



## Assessment of Clinical Outcomes Among Children and Adolescents Hospitalized With COVID-19

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### Article History :

Received date : 2024/10/19  
Revised date : 2024/11/06  
Accepted date : 2024/12/25  
Published date : 2025/01/14



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### ABSTRACT

**Background:** The COVID-19 pandemic has precipitated a significant transformation in the daily lives of children and adolescents, particularly concerning their screen time usage. The literature reflects a growing recognition of the multifaceted implications of increased digital screen time, with studies revealing alarming trends and potential health consequences. **Literature Review:** Further analysis by (D. Ribner et al., 2021) reveals that pre-pandemic screen habits are strong predictors of increased screen time during the pandemic, suggesting that individual behaviors significantly shape current outcomes. This notion is complemented by (Lee et al., 2022), who discuss the intersection of socioeconomic status and screen time management, indicating that children from lower economic backgrounds are particularly vulnerable to the negative effects of increased screen usage. Moreover, highlight the correlation between increased recreational screen time and heightened levels of psychopathology among adolescents, indicating that while some screen time can foster social connections, excessive use can exacerbate mental health issues. This is further supported by (Moitra & Madan, 2022), who document a concerning trend of screen addiction among Indian adolescents, linking high screen time to decreased physical activity and poor sleep quality. The narrative review by (Y. Q. Lua et al., 2023) synthesizes these findings, suggesting a complex relationship between screen time and wellbeing, where moderate use may enhance social connectedness, yet excessive use correlates with poorer outcomes. **Conclusion:** In conclusion, the literature presents a concerning trend of increased screen time among children and adolescents during the COVID-19 pandemic, with significant implications for their physical and mental health. The studies collectively underscore the necessity for informed policies and guidelines aimed at mitigating the adverse effects associated with excessive screen use, particularly among vulnerable populations. The evidence highlights the need for a balanced approach to screen time, recognizing both its potential benefits and risks, and calls for future research to explore the diverse dimensions of screen time across different cultural and socioeconomic contexts.

**Keyword:** Clinical Outcomes, Children and Adolescents, Hospitalized With COVID-19

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## INTRODUCTION

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The literature surrounding the clinical outcomes of children and adolescents hospitalized with COVID-19 has evolved significantly since the onset of the pandemic. Early studies, such as the one by (Y. Chao et al., 2020), highlighted a concerning rate of severe disease in hospitalized pediatric patients, with a notable proportion requiring intensive care. This study emphasized that, contrary to the general perception of children being at lower risk for severe illness, a subset does experience critical conditions necessitating specialized care.

In 2021, (Williams et al., 2021) expanded on this notion through a systematic review that identified a small but significant number of children who became critically unwell due to SARS-CoV-2, particularly those with underlying comorbidities. Their findings underscored the importance of understanding risk factors associated with severe disease, as the majority of pediatric cases were mild. This gap in knowledge is critical as public health measures began to shift during the recovery phase of the pandemic.

As research progressed into 2022, (Borel et al., 2022) conducted a scoping review that revealed long-term physical, mental, and social health effects experienced by children post-COVID-19 infection. This study identified a range of persistent symptoms, including fatigue and cognitive difficulties, which raised concerns about the long-term implications of COVID-19 on the pediatric population. Similarly, (Melo et al., 2022) reinforced the importance of vaccination as a preventative measure against severe illness, while also documenting a variety of symptoms that could lead to serious outcomes in children.

The systematic review by (Victor Ariel Franco et al., 2022) further illustrated the complexity of long COVID in children, reporting a wide array of persistent symptoms and emphasizing the necessity for ongoing research to quantify these health impacts accurately. This review highlighted the variability in symptom prevalence and the critical need for standardized definitions in future studies.

(Hookham et al., 2022) tackled the issue of vaccination, noting that while children are generally at lower risk for severe COVID-19, the potential for long-term health consequences necessitates careful consideration of vaccination strategies. Their findings indicated a rising hospitalization rate among children and adolescents and emphasized vaccination as a protective factor against severe disease and community transmission.

