

<https://doi.org/10.59298/NIJCIAM/2025/6.3.212500>

Socioeconomic Inequalities in Diarrhea Prevention and Treatment in East Africa

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ABSTRACT

Diarrheal diseases remain a leading cause of morbidity and mortality among children under five in East Africa, with socioeconomic inequalities significantly influencing prevention and treatment outcomes. This review examines how disparities in household income, maternal education, living conditions, and access to water, sanitation, and hygiene (WASH) infrastructure contribute to uneven diarrhea burdens across the East African Community countries. Despite some improvements in treatment access, particularly in Uganda, children from low-income and marginalized communities continue to face higher risks due to inadequate environmental conditions and limited healthcare services. The review highlights systemic barriers perpetuating these inequalities, including poor infrastructure, low health literacy, and fragmented health systems. It evaluates integrated interventions such as community-led sanitation, maternal education, and health system reforms that have demonstrated potential in narrowing equity gaps. Recommendations emphasize prioritizing disadvantaged populations through infrastructure investments, targeted education, expanded WASH-health programs, and equity-focused monitoring to achieve more inclusive and sustainable diarrhea prevention and treatment in the region.

Keywords: Diarrheal diseases, socioeconomic inequalities, East Africa, child health, maternal education,

INTRODUCTION

Diarrheal diseases remain a significant public health concern in East Africa, disproportionately affecting children under the age of five. Despite being preventable and treatable, diarrhea continues to contribute substantially to child morbidity and mortality across the region [1]. The East African Community (EAC), comprising countries such as Kenya, Uganda, Tanzania, Rwanda, Burundi, Ethiopia, and South Sudan, faces a complex web of socioeconomic and environmental challenges that directly influence health outcomes [2]. Among these, socioeconomic inequalities stand out as persistent barriers to achieving equitable access to safe water, sanitation, hygiene (WASH), and timely medical treatment, all of which are essential for preventing and managing diarrheal illnesses [3].

Recent data from Demographic and Health Surveys (DHS) estimate the average under-five diarrhea prevalence in East Africa at approximately 14.3%, with variations across countries and communities. Alarming, some hyperlocalized regions exhibit even higher rates [4]. For instance, in urban informal settlements of Uganda, such as those in Entebbe and Wakiso, diarrhea prevalence in children has been reported at staggering levels of 62–62.4% in the previous month alone. Such figures signal urgent disparities in exposure, vulnerability, and access to care, particularly among low-income populations [5].

Diarrheal disease is caused by infectious agents, viruses, bacteria, and parasites, transmitted primarily through contaminated food, water, and poor sanitation. While biomedical interventions like oral rehydration salts (ORS), zinc supplementation, and antibiotics can significantly reduce the severity and duration of diarrhea, social determinants of health play a central role in disease prevention and recurrence [6]. These determinants, such as household income, maternal education, access to healthcare, and quality of living conditions, shape the ability of families to adopt and maintain safe hygiene practices, seek timely treatment, and avoid exposure to pathogens.

In East Africa, economic inequality, urbanization, and environmental degradation exacerbate the risk of diarrheal disease [7]. Many communities lack access to clean water, improved sanitation facilities, and proper waste disposal systems. Informal settlements, often unregulated and overcrowded, are particularly vulnerable due to limited infrastructure and poor public service delivery. Households in these settings are often characterized by shared or unimproved toilets, proximity to open drains, contaminated water sources, and low health literacy [8].

Children born into poorer households are at higher risk not only because of inadequate environmental conditions but also due to limited access to formal healthcare services. Such children are less likely to receive ORS, antibiotics, or hospital care, and more likely to suffer from complications such as dehydration and malnutrition [9]. This inequity is further compounded by lower maternal education levels, younger maternal age, and insufficient public health outreach. In contrast, wealthier households can often mitigate these risks through improved housing, access to medical treatment, and better health knowledge. While national averages may show gradual progress in diarrhea treatment coverage, these figures often mask deep-rooted inequalities between rural and urban areas, within cities, and across wealth quintiles. Understanding and addressing these disparities is crucial for achieving the Sustainable Development Goals (SDGs), particularly SDG 3 (Good Health and Well-being) and SDG 6 (Clean Water and Sanitation) [10].

Despite global and regional efforts to reduce the burden of diarrheal diseases, socioeconomic disparities in prevention and treatment access remain stark in East Africa. Current WASH interventions, though widely promoted, have not equally benefited all populations. Households with limited income and education continue to face higher disease burdens, even within countries where national policies have aimed to improve equity [11]. Moreover, studies have shown that children from low-income households are more likely to experience repeated diarrhea episodes, delayed treatment-seeking behavior, and poor nutritional outcomes. This cyclical relationship between poverty, poor sanitation, and child health perpetuates intergenerational health disparities. Existing health policies and interventions have yet to fully integrate the socio-contextual factors that influence disease transmission and treatment accessibility.

