

Renal complications in children during the pandemic covid-19

Ismoilova Ziyoda Aktamovna ^{1,*}, Ahmedjanova Nargiza Ismoilovna ² and Muhammad Arsalan Ali Sajid ³

¹ Department of Pediatrics, Urgench Branch of Tashkent Medical Academy, Khorezm, Uzbekistan.

² Department of Pediatrics, Samarkand State Medical University, Samarkand, Uzbekistan.

³ University of Sargodha, Pakistan, Urgench Branch of Tashkent Medical Academy, Khorezm, Uzbekistan, IUBH University of Applied sciences, Germany.

World Journal of Advanced Research and Reviews, 2022, 15(02), 257–262

Publication history: Received on 03 July 2022; revised on 09 August 2022; accepted on 11 August 2022

Article DOI: <https://doi.org/10.30574/wjarr.2022.15.2.0803>

Abstract

A pandemic that is fast developing, the coronavirus epidemic is putting unprecedented pressure on healthcare systems. Children with renal disorders, including those undergoing renal transplantation, those with chronic kidney disease, and those with acute kidney damage necessitating dialysis, offer treatment issues due to COVID-19, particularly for those using long-term immunosuppressive medicines. The urgent requirement is for us to be ready to handle this vulnerable group of kids. This article's goals are to help caregivers and medical professionals manage children with renal illnesses, maintain patient well-being, and safeguard staff from infection.

Setting: Participants and their data were drawn from an existing consent to contact database of the Infectious disease center of the Khorezm region. The candidates were 2 to 12 years of age, 20 women, and the ratio of male to female children was 67 % to 87 %. These individuals were receiving care (treatment and medication support) at different centers especially designated for Covid-19 infection in the Khorezm region and at different clinics in the Khorezm region. We retrieved the data from the infectious control center where all the data were collected from all centers of the Khorezm region. They can speak English or Russian, and agreed to be contacted for further research.

Methods: A prospective study with Cohort study/guidelines from WHO for Covid-19 care and self-protection. A combined Cohort study of the COVID-19 survey was performed telephonically and personally for 15-20 minutes maximum, which included a discussion with doctors who attended and had any information about this syndrome.

Research Focus: This research is focusing on the problems of (MIS-C), which is a rare complication of COVID-19, but it can be serious or dangerous. The symptoms can overlap with infections and other illnesses. What are the circumstances and conditions of this disease, and what steps we can take to address them?

Keywords: Chronic kidney disease; Hemodialysis; Nephrotic syndrome; Transplant

1. Introduction

Since it has spread over the whole world, the coronavirus illness of 2019 (COVID-19) has been classified as a pandemic. Children make up about 1–5% of patients and are less likely than adults to have a severe illness; nonetheless, preschoolers and newborns may have severe clinical characteristics [1,2].

The Indian Society of Pediatric Nephrology (ISBN) decided in March 2020 to develop recommendations for treating children with renal illnesses during the COVID-19 pandemic. Based on policies and recommendations from the Ministry

* Corresponding author: Muhammad Arsalan Ali Sajid
Department of Pediatrics, Urgench Branch of Tashkent Medical Academy, Khorezm, Uzbekistan.

of Health and Family Welfare, the Indian Society of Nephrology, and other international professional organizations, as well as data from systematic and narrative reviews, trials, and other reports, a writing committee, and advisory board was established to draft the guidelines. Before being completed, draft guidelines underwent several revisions. [3]

1.1. Transmission in children

Although SARS-CoV-2 virus shedding varies from person to person, sick children appear to shed SARS-CoV-2 virus with nasopharyngeal viral levels comparable to or higher than those in adults, and children of all ages can transmit SARS-CoV-2 to others in the family, child care, educational, and community contexts. Whether the child exhibits symptoms or not, transmission can still happen. Adult asymptomatic transmission has a long history of research. (See the section on "Viral shedding and time of infectiousness" in "COVID-19: Epidemiology, virology, and prevention. [4,5]

Given the different contributions of biologic, host, and environmental factors (e.g., community transmission, ventilation, class size), the relative transmissibility of SARS-CoV-2 by kids in different age groups is unknown.