Finally, (Sun et al., 2024) provided a comprehensive review of severe pediatric COVID-19 from both clinical and immunopathophysiological perspectives, detailing the symptoms of long COVID and the factors that increase susceptibility among children. Their work called for a holistic approach to managing severe cases and highlighted the critical role of vaccination in mitigating severe outcomes.

Together, these studies contribute to a nuanced understanding of the clinical outcomes associated with COVID-19 in children and adolescents, revealing both immediate and long-term health implications that warrant further investigation and targeted public health strategies.

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### LITERATURE REVIEW

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The article titled "Clinical Characteristics and Outcomes of Hospitalized and Critically Ill Children and Adolescents with Coronavirus Disease 2019 at a Tertiary Care Medical Center in New York City" by (Y. Chao et al., 2020) provides a detailed examination of the clinical profiles and outcomes of pediatric patients hospitalized with COVID-19. The study is particularly significant as it addresses a critical gap in understanding the severity of COVID-19 in children, a demographic often perceived to be at lower risk for severe illness compared to adults.

The authors conducted a retrospective review of 46 children and adolescents aged 1 month to 21 years who were admitted to a single tertiary care children's hospital between March 15 and April 13, 2020. This timeframe coincides with the early surge of COVID-19 cases in the United States, making the findings particularly relevant for understanding the disease's impact during that period. The study's design is robust, as it collects comprehensive demographic and clinical data, allowing for a nuanced understanding of the patient population.

One of the critical insights from the study is the observation that a significant portion of the hospitalized patients—28%—required admission to the pediatric intensive care unit (PICU), which underscores a higher rate of severe disease than previously recognized in pediatric populations. This finding challenges the prevailing notion that children are largely spared from severe manifestations of the virus. The authors note that while epidemiological studies have indicated that children generally exhibit milder symptoms, their data suggest that a subset of pediatric patients can experience critical illness requiring intensive care.

Furthermore, the article highlights that among the 46 patients, only one individual died after the withdrawal of life-sustaining therapy due to metastatic cancer, a critical point that emphasizes the overall better outcomes in this demographic compared to adults. However, the need for invasive mechanical ventilation in some cases, with a median duration of 9 days, illustrates the potential for severe respiratory distress in a minority of pediatric patients.

In terms of limitations, the study is based on a relatively small sample size from a single institution, which may limit the generalizability of the findings. Additionally, the study's retrospective nature may introduce biases in data collection and interpretation. Nonetheless, the authors provide a valuable contribution to the literature by documenting the clinical characteristics of hospitalized children and adolescents with COVID-19, thereby informing healthcare providers about the potential for severe illness in this population.

The article "COVID-19 Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection in children and adolescents: a systematic review of critically unwell children and the association with underlying comorbidities" by (Williams et al., 2021) provides a comprehensive examination of the clinical outcomes associated with COVID-19 in pediatric populations. The authors critically assess the available literature on children and adolescents hospitalized due to SARS-CoV-2 infection, noting a significant discrepancy in severity of illness when compared to adult cases.

The article highlights that while children represent approximately 5% of total infections and less than 1% of hospital admissions, there exists a subset of pediatric patients who experience severe illness. The systematic review identifies

that the majority of cases in children are characterized by mild respiratory symptoms, with gastrointestinal symptoms being less common. Notably, the findings indicate that severe cases requiring intensive care are rare, with only one patient documented as having severe disease in the reviewed literature.

A critical aspect of the study is its exploration of the association between underlying comorbidities and severe COVID-19 outcomes in children. The authors point out a significant gap in the literature regarding risk factors that could predispose children to more severe manifestations of the virus. This lack of comprehensive data limits the understanding of how underlying health issues may correlate with adverse clinical outcomes in pediatric patients.

The systematic review methodology employed by (Williams et al., 2021) is robust, yet the authors acknowledge the dearth of studies that directly address the relationship between comorbidities and severe disease in children. This gap emphasizes the need for further research to elucidate which specific underlying conditions may exacerbate the impact of SARS-CoV-2 in younger populations. The article serves as a crucial contribution to the understanding of COVID-19's effects on children, but it also highlights the necessity for ongoing investigations to fill the existing knowledge void.