While some progress has been made in narrowing treatment gaps, such as in Uganda, where treatment access has become more uniform across wealth quintiles, underlying inequalities persist. Richer households remain more likely to access private healthcare, afford ORS and antibiotics, and utilize formal care, whereas poorer households often resort to traditional remedies or forego treatment altogether [12]. Without a deliberate focus on the drivers of inequality, public health interventions may continue to fall short of achieving universal coverage and impact.

This review sets out to investigate the intricate and multifaceted socioeconomic inequalities that shape diarrhea prevention and treatment outcomes across East Africa, with a particular focus on children under the age of five. The objectives are fivefold. First, it seeks to assess the overall regional burden of diarrheal disease among young children, highlighting its prevalence and health consequences. Second, the review aims to identify critical socioeconomic determinants such as household income, maternal education, and living conditions that contribute to variations in disease occurrence and care-seeking behaviors. Third, the study will examine disparities in access to preventive tools, including clean drinking water, improved sanitation facilities, and hygiene practices like handwashing, as well as disparities in access to treatment options such as oral rehydration salts (ORS), zinc, and antibiotics. Fourth, it explores how structural inequality reinforces vulnerability to diarrheal illness, including through systemic issues like inadequate infrastructure, health system fragmentation, and poverty traps. Fifth, it evaluates intervention strategies ranging from health promotion and behavior change campaigns to water and sanitation projects and community-based healthcare delivery that have proven effective or show promise in reducing these disparities. The research will be guided by questions centered on the differential burden of diarrhea across social classes, the influence of maternal knowledge and environmental conditions, and the mechanisms by which inequities are perpetuated or mitigated. Ultimately, this review holds significant policy and programmatic value. By exploring equity gaps and identifying evidence-based interventions that prioritize the most disadvantaged populations, the review will inform efforts to design more inclusive, responsive, and sustainable public health interventions. Moreover, it contributes to scholarly discourse by surfacing overlooked drivers of disease and proposing new avenues for research. In doing so, it supports the broader global agenda of health equity and justice, reinforcing that every child, regardless of socioeconomic background, has a right to survive and thrive.

Burden and Regional Overview

Diarrhea remains a leading cause of morbidity and mortality among children under five in East Africa, with regional prevalence averaging approximately 14.3%, as indicated by recent Demographic and Health Surveys (DHS) across 12 countries, including Kenya, Tanzania, Uganda, Rwanda, Burundi, and Ethiopia [13]. This statistic underscores the widespread nature of the issue but masks stark disparities within countries, particularly between urban slums and more affluent or rural areas. In Uganda, the burden is especially acute in informal settlements such as those in Entebbe and Wakiso, where diarrhea prevalence among children under five has reached a staggering 62–62.4% within a single month. These alarmingly high rates reflect the dire conditions faced by households in such communities, including inadequate sanitation, limited access to clean water, overcrowding, and poor waste disposal

practices. The data points to an urgent need for targeted interventions addressing the root causes of diarrheal disease, especially in marginalized urban populations.

Socioeconomic Drivers of Inequality

Socioeconomic factors play a pivotal role in shaping health inequalities, particularly in relation to childhood diarrhea in East Africa. Household income and wealth are critical determinants, with children from poorer households facing a significantly higher risk of diarrheal disease [14]. Studies have shown that being from a low-income household increases the odds of diarrhea by approximately 16%, reflecting the compounding effects of poverty on health outcomes. In Tanzania, stark disparities in access to clean water and improved sanitation infrastructure further deepen these inequities areas with limited access experience higher rates of malnutrition and diarrhea, creating a vicious cycle of disease and deprivation. Maternal education and age are also key influences; children of mothers with limited education are more vulnerable to diarrheal illnesses, likely due to reduced knowledge of hygiene practices, nutrition, and illness prevention. Additionally, younger mothers aged 15–24 are associated with a 1.41-fold increased risk of their children developing diarrhea compared to older, more experienced mothers. Environmental and household conditions further compound the issue [15]. Overcrowding, shared or poorly maintained toilets, lack of ventilation, and the use of unprotected water sources significantly elevate the risk of diarrhea. In contrast, rural Tanzanian households with improved water and sanitation systems experience markedly reduced disease burden, illustrating the protective effect of adequate WASH infrastructure.

Access to Prevention & Treatment

Over the years, Uganda has made notable progress in improving access to diarrhea treatment, particularly among children under five, with a narrowing of socioeconomic disparities in care-seeking behavior. Data from recent health surveys and research (e.g., *PMC*) indicate that treatment coverage especially the use of oral rehydration salts (ORS) is now relatively consistent across wealth quintiles, a testament to expanded public health messaging and improved community-based interventions [16]. However, significant gaps in the quality and type of care accessed persist between different socioeconomic groups. Wealthier households are still more likely to seek care from formal medical facilities, such as private clinics, pharmacies, and hospitals, where they can afford a broader range of treatments, including antibiotics and zinc supplements when prescribed appropriately. In contrast, lower-income families, often constrained by financial and geographic barriers, tend to rely on home remedies, traditional healers, or receive no treatment at all. These practices, while sometimes culturally rooted, increase the risk of severe dehydration, prolonged illness, and complications, particularly in young children. Moreover, inconsistent access to clean water and sanitation exacerbates the burden among poorer households. Therefore, while treatment coverage has improved overall, ensuring equitable access to high-quality, timely, and complete care for all socioeconomic groups remains a pressing public health priority in Uganda [17].