Variable rates of transmission from pediatric index cases have been discovered by household contact investigations. The varying rates may be attributed to various community prevalence and mitigation strategies, techniques for diagnosing secondary cases, time of sample collection, predominant variations, and levels of adherence to infection control measures in the home, which is particularly difficult when the index patient is a small kid.

Although transmission can happen in child care and educational settings, studies conducted before COVID-19 vaccinations were permitted for children under the age of 16 and before the advent of more transmissible variations revealed that transmission by kids and teens in the classroom was unusual when there was rigorous adherence to numerous public health measures and low community transmission. [6,7]

1.2. Is COVID-19 a risk for Patients with Kidney Disease?

Adult patients with chronic kidney disease (CKD) and those on maintenance dialysis frequently have co-morbidities that are linked to death during COVID-19.

Immunocompromised children are individuals who have CKD, particularly stage 4-5, are having hemodialysis (HD), or are taking immunosuppressive medications. Advanced CKD patients have malnutrition and maintenance HD in busy wards, which raises their risk of infection. According to an analysis of verified COVID-19 cases reported to the Centers for Disease Control (USA), patients with CKD were 11 to 14 times more likely to need intensive care and to be hospitalized, respectively, than those without CKD.

According to Chinese reports, dialysis patients experience the condition less severely than transplant recipients do.

37 of the 230 HD patients and 4 of the 33 dialysis staff at Renmin Hospital in Wuhan had severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) infection over 4 weeks [4]. Six of the seven patients who passed away had COVID-19. Incidences of COVID-19 in HD patients reported from China are comparable to Italian cohorts with a similar cohorts. Five of the 20 adult COVID-19 transplant patients in Brescia (Lombardy), Italy, died, four were in serious condition, and three made a full recovery. Similar to this, of 21 HD patients with COVID-19, 5 passed away while 4 made a full recovery [5].

According to a report on 15 adult COVID-19 transplant patients from a single US hospital, one-fourth required ventilator support, with one patient passing away [6]. The remaining half was released. In contrast, a different US study found that death rates were greater among 36 adult kidney transplant recipients who had COVID-19 (28 percent vs. 5 percent and 8–15 percent, respectively) than they were among the general population.

1.3. Recommendations for Patients

Parents and guardians who look after the physical and emotional needs of children are referred to as caregivers. To lower their risk of illness, those with CKD, those on immunosuppressive drugs, and transplant patients should heed the proper guidance.

These precautions include staying at home and isolating oneself to reduce contact with others, avoiding unnecessary travel, crowded areas, and large gatherings, regularly washing hands with soap and water, and practicing proper coughing techniques. While visiting healthcare facilities, particularly dialysis units, patients and caregivers should wear a triple-layer mask. Social segregation practices should be closely adhered to in outpatient clinics, along with other

personal safety precautions. Before throwing away used disposable gloves and masks with other household rubbish, all items should be stored in a lined container. Hands should also be washed with soap and water or an alcohol-based hand rub.

Ideally, caregivers should keep four weeks' worth of medicine on hand. If a kid exhibits any of the following symptoms: fever, cough, shortness of breath, with or without rhinorrhea, and muscular pains or chills, they should contact their treating physician or hospital by phone or email. [7,9]

1.4. General Administration

The danger of a disease flare-up is greater than the risk posed by COVID-19 in children, hence we advise against changing the amount of immunosuppressive medicine.

Patients need to be told to keep four weeks' worth of immunosuppressive medicine on hand. Avoid non-emergency hospital visits by communicating with HCP over the phone instead. On a case-by-case basis, the doctor may think about postponing IV cyclophosphamide or rituximab maintenance doses in patients who are in durable remission and have a low chance of relapsing. Encouragement should be given to patients to stay hydrated. [8]

1.5. Nephrotic Syndrome, Glomerulonephritis, Vasculitis

As in regular situations. Treatment delays might lead to bacterial infections and problems related to anasarca. The topic of therapy continuation can be discussed over the phone. The current course of treatment for often relapsing and steroid-resistant nephrotic syndrome should not be altered.