The article "Long-term physical, mental and social health effects of COVID-19 in the pediatric population: a scoping review" by (Borel et al., 2022) presents a comprehensive examination of the long-term consequences of COVID-19 on children and adolescents. The authors conducted a scoping review of 130 articles, narrowing their focus to 34 studies directly related to the long-term effects experienced by the pediatric population post-infection. This systematic approach allows for a thorough understanding of the multifaceted impact of COVID-19 on young individuals.

One of the key insights from the review is the prevalence of long-term symptoms reported by pediatric patients, which were assessed on average 3–6 months after the initial infection. These symptoms include fatigue, muscle and joint pain, headaches, insomnia, respiratory issues, palpitations, difficulties in concentration, and sensory problems. The diversity of these symptoms underscores the complexity of post-COVID conditions in children, suggesting that the effects of

the virus extend beyond the acute phase of illness and can significantly impair daily functioning and quality of life.

Moreover, the article highlights the immunological aspects of post-COVID conditions, noting findings related to long-term viral shedding and variations in immunoglobulin G (IgG) levels. These insights are crucial as they suggest potential ongoing viral activity or immune dysregulation in children recovering from COVID-19, which may warrant further investigation to understand the implications for long-term health and management strategies.

The mental health consequences of COVID-19 in the pediatric population are another significant focus of the review. The authors report that anxiety and depression were the most common mental health issues identified during the pandemic. This finding is particularly concerning, as it indicates that the psychological impact of the pandemic may have lasting effects on children's mental well-being. The relationship between physical symptoms and mental health challenges is complex, and the authors suggest that addressing these issues holistically is essential for effective intervention and support.

The article "Symptoms of COVID-19 in children" by (Melo et al., 2022) presents a comprehensive analysis of the clinical manifestations of COVID-19 in pediatric populations. The authors emphasize the critical nature of recognizing symptoms that could lead to severe outcomes, including death, thereby highlighting the urgent need for vaccination in children to mitigate the risk of serious illness and protect vulnerable family members.

One of the key insights from this review is the variability of symptoms observed in children across different geographical regions. This finding underscores the necessity for healthcare professionals to remain vigilant and adaptable in their diagnostic approaches, as the presentation of COVID-19 can differ significantly among pediatric patients. The authors argue that understanding this symptomatology is vital for effective clinical decision-making and can enhance the capacity of healthcare teams to identify COVID-19 cases promptly.

Moreover, the article advocates for a structured approach to managing suspected COVID-19 cases in children, which includes timely diagnosis, patient isolation, and continuous monitoring of clinical progression. This systematic

framework is essential not only for the immediate care of affected children but also for the broader public health strategy aimed at controlling the spread of the virus within communities.

The authors also highlight the importance of public health policies that specifically address the unique needs of children during the pandemic. Given that many children may present with asymptomatic or mild cases, there is a pressing need for targeted interventions that can effectively reach this demographic. The implications of this review extend beyond clinical settings, suggesting that improved understanding of COVID-19 symptoms in children can inform policy decisions and resource allocation to better protect this vulnerable population.

The article "Short and Long-Term Wellbeing of Children following SARS-CoV-2 Infection: A Systematic Review" by (Victor Ariel Franco et al., 2022) provides a comprehensive examination of the health outcomes experienced by children and adolescents after SARS-CoV-2 infection. The systematic review synthesizes findings from previous studies, noting a significant variability in reported symptoms and the prevalence of post-COVID syndrome in this demographic, which ranges from 0% to 70%. This variability underscores the complexities of assessing clinical outcomes in pediatric populations post-infection.

One of the critical insights from the review is the identification of various symptoms that persist following acute COVID-19, including respiratory, neurological, and cognitive issues. These findings align with the broader literature on Long COVID, emphasizing the need for thorough and systematic approaches in future research to ascertain the long-term health impacts of COVID-19 on children and adolescents. The authors highlight the importance of including control groups in studies to differentiate between symptoms caused by SARS-CoV-2 and those arising from other contextual factors, which is crucial for establishing a clear causal relationship.

Moreover, the review draws attention to the risk of bias in existing studies, primarily due to confounding variables. This acknowledgment of potential limitations is vital for interpreting the results of the systematic review and underscores the necessity for rigorous methodological standards in future research endeavors. The article also outlines ongoing studies, such as the COVID-19 Schools

Infection Survey and the British CLoCk study, which aim to provide further clarity on the prevalence and persistence of symptoms in children and adolescents, thereby contributing to a more nuanced understanding of the long-term consequences of COVID-19.

