Children with severe neurological disorders or chronic medical illnesses.
- Children with psychiatric disorders other than ADHD that significantly affect behaviour (e.g., psychosis, severe mood disorders).
- Caregivers unwilling to participate or unable to provide reliable information.
- Families with incomplete questionnaire/interview responses.
- Children who did not experience pandemic-related lifestyle changes or restrictions.

Study Variable:

- School closure
- Online learning
- Social isolation
- Reduced outdoor activities
- Change in daily routine
- Increased screen time
- Sleep schedule changes
- Inattention
- Hyperactivity
- Impulsivity
- Irritability
- Emotional outbursts
- Aggressive behaviour
- Difficulty following routines

Statistical Analysis: For statistical analysis, data were initially entered into a Microsoft Excel spreadsheet and then analysed using SPSS (version 27.0; SPSS Inc., Chicago, IL, USA) and GraphPad Prism (version 5). Numerical variables were summarized using means and standard deviations, while Data were entered into Excel and analyzed using SPSS and GraphPad Prism. Numerical variables were summarized using means and standard deviations, while categorical variables were described with counts and percentages. Two-sample t-tests were used to compare independent groups, while paired t- tests accounted for correlations in paired data. Chi-square tests (including Fisher's exact test for small sample sizes) were used for categorical data comparisons. P-values $\leq$ 0.05 were considered statistically significant.

RESULT

Table 1: Distribution of mean Pair 1, Pair 2

	Paired Differences					t	df	P-value
	Mean	Std. Deviation	Std. Er	95% Confidence Interval of the Difference				
				Lo	U			

			n	r or Mean	wer	pper			
Pair 1	Tool-1 SCORE before COVID - Tool-1 SCORE after COVID	-2.58	2.475	0.35	-3.283	-1.877	-7.371	49	0
Pair 2	Tool-2 SCORE before COVID - Tool-2 SCORE after COVID	-6.08	3.129	0.442	-6.969	-5.191	-13.741	49	0

Table 2: Distribution of mean Tool-1 SCORE before COVID, Tool-1 SCORE after COVID, Tool-2 SCORE before COVID, Tool-2 SCORE after COVID

	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper

						)				
Tool-1 SCORE before COVID	Equal variances assumed	0.599	0.443	-0.569	48	0.572	-0.644	1.131	-2.918	1.631
	Equal variances not assumed			-0.717	7.758	0.494	-0.644	0.898	-2.725	1.437
Tool-1 SCORE after COVID	Equal variances assumed	1.419	0.239	-0.402	48	0.689	-0.545	1.357	-3.275	2.184
	Equal variances not assumed			-0.456	7.049	0.662	-0.545	1.195	-3.367	2.276
Tool-2 SC	Equal variances assumed	0.061	0.806	-0.954	48	0.344	-1.144	1.199	-3.562	3.275

ORE before COVID	umed					5			7	5
	Equal variances not assumed			0.883	6.169	0.41	1.144	1.296	-2.006	4.294
Tool-2 SCORE after COVID	Equal variance s assumed	0	0.985	0.482	48	0.632	0.485	1.006	-1.537	2.507
	Equal variances not assumed			0.481	6.435	0.646	0.485	1.008	-1.941	2.911

Table 3: Distribution of mean Tool-1 SCORE before COVID, Tool-1 SCORE after COVID, Tool-2 SCORE before COVID, Tool-2 SCORE after COVID

Age	N	Mean	Std. Deviation	Std. Er	95% Confidence Interval for Mean		Minimum	Maximum
					Lowe	Uppe		

					r o r	r B o u n d	r B o u n d		
Tool-1 SCORE before COVID	6	8	18.63	2.264	0.8	16.73	20.52	15	21
	7	9	20.11	3.14	1.047	17.7	22.52	15	26
	8	6	19.83	3.312	1.352	16.36	23.31	16	25
	9	1	19	.	.	.	.	19	19
	10	6	16.5	1.378	0.563	15.05	17.95	15	18
	11	4	18.5	2.38	1.19	14.71	22.29	16	21
	12	8	19.38	2.2	0.778	17.54	21.21	17	23
	13	4	18.75	2.5	1.25	14.77	22.73	16	22
	14	4	1	2.64	1	1	2	15	21

