

The Impact Of COVID-19 On The Mental Health Of Children With Neurodevelopmental Disorders: A Cross-Sectional Analysis

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Abstract

The COVID-19 pandemic has significantly impacted the mental health of children, with those diagnosed with neurodevelopmental disorders (NDDs) such as ADHD and autism spectrum disorder (ASD) being particularly vulnerable. Many children with NDDs rely heavily on structured environments and regular routines, which were disrupted during the pandemic due to school closures, isolation from peers, and changes in access to support services. Numerous studies have been published to support parents, caregivers, and mental health professionals in understanding and managing the pandemic's impact on child mental health. This paper aims to contribute to this body of research by offering insights into these challenges and strategies for addressing them effectively. The study aims to examine the specific mental health challenges faced by these children during the pandemic and explore how disruptions to their daily routines, education, and therapeutic interventions have intensified their emotional and behavioral difficulties. Through a cross-sectional analysis of existing research, this article highlights the heightened anxiety, stress, and emotional dysregulation experienced by children with NDDs during and after the pandemic, with a particular focus on academic performance, social isolation, and communication deficits.

The study also explores pre-pandemic mental health interventions, including behavioral therapies such as Applied Behavior Analysis (ABA) and Cognitive Behavioral Therapy (CBT), and reviews how the pandemic disrupted access to these essential services. The analysis emphasizes the need for properly strategized, hybrid intervention models combining in-person and virtual care to ensure consistent support for children with NDDs in the future.

Keywords: COVID-19, Neurodevelopmental Disorders, ADHD, Autism Spectrum Disorder, Mental Health, Children, Hybrid Intervention, Anxiety, Behavioral Therapy, Early Intervention

Date of Submission: 01-12-2024

Date of Acceptance: 11-12-2024

I. Introduction

The World Health Organization (WHO) defines mental health as a state of well-being that enables individuals to effectively cope with life's stresses, realize their abilities, learn and work productively, and contribute to their communities (WHO, 2024). This definition highlights that mental health issues arise when individuals face obstacles that hinder their ability to manage typical life stressors, such as family and relationship challenges, financial strains, and major life transitions. For children, especially those with neurodevelopmental disorders (NDDs) like autism spectrum disorder (ASD) and attention-deficit/hyperactivity disorder (ADHD), difficulties in coping with these stresses may manifest through symptoms like anxiety, physical complaints (e.g., headaches, stomachaches), and behavioral changes under pressures such as academic expectations or family tension. These challenges became particularly evident during the COVID-19 pandemic, as children struggled with the disruption of routines, limited social interactions, and reduced access to supportive services—factors that further impacted their mental well-being in unprecedented ways. The COVID-19 pandemic caused extensive disruption in almost all areas of daily life, profoundly impacting global health, economies, and social structures. The restrictions and changes implemented to curb the spread of the virus, such as lockdowns, social distancing, and school closures, have had profound psychological and social consequences, particularly for vulnerable populations. Among these, children with neurodevelopmental disorders (NDDs), who often face difficulties in emotional regulation, social interactions, and maintaining routines, were especially affected due to the essential role structure and stability play in their well-being (Mänty et al., 2020). The disruption of educational and therapeutic services due to the pandemic has influenced these issues, leading to increased reports of anxiety, depression, and behavioral problems in this population (Courtenay & Perera, 2020). These disorders typically require consistent interventions, including specialized education, behavioral therapy, and family support, which were significantly interrupted during the pandemic.

Children in this group experienced specific challenges due to the pandemic's social isolation and uncertainty. The lack of structured environments, limited access to routine healthcare services, and disrupted social interactions exacerbated pre-existing mental health conditions. A study by Mingins et al. (2021) found that children with autism exhibited a marked increase in anxiety and behavioral issues due to the pandemic's impact on their routines. Similarly, children with ADHD struggle with the lack of physical outlets and educational support, often leading to heightened levels of frustration and emotional dysregulation (Bobo et al., 2020).

The purpose of this study is to provide a comprehensive analysis of the impact of COVID-19 on the mental health of children with neurodevelopmental disorders. By addressing the specific psychological and social challenges faced by this vulnerable population during the pandemic, we aim to highlight the importance of targeted interventions and support systems for these children. The study is crucial for understanding how to better support children with NDDs in future crises and for ensuring their mental health needs are adequately met during times of prolonged disruption. Understanding these impacts can inform the development of effective public health strategies that address the unique needs of children with NDDs in pandemic and post-pandemic settings.

