

Research Article

OPEN ACCESS

Narrative Review on Endemic Communicable Diseases in Africa: Mortality and Morbidity Trends, Impacts on Families, and the Way Forward

Angham Tartour, Tarig Osman, Reshma Javed, Raja Ali, Asma Syed, Fatimah Elnour, Abid Saeed, Devendra Bansal, Hamad Al-Romaihi, Elmobashar Farag*

Health Protection and Communicable Diseases Department, Ministry of Public Health, PO Box 42, Doha, Qatar

*Email: eabdfarag@moph.gov.qa

ABSTRACT

African nations have experienced various environmental and anthropological changes, including climate change, natural disasters, food safety issues, and increased industrial waste. These changes have increased the risk of emerging endemic microorganisms and intensified the transmission and impact of existing endemic communicable diseases (ECDs). This paper reviews the literature on the repercussions of ECDs, such as malaria, neglected tropical diseases (NTDs), human immunodeficiency virus (HIV)/acquired immunodeficiency syndrome (AIDS), tuberculosis (TB), and viral hepatitis diseases (VHD) in Africa. The narrative review involved an extensive search of published articles and grey literature on these selected ECDs in Africa between January 2000 and December 2022. Through case studies on malaria, NTDs, HIV/AIDS, TB, and VHD, the effects of these ECDs on public health, economic development, and social systems in Africa were demonstrated, as they continue to be major causes of morbidity and mortality in the African region. It was emphasized that underlying social and economic factors contribute to the vulnerabilities associated with these diseases. In conclusion, providing services through community care workers can improve families' trust, awareness of social support, and recognition of domestic vulnerabilities.

Keywords: Endemic Communicable Diseases(ECDs), Africa, Mortality and Morbidity Trends

1. INTRODUCTION

The WHO African region recorded 1,843 substantiated public health events between 2001 and 2022. Over 90% of these events were infectious diseases [1]. There has been growing concern about endemic communicable diseases (ECDs) in the past two decades.

Cite this article as: Tartour A, Osman T, Javed R, Ali R, Syed A, Elnour F, Saeed A, Bansal D, Al-Romaihi H, Farag E. Narrative Review on Endemic Communicable Diseases in Africa: Mortality and Morbidity Trends, Impacts on Families, and the Way Forward. Qatar Journal of Public Health. 2023(2):9 <https://doi.org/10.5339/qjph.2023.9>

Submitted: 27 November 2023; Accepted: 07 January 2024

<http://doi.org/10.5339/qjph.2023.9>

© 2023 The Author(s), licensee HBKU Press. This is an Open Access article distributed under the terms of the Creative Commons Attribution License CC BY 4.0, which permits unrestricted use, distribution and reproduction in any medium, provided the original work is properly cited.

Environmental and anthropological changes, including climate change, natural disasters, food safety issues, and increased industrial waste, have altered the natural habitats of organisms [2][3][4]. As a result, the risk of emerging endemic microorganisms has increased, along with the transmission and severity of existing ECDs [3]. It is worth noting that while ECDs are prevalent in developed nations, their impact has been more severe in developing countries [5][6]. This is because developing countries are more vulnerable to infectious diseases and endemicity.

Africa bears the largest burden of endemic diseases in the world. Each year, infectious diseases contribute to over 227 million years of healthy life loss [7]. Measures of morbidity and mortality only capture one aspect of the disease's impact, neglecting other significant losses such as psychological, educational, and financial impacts on individuals, families, and communities [8]. These effects are amplified in resource-poor settings. Developed countries rely on organized public health system efforts, while low-resource settings like African nations heavily depend on foreign aid for funding and developing social protection policies and programs [9][10]. This dependence has deprived African nations of autonomous governance over their public affairs, leaving them vulnerable to the political agendas of international donor institutions [11]. Additionally, limited resources pose barriers to independent health actions and investments into education to improve individual-level infection risk awareness and privately funded indigenous institutions [9][10]. Furthermore, the industrialization of lands and communities has further exacerbated Africa's endemicity and burden of infectious diseases, leading to urbanized, unhealthy, and densely populated environments with impoverished communities [9].

Endemic communicable diseases (ECDs) remain a significant public health challenge in Africa, impacting families and society [9][12]. These diseases are constantly present in the population and often affect disadvantaged or marginalized groups disproportionately, leading to high mortality rates and hindering economic development across the continent [9][12].

The literature extensively documents the impact of ECDs on African families. The well-being of each family member determines the overall quality of life. Taking care of and living with a relative suffering from a debilitating disease can cause emotional distress and financial hardship, potentially straining family relationships [13]. These diseases can lead to illness, disability, and death, significantly affecting affected families economically, socially, and psychologically. Consequently, these effects have a lasting detrimental impact on the well-being of African individuals and communities [14][15][16][17]. Families play a crucial role in promoting the health of individuals and communities by shaping health-related behaviors, providing care, and acting as conduits for information and culture [18]. Thus, understanding their vulnerabilities and the impact of ECDs on families as a unit is crucial for informing public policy.

Despite Africa's disproportionate disease burden globally, population-based research on the social determinants of health to advance global public health systems lacks representation from the continent [19]. Therefore, this narrative review synthesizes the relevant literature on ECDs, emphasizing case studies related to infectious diseases. The objective is to demonstrate the effects of these diseases on public health, economic development, social systems, and, ultimately, the well-being of African families. Specifically, the case studies focus on malaria, neglected tropical

diseases (NTDs), human immunodeficiency virus (HIV)/ acquired immunodeficiency syndrome (AIDS), tuberculosis (TB), and viral hepatitis diseases (VHD) as prominent causes of morbidity and mortality in African regions [9][12]. Moreover, this review explores the multifaceted challenges in effectively controlling these ECDs and emphasizes the importance of addressing the underlying social determinants of health. These determinants, including socioeconomic status, education, employment, social support networks, access to healthcare, and the physical environment, contribute to vulnerabilities and significantly impact health outcomes and disparities within African families.

The African continent faces the complex problem of endemic communicable diseases (ECDs) in the context of global health. A complicated web of morbidity and death is woven by diseases like malaria, NTDs, HIV/AIDS, TB, and VHD, all of which have a long-lasting impact on family well-being. Researchers are beginning to comprehend these disorders' effects on family well-being in more detail as they examine the socioeconomic drivers of these conditions.

This narrative review aims to break down the interlinked societal variables of ECDs in Africa. Various factors, including socio-economic inequality, environmental conditions, biological factors, brittle health systems, and political instability, shape these diseases' paths. The review reveals the differences in vulnerability among families by looking at distribution across communities.

Because ECDs are complicated disorders, understanding them and the various situations in which they occur is essential to effectively combating them. Finding marginalized communities and at-risk groups becomes critical when resources are allocated inequitably. The review supports programs that involve these communities through participatory techniques to promote inclusion and equity.

A critical gap is shown in the literature regarding this complex network of difficulties. The socioeconomic determinants of ECDs have been clarified by previous research, but there is still a significant lack of knowledge regarding the particular processes at work in marginalized populations. This gap in the literature highlights the necessity for focused studies into the vulnerabilities of these communities, which will help shape the creation of more efficient and situation-specific interventions.

The following parts will explore the corpus of information that already exists as well as highlight uncharted territory for research as we set out on this review journey. After this investigation, we hope to have deepened our understanding of the social determinants and laid the groundwork for future studies that fill the critical knowledge gaps.