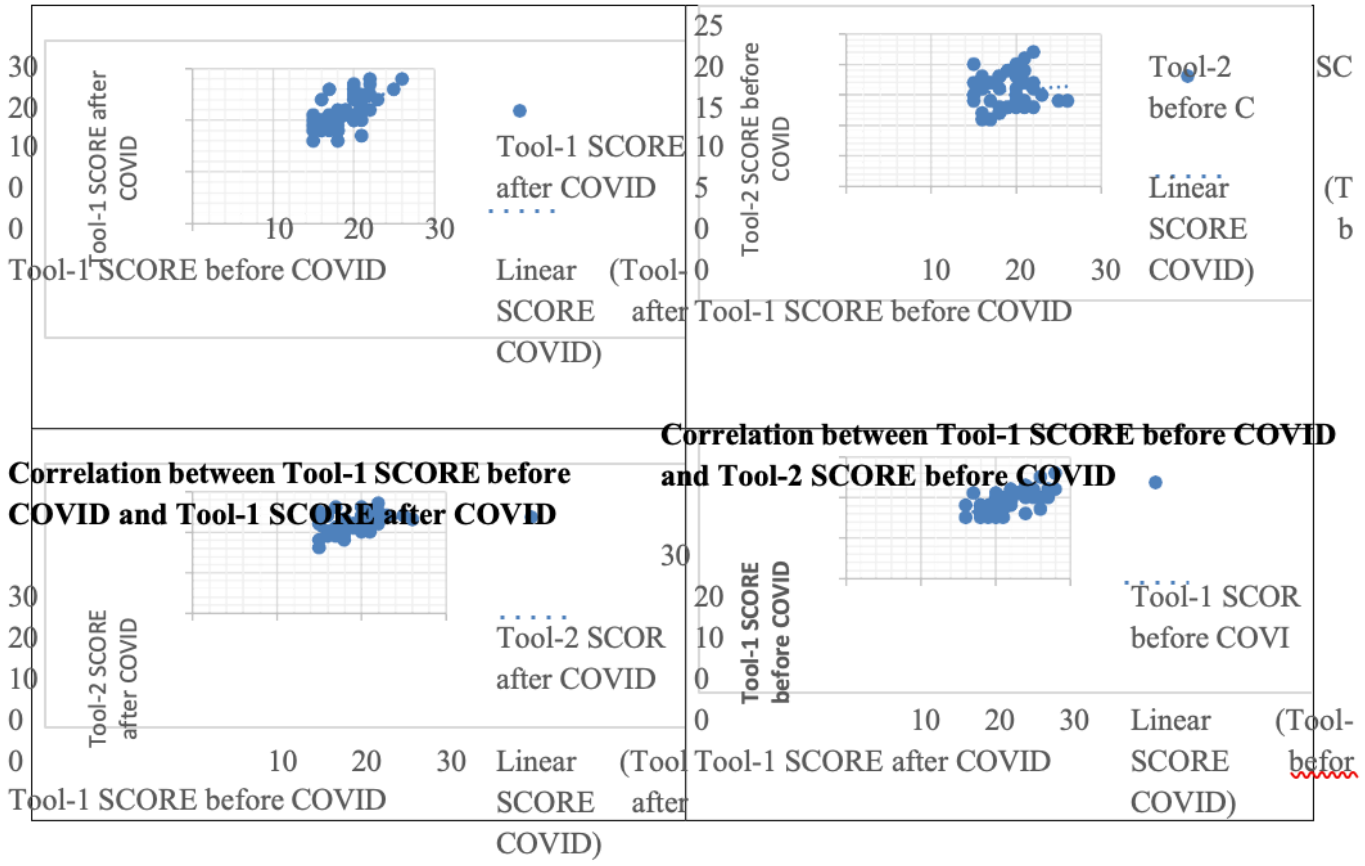
			8.5	6	.323	4.29	2.71		
	P-value	.397							
Tool-1 SCORE after COVID	6	8	21	2.449	0.866	18.95	23.05	18	26
	7	9	22.33	3.571	1.19	19.59	25.08	18	28
	8	6	22.5	3.271	1.335	19.07	25.93	18	26
	9	1	22	.	.	.	.	22	22
	10	6	18.67	1.751	0.715	16.83	20.5	16	21
	11	4	22	1.826	0.913	19.09	24.91	20	24
	12	8	21	3.586	1.268	18	24	16	26
	13	4	21.7	4.349	2.17	14.8	28.6	18	28

			5		5	3	7		
	14	4	23.25	2.63	1.315	19.07	27.43	21	27
	P-value	.432							
Tool-2 SCORE before COVID	6	8	17.38	2.134	0.754	15.59	19.16	13	20
	7	9	16.78	2.819	0.94	14.61	18.94	13	22
	8	6	15.17	2.639	1.078	12.4	17.94	11	19
	9	1	13	.	.	.	.	13	13
	10	6	15.5	2.881	1.176	12.48	18.52	12	20
	11	4	13.25	2.63	1.315	9.07	17.43	11	17
	12	8	16.13	1.642	0.581	14.75	17.5	14	18
	13	4	13	2.63	1.	9.	17	11	17

			.25		315	07	.43		
	14	4	15.25	3.948	1.974	8.97	21.53	12	21
	P-value	.128							
Tool-2 SCORE after COVID	6	8	22.38	2.066	0.73	20.65	24.1	20	26
	7	9	21.78	2.906	0.969	19.54	24.01	18	27
	8	6	22.17	1.941	0.792	20.13	24.2	20	25
	9	1	22	.	.	.	.	22	22
	10	6	20.67	2.805	1.145	17.72	23.61	16	24
	11	4	20	0.816	0.408	18.7	21.3	19	21
	12	8	22.13	2.357	0.833	20.15	24.1	19	26

	13	4	20.75	2.5	1.25	16.77	24.73	18	24
	14	4	23.25	1.258	0.629	21.25	25.25	22	25
	P-value	.544							