II. Literature Review

Neurodevelopmental Disorders and Mental Health

According to a review by Billie et. al (2020), Neurodevelopmental disorders (NDDs) are conditions resulting from a typical development of the central nervous system, leading to functional impairments in the brain that become evident over time. These disorders may affect cognitive and motor abilities, learning capacities, language skills, or non-verbal communication. Additionally, they can often be linked to neuropsychiatric symptoms, impacting overall mental health and behavior (Billie & David, 2020). Lorenzo et. al defines Neurodevelopmental disorders as a psychiatric condition arising in early life featuring abnormalities in the central nervous system development.

Autism spectrum disorder (ASD) and attention deficit hyperactivity disorder (ADHD) are among the most prevalent neurodevelopmental disorders diagnosed in childhood. While the DSM-IV did not allow for a combined diagnosis of ADHD and ASD, the DSM-5 now recognizes the possibility of co-occurring diagnoses of these two conditions (Scandurra et al., 2019). These conditions often lead to significant challenges in emotional regulation, social interactions, and behavioral control, which can contribute to mental health problems, such as anxiety and depression. Existing research consistently shows that children with ADHD and ASD are at a higher risk for developing mental health issues. According to Cuffe et al. (2015), most children with ADHD experience psychiatric comorbidities, which affect their functional outcomes. The nature of these outcomes differs depending on the type of comorbidity. Children with ADHD and comorbid conditions tend to have more strained relationships with peers and parents, perform worse academically, and report lower emotional well-being and school functioning compared to those with ADHD alone or children without ADHD. Similarly, children with ASD often struggle with heightened anxiety, sensory sensitivities, and social communication deficits, which can increase their vulnerability to emotional distress (Mazefsky, 2015).

Studies have demonstrated that mental health challenges in these children often arise from difficulties in managing everyday social interactions, adhering to routines, and processing sensory information (Scott et al., 2016). Children with autism may experience heightened anxiety in new or unpredictable environments, while children with ADHD often struggle to regulate their attention and impulsivity, leading to emotional outbursts. As noted by Leitner (2021), both groups require consistent support, including behavioral interventions and specialized education programs, to manage these challenges and reduce the risk of escalating mental health issues.

Impact of COVID-19 on Mental Health

Social isolation, disruption of routines, and the overall uncertainty caused by the pandemic have been major contributors to increased mental health challenges among children. A study by Sayed et al. (2023) pointed out that school-aged children (ages 7 to 13 years) have exhibited higher rates of anxiety and depression since the pandemic, with studies revealing substantial depressive symptoms ranging from 2.2% to 11.78% and significant anxiety symptoms between 1.8% and 23.87%. These children also show increased inattention, a heightened need for reassurance, academic difficulties, inappropriate behavior, anxiety, social isolation, and depressive symptoms. In addition to isolation, the sudden and prolonged shift to remote learning disrupted many children's daily routines, which are critical for their emotional and cognitive development. The stress of uncertainty, health concerns, and adapting to new learning environments further contributed to a rise in mental health problems (Cortés-Albornoz et al., 2024; Wang, 2023).

The absence of typical social structures, such as schools, extracurricular activities, and peer interactions, left many children feeling isolated and anxious. Studies have shown that school closures not only disrupt learning but also severe children's primary source of socialization, which is crucial for their emotional development (Mazrekaj & De Witte, 2024). The absence of physical activity and regular schedules also led to increased behavioral problems and emotional dysregulation among children. A study by de Figueiredo et al. (2021)

highlighted that children who faced prolonged isolation exhibited higher rates of irritability, emotional instability, and stress compared to pre-pandemic levels.

COVID-19 and Children with Neurodevelopmental Disorders

Children with neurodevelopmental disorders (NDDs), such as ADHD and autism, faced heightened challenges during the COVID-19 pandemic. Disruptions to daily routines, the loss of access to therapeutic interventions, and increased isolation had a more severe impact on their mental health compared to neurotypical children. Research by Pai et al. (2022) found that children with autism exhibited worsened symptoms, including increased anxiety, heightened sensory sensitivities, and more frequent emotional outbursts, largely due to the pandemic's disruption of their structured environments. Similarly, for children with ADHD, the absence of a regular school setting reduced opportunities for physical activity, increasing difficulties in managing hyperactivity and impulsivity (Li et al., 2023).

Children with autism, who often struggle with communication and social skills, faced additional challenges as the lack of in-person interactions hindered their learning and social development. Many families also found it difficult to provide the necessary support at home due to the demands of remote work and pandemic-related stress. Currie (2022) reported that both parents and children with NDDs experienced significant mental health challenges stemming from the denial, delay, and disruption of crucial support services during the pandemic. These disruptions, though often resulting from necessary public health measures, had unintended consequences for vulnerable groups like families of children with NDDs. Hence, the need for targeted interventions and support strategies for children with neurodevelopmental disorders, both during and after the pandemic. Insights from parents caring for these children should inform a disability-inclusive recovery plan and future emergency preparedness efforts to manage adverse mental health impacts on this population. By incorporating these learnings, local and national stakeholders can improve access to services and support for families moving forward.