2. METHODS

A narrative review was conducted, starting with an extensive literature search in the PubMed and Embase databases from January 2000 to December 2022. Specific search terms were employed, such as "communicable diseases," "mortality," "morbidity," "Africa," "Sub-Saharan Africa," and "families," as well as social determinants-related terms, including "education," "income," "environment," "sanitation," and "nutrition." MeSH terms for infectious diseases, Sub-Saharan African countries, and families were also included. Additionally, we searched Google for relevant grey literature to identify governmental and non-governmental documents on malaria, neglected tropical diseases,

human immunodeficiency virus/acquired immunodeficiency syndrome, tuberculosis, and viral hepatitis diseases in African countries. The findings are presented as case studies organized according to the five ECDs mentioned above. Each case study includes a synthesis of the literature on mortality and morbidity of the respective ECD, specifically in sub-Saharan Africa (SSA). We also examine the impact of each ECD and related vulnerabilities in Africa and provide examples of good practices to control the disease burden and its impact on families in Africa.

3. RESULTS AND DISCUSSION

3.1. Case Study 1: Malaria

The global importance of malaria, a vector-borne disease, is immense. According to the World Health Organization (WHO), there were 247 million cases in 2021 compared to 245 million in 2020 and 619,000 deaths in 2021 compared to 625,000 in 2020 [20]. The majority of deaths in the WHO African Region occur among children under five years old and pregnant women, accounting for approximately 95% of cases and deaths. The African countries with the highest number of malaria deaths globally were Nigeria (31.3%), followed by the Democratic Republic of the Congo (12.6%), the United Republic of Tanzania (4.1%), and Niger (3.9%) [21]. *Plasmodium falciparum* is the most prevalent in Africa, while *Plasmodium vivax* dominates outside SSA. Several factors contribute to the increase in environmental heterogeneities of malaria, including residential development, population migration [22][23], and socioeconomic status [24]. Climate and ecological changes pose the most significant challenges to malaria elimination today [25][3].

3.2. Impact of Malaria and Related Vulnerabilities in Africa

Malaria causes significant morbidity and mortality, resulting in losses for national economies. Countries with high malaria transmission experience lower annual economic growth compared to those without malaria. This relationship leads to substantial differences in GDP between these countries, ultimately hindering the economic development of the entire region [26]. Financing and sustaining intervention programs also become challenging. In SSA, low-income and lower-middle-income countries often face a cycle of disease and poverty, which perpetuates the prevalence of malaria [27].

Several factors make many African populations highly vulnerable to malaria infections, including pastoralist work and mobile tribes [28]. Herding is a significant economic activity for many African communities, especially with a high malaria burden. Socioeconomic status can also influence malaria risks through various mechanisms [29][30][31]. For instance, inadequate access to insecticide-treated nets (ITNs), a potentially life-saving intervention, poses significant challenges in preventing malaria. Despite some progress in SSA, only 36% of households have access to ITNs. Moreover, the availability of sufficient ITNs varies across countries and regions. From 2015 to 2021, less than 25% of children in Angola and Zimbabwe had access to ITNs compared to 90% of children in Guinea-Bissau and Niger [32].

Furthermore, lack of education and living in poorly constructed houses may increase the risk of malaria infection among SSA families. An analysis of 11 SSA countries found higher malaria prevalence among children whose mothers did not attend school, suggesting a lack of knowledge about malaria prevention. Lack of

awareness may also delay seeking healthcare, thus hindering prompt diagnosis [27] and increasing the risk of disease transmission in the family and community.

Finally, sustained international and national funding plays a significant role in the fight against malaria. Major initiatives and investments such as the Global Fund to Fight AIDS, TB, and Malaria (GFATM), the President's Malaria Initiative (PMI), Roll Back Malaria (RBM), and the Bill and Melinda Gates Foundation (BMGF) are in place globally. However, in 2020, there was a funding shortfall of \$3.3 billion, less than half of what was needed for malaria control and elimination. Due to the recognition of malaria as a leading cause of poverty in disease-endemic areas, it is an essential factor in national poverty reduction strategies. One study found that the economic impact of malaria on families in Africa can be significant, as the disease can lead to absenteeism from work and an inability to meet basic needs such as food, shelter, and healthcare [14].

Additionally, the cost of malaria treatment can be financially burdensome for families, especially those already living in poverty [14]. A systematic review of studies from sub-Saharan Africa shows that the cost of malaria diagnosis and treatment varies based on specific circumstances, such as technology or policy. This cost impacts both patient expenses and the health system. For example, implementing rapid diagnostic testing kits and artemisinin-based combination therapy is costly for the health system. However, compared to previous regimens, patients now face lower costs due to subsidies provided for these medicines in public and private health facilities [33]. On a continental level, Africa's estimated annual direct malaria cost is around 12 billion USD, reducing GDP by 1.3% annually [34].

3.3. Examples of Good-Practice

Over the last two decades, successful vector control and preventive antimalarial drugs have significantly reduced the global disease burden [35][36]. It is known that both ITNs and indoor residual spraying (IRS) are effective in preventing infection and reducing malaria transmission. In addition, the production, procurement, and delivery of ITNs, particularly long-lasting ITNs, have increased by 66% in 2021 in most SSA countries. The percentage of children in SSA sleeping under ITNs has also increased from less than 40% in 2011 to over 50% in 2021. Moreover, due to the ongoing impact of malaria, there is growing international attention to combat the disease, and prioritizing funding for prevention and treatment is more effective in saving lives. In the last decade, over a million children's lives in Africa have been saved, and malaria cases and deaths have been reduced in over 40 endemic countries [36].

3.4. Case Study 2: Neglected Tropical Diseases

Neglected tropical diseases (NTDs) are a group of 20 conditions, including dengue, leishmaniasis, leprosy (Hansen's disease), schistosomiasis, soil-transmitted helminth (STH) infections (STH: *Ascaris lumbricoides*, the hookworms, and *Trichuris trichiura*), and trachoma. These diseases are primarily found in tropical areas and have a disproportionate impact on disadvantaged communities and vulnerable groups such as women and children. The negative consequences of NTDs, including health, social, and economic effects, affect more than one billion people [37]. In Africa, over a third of the burden of NTDs is concentrated, with every country in the African Region having at least one endemic NTD. Furthermore, 79% of African countries are co-endemic, with at least five NTDs present [38].

It is worth noting that the NTDs predominantly affect the poorest 500 million individuals in SSA. Helminth infections are responsible for approximately 85% of the disease burden related to NTDs [39]. For instance, in Kenya, more than five million school-age children are considered at risk of soil-transmitted helminthiasis (STH) and other NTDs [40]. A study conducted on schoolchildren in Kenya found a 12.9% prevalence of STH (95% CI: 10.4-16.1). The multivariate analysis revealed a significant association between increased odds of STH infection and factors such as “not wearing shoes, a high number of household members, and school absenteeism of more than two days” [40].

3.5. The Impact of Neglected Tropical Diseases and Related Vulnerabilities in Africa

NTDs result in high economic costs for affected families. Out-of-pocket health expenditures and lost wages due to these diseases amount to at least US\$ 33 billion annually [41].

The prevalence of NTDs in many SSA regions indicates the limited socioeconomic development in these areas. A prime example is STH, which, although present globally, poses the most severe infections in impoverished tropical and sub-tropical regions [41]. Various factors contribute to the risk of infection, including poor sanitation, prolonged contact with vectors, ecosystem conditions, and dietary habits [34][36]. A study conducted in Kenya focused on the impact of NTDs on community health and well-being. It revealed that structural factors such as marginalization, political interests, economic and cultural elements, illiteracy, and limited access to water, sanitation, and housing contribute to the spread of NTDs [42]. Moreover, NTDs have adverse effects on child development, pregnancy, and labor. These diseases can further exacerbate the financial hardship of struggling families, leading to billions of dollars in lost income annually in developing nations [43].