Figure 1: Correlation between Tool-1 and Tool-2 Scores before and after COVID



Correlation between Tool-1 SCORE before COVID and Tool-2 SCORE after COVID

b COVID)

Correlation between Tool-2 SCORE after

Correlation between Tool-2 SCORE after COVID and Tool-1 SCORE after COVID	**COVID and Tool-2 SCORE before COVID**

A statistically significant decline in scores following COVID was shown by paired t-test analysis. With a standard error of 0.35 and a 95% confidence interval of −3.283 to −1.877, the mean difference for Tool-1 was −2.58 ± 2.475, indicating high statistical significance (t=−7.371, df=49, p<0.001). Similarly, Tool-2 demonstrated a highly significant mean difference of −6.08 ± 3.129 with a standard error of 0.442 and a 95% confidence interval of −6.969 to −5.191 (t=−13.741, df=49, p<0.001). Tool-1 and Tool-2 scores before and after COVID did not significantly differ across groups, according to Levene's test (all p>0.05). Additionally, Tool-1 before COVID (F=0.599, p=0.443; t=−0.569, p=0.572), Tool-1 after COVID (F=1.419, p=0.239; t=−0.402, p=0.690), Tool-2 before COVID (F=0.061, p=0.806; t=0.954, p=0.345), and Tool-2 after COVID (F=0.000, p=0.985;
t=0.482, p=0.632). Tool-1 scores before COVID varied from 16.5 ± 1.378 in 10 years to 20.11 ± 3.14 in 7 years, according to age-wise analysis. After COVID, scores increased in all age groups, ranging from 18.67 ± 1.751 in 10 years to 23.25 ± 2.63 in 14 years. In a similar vein, prior to COVID, Tool-2 scores varied from 13 ± 0 in 9 years to 17.38 ± 2.134 in 6 years, whereas following COVID, scores rose from 20 ± 0.816 in 11 years to 23.25 ± 1.258 in 14 years. The Tool-1 score before and after COVID showed a strong positive association, according to correlation analysis (r=0.633, p<0.001). The Tool-1 score prior to COVID also had a modest association with the Tool-2 score following COVID (r=0.378, p=0.007), however the Tool-1 score following COVID demonstrated a substantial positive correlation with the Tool-2 score following COVID (r=0.645, p<0.001). Tool-1 before COVID and Tool-2 before COVID (r=0.096, p=0.509), Tool-1 after COVID and Tool-2 before COVID (r=0.137, p=0.343), and Tool-2 before and after COVID (r=0.241, p=0.092) did not, however, show any significant relationships.

DISCUSSION

With statistically significant increases in Tool-1 and Tool-2 scores following COVID, indicating deteriorating behavioral, emotional, and psychosocial effects, the current study showed a considerable impact of the COVID-19 epidemic on children with ADHD and their caregivers/families. In line with the findings of Bobo E [12] and Duan L [18], who found greater emotional dysregulation, anxiety, tension, and behavioral abnormalities among children during lockdowns and protracted social isolation, the paired t-test indicated a substantial post-COVID deterioration. Tool-1 scores rose from 18.9 ± 2.581 to 21.48 ± 3.092 and Tool-2 scores from 15.66 ± 2.752 to 21.74 ± 2.293 in this study, indicating increased symptom severity and caregiver burden. These findings are consistent with those of Chawla N [13] and Carrell Moore H [15], who noted psychological stress in kids during remote learning and disturbed routines. In line with Amos KA [9], who documented widespread effects of screen exposure and lifestyle disturbance regardless of demographic considerations, no significant differences between groups were found in independent t-test analysis, suggesting a uniform impact of the pandemic across communities. In line with Bliznashka L [10] and Bican R [11], who highlighted disrupted healthcare access and interruption of therapeutic services affecting children across age categories, age-wise analysis also revealed increased

scores across all age groups without statistical significance, indicating consistent adverse effects. Strong positive correlations were found between Tool-1 and Tool-2 post-COVID scores ($r=0.645$, $p<0.001$), indicating that worsening child symptoms were linked to increased caregiver burden, and between Tool-1 and Tool-2 pre-COVID scores ($r=0.633$, $p<0.001$), indicating persistence of baseline difficulties. Glumbic N [19], Guyer J [20], and Chu JTW [17], who highlighted the significance of caregiver stress and the necessity of structured support systems during crises, corroborate these findings. Furthermore, Celikel R [14] emphasized the value of ongoing psychosocial and therapeutic support both during and after public health catastrophes by highlighting the advantages of rehabilitative and remote therapies in enhancing outcomes.

CONCLUSION

We concluded that children with ADHD and their caregivers were greatly impacted by the COVID-19 epidemic. Significant post-COVID deterioration was evident in the behavioral, psychological, and functional areas of both Tool-1 and Tool-2 scores. Age-wise increases showed impact across all age groups, despite non-significant intergroup differences. The persistence of problems over time is suggested by significant positive correlations between pre- and post-COVID scores. Overall, the results highlight the importance of providing impacted children and families with ongoing psychological support, caregiver counseling, regular routines, and easily accessible mental health treatments during public health emergencies.

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