Mental Health Interventions Pre- and Post-Pandemic

Before the COVID-19 pandemic, mental health interventions for children with neurodevelopmental disorders (NDDs) typically involved a combination of behavioral therapies, specialized education, and parental support. Widely used interventions included Applied Behavior Analysis (ABA) for children with autism and Cognitive Behavioral Therapy (CBT) for children with ADHD, both of which were effective in managing symptoms and improving social and emotional functioning (Gitimoghaddam et al., 2022; Ojinna, 2022). Schools also played a vital role in providing structured environments, offering specialized services like individualized education programs (IEPs) and behavioral interventions, which were essential for supporting these children. Before the pandemic, nearly 46% of children with NDDs qualified for special education and related services through an IEP. However, during the pandemic, 48% of those with IEPs reported a reduction in the frequency and/or duration of these services. The most significant decreases occurred in occupational therapy (47%), followed by physical therapy (46%) and special education services (34%). These reductions in essential services further exacerbated the challenges faced by children with NDDs, as schools and healthcare providers struggled to maintain continuity in care (Chen et al., 2022).

As the pandemic disrupted access to these critical interventions, there was a rapid shift towards remote and virtual services. However, the effectiveness of these adaptations was limited, prompting the need for more sustainable and flexible intervention models. Moving forward, hybrid models of care that combine in-person and virtual services are gaining recognition as essential for ensuring continuous support for children with NDDs. Krasovsky et al. (2024) highlight the importance of developing these flexible hybrid strategies planned to individual needs, allowing for consistent care regardless of external circumstances.

III. Methodology

Study Design

This study employed a cross-sectional analysis to assess the impact of COVID-19 on the mental health of children with neurodevelopmental disorders (NDDs), specifically ADHD and autism. A cross-sectional approach was selected for its ability to capture a snapshot of the mental health challenges experienced during a defined period of the pandemic, enabling an analysis of correlations between pandemic-induced stressors and mental health outcomes.

Data Collection

Data for this study were gathered from multiple sources, including existing literature, surveys, and studies that focused on the mental health of children with NDDs during the pandemic. Surveys that were administered to parents and caregivers of children with ADHD and autism to capture firsthand accounts of behavioral and emotional changes during the pandemic were studied.

Population Studied

The population under study included children aged 3 to 17 years who had been diagnosed with ADHD, autism, or both. The study focused on children who had received pre-pandemic support in the form of behavioral therapies, special education services, or other mental health interventions. The sample was drawn from various geographic locations to ensure diverse socioeconomic and cultural representation.

Limitations

The first of several limitations recognized in this study was the reliance on self-reported data from caregivers may introduce bias, as responses could be influenced by the caregiver's stress levels or perceptions. The cross-sectional design does not allow for causal inferences regarding the long-term effects of the pandemic. Another limitation is the potential underrepresentation of certain demographic groups, such as children from low-income families, which may affect the generalizability of the findings. Lastly, the rapidly changing nature of the pandemic meant that the mental health challenges faced by these children could evolve, and a longitudinal study might provide deeper insights.

IV. Results

Mental Health Outcomes for Children with ADHD

The COVID-19 pandemic significantly affected mental health and heightened the challenges faced by children with ADHD, as the sudden changes to their daily routines made it harder for them to manage symptoms. One of the key outcomes observed was an increase in anxiety levels, with many children struggling to adapt to the isolation and the loss of structured environments like schools (Li et al., 2023). These children exhibited heightened behavior changes, including impulsivity and hyperactivity, which became more pronounced as opportunities for physical activity and social engagement decreased. It was also noted that academic performance issues were reported widely, as children with ADHD found it difficult to maintain focus during online learning, contributing to lower educational outcomes. The lack of direct engagement with teachers and peers worsened their ability to stay on task, further compounding the challenges associated with remote learning environments (Lynch & Davison, 2024).

Mental Health Outcomes for Children with Autism

For children with autism spectrum disorder (ASD), the pandemic intensified sensory and social challenges that are inherent to the condition. The abrupt disruption to their established routines led to increased symptoms of anxiety and heightened sensory sensitivities, as these children struggled to cope with the sudden lack of structure (Pai et al., 2022). Social isolation was particularly detrimental, as children with ASD often rely on regular, in-person interactions for social learning and communication development. Without access to these critical social environments, many children regressed in their communication skills, leading to increased frustration and emotional outbursts. The absence of therapeutic interventions, such as speech and occupational therapy, further compounded these difficulties, leaving many families struggling to provide adequate support in the home setting (Yizengaw, 2021).