NTDs can have devastating effects on individuals and families due to the severe pain and disabilities they may cause. These diseases directly impact the central, peripheral, and autonomic nervous systems, resulting in neurologic impairments [44]. Additionally, NTDs interfere with cognitive development and hinder school attendance, limiting educational opportunities for children. These adverse effects perpetuate a cycle of poverty and lead to social stigma within families and communities [45]. Moreover, parasitic infections in school-age children and younger can negatively affect their physical growth, endurance, and cognitive function. Consequently, their school performance and attendance are affected, potentially resulting in lower future wage-earning capacity for families [46]. Furthermore, hookworm and schistosomiasis infections during pregnancy contribute to prematurity and low birth weight, increased morbidity, and mortality rates among mothers [46].

3.6. Example of Good-Practice

A study conducted in Kenya in 2022 found that the Neglected Tropical Diseases Strategic Agenda, established by the Ministry of Health, has been successful in the fight against NTDs [47]. For instance, the deworming program in Kenya has eliminated worm infestations in children and improved school participation [48]. In 2012, the Government of Kenya launched the National School-Based Deworming program, explicitly targeting school-age children and aiming to reduce the prevalence of infections in high-risk areas [49]. A study conducted in Kenya in 2017 evaluated the outcomes of this program in 100 schools, demonstrating

a decrease in the prevalence of STH and schistosomiasis infections [40].

3.7. Case Study 3: HIV/AIDS

The African Region is the most affected by HIV/AIDS, with 25.7 million people living with HIV and 1.1 million people newly infected in 2018 [50]. For decades, SSA has been known as a hotspot for HIV infections. Although HIV-related mortality in Africa has decreased over the past 15 years due to the widespread use of antiretroviral therapy, HIV remains endemic and continues to be the leading cause of death in the region [51]. The incidence of HIV and other sexually transmitted infections (STIs) in Africa has been particularly high among women of child-bearing ages, with rates 3 to 4 times higher than in males [52][53]. Consequently, the rate of lifelong disease has increased due to infection in newborns. This has shifted the focus to prioritizing family planning services and preventing mother-to-child transmission programs in endemic African regions [52].

3.8. Impact of HIV/AIDS and Related Vulnerabilities in Africa

HIV/AIDS has the potential to disrupt family systems, as affected families face financial hardships and experience emotions such as anger, shame, and fear due to the diagnosis. The patient and caregiver commonly face social isolation and discrimination [54].

In recent years, it has become clear that HIV infections have significant implications, particularly in terms of “multimorbidity” [19][55][5]. This observation aligns with global trends, as a meta-analysis has shown a more than 60% increase in the risk of cardiovascular diseases among People Living With HIV/AIDS (PLHIV) [56]. Notably, women infected with HIV bear the greatest burden of HIV-related multimorbidity [18]. Moreover, the impact of HIV on African youth has long been recognized as an area with limited knowledge. The increased incidence of HIV in African children has brought about increased implications for children’s nutrition [57]. Additionally, it has been observed that HIV exacerbates nutritional morbidity and mortality in African children, introducing HIV-associated secondary infections, many of which are also endemic in Africa, such as malaria [52]. A survey conducted in South Africa among 2,477 households revealed that over 16% of children were orphaned due to HIV/AIDS [58].

Notably, a bi-directional relationship exists between poverty and HIV infection in Africa [59]. Another survey indicated that HIV-positive individuals have a significantly lower socioeconomic status compared to those affected by other illnesses [58]. Economic hardship has consistently been linked to changes in social dynamics, including sexual behaviors, timing of marriage, and migration, which are known factors contributing to the transmission of infectious diseases [60][61]. These associations are particularly relevant for African women, often leading to early marriages to receive customary bridal payments [59][60]. Consequently, young women in Africa face higher exposure to STIs due to engaging in sexual activity at earlier ages. Furthermore, widowed or single mothers often resort to or are targeted for sex work to secure financial gains [62]. Some women also express fear of advocating for preventative measures, such as condom use, to their sexual partners [62].

A participant in a study shared the following experience. “If I had insisted on condoms, he would have been angry and may have even beaten me. And the times I refused to have sex with him, he would

refuse to bring food and neglect to care for the children. I tried it twice, and on both occasions, he didn't bring any home.” [62]

Generally, HIV/AIDS can have a profound impact on one's work, social, and family lives, potentially causing debilitating conditions [57][58]. This consequence is often associated with the development of secondary mental health conditions that impair everyday functioning. Moreover, the absence of social grants, like child support and old age pensions, has been shown to exacerbate these conditions [63]. Caregivers for children with HIV also experience significant stress and anxiety [58].

3.9. Example of Good-Practice

An Action for West Africa Region (AWARE) report presents an example of good practice, highlighting successful approaches and experiences in addressing HIV/AIDS in Africa [64]. Notably, integrating voluntary testing and counseling into education systems and schools in Burkina Faso has significantly increased youth awareness, acceptability, and access to services. Another positive example comes from Côte d'Ivoire, where the CASM (Centre for Socio-Medical Assistance) project operates a daily center dedicated to providing sociomedical support services to families affected by HIV/AIDS. These services include basic medical care, food packages, psychological counseling, job opportunities, support for orphaned children, care for neglected communities in remote areas, and training for community-care workers (CCWs). The report emphasizes the crucial role of civil society organizations in expanding the availability of medical and social services to vulnerable communities through collaborative planning and the delivery of HIV services in partnership with public authorities [64].

3.10. Case Study 4: Tuberculosis

In 2020, there were an estimated 10.6 million people diagnosed with TB worldwide, up from 10.1 million in 2019 [65]. Out of these, 1.1 million were children. The second highest incidence of TB cases, about 22%, occurred in the WHO African Region [66]. This region also accounts for 24% of all TB deaths [67]. In 2018, Africa had 72% of the cases of TB/HIV co-infection and 80% of all TB/HIV deaths. Modeled data suggest that COVID-19 could result in over 5 million TB deaths by 2024 [68]. These rates may be due to barriers to early diagnosis and treatment of TB, along with the burden of other co-infections like HIV and increasing vulnerability resulting from loss of income [68].

3.11. Impact of Tuberculosis and Related Vulnerabilities in Africa

Tuberculosis is a community disease with a high transmission rate among individuals, families, and households. The burden of TB on an individual is intricately linked to the burden faced by the entire household. A study conducted in South Africa found that most participants lived in large families [69]. Living conditions were often crowded, with many family members sharing living spaces, increasing the risk of transmission. Nevertheless, there were also certain benefits to such close-knit households. For example, unemployed participants reported that family closeness provided a robust support system, particularly in securing food sources, accompanying them to clinics, and caring for their children [69].

Notably, TB exposure risk is higher in high-incidence settings and conditions of overcrowding and poor ventilation [70]. In Africa in 2017, 473.4 million people were estimated to be living in overcrowded conditions, with 47.5% of them in Nigeria, Ethiopia,

the Democratic Republic of the Congo, Sudan, Uganda, and Kenya [71]. Moreover, one's nutritional status often determines their susceptibility to TB [70]. In 2020, undernutrition was associated with 2.1 million new TB cases globally [66]. The risk of active TB is also higher in individuals with conditions that weaken the immune system, such as diabetes mellitus and HIV/AIDS [66]. In various regions of Africa, food insecurity coexists with the high prevalence of HIV/AIDS, further increasing susceptibility to TB [72].

