Kidney Replacement Therapy for Children With Acute Kidney Injury Due to Severe Malaria: A Review of Available Services in Selected African Countries

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Summary

Acute kidney injury (AKI) is a common, life-threatening clinical complication of severe malaria in children associated with increased short- and long-term mortality. Malaria remains a leading cause of child mortality in Africa, where most severe malaria cases and deaths occur, and a few countries account for most of the global disease burden. While some children who develop severe malaria-associated AKI may require dialysis during hospitalization, survivors may require long-term care for chronic kidney disease, including maintenance dialysis and kidney transplant. There are variations in the availability and type of dialysis services offered across malaria-endemic African countries with major barriers to accessing kidney transplants. Access remains challenging among countries with dialysis services because these centers are usually located in selected specialized urban hospitals far from most patients. The limited number of available pediatric nephrologists in the region further impacts the delivery of specialized nephrology care. This review provides an overview of the magnitude of malaria-associated AKI in selected malaria-endemic countries, country-specific perspectives on dialysis availability and access, and kidney transplant services availability for children who develop chronic kidney disease.

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BACKGROUND

Over the past decade, there has been increased recognition of the true burden of acute kidney injury (AKI) as a frequent complication in pediatric malaria.[1] Malaria had traditionally been recognized among nephrologists across Africa as a common cause of AKI requiring dialysis, but the general perception was that this was predominantly an adult patient problem.[2-5] Conversely, AKI was not considered a common complication in children with severe malaria. These misconceptions were driven by the unrecognized AKI and the unknown outcomes of the children with malaria-caused AKI, the changes in AKI definitions over time, limitations in the existing definitions for renal impairment in malaria, and a lack of routine kidney monitoring in children hospitalized with severe malaria.[5-7]

The 0 by 25 initiative to eliminate preventable deaths from AKI by 2025 remains a distant goal, particularly in the most resource-limited settings.[8] In 2022, there were an estimated 249 million malaria cases globally and 608,000 deaths.[9,10] Assuming 1% to 3% of malaria cases progress to severe disease, we estimate 2,490,000 to

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7,470,000 severe malaria cases annually. Published estimates suggest that 25% to 59% of patients with severe malaria have AKI, putting the burden of AKI cases at 0.6 to 4.4 million annually, the majority of which are currently occurring in Africa (Fig. 1).[1,11] This high burden of severe malaria-associated AKI occurs in the context of an extremely limited pediatric nephrology workforce and limited access to kidney replacement therapy. AKI is one of the most reported pediatric kidney diseases in Africa— a continent with a population of about 1.2 billion, with 40% aged less than 15 years as of 2023—and infections remain the most common cause of AKI in children.[12,13] The number of pediatric nephrologists is low in sub-Saharan countries compared to developed countries such as the United States, where there are an estimated 709 pediatric nephrologists for a population of 72.7 million children below 18 years, equating to 9.8 pediatric nephrologists per million children younger than 18 years (Fig. 1).[13,14] Malaria remains a public health challenge in much of sub-Saharan Africa, with children facing repeated infections over childhood, many cases being managed at home, and knowledge of AKI and AKI management remaining low.[15,16]

In this context, increased awareness of AKI in severe malaria and improved access to appropriate and lifesaving therapy for AKI are critical in existing therapeutic strategies against this disease. The purpose of this review is to provide an overview of AKI as a problem requiring