Common Mental Health Trends Across Both Groups

These shared challenges explain the importance of properly strategized interventions that address emotional regulation and coping strategies for children with neurodevelopmental disorders, particularly in times of crisis. Children with both ADHD and autism shared several common mental health trends during the pandemic, notably in their struggles with emotional regulation. Both groups experienced increased anxiety, often stemming from the loss of routine and the uncertainty of the pandemic environment (Gitimoghaddam et al., 2022). Stress-related behaviors, such as irritability, tantrums, and emotional outbursts, were more frequent as these children faced greater challenges in adapting to the changes in their social and academic lives. Additionally, difficulties in managing emotional responses were evident in both groups, with heightened levels of frustration and distress over the lack of predictability and structure (Fatima, 2024).

V. Case Study

Education Robotics in Neurodevelopmental Support

Education Robotics (ER) has been explored as a promising intervention tool for children with neurodevelopmental disorders, including autism spectrum disorder and ADHD. Research reviewed in various studies, suggests that ER can positively impact social interaction, engagement, and skill acquisition among children with NDD. Programs utilizing ER encourage basic programming skills, allowing children to interact in structured, supportive settings. Findings often highlight increased pupil engagement and improved interactions with teachers and peers, making ER a valuable approach for supporting children's cognitive and social development. This approach is beneficial for educational outcomes and for social skills, suggesting that schools

and institutions consider integrating ER as part of tailored educational plans for children with ND. ER initiatives align well with public policy efforts that prioritize inclusive education and evidence-based interventions (Pivetti et al., 2020).

VI. Government Initiative To Support Children With Ndd

During the COVID-19 pandemic, the U.S. government introduced several programs aimed at supporting children with neurodevelopmental disorders (NDDs) and their families, addressing the challenges posed by school closures, disruptions to therapy services, and social isolation.

Expanded Telehealth Services

The U.S. Department of Health and Human Services (HHS) and Centers for Medicare & Medicaid Services (CMS) extended telehealth services, which were particularly beneficial for children with NDDs. This allowed families to access critical therapies remotely, including occupational, physical, and speech therapy, despite physical distancing mandates. It also expanded Medicaid coverage to include telehealth services for children needing behavioral health support, which was vital as mental health needs grew during the pandemic (Bosworth, 2022).

CARES Act Funding

The Coronavirus Aid, Relief, and Economic Security (CARES) Act provided financial assistance to healthcare providers and schools, including funding to support remote learning infrastructure. For children with autism and other NDDs, this funding helped schools acquire technology and resources to support distance learning adaptations tailored to their needs.

Project AWARE (Advancing Wellness and Resilience in Education)

Through SAMHSA (Substance Abuse and Mental Health Services Administration), this initiative funded states and local education agencies in places like Hampshire, Minnesota, and Nebraska to enhance mental health support services for students. Minnesota received its first Project AWARE grant covering September 2020 to September 2025. This grant supports initiatives in collaboration with Intermediate District 287, Independent School District 622 (North St. Paul, Maplewood, Oakdale), and Redwood Area School District. A second Project AWARE grant was awarded from September 2021 to September 2026, supporting efforts with Northeast Metro 916 Intermediate School District, Duluth Public Schools, and St. Louis County School District. Through these partnerships, the Minnesota Department of Education aims to gather insights on effectively implementing Comprehensive School Mental Health Systems statewide (Minnesota Department of Education, 2024). This included additional training for educators to better support students with NDDs as they adjusted to remote learning or hybrid educational models.

Individuals with Disabilities Education Act (IDEA) Adjustments

The Department of Education provided guidance for IDEA during the pandemic, ensuring that children with disabilities, including those with NDDs, continued to receive free appropriate public education (FAPE) under challenging circumstances. Schools had to implement Individualized Education Programs (IEPs) remotely and adapt services as necessary, ensuring that children received educational benefits even if physical access to schools was limited.

VII. Discussion

Implications for Mental Health Education and Support

The COVID-19 pandemic highlighted critical challenges in supporting children with neurodevelopmental disorders (NDDs), revealing a need for mental health professionals to adapt their approaches moving forward (Montague et al., 2024). As the world transitions into a post-pandemic phase, mental health professionals must develop strategies that accommodate the lasting effects of disruptions in therapy and educational services. A key focus should be on offering integrated support that combines both in-person and virtual care to ensure continuity, particularly in times of crisis (Krasovsky et al., 2024). Professionals may also need to focus on rebuilding therapeutic routines that were disrupted during the pandemic, with tailored approaches to re-establish stability for children with NDDs.