Furthermore, in 2020, nearly 1.4 million new TB cases worldwide were attributable to alcohol use disorder and smoking [66][70]. Injecting drug users were also at a higher risk of TB due to socioeconomic factors, risky behaviors leading to deprivation, homelessness, imprisonment, HIV infection, and malnutrition [70]. In South Africa, 13.2% of the adult population met the criteria for a lifetime substance use disorder, with a high burden of TB and HIV co-infections [73]. African governments contribute only 21% of the resources needed for adequate TB services [74]. Considering the impact of pandemics, wars, and ongoing conflicts, it is crucial to have multisectoral action to address all determinants of TB. Currently, practical collaborative efforts are lacking [65]. An audit of health facilities and non-government organizations (NGOs) also revealed a lack of coordination between health facilities and community care workers (CCWs) and inadequate training for these workers [75].

Furthermore, households affected by TB face significantly increased financial costs, with estimates ranging from a 12% to a 91% increase [66]. In SSA, TB patients incur direct and indirect costs both before and after diagnosis, with a significant emphasis on private-sector care [76]. A systematic review of the financial burden of tuberculosis in low- and middle-income countries revealed that total costs accounted for 57% of annual individual income and 38% of household income, with 19% attributed to direct medical expenses, 19% to non-medical costs, and 59% to income loss. Families often resort to selling assets and borrowing money to cope with these expenses, which depletes household resources over time [69].

School disruption is another significant consequence faced by children and adolescents with TB [77]. The impact on their education, academic performance, and behaviors stems from the disease and its treatment [78]. Furthermore, stigma exacerbates the adverse effects of TB on families. It has been reported that the fear of airborne infections and regarding them as co-infection with HIV were major drivers of the discrimination faced by patients living with TB in Africa, particularly children [79]. This stigma, combined with insufficient social support, can lead to delayed healthcare seeking, medication non-compliance, and poor treatment outcomes, subsequently reducing the effectiveness of testing and treatment services in Africa [70]. On a household level, TB also disrupts family relationships, primarily due to the fear of transmission [80]. A study conducted in South Africa revealed that severe cases, such as multidrug-resistant (MDR)-TB, often require extended hospitalization [81]. Consequently, this can result in caregiver-child separation, which has been shown to cause psychological difficulties in children.

3.12. Example of Good-Practice

In the fight against TB in Africa, NGOs and CCWs provide various services, including health education, TB symptoms screening, sputum collection, TB contact tracing, nutrition services (food parcels), collection of TB medication, adherence support for TB

treatment, TB defaulter tracing and TB Direct observed therapy. These services significantly impact families overcoming the disease and its related social effects [75]. Good practices can also be seen through initiatives implemented by the global partnership STOP-TB (STP) [82]. STP has invested in recruiting and training community/village-based health workers to collaborate effectively with National TB Programme supervisors for community-based activities. They also promote sustainable practices through community-based projects by TB groups, such as cultivating gardens and selling the produce. They also provide social grants to those most in need, including nutritional and financial support and temporary accommodation during treatment [83].

In addition, in South Africa, TB patients have the option to apply for the Disability Grant, which is a form of social assistance provided by the government. This grant is available to individuals with physical or mental disabilities who cannot work for at least six months. However, evidence shows that only 4% of drug-sensitive TB patients have accessed this grant [69].

3.13. Case Study 5: Viral Hepatitis

Viral hepatitis remains a significant public health problem, affecting many people worldwide [84][85]. Globally, there are nearly 2.2 billion people infected with one or more hepatitis viruses, with hepatitis B virus (HBV) and hepatitis C virus (HCV) responsible for up to 95% of related fatalities [84][85]. According to the Global Burden of Disease Study 2019 data, many countries of East and West Africa had the heaviest burden of Acute Viral Hepatitis A, B, C and E [86]. Notably, over 69 million Africans are living with chronic viral hepatitis, with 59 million having HBV and 9 million having HCV [85]. In 2019, the African region accounted for 25% of the global burden of Hepatitis B and C [87]. Consequently, liver cancer in SSA causes approximately 199,000 deaths per year, often among the young and productive populations [88].

3.14. Impact of Viral Hepatitis and Related Vulnerabilities in Africa

Over 89% of people living with HBV and HCV in Africa still lack the necessary care despite the availability of diagnostic tools and effective treatments [89]. Consequently, those with advanced forms of the disease face catastrophic financial burdens, as well as emotional distress and stigmatization related to their illness [89]. In 2018, only 12 of the 27 WHO African region member countries with a national viral hepatitis action plan had it endorsed and disseminated. These countries include Algeria, Burundi, Cote-d'Ivoire, Ethiopia, Ghana, Guinea, Mauritania, Niger, Nigeria, Rwanda, Senegal, South Africa, and Uganda [90][91]. Furthermore, in 2020, 15 member states drafted and endorsed their national hepatitis strategies. These countries are Angola, Benin, Burkina Faso, Burundi, Cameroon, Centre African Republic, Chad, Democratic Republic of the Congo, Equatorial Guinea, Mali, Malawi, Mozambique, South Sudan, Togo, Tanzania, and Zambia [92].

Notably, the response to viral hepatitis in Africa has been greatly hindered by significant socioeconomic and political challenges, such as a lack of understanding of sociopolitical conditions, limited evidence-based decision-making, financial constraints, and a shortage of trained healthcare workers [89][93]. It is essential to highlight that literature on infection's socioeconomic and psychosocial impacts in high-endemic areas is scarce [88]. Data on infection-related direct and indirect costs and health-related quality of life in SSA are still limited. However, studies conducted in Ghana and Cameroon have shown that infected

youth feel greatly burdened by the financial implications of the diseases [89][94]. According to an adolescent with chronic hepatitis B interviewed in a Ghanaian study:

"Well, for now, it's the lab tests that are really hard for us. When we go for tests, they say the NHIS (National Health Insurance Scheme) does not cover it. The most expensive test is the viral load. Most people, including myself, can't afford it. The government must add it to the NHIS or make the cost more affordable through subsidies." [89]

African mothers of children with hepatitis infections also experience psychological distress due to concerns about their children's health education, employment, marriage, and the attitudes of others toward them [89][95]. Additionally, female patients were apprehensive about transmitting the infection to their children. A pregnant adolescent with an infection stated in the study conducted by Kolbila et al. [89]:

"I worry about the fact that the disease might affect my pregnancy. I always feel that if I have the baby, he or she might get infected or might fall sick easily. Right now, I do not even know what to do, either to keep the pregnancy or terminate it. I need information on that. The doctor didn't tell me how my baby will be affected, an information that I desperately need now." [89]

Individuals with hepatitis infection can face stigma and discrimination, resulting in barriers to employment opportunities and immigrating for work [96]. Additionally, lifestyle changes related to the infection, such as reduced working hours or alcohol consumption, can impact individuals' economic status and social participation. These infection-related challenges can also affect individuals' healthcare experience, with some patients being denied medical attention and facing difficulties in accessing healthcare due to perceived discrimination [97].

A qualitative study conducted in Ghana on family caregivers of patients with hepatitis B-related chronic liver disease revealed that caregivers often experience physical strain, resulting in weight loss and aches. They also reported difficulties fulfilling other social roles, such as marriage and parenting, while acting as caregivers. Financial challenges due to high healthcare expenses and the inability to sustain jobs were also common among caregivers [98].

3.15. Example of Good-Practice

A multidisciplinary approach with a biobehavioral and psychosocial focus has proven to be effective in understanding and addressing the complexities associated with viral hepatitis, similar to how it has been successful in the case of HIV [99]. Therefore, it is essential to adopt such an approach in research, assessment, and treatment of viral hepatitis.