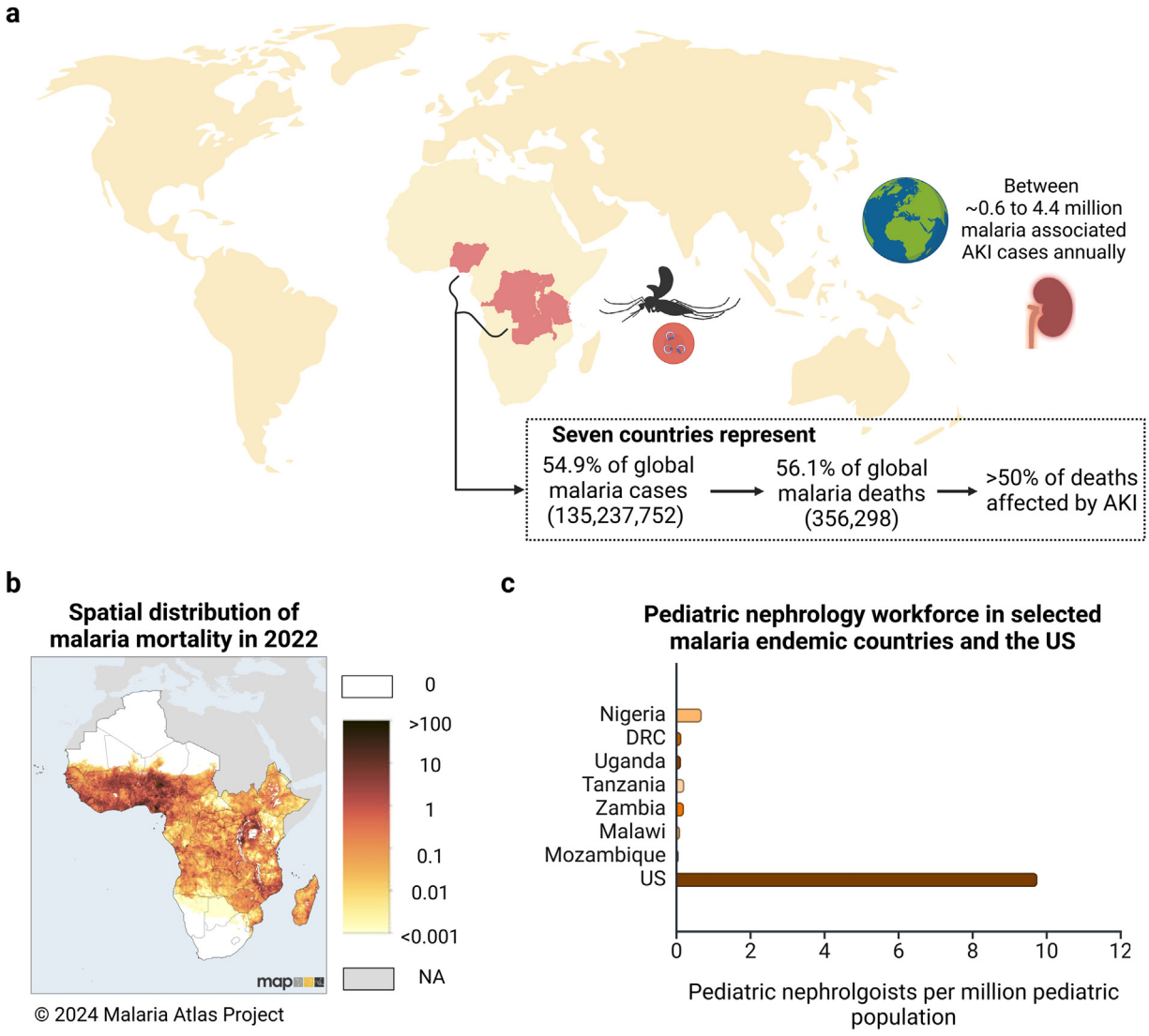

Figure 1. The burden of malaria and acute kidney injury and pediatric nephrology capacity in selected high-burden malaria countries. (A) Global map highlighting six countries representing more than half the global malaria cases and deaths (Nigeria, Democratic Republic of Congo, Uganda, Tanzania, Zambia, Mozambique, and Malawi) and the estimated global burden of AKI associated with malaria annually. (B) Map on the spatial distribution of *P. falciparum* mortality from the Malaria Atlas Project based on methodology published previously.[10] (C) Bar graph depicting the number of pediatric nephrologists per million children in selected African countries and the United States. Created in BioRender. Conroy, A. (2024). https://BioRender.com/l74k712