Importance of Early Intervention

Early intervention is crucial in managing the long-term mental health effects experienced by children with NDDs during crises such as the COVID-19 pandemic. Timely support helps in reducing the severity of mental health challenges by addressing stressors such as isolation and disruption of routines early on. Aldharman et al., (2023) describe the integration of machine learning into improving communication and academic

performance of children with NDD. Providing children with structured, consistent therapeutic interventions as soon as possible can help them manage the emotional and behavioral impacts of COVID-19 disruptions, preventing these issues from becoming entrenched. Ensuring that interventions are flexible enough to continue even in unpredictable situations is essential in safeguarding the mental health of these children.

Strategies for Mental Health Education

Educating parents, teachers, and caregivers is essential in providing the best support for children with NDDs, particularly during times of crisis. Faden et al., (2023) describe this as a mixed-method approach that aids the understanding of the children's quality of life, parental stress and life satisfaction of the parents. Mental health professionals should implement targeted training programs designed to help caregivers understand the unique needs of these children, equipping them with the tools to maintain supportive environments even when professional interventions are temporarily unavailable. Proposed strategies could include online workshops, instructional resources, and virtual support groups to keep caregivers informed and supported. These methods will ensure that children with NDDs continue to receive appropriate care and stability, even when access to formal therapy is disrupted.

Addressing Gaps in Mental Health Support

The pandemic exposed significant gaps in mental health support for children with NDDs, including insufficient access to services, delays in intervention, and a lack of crisis-responsive strategies. Identifying these gaps is essential for improving future mental health systems. Doda et al., (2024) suggested that enhanced support and firm policies are needed to support mental health. Policy improvements should focus on expanding the accessibility of hybrid care models, increasing funding for mental health services in schools, and establishing crisis-preparedness frameworks. The sudden transition to remote services revealed the unpreparedness of many mental health providers and schools in delivering virtual care. Future research should also investigate how mental health outcomes for children with NDDs differ based on the types of support they receive during emergencies, providing a basis for more robust and flexible mental health systems.

Recommendations for Future Research and Policy Improvements

To address these gaps, further research is needed to explore the long-term impact of the pandemic on children with neurodevelopmental disorders. Studies should assess the effectiveness of hybrid models of care and explore how such models can be improved to meet the specific needs of children with NDDs. Also, policymakers must consider the creation of crisis-ready mental health infrastructures that ensure uninterrupted access to support services during future emergencies. This includes improving the technological capabilities of schools and healthcare systems to provide continuous, adaptable care for children with neurodevelopmental disorders, regardless of external circumstances.

VIII. Recommendations

Tailored Interventions

To effectively support children with ADHD and autism in the post-pandemic era, tailored interventions that address their unique challenges must be prioritized. For children with ADHD, interventions should focus on improving self-regulation, building structured routines, and enhancing executive function skills through individualized behavioral therapies such as Cognitive Behavioral Therapy (CBT). Children with autism would benefit from interventions that continue to address their sensory needs and improve communication skills, with programs like Applied Behavior Analysis (ABA) being critical. Hybrid intervention models combining in-person therapy with virtual care should be developed to ensure consistent support during periods of disruption. Flexibility in therapeutic approaches will also help these children adapt to future crises and minimize regression in their developmental progress.

Role of Schools and Healthcare Providers

Schools and healthcare providers must strengthen their collaboration to provide comprehensive support to children with neurodevelopmental disorders. Schools, which play a pivotal role in creating structured environments for these children, should work closely with healthcare providers to design individualized education programs (IEPs) that integrate mental health care alongside academic goals. Regular communication between teachers, school counselors, and therapists can help track a child's progress and adjust interventions as needed. Schools should also provide training for teachers to recognize and manage mental health issues in children with ADHD and autism. Healthcare providers, on the other hand, need to collaborate with educational institutions to ensure that therapy strategies are reinforced at school, creating a holistic support system that addresses both academic and emotional well-being.

Technological Tools for Mental Health Support

The integration of digital tools such as teletherapy and mobile health applications has proven to be a valuable resource in supporting the mental health of children with neurodevelopmental disorders during the pandemic. Moving forward, the use of these technologies should continue and expand. Teletherapy, for instance, offers a flexible option for children who may face barriers to in-person care, ensuring that they receive continuous support even in the face of disruptions. Digital tools like mental health apps can be utilized to provide children with ADHD and autism with self-management strategies for coping with anxiety, emotional dysregulation, and behavioral challenges. These tools can also facilitate remote communication between parents, teachers, and healthcare providers, creating a coordinated network of support that adapts to the evolving needs of each child. By embracing technological advancements, mental health professionals can provide more accessible, personalized care that empowers children and their families long after the pandemic.