4. CONCLUSION

This narrative review focuses on the social determinants of morbidity and mortality associated with five endemic communicable diseases, malaria, NTDs, HIV/AIDS, TB, and VHD, and their impact on family well-being in the African region. In summary, deliberate and comprehensive interventions are needed to lessen the burden on families and communities because of the African region's complex interactions between social factors and endemic communicable diseases (ECDs). Giving special attention to the difficulties encountered by vulnerable groups in Africa is essential to meet the global Sustainable Development Goals (SDGs).

Practical actions should be taken as below to address these problems in the future, both locally and globally.

1. Sustainable Healthcare Investments: Suggest raising the number of sustainable investments to strengthen healthcare systems. This involves improving capacity-building initiatives to maximize human resources and tackling issues with the healthcare infrastructure.

2. Comprehensive Policy-Making: To reduce the risk of ECD transmission and improve access to healthcare, incorporate health considerations into all policy-making processes. Coordinated measures must be made to lower poverty, increase social protection, guarantee food security, and enhance living and working circumstances.

3. Human agency and community involvement: Promote human agency by including communities in creating solutions sensitive to cultural differences and specific contexts. To jointly develop inclusive and long-lasting initiatives addressing ECDs, policymakers should work with communities.

4. Localized Social Institutions: Recognize the importance of the local context by developing internal social institutions. Local community members who work as Community Care Workers (CCWs) can be essential in providing and improving the acceptance, credibility, and knowledge of specific social services.

5. Civil Society Empowerment: Acknowledge civil society's vital role in the struggle against ECDs. Support should focus on internal social institutions to guarantee fair assistance distribution and a sustained transition of nations away from foreign aid.

6. Customized Educational and Livelihood Assistance: Create customized support systems for people with ECDs and their families. This approach entails looking into different educational options, offering food assistance or alternative sources of income during school closures, and exploring other educational pathways.

7. Stigma Reduction and Psychological Support: Engage in community and health facility-based implementation of stigma reduction techniques. Give patients and caregivers psychological support to help them get over the fear, anxiety, and guilt that come with having an ECD diagnosis.

8. Ongoing Research and Learning: Promote ongoing research to pinpoint changing problems and practical solutions. Provide an environment that enables the sharing and adapting lessons learned from effective interventions to various scenarios.

Hence, implementing these practical measures can end the cycle of poverty and ECDs and work for a stronger, healthier African community. Policymakers, communities, and international stakeholders must work together to create a path toward sustainable health and well-being if these projects are to be successful.

4.1. Targeted recommendations to address the social determinants of ECDs and related impacts on community and family well-being

The review emphasizes the complex and multifaceted impact of these diseases on African families [19][59]. It highlights the varied distribution of infectious diseases in the region, driven by underlying vulnerabilities such as biological and environmental factors, social inequalities, weak health system infrastructure, and political instability [9][69][100]. Within communities, resources are unevenly distributed, resulting in differing family vulnerabil-

ities [31][89]. In combating ECDs, it is crucial to identify marginalized communities and at-risk groups, involve them in interventions through participatory methods, and establish equitable policies.

Best practices for addressing the implications of ECDs in Africa focus primarily on interventions that reduce disease burden and improve the overall well-being of affected communities [24][68]. For instance, promoting health literacy and awareness campaigns targeted at caregivers with limited education can significantly prevent and control the effects of ECDs, improving access to care, medication adherence, and disease prevention measures [27]. These campaigns could cover hygiene practices, using ITNs correctly, adopting healthier lifestyles, and accessing public sector services to reduce out-of-pocket expenses. Community-based interventions are also essential, including support groups, home-based care programs, community healthcare services, and financial and psychosocial interventions. By implementing comprehensive and targeted interventions, the physical and emotional demands on infected family members and their caregivers can be better managed, ultimately enhancing their overall well-being.

Cultural factors play a significant role in ECDs and should be considered to implement interventions successfully. Targeted interventions, such as deworming school-age children, have effectively reduced infestation [48]. Identifying other at-risk groups and providing interventions based on the best available evidence is essential. For example, adolescent girls and their families might be counseled against early marriage to prevent early initiation of sexual activity, exploitation, and infections [89]. The success of such interventions also relies on appropriate training for CCWs and their collaboration with health personnel [75].

Furthermore, ECDs can have a debilitating effect, leading to absenteeism from school and work for both affected individuals and their caregivers [14]. Alternating coaching sessions or online pathways could be considered to ensure uninterrupted schooling. In communities with school meal programs, school closures or absenteeism may have nutritional consequences [68]. Measures should be in place to provide food rations or supplements to affected families. Individuals requiring extended recovery periods or caring for family members should have access to options and resources for alternative income or food, such as poultry rearing and plant cultivation. The governments should provide grants and support to prevent families from catastrophic costs.

Moreover, families dealing with diagnoses like HIV/AIDS and TB often face discrimination [15][16]. Stigma reduction strategies should be implemented at community and health facility levels to promote early diagnosis and prompt treatment. Psychological support must also be extended to patients and caregivers to help them overcome shame, anxiety, and fear.

4.2. Contextualizing policy and the way forward

As countries strive to achieve global Sustainable Development Goals, it is vital to address the needs of vulnerable populations locally and globally [42][48]. In Africa, scaling up national resources is crucial to fulfill the priorities related to the SDGs. This allocation of resources could involve increasing sustainable investments to address the challenges faced by the healthcare systems and strengthening capacity-building programs to optimize human resources. According to the review, the cycle of poverty and ECDs will continue to impact the health of individuals and families and deplete resources. It is crucial to include health in

all policy-making processes to break this cycle, as this can help reduce the risk of ECD transmission and improve access to health services [21]. Strategies to achieve this include reducing poverty, expanding social protection, ensuring food security, improving living and working conditions, promoting healthy lifestyles, and preventing school disruption for children in affected households [15][34][36][101][102][103]. Encouraging human agency is crucial to promoting new forms of involvement and co-producing inclusive and sustainable solutions to address ECDs. Policymakers must involve communities in developing context-specific and culturally sensitive solutions [102].

Furthermore, it is widely acknowledged in the literature that there are significant cultural, geographical, and environmental variations among communities worldwide [103][104][105][106]. While external support systems have positively impacted medical practices and financing for infectious diseases in Africa, foreign organizations may not be the ideal providers of locally relevant social care to affected communities. Therefore, civil society plays a central role in the fight against ECDs in the African region. It ensures

that investments are accounted for, aid is distributed equitably, and ultimately, a country's transition from foreign aid is viable [107]. Therefore, in addition to understanding the dynamics, unique needs, and socioeconomic inequalities of local populations in Africa, it is recommended that contextualized services be provided by internal social institutions [103][104][105][108].

Fostering a local dialogue through in-house social institutions, with the participation of CCWs from the local community, can enhance families' acceptability, trust, and awareness of the designated social services [101]. This approach also allows for the establishment of internalized support networks that can address domestic vulnerabilities and provide decentralized services to difficult-to-reach groups and distant communities at high risk of infections or related socioeconomic and psychological complications [103][104][105]. In conclusion, ECDs can profoundly impact individuals and families in Africa. Developing context-specific strategies based on each country's socioeconomic status may help safeguard communities from being overwhelmed and maintain their resilience.