Mechanisms Reinforcing Inequality

Inequality in health outcomes, particularly in the context of infectious disease prevention and control, is deeply entrenched in broader socio-economic structures that disproportionately affect poor and rural populations. One of the key mechanisms reinforcing this inequality is the persistent lack of household income, which limits families' ability to access essential resources such as clean water, adequate sanitation, hygiene products like soap, and timely healthcare services [18]. Without these necessities, low-income households face a heightened risk of disease transmission and poor health outcomes. Compounding this issue is the low level of maternal education often prevalent in these settings. Limited knowledge and awareness among mothers who typically manage household hygiene practices can result in poor uptake of critical preventative behaviors such as handwashing, safe food handling, and appropriate disposal of children's stools, further increasing the household's vulnerability to infections. Moreover, environmental infrastructure in impoverished and rural communities is frequently neglected or underdeveloped. These areas often lack piped water systems, proper drainage, waste disposal facilities, and well-maintained sanitation infrastructure, which significantly increases exposure to disease-causing agents. Together, these interlinked socio-economic and infrastructural barriers form a cycle of disadvantage that perpetuates health disparities and reinforces systemic inequality, making disease prevention and overall well-being more difficult to achieve for marginalized populations [19].

Interventions & Equity Outcomes

Integrated interventions targeting water, sanitation, hygiene (WASH), education, and healthcare accessibility have demonstrated promising outcomes in reducing health inequities across East Africa. WASH programs, in particular, have shown measurable impacts on child health and nutrition. In Tanzania, for example, national efforts to scale up clean water and sanitation infrastructure contributed to significant declines in stunting rates, particularly in marginalized rural areas. Community-Led Total Sanitation (CLTS), widely implemented across East Africa, has proven effective in mobilizing rural populations to eliminate open defecation and adopt sustainable hygiene practices [20]. Coupled with targeted health education, these programs promote essential behaviors such as handwashing, safe water storage, hygienic food handling, and proper stool disposal, leading to reduced incidence of diarrheal diseases and other infections. However, uptake remains uneven, with awareness and practice notably lower among

less-educated mothers and households in lower socioeconomic brackets. To address these disparities, healthcare accessibility reforms in Uganda including the abolition of user fees and decentralization of primary healthcare services have helped bridge treatment gaps for underserved populations. Additionally, NGO-led initiatives such as HIJRA's integration of WASH interventions with community health worker training in slums and internally displaced persons (IDP) settlements further exemplify the importance of localized, equity-focused approaches. Collectively, these interventions highlight the need for holistic, inclusive strategies to improve public health and narrow equity gaps [21].

RECOMMENDATIONS

To effectively reduce the burden of diarrheal diseases and promote equitable health outcomes, a multifaceted approach centered on disadvantaged communities is essential. First, infrastructure investments must prioritize rural and urban-poor areas by expanding access to safe drinking water, functional sanitation facilities, and effective drainage systems critical determinants of health. Second, maternal education programs should be strengthened to emphasize hygiene practices, exclusive breastfeeding, and the prompt use of oral rehydration salts (ORS), equipping caregivers with the knowledge to prevent and manage diarrheal illness [3]. Third, integrated WASH-health interventions—such as school-based programs, community-led total sanitation (CLTS), and campaigns driven by community health workers (CHWs) should be scaled up in informal settlements to reinforce behavior change and improve coverage. Fourth, equity-focused monitoring systems must be instituted, collecting routine data to track disparities in diarrhea incidence and treatment access across wealth quintiles. Lastly, combining community-led infrastructure efforts with targeted subsidies can increase service uptake and ensure lasting improvements in underserved populations.

CONCLUSION

This review underscores that socioeconomic inequalities significantly shape the prevention and treatment of diarrheal diseases in East Africa, disproportionately burdening children from low-income, poorly educated, and marginalized communities. Despite overall progress in reducing diarrhea prevalence and expanding treatment access, stark disparities persist, particularly in informal urban settlements and rural areas, where inadequate water, sanitation, and hygiene infrastructure intersect with limited healthcare access. Maternal education, household income, and environmental conditions emerge as critical determinants influencing disease risk and care-seeking behavior. Effective interventions must therefore adopt a comprehensive, equity-focused approach that prioritizes vulnerable populations by improving infrastructure, scaling integrated WASH and health education programs, and enhancing healthcare affordability and quality. Additionally, robust data collection and monitoring are essential to track and address persistent gaps. By addressing these systemic socioeconomic drivers and promoting community-led initiatives alongside policy support, East Africa can advance toward equitable diarrheal disease prevention and treatment, ultimately improving child survival and health outcomes across the region.

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