IX. Conclusion

This analysis explains how the vulnerabilities of children with neurodevelopmental disorders, such as ADHD and autism, were magnified by the disruptions to routines, access to care, and social environments during the COVID-19 pandemic. Key findings reveal that children with ADHD faced increased anxiety, challenges with hyperactivity, and academic difficulties due to the lack of structure and physical activity. Similarly, children with autism experienced heightened sensory sensitivities, social isolation, and a loss of communication opportunities. These shared mental health trends highlight the urgent need for targeted interventions during and after crises.

Addressing the mental health needs of children with NDDs is important for their long-term well-being. The pandemic has shown that disruptions in care have lasting effects on their emotional, social, and academic development. Therefore, mental health professionals, educators, and policymakers must prioritize building resilient support systems that adapt to crises. Early intervention, including behavioral therapies and structured educational plans, remains key to preventing further mental health deterioration.

Support strategies must be multifaceted, with schools and healthcare providers collaborating to ensure children receive comprehensive care. Hybrid models that blend in-person and virtual services offer a flexible solution for consistent mental health support. Also, teletherapy and mobile mental health tools should be further developed to enhance access. By embracing these approaches, we can improve how mental health support is delivered to children with NDDs, helping them recover from current challenges and thrive in the future.

References

- [1] Andrea Lynch, Kevin Davison 2024 Tensions And Contradictions: Exploring Post-Primary Teachers' Perspectives And Experiences Of Students With Attention Deficit Hyperactivity Disorder <https://Nasenjournals.Onlinelibrary.Wiley.Com/Doi/Full/10.1111/1471-3802.12648>
- [2] Aldharman Ss, Al-Jabr Kh, Alharbi Ys, Alnajar Nk, Alkhanani Jj, Alghamdi A, Abdellatif Ra, Allouzi A, Almallah Am, Jamil Sf. (2023). Implications Of Early Diagnosis And Intervention In The Management Of Neurodevelopmental Delay (Ndd) In Children: A Systematic Review And Meta-Analysis. *Cureus*. 2023 May 8;15(5):E38745. Doi: 10.7759/Cureus.38745. Pmid: 37303321; Pmcid: Pmc10248310.
- [3] Bobo E, Lin L, Acquaviva E, Caci H, Franc N, Gamon L, Picot Mc, Pupier F, Speranza M, Falissard B, Purper-Ouakil D. (2020). Comment Les Enfants Et Adolescents Avec Le Trouble Déficit D'attention/Hyperactivité (Tdah) Vivent-Ils Le Confinement Durant La Pandémie Covid-19 ? [How Do Children And Adolescents With Attention Deficit Hyperactivity Disorder (Adhd) Experience Lockdown During The Covid-19 Outbreak?]. *Encephale*. French. Doi: 10.1016/J.Encep.2020.05.011. Epub 2020 Jun 7. Pmid: 32522407; Pmcid: Pmc7276130.
- [4] Chen B, Rasmussen P, Legg M, Alexander N, Vedmurthy P, Asiedu A, Bay M, Belcher H, Burton Vj, Conlon C, Fine A, Gill R, Lance Ei, Lipkin P, Wong J, Wilms Floet Am, Doerrer Sc, Glattfelder J, Kordek A, Pertman J, Murray R, Zabel Ta, Comi Am, Leppert Ml. (2022). Reduction In School Individualized Education Program (Iep) Services During The Covid-19 Pandemic. *Front Rehabil Sci*. 2022 Sep 26;3:962893. Doi: 10.3389/Fresc.2022.962893. Pmid: 36225267; Pmcid: Pmc9548582.
- [5] Cortés-Albornoz Mc, Ramírez-Guerrero S, García-Guáqueta Dp, Vélez-Van-Meerbeke A, Talero-Gutiérrez C. (2023). Effects Of Remote Learning During Covid-19 Lockdown On Children's Learning Abilities And School Performance: A Systematic Review. *Int J Educ Dev*. 2023 Sep;101:102835. Doi: 10.1016/J.Ijedudev.2023.102835. Epub 2023 Jun 14. Pmid: 37361921; Pmcid: Pmc10266495.
- [6] Courtenay K, Perera B. (2020) Covid-19 And People With Intellectual Disability: Impacts Of A Pandemic. *Ir J Psychol Med*. 2020 Sep;37(3):231-236. Doi: 10.1017/Ipm.2020.45. Epub 2020 May 14. Pmid: 32404232; Pmcid: Pmc7287305.
- [7] Cuffe Sp, Visser Sn, Holbrook Jr, Danielson Ml, Geryk Ll, Wolraich Ml, Mckeown Re. (2015). Adhd And Psychiatric Comorbidity: Functional Outcomes In A School-Based Sample Of Children. *J Atten Disord*. 2020 Jul;24(9):1345-1354. Doi: 10.1177/1087054715613437. Epub 2015 Nov 25. Pmid: 26610741; Pmcid: Pmc4879105.
- [8] Currie, G., Finlay, B., Seth, A., Roth, C., Elsabbagh, M., Hudon, A., ... Zwicker, J. (2022). Mental Health Challenges During Covid-19: Perspectives From Parents With Children With Neurodevelopmental Disabilities. *International Journal Of Qualitative Studies On Health And Well-Being*, 17(1). <https://doi.org/10.1080/17482631.2022.2136090>
- [9] Dal Pai, Janise & Wolff, Cecília & Aranchipe, Carolina & Kepler, Carolina & Santos, Gabriele & Canton, Luiz & Carvalho, Antonella & Richter, Samanta & Nunes, Magda. (2022). Covid-19 Pandemic And Autism Spectrum Disorder, Consequences To Children And Adolescents — A Systematic Review. *Review Journal Of Autism And Developmental Disorders*. 11. 1-26. 10.1007/S40489-022-00344-4.
- [10] De Figueiredo Cs, Sandre Pc, Portugal Lcl, Mázala-De-Oliveira T, Da Silva Chagas L, Raony Í, Ferreira Es, Giestal-De-Araujo E, Dos Santos Aa, Bomfim Po. (2021). Covid-19 Pandemic Impact On Children And Adolescents' Mental Health: Biological,