In newly diagnosed patients with other glomerular diseases or vasculitis, particularly those from hotspots/clusters, decisions regarding the start of immunosuppressive therapy should be based on the severity of the disease, renal histology, serum creatinine, severity of proteinuria, co-morbidities, and weighing the risk versus benefit of therapy [14]. According to current recommendations, we advise starting immunosuppression in newly diagnosed patients with glomerular disorders or vasculitis, except for kids with asymptomatic or low-grade proteinuria and normal renal function. [10,11,12]

2. Material and methods

2.1. Chronic kidney disease in children

Children and caregivers must take the measures listed above because children with CKD stages 3-5 are thought to be more susceptible to coronavirus infection. Patients and caregivers should stay in touch with their doctors, particularly if they experience COVID-19 symptoms like fever or increasing respiratory symptoms. Children with fever can take paracetamol without harm, but other non-steroidal anti-inflammatory medicines (ibuprofen, naproxen) shouldn't be used as a therapy.

The 90th percentile for age, gender, and height should be the aim for systolic and diastolic blood pressure in patients using antihypertensive medicines. [15,16,17]

We advise patients with CKD who are getting ACE-I or ARB to maintain their treatment.

2.2. Other Renal issues

Coronavirus has been related to both cylindrical and glomerular diseases. Proximal tubule issues have been accounted for in patients with COVID-19 giving low-sub-atomic weight proteinuria, unbiased aminoaciduria, and flawed handling of uric acid [48]. As for glomerular disease, a few examinations have revealed patients with biopsy-demonstrated glomerulonephritis giving intense renal disappointment (at times joined by hematuria and/or nephrotic disorder). [19].

Recommendations in general

- HD patients are encouraged not to change their scheduled dialysis appointments. Patients should be given the dialysis unit's phone numbers and other contact information.
- The supply of consumables, such as dialysate, dialyzers, tubing, catheters, fistula needles, disinfectants, and drugs, must be guaranteed by administrators. [234,25,25]

- Information regarding COVID-19, including hand hygiene, respiratory hygiene, cough etiquette, use of facemasks, and disposal of contaminated things, must be provided to HCP, patients, and careers. There should be material and posters available in the local tongue.[30]

Table 1 Protective Gear Needed for Various Levels of Expected Contact

Category of staff	Hand hygiene	Eye protection	Wearing Equipment like Gowns, gloves, etc	N-95 Mask
Reception staff	yes	No	No	Yes
HCP attending to the patient	yes	Yes	Yes	yes
HCP performing procedures	yes	Yes	Yes	yes
HCP performing aerosol, generating procedures or HD/PD full cover and long for a COVID suspect or	yes	Yes	Yes	yes
Housekeeping staff	yes	No	No	yes
Security Officer	yes	No	No	yes

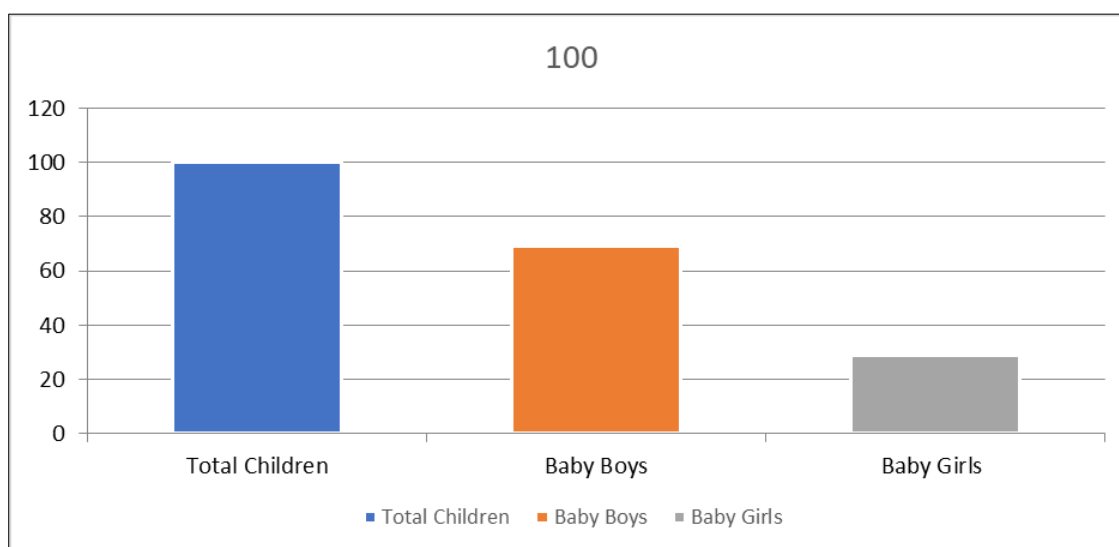


Figure 1 This chart shows the demographic distribution of the sample taken, the total number of patients, and the number of female children and male children

