Arch Argent Pediatr. 2025;e202410616

Chronic kidney disease in pediatrics: Closing the gap between knowledge and clinical practice

Verónica Ferraris[1], *Jorge R. Ferraris*[1,2]

Kidney disease affects one in every seven people. In 2019, 3.1 million deaths were due to renal failure, making it the seventh leading cause of death worldwide, with mortality between 5 and 11 million when considering acute renal failure and lack of access to renal replacement therapy (RRT). These figures reflect disparities in preventing, diagnosing, and treating chronic kidney disease (CKD).[1]

The World Kidney Congress slogan "Mind the gap in kidney care: translating what we know into what we do" is especially relevant in this context. This phrase is crucial in pediatrics, as the challenges are manifold, and the long-term implications are significant.

Pediatric CKD has some peculiarities. The most common underlying diseases in pediatric CKD are congenital anomalies of the urinary and renal tract. There is scarce epidemiological data on CKD in the pediatric population, and the actual values are underestimated because they do not include data from the early stages. The Spanish Pediatric Registry of non-terminal CKD, which collects data in all stages of CKD, shows a prevalence of 128 patients per million inhabitants (ppm) and 63.3% in males.[2] The Argentine Chronic Dialysis Registry 2023 reports prevalence values of 32.5 ppm and incidence of 12.50 ppm for pediatrics (0-19 years) in 2023.[3]

Hypertension and proteinuria are independent risk factors for the progression of CKD. Other factors affecting progression are primary disease, age, sex, racial/genetic factors, low birth weight, hydroelectrolyte disturbances, acidosis, socioeconomic status, parental education, and health literacy. There are complications specific to children: growth/developmental disorders and urologic abnormalities. When the patient reaches end-stage kidney disease (ESKD), therapies include dialysis and renal transplantation. Improving patient and graft survival rates is the goal of managing ESKD in children.[4]

Optimization in dialysis techniques for young children has contributed to improved outcomes among children under 5. They would have died before reaching ESKD due to a lack of resources for dialysis.[4]

Children with CKD have a 30 to 60 times higher mortality risk vs. children without CKD. Cardiovascular diseases are the most common cause of death (25-40%) in the United States, Canada, Australia and New Zealand. Infection is the most common cause of death in other countries: 20-40%.[4]

Factors associated with increased mortality in children with CKD include age younger than

doi: http://dx.doi.org/10.5546/aap.2024-10616.eng

To cite: Ferraris V, Ferraris JR. Chronic kidney disease in pediatrics: Closing the gap between knowledge and clinical practice. *Arch Argent Pediatr*. 2025;e202410616. Online ahead of print 30-JAN-2025.

[1] *Pediatric Nephrology and Renal Transplant Service, Hospital Italiano de Buenos Aires, City of Buenos Aires, Argentina;*
[2] *Universidad de Buenos Aires, Argentina.*

***Correspondence to** Verónica Ferraris: veronica.ferraris@hospitalitaliano.org.ar*

5 years, female sex, non-white race, dialysis vs. transplantation, hemodialysis vs. peritoneal dialysis, non-dysplastic etiologies/uropathies, and comorbidities. Short stature, body mass index alterations, anemia, and hypoalbuminemia have been linked to higher mortality.[4]

Renal transplantation improves survival with better outcomes observed in preemptive and living donor transplantation. Deceased donors, adolescents, and specific etiologies (recurrence disease in the renal transplant) increase mortality and graft failure.[4,5]

In Argentina, there is no national registry documenting the causes of CKD. The etiological distribution in our patient population differs from that observed in other regions due to Shiga toxin-positive hemolytic uremic syndrome (HUS-STEC). In 2000, the causes of ESRD were uropathies/dysplasias in 41%, HUS-STEC in 18.1%, and focal and segmental sclerosis (FSS) in 13.2%.[5] In 2023, it was uropathies/dysplasias in 57%, FSS in 12%, and HUS-STEC in 6.48%. The decrease in HUS-STEC is related to better prevention and early disease management practices. The results suggest the efficacy of the renoprotective measures implemented.[6]

Awareness of CKD is low among people with renal dysfunction. In 252 patients with non-dialyzed HUS-STEC, 130 were lost to follow-up. Patients who do not require dialysis during the acute phase may develop CKD years after the initial episode. The absence of follow-up prevents early detection and treatment of complications to avoid progression of renal disease.[7]

Policies should integrate renal care into health packages under universal health coverage. CKD detection and management should begin in primary care by establishing multidisciplinary care models. Equity in access to care and medication are essential, especially in low-resource countries.[1]

The prevalence of CKD in children would be three to four times higher than estimated, according to screening programs in Japan and Korea. The efficacy of annual urinalysis as a preventive tool remains uncertain and requires studies to assess its impact on progression to CKD.[8]

In this context, preventive strategies for CKD in primary pediatric control should prioritize the monitoring of obesity and hypertension and long-term control of premature infants, children with a history of HUS or with urinary tract anomalies and urinary tract infections.[4]

We have achieved a decrease in HUS-STEC cases (358 in 2013 vs. 290 in 2023); this reflects the importance of continuing prevention campaigns and patient follow-up.[9] ■

REFERENCES

1. Luyckx VA, Tuttle KR, Abdellatif D, Correa-Rotter R, Fung WWS, Haris A, et al. Mind the gap in kidney care: translating what we know into what we do. *Kidney Int*. 2024;105(3):406-17.
2. Andreu Periz D, Sarria Guerrero JA. Actualidad del tratamiento renal sustitutivo pediátrico. *Enferm Nefrol*. 2017;20(2):179-89.
3. Marinovich S, Bisigniano L, Rosa Diez G, Hansen Krogh D, Liderman S, Tagliafichi V, et al. Registro Argentino de Diálisis Crónica SAN-INCUCAI 2023. Buenos Aires: Sociedad Argentina de Nefrología e INCUCAI; 2024. [Accessed on: December 9, 2024]. Available at: https://www.san.org.ar/wp-content/uploads/2024/11/Registro-Argentino-de-Dialisis-Cronica-2023-SAN-INCUCAI-version-completa.pdf
4. Harada R, Hamasaki Y, Okuda Y, Hamada R, Ishikura K. Epidemiology of pediatric chronic kidney disease/kidney failure: Learning from registries and cohort studies. *Pediatr Nephrol*. 2022;37(7):1215-29.
5. Ferraris J, Rodríguez Rilo L. Trasplante renal. In: Nefrología Pediátrica. Buenos Aires: Sociedad Argentina de Pediatría; 2003:581-601.
6. Monteverde ML, Panero N, Chaparro AB, Locane F, Sarkis C, Mattio SA, et al. A decrease in the incidence of Shiga toxin-related hemolytic uremic syndrome as a cause of kidney transplantation at an Argentine referral center. *Pediatr Transplant*. 2023;27(4):e14489.
7. Alconcher LF, Lucarelli LI, Bronfen S. Long-term kidney outcomes in non-dialyzed children with Shiga-toxin Escherichia coli associated hemolytic uremic syndrome. *Pediatr Nephrol*. 2023;38(7):2131-6.
8. Cho BS, Kim SD, Choi YM, Kang HH. School urinalysis screening in Korea: Prevalence of chronic renal disease. *Pediatr Nephrol*. 2001;16(12):1126-8.
9. Argentina. Ministerio de Salud. Boletín Epidemiológico Nacional. Buenos Aires: Ministerio de Salud; 2024;(702) SE17. [Accessed on: December 9, 2024]. Available at: https://www.argentina.gob.ar/sites/default/files/2024/04/ben-702_se17.pdf