REFERENCES

- Koua EL, Njingang JRN, Kimenyi JP, Williams GS, Okeibunor J, Oka S, et al. Trends in public health emergencies in the WHO African Region: an analysis of the past two decades public health events from 2001 to 2022. *BMJ Global Health*. 2023;8(10):e012015. doi: [10.1136/BMJGH-2023-012015](https://doi.org/10.1136/BMJGH-2023-012015).
- Hammer CC, Brainard J, Hunter PR. Risk factors and risk factor cascades for communicable disease outbreaks in complex humanitarian emergencies: a qualitative systematic review. *BMJ Global Health*. 2018;3(4):e000647. doi: [10.1136/bmjgh-2017-000647](https://doi.org/10.1136/bmjgh-2017-000647).
- Ludwig A, Zheng H, Vrbova L, Drebot MA, Iranpour M, Lindsay LR. Increased risk of endemic mosquito-borne diseases in Canada due to climate change. *Can Commun Dis Rep*. 2019 Apr 4;45(4):91–97. doi: [10.14745/ccdr.v45i04a03](https://doi.org/10.14745/ccdr.v45i04a03).
- Schneider MC, Tirado MC, Rereddy S, Dugas R, Borda MI, Peralta EA, et al. Natural disasters and communicable diseases in the Americas: contribution of veterinary public health. *Vet Ital*. 2012 Apr–Jun;48(2):193–218.
- Kaluvu L, Asogwa OA, Marzà-Florensa A, Kyobutungi C, Levitt NS, Boateng D, et al. Multimorbidity of communicable and non-communicable diseases in low- and middle-income countries: A systematic review. *J Multimorb Comorb*. 2022 Sep 1;12:26335565221112593. doi: [10.1177/26335565221112593](https://doi.org/10.1177/26335565221112593).
- Ogoina D, Onyemelukwe GC. The role of infections in the emergence of non-communicable diseases (NCDs): Compelling needs for novel strategies in the developing world. *J Infect Public Health*. 2009;2(1):14–29. doi: [10.1016/j.jiph.2009.02.001](https://doi.org/10.1016/j.jiph.2009.02.001).
- Nkengasong JN, Tessema SK. Africa Needs a New Public Health Order to Tackle Infectious Disease Threats. *Cell*. 2020 Oct 15;183(2):296–300. doi: [10.1016/j.cell.2020.09.041](https://doi.org/10.1016/j.cell.2020.09.041).
- Smith KM, Machalaba CC, Seifman R, Feferholtz Y, Karesh WB. Infectious disease and economics: The case for considering multisectoral impacts. *One Health*. 2019 Jan 9;7:100080. doi: [10.1016/j.onehlt.2018.100080](https://doi.org/10.1016/j.onehlt.2018.100080).
- Devereux S, Kapingidza S. External Donors and Social Protection in Africa: A Case Study of Zimbabwe. In: Schmitt C, editor. *From Colonialism to International Aid: External Actors and Social Protection in the Global South*. Springer International Publishing; 2020. p. 273–302. doi: [10.1007/978-3-030-38200-1_11](https://doi.org/10.1007/978-3-030-38200-1_11).
- Gori L, Mammana C, Manfredi P, Michetti E. Economic development with deadly communicable diseases and public prevention. *J Public Econ Theor*. 2022;24(5):912–943. doi: [10.1111/jpet.12560](https://doi.org/10.1111/jpet.12560).
- Makuwira J. Governing the ungovernable - donor agencies and the politics of development in Africa. *Afr J Public Aff*. 2017;9(5):23–34. doi: [10.10520/EJC-69ffa4178](https://doi.org/10.10520/EJC-69ffa4178).
- Bates M, Marais BJ, Zumla A. Tuberculosis Comorbidity with Communicable and Noncommunicable Diseases. *Cold Spring Harb Perspect Med*. 2015 Feb 6;5(11):a017889. doi: [10.1101/cshperspect.a017889](https://doi.org/10.1101/cshperspect.a017889).
- Golics CJ, Basra MK, Finlay AY, Salek S. The impact of disease on family members: a critical aspect of medical care. *J R Soc Med*. 2013 Oct;106(10):399–407. doi: [10.1177/0141076812472616](https://doi.org/10.1177/0141076812472616).
- Alonso S, Chaccour CJ, Elobolobo E, Nacima A, Candrinho B, Saifodine A, et al. The economic burden of malaria on households and the health system in a high transmission district of Mozambique. *Malar J*. 2019 Nov 11;18(1):360. doi: [10.1186/s12936-019-2995-4](https://doi.org/10.1186/s12936-019-2995-4).
- Embleton L, Logie CH, Ngure K, Nelson L, Kimbo L, Ayuku D, et al. Intersectional Stigma and Implementation of HIV Prevention and Treatment Services for Adolescents Living with and at Risk for HIV: Opportunities for Improvement in the HIV Continuum in Sub-Saharan Africa. *AIDS Behav*. 2023 May;27(Suppl 1):162–184. doi: [10.1007/s10461-022-03793-4](https://doi.org/10.1007/s10461-022-03793-4).
- Ma PHX, Chan ZCY, Loke AY. Self-Stigma Reduction Interventions for People Living with HIV/AIDS and Their Families: A Systematic Review. *AIDS Behav*. 2019 Mar;23(3):707–741. doi: [10.1007/s10461-018-2304-1](https://doi.org/10.1007/s10461-018-2304-1).
- Short SE, Goldberg RE. Children Living with HIV-Infected Adults: Estimates for 23 Countries in sub-Saharan Africa. *PLoS One*. 2015 Nov 17;10(11):e0142580. doi: [10.1371/journal.pone.0142580](https://doi.org/10.1371/journal.pone.0142580).
- Weiss-Laxer NS, Crandall A, Hughes ME, Riley AW. Families as a Cornerstone in 21st Century Public Health: Recommendations for Research, Education, Policy, and Practice. *Front Public Health*. 2020 Sep 18;8:503. doi: [10.3389/fpubh.2020.00503](https://doi.org/10.3389/fpubh.2020.00503).
- Wong EB, Olivier S, Gunda R, Koole O, Surujdeen A, Gareta D, et al. Convergence of infectious and non-communicable disease epidemics in rural South Africa: a cross-sectional, population-based multimorbidity study. *Lancet Glob Health*. 2021;9(7):e967–e976. doi: [10.1016/S2214-109X\(21\)00176-5](https://doi.org/10.1016/S2214-109X(21)00176-5).
- World Health Organization. World Malaria Report 2021 [Internet]. Geneva: World Health Organization; c2021 [cited 2023 Oct 1]. Available from: <https://www.who.int/teams/global-malaria-programme/reports/world-malaria-report-2021>