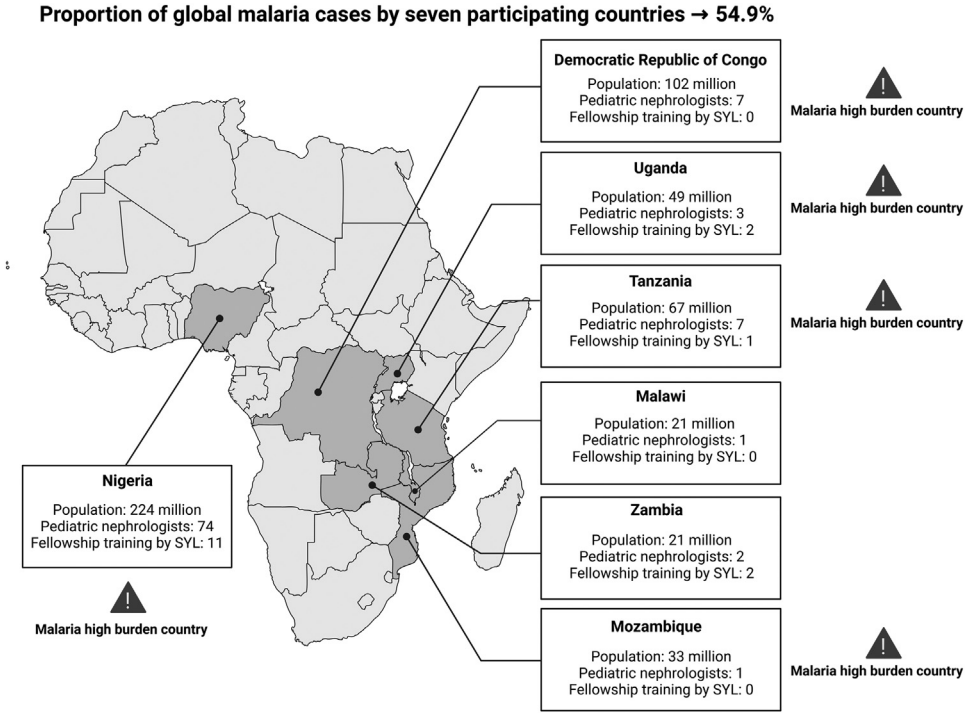

Figure 2. Countries providing data on AKI recognition and management in severe malaria. Created in BioRender. Conroy, A. (2024). https://BioRender.com/l74k712

kidney replacement therapy in African children and to offer country-specific perspectives on dialysis capacity and treatment outcomes from physicians offering pediatric nephrology services. The authors offer insights into nephrology capacities in seven countries that together represented 54.9% of global malaria cases and 56.1% of malaria deaths in 2022 (Fig. 2).[9,17] Programmatic efforts that can improve outcomes are highlighted, ranging from primary prevention activities to reduce infections, secondary prevention to reduce disease progression, and supporting the development of advanced supportive care focusing on addressing critical shortages of pediatric nephrologists and adopting peritoneal dialysis programs to improve access to lifesaving care, prioritizing innovation and adaptation.

NIGERIA

Nigeria has the highest malaria burden in the world, with 26.8% of global cases and 31.1% of global deaths. Most of the malaria burden of occurs in children less than 5 years of age, with 20% of deaths in children under 5 attributed to malaria.[18] Though the country has made some progress, with a decline in malaria incidence from 413 per 1,000 population in 2000 to 306 per 1,000 population in 2021, malaria remains a disease of public health significance in Nigeria.[18] Malaria infection prevalence among children still remains high at 26.3 per 100 children aged 2-10 years.[19]