- Environmental, And Social Factors. *Prog Neuropsychopharmacol Biol Psychiatry*. 2021 Mar 2;106:110171. Doi: 10.1016/J.Pnpbbp.2020.110171. Epub 2020 Nov 11. Pmid: 33186638; Pmcid: Pmc7657035.
- [11] Doda V, Kennedy C, Kaur M. (2024). Policies For Individuals With Autism: Gaps, Research, And Recommendations. *Cureus*. 2024 Jan 8;16(1):E51875. Doi: 10.7759/Cureus.51875. Pmid: 38327931; Pmcid: Pmc10849157.
- [12] Faden Sy, Merdad N, Faden Ya. (2023). Parents Of Children With Neurodevelopmental Disorders: A Mixed Methods Approach To Understanding Quality Of Life, Stress, And Perceived Social Support. *Cureus*. 2023 Apr 10;15(4):E37356. Doi: 10.7759/Cureus.37356. Pmid: 37182086; Pmcid: Pmc10171881.
- [13] Fatima, R. (2024). The Impact Of Covid-19 On Children With Autism Spectrum Disorder. *Eukaryon*, 20, 30-35. Lake Forest College. Retrieved From https://www.lakeforest.edu/public/eukaryon/volume_20/rabia%20fatima.pdf.
- [14] Gitimoghaddam M, Chichkine N, Mcarthur L, Sangha Ss, Symington V. (2022). Applied Behavior Analysis In Children And Youth With Autism Spectrum Disorders: A Scoping Review. *Perspect Behav Sci*. 2022 May 18;45(3):521-557. Doi: 10.1007/S40614-022-00338-X. Pmid: 36249174; Pmcid: Pmc9458805.
- [15] Krasovsky T, Weiss Pl, Gafni-Lachter L, Kizony R, Gefen N. (2024). Hybrid Approaches To Allied Health Services For Children And Young People: A Scoping Review. *J Neuroeng Rehabil*. 2024 Jul 19;21(1):122. Doi: 10.1186/S12984-024-01401-1. Erratum In: *J Neuroeng Rehabil*. 2024 Aug 10;21(1):139. Doi: 10.1186/S12984-024-01434-6. Pmid: 39030627; Pmcid: Pmc11264746.
- [16] Kristiina Mänty, Hanna Järvenoja, Tiina Törmänen,(2020). Socio-Emotional Interaction In Collaborative Learning: Combining Individual Emotional Experiences And Group-Level Emotion Regulation. *International Journal Of Educational Research*, <https://doi.org/10.1016/j.ijer.2020.101589>.
- [17] Leitner Y. (2014). The Co-Occurrence Of Autism And Attention Deficit Hyperactivity Disorder In Children - What Do We Know? *Front Hum Neurosci*. 2014 Apr 29;8:268. Doi: 10.3389/Fnhum.2014.00268. Pmid: 24808851; Pmcid: Pmc4010758.
- [18] Li D, Li L, Zang W, Wang D, Miao C, Li C, Zhou L, Yan J. Effect Of Physical Activity On Attention In School-Age Children With Adhd: A Systematic Review And Meta-Analysis Of Randomized Controlled Trials. *Front Physiol*. 2023 Jul 27;14:1189443. Doi: 10.3389/Fphys.2023.1189443. Pmid: 37576338; Pmcid: Pmc10415683.
- [19] Mazefsky Ca. (2015). Emotion Regulation And Emotional Distress In Autism Spectrum Disorder: Foundations And Considerations For Future Research. *J Autism Dev Disord*. 2015 Nov;45(11):3405-8. Doi: 10.1007/S10803-015-2602-7. Pmid: 26391886; Pmcid: Pmc4609632.
- [20] Mazrekaj, D., & De Witte, K. (2024). The Impact Of School Closures On Learning And Mental Health Of Children: Lessons From The Covid-19 Pandemic. *Perspectives On Psychological Science*, 19(4), 686-693. <https://doi.org/10.1177/17456916231181108>