21. World Health Organization. Malaria [Internet]. Geneva: World Health Organization; c2023 [cited 2023 Oct 1]. <https://www.who.int/news-room/fact-sheets/detail/malaria>
22. Prosper O, Ruktanonchai N, Martcheva M. Assessing the role of spatial heterogeneity and human movement in malaria dynamics and control. *J Theor Biol*. 2012 Jun 21;303:1–14. doi: [10.1016/j.jtbi.2012.02.010](https://doi.org/10.1016/j.jtbi.2012.02.010).
23. Tessema S, Wesolowski A, Chen A, Murphy M, Wilhelm J, Mupiri AR, et al. Using parasite genetic and human mobility data to infer local and cross-border malaria connectivity in Southern Africa. *Elife*. 2019 Apr 2;8:e43510. doi: [10.7554/eLife.43510](https://doi.org/10.7554/eLife.43510).
24. Degarege A, Fennie K, Degarege D, Chennupati S, Madhivanan P. Improving socioeconomic status may reduce the burden of malaria in sub Saharan Africa: A systematic review and meta-analysis. *PLoS One*. 2019 Jan 24;14(1):e0211205. doi: [10.1371/journal.pone.0211205](https://doi.org/10.1371/journal.pone.0211205).
25. Caminade C, Kovats S, Rocklöv J, Tompkins AM, Morse AP, Colón-González FJ, et al. Impact of climate change on global malaria distribution. *Proc Natl Acad Sci U S A*. 2014 Mar 4;111(9):3286–91. doi: [10.1073/pnas.1302089111](https://doi.org/10.1073/pnas.1302089111).
26. RBM. RBM Roll Back Malaria [Internet]. [cited 2023 Oct 1]. Available from: <https://endmalaria.org/>
27. Adeyemo AO, Aborode AT, Bello MA, Obianuju AF, Hasan MM, Kehinde DO, et al. Malaria vaccine: The lasting solution to malaria burden in Africa. *Ann Med Surg (Lond)*. 2022 Jul;79:104031. doi: [10.1016/j.amsu.2022.104031](https://doi.org/10.1016/j.amsu.2022.104031)
28. Buckee C, Noor A, Sattenspiel L. Thinking clearly about social aspects of infectious disease transmission. *Nature*. 2021 Jul;595(7866):205–213. doi: [10.1038/s41586-021-03694-x](https://doi.org/10.1038/s41586-021-03694-x).
29. Onwujekwe OE, Uzochukwu BS, Ezeoke OP. Socioeconomic inequalities in cost of seeking treatment for malaria in south-east Nigeria. *Int J Med Health Dev*. 2012;15(2):2–16.
30. Tusting LS, Rek JC, Arinaitwe E, Staedke SG, Kanya MR, Bottomley C, et al. Measuring Socioeconomic Inequalities in Relation to Malaria Risk: A Comparison of Metrics in Rural Uganda. *Am J Trop Med Hyg*. 2016 Mar;94(3):650–8. doi: [10.4269/ajtmh.15-0554](https://doi.org/10.4269/ajtmh.15-0554).
31. Were V, Buff AM, Desai M, Kariuki S, Samuels A, Ter Kuile FO, et al. Socioeconomic health inequality in malaria indicators in rural western Kenya: evidence from a household malaria survey on burden and care-seeking behaviour. *Malar J*. 2018 Apr 16;17(1):166. doi: [10.1186/s12936-018-2319-0](https://doi.org/10.1186/s12936-018-2319-0).
32. UNICEF. Malaria [Internet]. 2023. UNICEF. [cited 2023 Oct 1]. Available from: <https://data.unicef.org/topic/childhealth/malaria/#:~:text=For%20example%2C%20during%202015%2D2021,5%20in%20an%20equitable%20way>
33. Hailu A, Lindtjörn B, Deressa W, Gari T, Loha E, Robberstad B. Economic burden of malaria and predictors of cost variability to rural households in south-central Ethiopia. *PLoS One*. 2017 Oct 11;12(10):e0185315. doi: [10.1371/journal.pone.0185315](https://doi.org/10.1371/journal.pone.0185315).
34. Tusting LS, Bottomley C, Gibson H, Kleinschmidt I, Tatem AJ, Lindsay SW, et al. Housing Improvements and Malaria Risk in Sub-Saharan Africa: A Multi-Country Analysis of Survey Data. *PLoS Med*. 2017 Feb 21;14(2):e1002234. doi: [10.1371/journal.pmed.1002234](https://doi.org/10.1371/journal.pmed.1002234).
35. Tusting LS, Willey B, Lucas H, Thompson J, Kafy HT, Smith R, et al. Socioeconomic development as an intervention against malaria: a systematic review and meta-analysis. *Lancet*. 2013 Sep 14;382(9896):963–72. doi: [10.1016/S0140-6736\(13\)60851-X](https://doi.org/10.1016/S0140-6736(13)60851-X).
36. Tusting LS, Gething PW, Gibson HS, Greenwood B, Knudsen J, Lindsay SW, et al. Housing and child health in sub-Saharan Africa: A cross-sectional analysis. *PLoS Med*. 2020 Mar 23;17(3):e1003055. doi: [10.1371/journal.pmed.1003055](https://doi.org/10.1371/journal.pmed.1003055).
37. World Health Organization. Neglected Tropical Diseases [Internet]. World Health Organization. 2022. [cited 2023 Oct 1]. Available from: https://www.who.int/health-topics/neglected-tropical-diseases#tab=tab_1m
38. George NS, David SC, Nabiryo M, Sunday BA, Olanrewaju OF, Yangaza Y, et al. Addressing neglected tropical diseases in Africa: a health equity perspective. *Glob Health Res Policy*. 2023 Jul 25;8(1):30. doi: [10.1186/s41256-023-00314-1](https://doi.org/10.1186/s41256-023-00314-1).
39. Hotez PJ, Kamath A. Neglected Tropical Diseases in Sub-Saharan Africa: Review of Their Prevalence, Distribution, and Disease Burden. *PLOS Neglected Tropical Diseases*. 2009;3(8):e412. doi: [10.1371/journal.pntd.0000412](https://doi.org/10.1371/journal.pntd.0000412).
40. Okoyo C, Campbell SJ, Williams K, Simiyu E, Owaga C, Mwandawiro C. Prevalence, intensity and associated risk factors of soil-transmitted helminth and schistosome infections in Kenya: Impact assessment after five rounds of mass drug administration in Kenya. *PLoS Negl Trop Dis*. 2020 Oct 7;14(10):e0008604. doi: [10.1371/journal.pntd.0008604](https://doi.org/10.1371/journal.pntd.0008604).
41. World Health Organization. Funding crisis threatens Africa's fight against neglected tropical diseases [Internet]. 2023. [cited 2023 Oct 19]. Available from: <https://www.afro.who.int/news/funding-crisis-threatens-africas-fight-against-neglected-tropical-diseases>
42. Ochola EA, Karanja DMS, Elliott SJ. The impact of Neglected Tropical Diseases (NTDs) on health and well-being in sub-Saharan Africa (SSA): A case study of Kenya. *PLoS Negl Trop Dis*. 2021 Feb 11;15(2):e0009131. doi: [10.1371/journal.pntd.0009131](https://doi.org/10.1371/journal.pntd.0009131).
43. WHO. (2017). Integrating neglected tropical diseases into global health and development: fourth WHO report on neglected tropical diseases.
44. Quansah E, Sarpong E, Karikari TK. Disregard of neurological impairments associated with neglected tropical diseases in Africa. *eNeurologicalSci*. 2016 ;3:11–14. doi: [10.1016/j.ensci.2015.11.002](https://doi.org/10.1016/j.ensci.2015.11.002).
45. Hotez PJ, Alvarado M, Basáñez MG, Bolliger I, Bourne R, Boussinesq M, et al. The global burden of disease study 2010: interpretation and implications for the neglected tropical diseases. *PLoS Negl Trop Dis*. 2014 Jul 24;8(7):e2865. doi: [10.1371/journal.pntd.0002865](https://doi.org/10.1371/journal.pntd.0002865).
46. Hotez PJ, Brindley PJ, Bethony JM, King CH, Pearce EJ, Jacobson J. Helminth infections: the great neglected tropical diseases. *J Clin Invest*. 2008 Apr;118(4):1311–21. doi: [10.1172/JCI34261](https://doi.org/10.1172/JCI34261).
47. Ministry of Health - Kenya (MOH-Kenya). The 2nd Kenya National Strategic Plan for Control of Neglected Tropical Diseases 2016-2020 [Internet]. 2016 [cited 2023 Oct 21]. Available from: https://espen.afro.who.int/system/files/content/resources/KENYA_NTD_Master_Plan_2016_2020.pdf
48. World Health Organization. Ending the neglect to attain the sustainable development goals: a sustainability framework for action against neglected tropical diseases 2021-2030. 2021.
49. Pullan RL, Halliday KE, Oswald WE, Mcharo C, Beaumont E, Kepha S, et al. Effects, equity, and cost of school-based and community-wide treatment strategies for soil-transmitted helminths in Kenya: a cluster-randomised controlled trial. *Lancet (London, England)*. 2019;393(10185):2039–50. doi: [10.1016/S0140-6736\(18\)32591-1](https://doi.org/10.1016/S0140-6736(18)32591-1).
50. World Health Organization. HIV/AIDS [Internet]. 2018 [cited 2023 Oct 19]. Available from: <https://www.afro.who.int/health-topics/hiv/aids>
51. Frank TD, Carter A, Jahagirdar D, Biehl MH, Douwes-Schultz D, Larson SL, et al. Global, regional, and national incidence, prevalence, and mortality of HIV, 1980-2017, and forecasts to 2030, for 195 countries and territories: a systematic analysis for the global burden of diseases, injuries, and risk factors study 2017. *Lancet HIV*. 2019;6(12):e831–e859. doi: [10.1016/S2352-3018\(19\)30196-1](https://doi.org/10.1016/S2352-3018(19)30196-1).
52. Jones A, Cremin I, Abdullah F, Idoko J, Cherutich P, Kilonzo N, et al. Transformation of HIV from pandemic to low endemic levels: a public health approach to combination prevention. *Lancet*. 2014 ;384(9939):272–279. doi: [10.1016/S0140-6736\(13\)62230-8](https://doi.org/10.1016/S0140-6736(13)62230-8).
53. Yegorov S, Joag V, Galiwango RM, Good SV, Okech B, Kaul R. Impact of Endemic Infections on HIV Susceptibility in Sub-Saharan Africa. *Trop Dis Travel Med Vaccines*. 2019 Nov 29;5(1):22. doi: [10.1186/s40794-019-0097-5](https://doi.org/10.1186/s40794-019-0097-5).
54. Iwelunmor J, Airhihenbuwa CO, Okoror TA, Brown DC, BeLue R. Family systems and HIV/AIDS in South Africa. *Int Q Community Health Educ*. 2006–2007;27(4):321–35. doi: [10.2190/IQ.27.4.d](https://doi.org/10.2190/IQ.27.4.d).
55. Feinstein MJ, Bogorodskaya M, Bloomfield GS, Vedanthan R, Siedner MJ, Kwan GF, et al. Cardiovascular Complications of HIV in Endemic Countries. *Curr Cardiol Rep*. 2016 Nov;18(11):113. doi: [10.1007/s11886-016-0794-x](https://doi.org/10.1007/s11886-016-0794-x).
56. Gowshall M, Taylor-Robinson SD. The increasing prevalence of non-communicable diseases in low-middle income countries: the view from Malawi. *Int J Gen Med*. 2018 Jun 28;11:255–264. doi: [10.2147/IJGM.S157987](https://doi.org/10.2147/IJGM.S157987).