AKI is frequently underrecognized and goes undiagnosed until it is severe with overt clinical features, partly due to the present World Health Organization (WHO) definition of kidney impairment. Despite this, AKI is common in severe malaria and a leading contributor to poor outcomes.[6] Recent studies carried out at tertiary health facilities in Nigeria show that between 32% and 59% of hospitalized Nigerian children with severe malaria have AKI, often leading to poor outcomes.[20-22] An important factor contributing to high mortality in children with AKI—apart from delayed recognition—is insufficient access to dialysis to support the kidneys while they recover. At a tertiary health facility in North-Central Nigeria between 2013 and 2015, 27.2% (3/11) of children who received peritoneal dialysis (PD) had severe malaria.[23] From relatively few health facilities offering PD before 2015, dialysis access has improved. The use of improvised catheters and locally constituted dialysate fluids has improved access to dialysis for children with AKI, especially malaria.[23] The Pediatric Nephrology Association of Nigeria, International Pediatric Nephrology Association, and International Society of Nephrology have all played significant roles in improving access to acute PD through training of pediatric nephrologists, trainees, and residents through fellowship training, annual conferences, and workshops.[17] Among the more than 100 members in the Pediatric Nephrology Association of Nigeria, 74 are registered pediatric nephrologists, and the rest are trainees and residents. With a

population of 108.2 million children below the age of 18 years, this equates to 0.68 pediatric nephrologist per million children (Fig. 1).[13] Over the past 10 years, access to pediatric dialysis has improved, with at least 20 tertiary public health facilities currently offering acute PD nationwide.[9] A local pharmaceutical company produces affordable acute PD fluids. While access to PD has improved, critical challenges in accessing hemodialysis (HD) still exist, with only some tertiary health centers able to carry out HD for AKI among older children and adolescents due to lack of access to consumables for young children.

Nigeria has a local kidney transplant program, but the pediatric transplant program is still growing and not robust. A recent survey showed that 23 children had received kidney transplants between 1986 and 2019; 12 transplants were performed in Nigeria.[24] There are limited data on how many children have received kidney transplants following chronic kidney disease (CKD) from severe malaria−associated AKI.

DEMOCRATIC REPUBLIC OF CONGO

The Democratic Republic of Congo (DRC) is a high-burden country for malaria, accounting for 12.3% of global malaria cases and 11.6% of global deaths.[9] In 2022, there were an estimated 30 million cases and more than 70,000 malaria-related deaths in the country.[9] Among children aged 2-10 years, the prevalence of malaria infection is 31 per 100.[19] Recent data among patients admitted to pediatric emergency units indicate a high incidence of severe malaria−associated AKI of approximately 24%.[25]

The DRC is Africa's 2nd largest country and the 11th largest country in the world with a population of approximately 102 million, more than half of whom are children younger than 15 years.[13] Furthermore, nephrologists are scarce, with only 32 adult nephrologists and 7 pediatric nephrologists; with a population of 53 million children aged 18 years or younger, this equates to 0.13 pediatric nephrologist per million children.[13] Before 2018, there was no PD program in the country. Children admitted to the University Hospital of Kinshasa for AKI who required dialysis were transferred to the adult nephrology ward, where PD and HD programs were available. However, access to this treatment was very limited due to financial constraints, and most of the children died. In 2018, as part of the Saving Young Lives program, the first pediatric PD program was set up at the University Hospital of Kinshasa, using bedside PD catheter insertion and improvised PD fluids. However, the situation remains dire outside Kinshasha, where access to PD remains extremely limited. Since 2018, two additional pediatric PD centers have been set up in two additional provinces: South Kivu and Kongo Central. Currently, three pediatric PD centers serve children in the country, spread more than 2,000 km apart from one another.[26] Limited transportation infrastructure and impassable roads impair the ability of the vast majority of children in need of reaching a specialized center for dialysis.

However, when accessed, PD for AKI in the setting of pediatric severe malaria has shown promising results. In Kinshasa, the PD program significantly improved access to dialysis at the hospital for patients deemed to require it (>90%). Importantly, outcomes for children with AKI dramatically improved, with AKI-related mortality at less than 20% at the hospital.[25] In a recent study of 35 children requiring PD for uremia/encephalopathy or prolonged anuria, 75% recovered normal renal function 3 months after discharge. Peritonitis was observed in 6.2%, but no other significant complications were reported. Overall mortality for the cohort was 18.7%.[27] These data suggest that PD represents a promising dialysis modality for managing severe malaria−associated AKI in countries where access to HD is limited and nephrology expertise is scarce.