- [21] Mingins Je, Tarver J, Waite J, Jones C, Surtees Ad. (2021). Anxiety And Intellectual Functioning In Autistic Children: A Systematic Review And Meta-Analysis. *Autism*. 2021 Jan;25(1):18-32. Doi: 10.1177/1362361320953253. Epub 2020 Nov 16. Pmid: 33198481; Pmcid: Pmc8162138.
- [22] Minnesota Department Of Education. (N.D.). Project Aware (Advancing Wellness And Resilience In Education). Retrieved October 31, 2024, From <https://education.mn.gov/mde/dse/safe/csmhs/aware/index.htm>
- [23] Montague, E., Mendon-Plasek, S.J., Stefancic, A. Et Al. (2024). Navigating Uncertainty: Adapting Guidance For Mental Health During The Covid-19 Public Health Emergency & The Crucial Role Of Bi-Directional Feedback. *Adm Policy Ment Health*. <https://doi.org/10.1007/S10488-024-01412-Z>
- [24] Ojinnat Bt, Parisapogu A, Sherpa Mi, Choday S, Ravi N, Giva S, Shantha Kumar V, Shrestha N, Tran Hh, Penumetcha Ss. Efficacy Of Cognitive Behavioral Therapy And Methylphenidate In The Treatment Of Attention Deficit Hyperactivity Disorder In Children And Adolescents: A Systematic Review. *Cureus*. 2022 Dec 17;14(12):E32647. Doi: 10.7759/Cureus.32647. Pmid: 36660538; Pmcid: Pmc9845961.
- [25] Sayed Aa, El-Gendy Aa, Aljohani Ak, Haddad Ra, Taher Oh, Senan Am, Qashqari Am, Alqelaiti Ba. The Effects Of Covid-19 On The Mental Health Of Children And Adolescents: A Review. *Cureus*. 2024 Mar 19;16(3):E56473. Doi: 10.7759/Cureus.56473. Pmid: 38638779; Pmcid: Pmc11025694.
- [26] Scandurra V, Emberti Gialloreti L, Barbanera F, Scordo Mr, Pierini A, Canitano R. (2019). Neurodevelopmental Disorders And Adaptive Functions: A Study Of Children With Autism Spectrum Disorders (Asd) And/Or Attention Deficit And Hyperactivity Disorder (Adhd). *Front Psychiatry*. 2019 Sep 4;10:673. Doi: 10.3389/Fpsyt.2019.00673. Pmid: 31551839; Pmcid: Pmc6737073.
- [27] Scott Jg, Mihalopoulos C, Erskine He, Et Al. (2016). Childhood Mental And Developmental Disorders. In: Patel V, Chisholm D, Dua T, Et Al., Editors. *Mental, Neurological, And Substance Use Disorders: Disease Control Priorities, Third Edition (Volume 4)*. Washington (Dc): The International Bank For Reconstruction And Development / The World Bank; 2016 Mar 14. Chapter 8. Available From: <https://www.ncbi.nlm.nih.gov/books/Nbk361938/> Doi: 10.1596/978-1-4648-0426-7_Ch8
- [28] Unesco. (2021). Education: From Covid-19 School Closures To Recovery. Retrieved From <https://www.unesco.org/en/covid-19/education-response>
- [29] Wang, Y. (2023). The Research On The Impact Of Distance Learning On Students' Mental Health. *Educ Inf Technol* 28, 12527–12539 <https://doi.org/10.1007/S10639-023-11693-W>
- [30] Yizengaw Ss. (2021). Effect Of Social Skills Training On Interpersonal Interactions Of Children With Autism: Interventional Research. *Int J Dev Disabil*. 2021 Mar 25;68(6):858-866. Doi: 10.1080/20473869.2021.1902730. Pmid: 36568627; Pmcid: Pmc9788721.