The article "Vaccinating Children against SARS-CoV-2: A Literature Review and Survey of International Experts to Assess Safety, Efficacy and Perceptions of Vaccine Use in Children" by (Hookham et al., 2022) provides a comprehensive examination of the implications of COVID-19 vaccination in children, particularly in light of the unique risks and long-term effects associated with the virus in this demographic.

The authors argue that while children are often categorized as a low-risk group for severe COVID-19 outcomes, the medium- and long-term consequences of infection can be significant. They highlight the emergence of serious conditions such as multisystem inflammatory syndrome in children (MIS-C) and post-COVID syndrome, or 'long COVID,' which can manifest in various clinical forms. This perspective is critical as it challenges the prevailing notion that children are not significantly affected by the pandemic. The cited meta-analysis indicating a 25.24% prevalence of long COVID among children and adolescents underscores the necessity for vigilance and proactive measures, particularly in light of findings suggesting that adolescent girls may face heightened risks.

Moreover, the article notes a concerning trend in hospitalization rates among children in Europe, which have increased as a proportion of total COVID-19 cases since January 2021. This trend emphasizes the need for ongoing monitoring and intervention strategies to mitigate the impact of COVID-19 in younger populations. The authors also point out that children play a crucial role in the transmission of the virus within households and communities, further complicating public health responses.

The systematic review conducted by the authors, alongside a questionnaire sent to international experts, serves to fill critical gaps in knowledge regarding the safety, efficacy, and perceptions surrounding COVID-19 vaccination in children. By summarizing existing data on vaccine effectiveness and current practices, the

authors contribute valuable insights that can inform public health policy and parental decision-making regarding vaccination.

The article "Severe pediatric COVID-19: a review from the clinical and immunopathophysiological perspectives" by (Sun et al., 2024) provides a comprehensive examination of the clinical outcomes associated with COVID-19 in pediatric populations, particularly focusing on the phenomenon known as long COVID. The authors elucidate the complexities surrounding the diagnosis and management of long COVID, emphasizing that it is often considered a diagnosis of exclusion following the acute phase of infection.

One of the critical insights from the article is the identification of prevalent symptoms among children who experience long COVID. These symptoms include persistent sore throat, fever, dyspnea, anosmia/ageusia, muscle weakness, and cough, alongside neuropsychiatric issues such as fatigue, mood disturbances, and cognitive dysfunction. The authors highlight that children under five years of age, those with pre-existing comorbidities, and those requiring intensive care during the acute phase are particularly vulnerable to developing long COVID. This observation underscores the need for targeted monitoring and intervention strategies for these high-risk groups.

The article further explores various pathophysiological hypotheses that may explain the persistence of symptoms in long COVID. These include viral persistence, autoimmune responses, endothelial dysfunction leading to microcirculation thrombosis, and immune dysregulation. The authors advocate for a holistic approach to managing severe pediatric COVID-19, which involves not only addressing respiratory and hemodynamic stability but also considering the multi-systemic nature of the disease. This comprehensive management strategy is crucial for preserving organ function and addressing comorbid conditions effectively.

Moreover, the authors reference the RECOVER initiative, which aims to enhance understanding and research into long COVID, particularly among children and adolescents. This initiative reflects a growing recognition of the need for systematic research to elucidate the long-term implications of COVID-19 on young patients.

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## CONCLUSION

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The reviewed literature on the clinical outcomes of children and adolescents hospitalized with COVID-19 reveals a complex interplay of immediate and long-term health issues arising from the infection. Early studies have shown that while children are generally perceived to be at lower risk for severe illness, a subset of pediatric patients experiences critical conditions requiring intensive care (Y. Chao et al., 2020). This finding is supported by a systematic review that highlights the significant impact of underlying comorbidities on the severity of COVID-19 in hospitalized children (Williams et al., 2021).