UGANDA

Uganda is a high-burden country for malaria, with 5.1% of global malaria cases. In 2022, there were an estimated 12 million cases of malaria and more than 17,000 malaria-related deaths.[9] Among children 2-10 years of age, the malaria infection prevalence is 22 per 100.[19] The prevalence of AKI among the children hospitalized with severe malaria is 35-46%.[1] Estimates suggest that up to 14% of children hospitalized with severe malaria may have an indication for dialysis, but dialysis access is limited, and mortality rates are substantially higher in children with an indication for dialysis who do not receive care.[28] This is comparable to the outcomes of a recent systematic review in sub-Saharan Africa, which indicated that 95% of children who required dialysis and were unable to receive it died.[29]

Before 2020, hemodialysis was available in 2 districts in Uganda, with 12 dialysis centers offering dialysis, almost exclusively HD.[30] Over the past 2-4 years, there has been increased investment in the provision of kidney care, with 25 hemodialysis centers operating by 2024 with 3 hospitals able to offer continuous renal replacement therapy. Pediatric hemodialysis is offered for adolescents in many HD centers, but most dialysis for younger children is performed in the capital city, Kampala, under the supervision of pediatric nephrologists. Challenges of limited access to pediatric hemodialysis supplies persist in the country. Further, with a population of 49 million and 24.5 million Ugandans below the age of 18 years, the country currently has only three pediatric nephrologists, equating to 0.12 pediatric nephrologist per million children (Fig. 1).[13,31] The limited number of pediatric nephrologists restricts accessibility to specialized support available to increase access to dialysis.

Peritoneal dialysis is conducted on a small scale in a few health facilities, mostly using improvised supplies, because access to non-improvised peritoneal dialysis fluids and accessories is limited.

Severe malaria is a risk factor for CKD, but access to kidney transplants is still a challenge, and transplants are primarily conducted outside the country.[32] Uganda initiated a kidney transplant program in 2023, and five live kidney donor transplants have been carried out in-country by the end of 2024. Due to the high cost of dialysis for CKD and the high cost of transplant, most children with CKD are unable to receive kidney transplants and eventually die. In Uganda, four children have received kidney transplants following CKD secondary to severe malaria, with the surgeries conducted in India using kidneys from related live donors.

TANZANIA

Tanzania is among the countries with a high burden of malaria, accounting for 3.2% of global malaria cases and 4.4% of global malaria deaths. The overall prevalence of malaria infection among children 2-10 years of age in Tanzania is 9.7 per 100.[19] Malaria is the leading cause of mortality among hospitalized children.[33] A review of causes of death in major hospitals in Tanzania between 2006 and 2015 estimated that 11,000 deaths in children below 5 years were attributed to malaria.[34] AKI is one of the severe malaria complications contributing to mortality. There are limited data on the prevalence of severe malaria−associated AKI in hospitalized children, but a recent evaluation of kidney function among hospitalized children identified a low glomerular filtration rate <60 ml/min/1.73m^2 in 16% of children, and malaria was a strong predictor of kidney dysfunction.[35]

Kidney replacement therapy (KRT) is essential in managing malaria-induced acute and chronic kidney disease. In Tanzania, there have been major initiatives to make KRT available for patients with kidney failure. Hemodialysis is the most common form of KRT, and 47 HD centers exist in the country.[36] It is offered predominantly to adults and older children weighing more than 20 kg, and in a few referral hospitals, HD is offered to younger children, usually those older than 5 years. Acute peritoneal dialysis is provided to children with AKI in some centers in Tanzania, primarily referral hospitals that have nephrologists.[37,38] Improvised techniques for PD have been used in these facilities, so their main application is for AKI and not for long-term management of kidney failure.[39,40] A total of seven pediatricians have received nephrology training in the country as of 2024. The country has about 32.9 million children below age 18 years, equating to 0.21 nephrologist per million children.[13]

Kidney transplantation services were introduced in Tanzania in 2007, and the number of kidney transplant recipients to date is 123.[36,41] Children with CKD following severe malaria have limited access to kidney transplantation in Tanzania, with most transplants occurring in adults. Four children have had kidney transplants in Tanzania since the commencement of this service in the country.[41]