3. Conclusion

Nephrology's approaches to treating renal disease patients during the COVID-19 pandemic are based on the most recent research and opinions of specialists. Children make up a tiny percentage of COVID-19 patients, but those who have chronic illnesses are at a higher risk for negative outcomes. The evidence from extensive case studies and randomized controlled trials is likely to lead to changes in therapeutic recommendations. It has been seen that the problems related to the immune system are increasing in patients especially children with COVID-19 infection, clinical symptoms showed multiple organs in both children and adults but here I will describe only children. Almost reported cases are 3,000 worldwide as of August 2020 and 5500 plus till the end of 2021, which includes almost many different disorders like systemic and organ disorders, therefore, decisions related to diagnosis and therapeutics are mostly resulted or based on highly clinical and expert opinions and experiences. Not unable to provide solid results and authentic antipathogenic reasons and explanations, the main purpose of this study is to put the focus of the doctors and clinical scientists on this emerging condition of specific illness and thus help in the development of investigations and studies related to the investigation of the pathogenesis mechanisms of this condition that helped the early diagnosis and proper care of

immune-related clinical conditions of COVID-19 in children. So, we will be prepared if there is a next wave arising of Covid-19 infection.

Compliance with ethical standards

Acknowledgments

We are grateful to all participants and people who supported us in this research article and have provided us with extensive personal and professional guidance.

Disclosure of conflict of interest

The authors declare that there is no conflict of interest.

Statement of informed consent

Consent was taken from all participants who participated in this research article.

References

- [1] Ochoa V, Díaz FE, Ramirez E, et al. Infants Younger Than 6 Months Infected With SARS-CoV-2 Show the Highest Respiratory Viral Loads. *J Infect Dis* 2022, 225:392.
- [2] McLean HQ, Grijalva CG, Hanson KE, et al. Household Transmission and Clinical Features of SARS-CoV-2 Infections. *Pediatrics* 2022, 149.
- [3] Stein-Zamir C, Abramson N, Shoob H, et al. A large COVID-19 outbreak in a high school 10 days after schools' reopening, Israel, May 2020. *Euro Surveill* 2020, 25.
- [4] Szablewski CM, Chang KT, McDaniel CJ, et al. SARS-CoV-2 Transmission Dynamics in a Sleep-Away Camp. *Pediatrics* 2021, 147.
- [5] Chu VT, Yousaf AR, Chang K, et al. Household Transmission of SARS-CoV-2 from Children and Adolescents. *N Engl J Med* 2021, 385:954.
- [6] Bhatt M, Plint AC, Tang K, et al. Household transmission of SARS-CoV-2 from unvaccinated asymptomatic and symptomatic household members with confirmed SARS-CoV-2 infection: an antibody-surveillance study. *CMAJ Open* 2022, 10:E357.
- [7] Okarska-Napierała M, Mańdziuk J, Kuchar E. SARS-CoV-2 Cluster in Nursery, Poland. *Emerg Infect Dis* 2021, 27.
- [8] Lopez AS, Hill M, Antezano J, et al. Transmission Dynamics of COVID-19 Outbreaks Associated with Child Care Facilities - Salt Lake City, Utah, April-July 2020. *MMWR Morb Mortal Wkly Rep* 2020, 69:1319.
- [9] Qiu H, Wu J, Hong L, et al. Clinical and epidemiological features of 36 children with coronavirus disease 2019 (COVID-19) in Zhejiang, China: an observational cohort study. *Lancet Infect Dis* 2020, 20:689.
- [10] Huff HV, Singh A. Asymptomatic Transmission During the Coronavirus Disease 2019 Pandemic and Implications for Public Health Strategies. *Clin Infect Dis* 2020, 71:2752.
- [11] World Health Organization. COVID-19 disease in children and adolescents. Scientific brief. September 29, 2021. https://www.who.int/publications/i/item/WHO-2019-nCoV-Sci_Brief-Children_and_adolescents-2021, 1 (Accessed on September 30, 2021).
- [12] Mallapaty S. How do children spread the coronavirus? The science still isn't clear. *Nature* 2020, 581:127.
- [13] Meyerowitz EA, Richterman A, Gandhi RT, Sax PE. Transmission of SARS-CoV-2: A Review of Viral, Host, and Environmental Factors. *Ann Intern Med* 2021, 174:69.
- [14] Kim J, Choe YJ, Lee J, et al. Role of children in the household transmission of COVID-19. *Arch Dis Child* 2021, 106:709.
- [15] Zhu Y, Bloxham CJ, Hulme KD, et al. A Meta-analysis on the Role of Children in Severe Acute Respiratory Syndrome Coronavirus 2 in Household Transmission Clusters. *Clin Infect Dis* 2021, 72:e1146.