As the pandemic progressed, research began to focus on the long-term consequences of COVID-19 in the pediatric population. A scoping review identified various persistent symptoms such as fatigue, cognitive difficulties, and mental health challenges, which can significantly affect the quality of life for children recovering from COVID-19 (Borel et al., 2022). This aligns with findings from other studies that document the prevalence of long COVID symptoms in children, emphasizing the need for a structured approach to monitoring and managing these cases (Victor Ariel Franco et al., 2022).

Vaccination has emerged as a critical component in mitigating severe outcomes associated with COVID-19. Evidence suggests that while children may generally face lower risks, the potential for long-term health consequences and rising hospitalization rates necessitates careful consideration of vaccination strategies (Hookham et al., 2022). The comprehensive review of pediatric COVID-19 emphasizes the importance of vaccination not only to protect individual health but also to prevent community transmission (Sun et al., 2024).

In conclusion, the literature indicates that while the majority of pediatric COVID-19 cases are mild, there is a significant subset of children who experience severe illness and long-term health consequences. The studies reviewed underscore the necessity for ongoing research to understand the full spectrum of clinical outcomes in this population, particularly regarding the management of long COVID and the role of vaccination in preventing severe disease and its associated risks.

Targeted public health strategies are essential to address these challenges effectively.

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### DISCLOSURE STATEMENT

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- Disclosure Statement : The authors have no conflicts of Interest to declare
- Funding Sources : None
- Acknowledgements : -
- Author Contribution : All authors discussed and contributed the final content for journal submission and publication

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### REFERENCES

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1. Y. Chao, J., R. Derespina, K., C. Herold, B., L. Goldman, D., Aldrich, M., Weingarten, J., M. Ushay, H., D. Cabana, M., & S. Medar, S., 2020. Clinical Characteristics and Outcomes of Hospitalized and Critically Ill Children and Adolescents with Coronavirus Disease 2019 at a Tertiary Care Medical Center in New York City. [ncbi.nlm.nih.gov](https://ncbi.nlm.nih.gov)
2. Williams, N., Radia, T., Harman, K., Agrawal, P., Cook, J., & Gupta, A., 2021. COVID-19 Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection in children and adolescents: a systematic review of critically unwell children and the association with underlying comorbidities. [ncbi.nlm.nih.gov](https://ncbi.nlm.nih.gov)
3. Borel, M., Xie, L., Kapera, O., Mihalcea, A., Kahn, J., & E. Messiah, S., 2022. Long-term physical, mental and social health effects of COVID-19 in the pediatric population: a scoping review. [ncbi.nlm.nih.gov](https://ncbi.nlm.nih.gov)
4. Melo, M. M., Neta, M. M. R., Neto, A. R. S., Carvalho, A. R. B., Magalhães, R. L. B., Valle, A. R. M. C., Ferreira, J. H. L., Aliaga, K. M. J., Moura, M. E. B., & Freitas, D. R. J., 2022. Symptoms of COVID-19 in children. [ncbi.nlm.nih.gov](https://ncbi.nlm.nih.gov)

5. Victor Ariel Franco, J., Ignacio Garegnani, L., Viviana Oltra, G., Metzendorf, M. I., Fabrizio Trivisonno, L., Sgarbossa, N., Ducks, D., Heldt, K., Mumm, R., Barnes, B., & Scheidt-Nave, C., 2022. Short and Long-Term Wellbeing of Children following SARS-CoV-2 Infection: A Systematic Review. [ncbi.nlm.nih.gov](https://ncbi.nlm.nih.gov)
6. Hookham, L., C. Lee, H., A. Patel, D., Coelho, M., Giglio, N., Le Doare, K., & S. Pannaraj, P., 2022. Vaccinating Children against SARS-CoV-2: A Literature Review and Survey of International Experts to Assess Safety, Efficacy and Perceptions of Vaccine Use in Children. [ncbi.nlm.nih.gov](https://ncbi.nlm.nih.gov)
7. Sun, Y. K., Wang, C., Lin, P. Q., Hu, L., Ye, J., Gao, Z. G., Lin, R., Li, H. M., Shu, Q., Huang, L. S., & Tan, L. H., 2024. Severe pediatric COVID-19: a review from the clinical and immunopathophysiological perspectives. [ncbi.nlm.nih.gov](https://ncbi.nlm.nih.gov)