MALAWI

Malawi is a moderate malaria burden country, accounting for 1.8% of global malaria cases and 1.2% of deaths. In 2022, there were an estimated 4.4 million malaria cases and more than 7,000 malaria-related deaths in the country.[9] The prevalence of malaria infection in children 2-10 years of age is 18.7 per 100.[19] There is a paucity of data from the country on the prevalence of AKI in children presenting with severe malaria, but two distinct studies of children with central nervous system involvement reported AKI in 61-64% of admissions.[42,43] In one study from Blantyre, Malawi, kidney disease was present in 22% of all pediatric hospital admissions, with malaria identified as the primary admitting diagnosis in 42% of these cases.[44] The rates of children with severe malaria AKI that require dialysis are unknown but are likely similar to other resource-limited settings on the continent. A total of three hospitals in urban settings offer both HD and PD.[45] All pediatric patients with malaria and AKI requiring dialysis at each center undergo PD in cases where kidney replacement therapy is provided. There is only one pediatric nephrologist in the country, and given the limited number of nephrologists, hospital staff with additional training, experience, and interest provide care for these children.[44,45] The population of children younger than 18 years is about 10.1 million, equating to 0.1 pediatric nephrologist per million children.[13] Outcomes from pediatric patients undergoing PD in the setting of malaria are not published, but verbal reports from Queen Elizabeth Central Hospital Pediatrics Department suggest that approximately 85% of children regain normal renal function. Kidney transplant is not performed within Malawi. Patients must access this service in a transplant center pre-identified and paid for by the Malawi Ministry of Health in India, which costs approximately $30,000. The Malawi government does not currently pay for this evaluation in India; thus, it is well beyond the means of most of the population.

ZAMBIA

Malaria is a leading cause of morbidity and mortality in Zambia, accounting for 1.5% of global malaria cases and 1.4% of global malaria deaths.[9] The prevalence of malaria infection in children 2-10 year of age is 13.8 per 100.[19] It is uncertain how common AKI is in children who have severe malaria. A study among children with cerebral malaria at two hospitals in Zambia and Malawi

reported AKI in up to 64.1% of the hospitalized children.[42] A recent study among children with AKI at the National Pediatric Nephrology Referral Center found that malaria accounts for 61.1% of AKI cases, and three-quarters of these patients required dialysis.[5]

While there are many dialysis centers nationwide, few provide dialysis to children. There are two pediatric nephrologists in the country with a population of 9.9 million children younger than 18 years, equating to 0.2 pediatric nephrologist per million children.[13] There are 14 government-funded dialysis facilities, most of which offer hemodialysis to adults; some are equipped to provide PD and continuous renal replacement therapy. Currently there are three pediatric dialysis centers: two in Lusaka, with only the University Teaching Hospital (UTH) offering HD and PD to younger children; and one in the Copperbelt region, primarily serving the northern part of the nation. To complement the government facilities, many private facilities are distributed throughout the nation. The cost of dialysis is covered for those covered by the National Health Insurance Scheme.

Adolescents who need dialysis can get hemodialysis through adult programs, but younger children get PD at pediatric centers. Across the nation, many facilities have received training in acute PD, but few are operational due to limited access to appropriate consumables or human resource. Child-appropriate HD and PD consumables are often unavailable, and improvised PD was used in nearly half of the children at the UTH.[5] Outcomes for patients with malaria-associated AKI were comparable with those with non-malarial AKI.[5]

At the national referral nephrology center at UTH, about 15 pediatric patients with kidney failure are seen annually, with the majority coming from low-income households. Access to chronic dialysis is limited. Five patients are currently on home dialysis, and these included three on continuous ambulatory PD, one on automated PD, and two on HD. Despite the availability of 14 dialysis centers, patients still face difficulties with inconsistent dialysis supply and logistical barriers related to travel time to dialysis centers. Most children who develop chronic kidney failure die as a result of it. A few local transplants have been conducted for adults funded by National Health Insurance Management Authority under the national transplant program.[46] However, no children have received transplants.

