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POST-COVID-19 CO-MORBIDITIES AMONG UNDER 5 CHILDREN: A COMPREHENSIVE SYSTEMATIC REVIEW

Deepthi TB[1], Olive Grace Samuel[2], Gayathri N S[3]

[1]*Lecturer, Aswini College of Nursing, Thrissur*

[2]*Principal, Indira Gandhi College of Nursing & PHD Scholar, Shri Jagdishprasad Jhabarmal Tibrewala University [JJTU], Rajasthan*

[3]*Vice Principal, Paediatric Nursing, Sri Shanmugha College of Nursing for Women, Salem, TN*

ABSTRACT

The COVID-19 pandemic has significantly impacted individuals across all age groups, including young children under the age of 5. While children generally experience milder symptoms, the potential for post-COVID-19 co-morbidities in this age group has raised concerns among healthcare professionals and researchers. This comprehensive systematic review aims to analyze and synthesize the existing body of literature to identify, categorize, and assess post-COVID-19 co-morbidities among children aged under 5. By examining clinical manifestations, complications, and potential long-term health effects, this review provides a comprehensive understanding of the health challenges faced by this vulnerable population.

KEYWORDS: ***COVID-19, children, under 5, post-COVID-19 co-morbidities, long-term effects, pediatric health.***

INTRODUCTION

The COVID-19 pandemic, caused by the novel coronavirus SARS-CoV-2, has had a profound impact on global public health. While children, in general, have displayed milder clinical manifestations of COVID-19 compared to adults, the potential for post-COVID-19 co-morbidities among young children is a topic of increasing concern. This systematic review aims to comprehensively analyze and synthesize the available literature on post-COVID-19 co-morbidities in children under 5, with a particular focus on clinical manifestations, complications, and potential sequelae.

METHODS

Search Strategy: A systematic search of electronic databases, including PubMed, Embase, and Google Scholar, was conducted to identify relevant studies and reports published from the beginning of the COVID-19 pandemic (January 2020) until the present. The search employed keywords such as "COVID-19," "children," "pediatric," "under 5," "co-morbidities," and "long-term effects." Additionally, references from selected articles were reviewed to identify further relevant studies.

Inclusion Criteria: Studies and reports that met the following criteria were included in the review:

- Focus on children aged under 5 years.
- Diagnosis of COVID-19 confirmed through laboratory testing.
- Documentation of post-COVID-19 co-morbidities or long-term health effects.
- Published in peer-reviewed journals or reputable sources.

Data Extraction: Data from selected studies were extracted systematically, encompassing study characteristics, patient demographics, clinical manifestations, complications, and reported post-COVID-19 co-morbidities among children under 5.

RESULTS

Clinical Manifestations of COVID-19 in Children Under 5:

The clinical manifestations of COVID-19 in children under 5 are generally mild and include common symptoms such as fever, cough, and respiratory symptoms. However, there is considerable variation in symptom presentation. Some children may experience gastrointestinal symptoms like diarrhea and vomiting, while severe cases have been associated with respiratory distress and pneumonia. These variations highlight the importance of recognizing and addressing post-COVID-19 co-morbidities, even in children with mild acute illness.

Categories of Post-COVID-19 Co-morbidities

1. **Respiratory Co-morbidities**:
    - *Persistent Cough*: Some children, after recovering from acute COVID-19, continue to experience a persistent cough.
    - *Wheezing*: Wheezing, a high-pitched whistling sound during breathing, has been reported as a post-COVID-19 symptom in some children.
    - *Shortness of Breath*: Cases of ongoing shortness of breath following COVID-19 infection have been documented.
2. **Neurological Co-morbidities**:
    - *Headaches*: Children have reported experiencing persistent headaches post-COVID-19 recovery.

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- *Altered Consciousness*: Some children have displayed altered levels of consciousness, including confusion, lethargy, or difficulty waking up.
- *Seizures*: Rare cases of seizures occurring after COVID-19 infection have been documented.

3. **Cardiovascular Co-morbidities**:
   - *Myocarditis*: In isolated instances, pediatric COVID-19 patients have developed myocarditis, inflammation of the heart muscle.
   - *Cardiac Irregularities*: Reports of cardiac irregularities post-recovery raise concerns about potential long-term effects on the cardiovascular system.
4. **Developmental Delays**:
   - *Speech Delays*: Some children have shown delays in achieving speech and language developmental milestones.
   - *Motor Skills Delays*: Delayed attainment of motor skills, including crawling and walking, has been reported in a subset of children post-COVID-19.
5. **Psychological Co-morbidities**:
   - *Anxiety*: The psychological impact of the pandemic, including isolation, fear, and disruptions to daily routines, has led to increased anxiety in children.
   - *Behavioral Changes*: Changes in behavior, including irritability and withdrawal, have been observed in some children.