- [16] Soriano-Brandes A, Gatell A, Serrano P, et al. Household Severe Acute Respiratory Syndrome Coronavirus 2 Transmission and Children: A Network Prospective Study. *Clin Infect Dis* 2021, 73:e1261.
- [17] Li F, Li YY, Liu MJ, et al. Household transmission of SARS-CoV-2 and risk factors for susceptibility and infectivity in Wuhan: a retrospective observational study. *Lancet Infect Dis* 2021, 21:617.
- [18] Paul LA, Daneman N, Schwartz KL, et al. Association of Age and Pediatric Household Transmission of SARS-CoV-2 Infection. *JAMA Pediatr* 2021, 175:1151.
- [19] Lotfi B, Farshid S, Dadashzadeh N, Valizadeh R, Rahimi MM. Is Coronavirus Disease 2019 (COVID-19) Associated with Renal Involvement? A Review of Century Infection. *Jundishapur J Microbiol [Internet]*. 2020, 13(4):e102899.
- [20] Stewart DJ, Hartley JC, Johnson M, Marks SD, du Pré P, Stojanovic J. Renal dysfunction in hospitalized children with COVID-19. Vol. 4, *The Lancet. Child & adolescent health*. 2020. p. e28–9.
- [21] Labarre P, Dumas G, Dupont T, Darmon M, Azoulay E, Zafrani L. Acute kidney injury in critically ill patients with COVID-19. *Intensive Care Med [Internet]*. 2020, 46(7):1339–48.
- [22] Ke R, Martinez PP, Smith RL, et al. Daily longitudinal sampling of SARS-CoV-2 infection reveal substantial heterogeneity in infectiousness. *Nat Microbiol* 2022, 7:640.
- [23] Hurst JH, Heston SM, Chambers HN, et al. Severe Acute Respiratory Syndrome Coronavirus 2 Infections Among Children in the Biospecimens from Respiratory Virus-Exposed Kids (BRAVE Kids) Study. *Clin Infect Dis* 2021, 73:e2875.
- [24] Chung E, Chow EJ, Wilcox NC, et al. Comparison of Symptoms and RNA Levels in Children and Adults With SARS-CoV-2 Infection in the Community Setting. *JAMA Pediatr* 2021, 175:e212025.
- [25] Yonker LM, Boucau J, Regan J, et al. Virologic Features of Severe Acute Respiratory Syndrome Coronavirus 2 Infection in Children. *J Infect Dis* 2021, 224:1821.
- [26] Ochoa V, Díaz FE, Ramirez E, et al. Infants Younger Than 6 Months Infected With SARS-CoV-2 Show the Highest Respiratory Viral Loads. *J Infect Dis* 2022, 225:392.
- [27] McLean HQ, Grijalva CG, Hanson KE, et al. Household Transmission and Clinical Features of SARS-CoV-2 Infections. *Pediatrics* 2022; 149.
- [28] Stein-Zamir C, Abramson N, Shoob H, et al. A large COVID-19 outbreak in a high school 10 days after schools' reopening, Israel, May 2020. *Euro Surveill* 2020; 25.
- [29] Szablewski CM, Chang KT, McDaniel CJ, et al. SARS-CoV-2 Transmission Dynamics in a Sleep-Away Camp. *Pediatrics* 2021, 147.
- [30] Chu VT, Yousaf AR, Chang K, et al. Household Transmission of SARS-CoV-2 from Children and Adolescents. *N Engl J Med* 2021, 385:954.