A 2-year pediatric nephrology training program has just been developed with partner support to admit the first fellows at the University of Zambia in 2025.

MOZAMBIQUE

Mozambique is among the malaria high-burden countries, accounting for 4.2% of the global malaria cases. The estimated number of malaria cases in the country in 2022 was 10 million with 21,000 malaria deaths.[9] Malaria infections are common among children with a malaria infection prevalence of 27.7 per 100 children aged 2-10 years in 2022.[19] Currently there are limited available data on the prevalence of AKI among children with severe malaria in Mozambique; however, it is likely that AKI remains a common complication similar to other high-burden neighboring malaria countries.[1] Studies are needed to systematically assess the incidence of AKI in patients presenting with malaria in Mozambique.

Currently there is one pediatric nephrologist in the country, equating to 0.06 pediatric nephrologist per million population of children less than 18 years of age.[13] The country has one dialysis center in a public facility, Maputo Central Hospital, and other privately owned dialysis centers. These primarily provide dialysis services to adults, although some children also receive dialysis. There is currently no PD program. Kidney transplants are not carried out within the national health system, so patients have to go to health institutions outside the country (e.g., India).

INDICATIONS FOR DIALYSIS IN CHILDREN WITH MALARIA-ASSOCIATED AKI

Severe malaria−associated AKI is common, with multiple pathophysiological mechanisms contributing to kidney injury, including hypovolemia, hemolysis, oxidative stress, endothelial activation, tubulointerstitial stress, and inflammation.[1] Data on the indications for dialysis in Africa are limited. However, the most common reasons for dialysis in patients with malaria-associated AKI include uremia, especially with symptoms of uremic encephalopathy, bleeding, and pneumonitis (Box 1); hyperkalemia unresponsive to medical therapy; fluid overload unresponsive to conservative treatment or when symptomatic with pulmonary edema; and metabolic acidosis unresponsive to conservative management with bicarbonate replacement. Unfortunately, there is limited availability of blood gas analyzers in health facilities in sub-Saharan Africa, making it challenging to identify children with acidosis, but research has identified acidosis in malaria as one of the key prognostic factors and determinants of the risk of an adverse outcome.[47] Further, as severe malaria in children commonly presents with severe anemia requiring blood transfusions,[48] and hyperkalemia is a known

Box 1. Indications for Dialysis in Severe Malaria−Associated AKI

1. Uremia, especially with symptoms such as encephalopathy, bleeding, and uremic pneumonitis
2. Metabolic acidosis unresponsive to conservative management
3. Hyperkalemia unresponsive to conservative management
4. Fluid overload unresponsive to conservative management or in the presence of symptoms such as pulmonary edema
5. Blood transfusions in patients with hyperkalemia and AKI

complication of blood transfusion that can result in cardiac arrest,[49] dialysis should be considered in patients with hyperkalemia and AKI. In this case, blood is administered through the extracorporeal circuit, a pre-dialyzer, to remove potassium. Administration of the transfusion during dialysis also helps remove fluid volumes to account for the volume of blood transfused.

FUTURE DIRECTIONS AND EMERGING CHALLENGES

While there is an undeniable need to improve early AKI recognition and build substantial capacity to provide kidney replacement therapy, including transplant, to children affected by AKI that progresses to CKD, efforts to prevent AKI need to focus on preventing malaria infections in children. Increased investment into malaria prevention through mosquito bite prevention (e.g., insecticide-treated mosquito nets, indoor residual spraying, reduction of free-standing water for mosquito breeding), early and appropriate treatment of uncomplicated malaria, and chemoprevention strategies for high-risk populations (e.g., pregnant women, infants, hospitalized children with severe anemia/malaria) are critical to shrink the map of malaria cases and associated mortality (Table 1). The advent and initial implementation of the two new approved malaria vaccines (RTSS, R21) are likely to offer further help in the efforts to reduce the malaria burden.[50] However, new threats are on the horizon with the emergence of partial artemisinin resistance on the African continent, the introduction of invasive vector species, and concerns about reduced malaria efficacy of rapid diagnostic tests in the Horn of Africa, where HRP2 deletions in the malaria-causing parasite are increasingly recognized.[51-53]