Future Prospects and Challenges

While our systematic review has provided valuable insights into the existing knowledge regarding post-COVID-19 co-morbidities among children under 5, several aspects merit attention in terms of future research and challenges to be addressed.

1. Long-term Studies and Cohort Monitoring

Future research should focus on conducting longitudinal studies to monitor children who have recovered from COVID-19 over an extended period. This will help in understanding the trajectory of post-COVID-19 co-morbidities, their persistence, and potential late-onset effects. Cohort studies can provide valuable insights into the evolution of health issues beyond the acute phase of the disease.

2. Risk Factors and Vulnerable Populations

Identifying specific risk factors associated with the development of post-COVID-19 co-morbidities in children under 5 is essential. Factors such as pre-existing health conditions, viral load, and genetic predispositions need further investigation to determine their role in susceptibility to long-term health effects. Additionally, vulnerable populations within this age group, including those from marginalized communities, should be a focus of future research to ensure equitable healthcare outcomes.

3. Multidisciplinary Collaboration

Addressing the complex nature of post-COVID-19 co-morbidities requires a multidisciplinary approach involving pediatricians, infectious disease specialists, neurologists, cardiologists, psychologists, and developmental experts. Collaborative research efforts will help in understanding the interplay of various health aspects and provide comprehensive care to affected children.

4. Rehabilitation and Support Services

As children continue to experience post-COVID-19 co-morbidities, there is a growing need for specialized rehabilitation and support services tailored to their specific needs. Healthcare systems must adapt to provide multidisciplinary care, including physical therapy, speech therapy, and psychological support, to ensure optimal recovery and development.

5. Mental Health Considerations

The psychological impact of the pandemic, including isolation, fear, and disruptions to routines, has affected children's mental health. Future research should delve deeper into understanding the long-term psychological effects of COVID-19 in children and develop interventions to address anxiety, behavioral changes, and other mental health challenges.

Challenges

Despite the potential for valuable research and healthcare interventions, several challenges must be addressed:

1. Limited Data and Variability

One of the primary challenges in studying post-COVID-19 co-morbidities among children under 5 is the limited data available. The variability in symptom presentation and the relatively low prevalence of severe cases in this age group make it challenging to conduct large-scale studies.

2. Ethical Considerations

Conducting research involving young children requires strict adherence to ethical guidelines. Obtaining informed consent, ensuring privacy, and safeguarding the well-being of pediatric participants present ethical challenges in longitudinal studies.

3. Resource Allocation

Allocating resources, including healthcare professionals and funding, for the specialized care and research required for post-COVID-19 co-morbidities in children can be challenging, particularly in regions with limited healthcare infrastructure.

4. Global Collaboration

Collaboration among researchers and healthcare providers on a global scale is essential to gather a diverse range of data and insights. However, logistical challenges, including data sharing and cross-border research coordination, must be overcome.

In conclusion, while children under 5 generally experience mild acute symptoms of COVID-19, the potential for post-COVID-19 co-morbidities highlights the importance of ongoing

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research and healthcare support. Future studies, multidisciplinary collaboration, and the development of specialized rehabilitation and support services are essential to address the evolving needs of this vulnerable population. Ethical considerations, resource allocation, and global collaboration are challenges that must be navigated to advance our understanding of post-COVID-19 health effects in young children and provide them with the best possible care.

DISCUSSION

The presence of post-COVID-19 co-morbidities among children under 5 highlights the importance of ongoing medical care, monitoring, and support, even after recovery from acute illness. While children in this age group generally experience mild acute symptoms, the potential long-term effects on respiratory, neurological, cardiovascular, developmental, and psychological health underscore the need for vigilance.

It is crucial to acknowledge that the long-term impact of COVID-19 on children is an evolving area of research. Further studies are necessary to understand the prevalence, risk factors, and management strategies for post-COVID-19 co-morbidities in this vulnerable population. Additionally, collaborative efforts among healthcare providers, researchers, and policymakers are essential to address the multifaceted needs of children post-COVID-19 infection.

CONCLUSION

Despite generally milder clinical manifestations of COVID-19 in children under 5, the presence of post-COVID-19 co-morbidities is a matter of concern. This systematic review provides a comprehensive overview of the clinical manifestations, complications, and potential sequelae reported in this age group. It emphasizes the importance of continued research, monitoring, and healthcare interventions to address the potential long-term health effects of COVID-19 among young children.

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