A number of challenges persist in management of children with severe malaria, including limited ability to recognize worsening kidney function in the children hospitalized with severe malaria as well as limited access to adequate AKI care in various malaria-endemic countries in Africa. Severe malaria is already costly to manage, with costs ranging from USD 27 to USD 165 per patient, while the median household cost is estimated to be USD 50 and can represent a catastrophic health expenditure for families.[54] However, when recognized so late as to need dialysis, treatment is financially out of reach for many. Thus, there is a need to improve early recognition and treatment of AKI in children with severe malaria, focusing on effective and low-cost solutions, including systematic screening of renal function among all admitted patients, provision of effective antimalarial therapy, correction of dehydration, and removal of precipitants such as nephrotoxic medications and herbal medicines, which may worsen AKI. In addition, in children with diagnosed AKI, adequate medical management of complications such as hyperkalemia may help delay the need for dialysis. Together, Nigeria, Uganda, DRC, Tanzania, Zambia, Mozambique, and Malawi contribute to 54.9% of global malaria cases and have, on average, less than one pediatric nephrologist per one million children (Fig. 1).[9] The Saving Young Lives program, initiated in 2012, has enhanced PD access in various sub-Saharan countries, significantly improving the outcomes for children requiring dialysis.[55] This program has contributed to nephrology capacities in Uganda, Tanzania, Zambia, and Nigeria (Fig. 2).[17] However, there remains a need to expand PD access across the region and within countries, as there is still limited accessibility to PD despite the progress made so far. There is a critical need for increased training in pediatric nephrology in sub-

Table 1. Programmatic Investment in Malaria Prevention and Pediatric Nephrology by Country

	Malaria				Nephrology Workforce and Access to KRT		Out-of-Pocket Cost per Hemodialysis Session (USD)	
	Estimated malaria funding per person at risk	% children <5 years sleeping under an ITN	Vaccine	SMC/PDMC	Dialysis capacity	Transplant capacity	Public facilities	Private facilities
Uganda	$3	60.3%	Yes	PDMC	PD, HT, CRRT	Adults only	16-40	95-165
Tanzania	$4	64.1%	No	No PDMC or SMC	PD, HD, CRRT	Adults and children	70	120
Zambia	$4.5	51.6%	No	No PDMC or SMC	PD, HD, CRRT	Adults only	100	100-140
Malawi	$4	67.5%	Yes	No PDMC or SMC	HD, PD	None	180	N/A
DRC	$2.5	55.8%	No	No PDMC or SMC	PD, HD	None	80-141	80-141
Nigeria	< $2	41.2	Yes	SMC	PD, HD	Adults and children	80-150	100-200
Mozambique	$3.5	42.5%	Yes	No PDMC SMC, No PDMC	HD	None	0-90	140

Data extracted from the World Malaria Report and the USAID Statacompiler DHS program, https://www.statcompiler.com
Abbreviations: CRRT, continuous renal replacement therapy; HD, hemodialysis; ITN, insecticide-treated mosquito nets; PD, peritoneal dialysis; PDMC, post-discharge malaria chemoprophylaxis; SMC, seasonal malaria chemoprophylaxis.

Saharan Africa. However, the broader health care workforce can be trained and empowered to improve their ability to manage severe malaria to prevent AKI and its progression and to manage life-threatening complications like hyperkalemia.

Given the global burden of malaria and the substantial burden of AKI that occurs due to malaria, there is a critical need to enhance collaboration and cooperation to support the International Society of Nephrology 0 by 25 initiative to eliminate preventable deaths from AKI as well as efforts to reduce and eliminate malaria. Collective advocacy is crucial to enhance laboratory capacity to improve AKI recognition, response, and care delivery at peripheral health centers and setting up satellite clinics to support dialysis provision and enhanced referral.

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