57. Hanass-Hancock J, Regondi I, van Egeraat L, Nixon S. HIV-related disability in HIV hyper-endemic countries : a scoping review. *World J AIDS*. 2013;3:257–279. doi: [10.4236/wja.2013.3303430](https://doi.org/10.4236/wja.2013.3303430).
58. Casale M, Wild L, Cluver L, Kuo C. The relationship between social support and anxiety among caregivers of children in HIV-endemic South Africa. *Psychol Health Med*. 2014;19(4):490–503. doi: [10.1080/13548506.2013.832780](https://doi.org/10.1080/13548506.2013.832780).
59. Sawers L, Stillwaggon E. Understanding the Southern African 'anomaly': poverty, endemic disease and HIV. *Development and Change*. 2010;14:195–224. doi: [10.1111/j.1467-7660.2010.01639.x](https://doi.org/10.1111/j.1467-7660.2010.01639.x).
60. Burke M, Gong E, Jones K. Income Shocks and HIV in Africa. *The Economic Journal*. 2015;125(585):1157–1189. doi: [10.1111/ecoj.12149](https://doi.org/10.1111/ecoj.12149).
61. Dzomba A, Kim HY, Tomita A, Vandormael A, Govender K, Tanser F. Predictors of migration in an HIV hyper-endemic rural South African community: evidence from a population-based cohort (2005–2017). *BMC Public Health*. 2022 Jun 7;22(1):1141. doi: [10.1186/s12889-022-13526-w](https://doi.org/10.1186/s12889-022-13526-w).
62. Miller CL, Bangsberg DR, Tuller DM, Senkungu J, Kawuma A, Frongillo EA, Weiser SD. Food insecurity and sexual risk in an HIV endemic community in Uganda. *AIDS Behav*. 2011 Oct;15(7):1512–9. doi: [10.1007/s10461-010-9693-0](https://doi.org/10.1007/s10461-010-9693-0).
63. Kuo C, Reddy MK, Operario D, Cluver L, Stein DJ. Posttraumatic stress symptoms among adults caring for orphaned children in HIV-endemic South Africa. *AIDS Behav*. 2013 Jun;17(5):1755–63. doi: [10.1007/s10461-013-0461-9](https://doi.org/10.1007/s10461-013-0461-9).
64. AWARE-HIV/AIDS. Promising and Best Practices in HIV/AIDS Prevention and Care for West and Central Africa [Internet]. c2006 [cited 2023 Oct 1]. Available from: <https://www.fhi360.org/sites/default/files/media/documents/Promising%20and%20Best%20Practices%20in%20HIV-AIDS%20Prevention%20and%20Care%20for%20West%20and%20Central%20Africa.pdf>
65. World Health Organization. Global tuberculosis report 2022 [Internet]. Geneva: World Health Organization. 2022 [cited 2023 Oct 1]. Available from: <https://www.who.int/teams/global-tuberculosis-programme/tb-reports/global-tuberculosis-report-2022>
66. World Health Organization. Tuberculosis Key Facts [Internet]. 2022 [cited 2023 Oct 1]. Available from: <https://www.who.int/news-room/fact-sheets/detail/tuberculosis>
67. World Health Organization. Tuberculosis [Internet]. 2018. [cited 2023 Oct 19]. Available from: <https://www.afro.who.int/health-topics/tuberculosis-tb>
68. Nachega JB, Kapata N, Sam-Agudu NA, Decloedt EH, Katoto PDMC, Nagu T, et al. Minimizing the impact of the triple burden of COVID-19, tuberculosis and HIV on health services in sub-Saharan Africa. *Int J Infect Dis*. 2021 Dec;113 Suppl 1:S16–S21. doi: [10.1016/j.ijid.2021.03.038](https://doi.org/10.1016/j.ijid.2021.03.038).
69. Vanleeuw L, Zembe-Mkabile W, Atkins S. "I'm suffering for food": Food insecurity and access to social protection for TB patients and their households in Cape Town, South Africa. *PLoS One*. 2022 Apr 26;17(4):e0266356. doi: [10.1371/journal.pone.0266356](https://doi.org/10.1371/journal.pone.0266356).
70. Duarte R, Lönnroth K, Carvalho C, Lima F, Carvalho ACC, Muñoz-Torrico M, Centis R. Tuberculosis, social determinants and co-morbidities (including HIV). *Pulmonology*. 2018 Mar–Apr;24(2):115–119. doi: [10.1016/j.rppnen.2017.11.003](https://doi.org/10.1016/j.rppnen.2017.11.003).
71. Chipeta MG, Kumaran EPA, Browne AJ, Hamadani BHK, Haines-Woodhouse G, Sartorius B, et al. Mapping local variation in household overcrowding across Africa from 2000 to 2018: a modelling study. *Lancet Planet Health*. 2022 Aug;6(8):e670–e681. doi: [10.1016/S2542-5196\(22\)00149-8](https://doi.org/10.1016/S2542-5196(22)00149-8).
72. Ojo T, Ruan C, Hameed T, Malburg C, Thunga S, Smith J, et al. HIV, Tuberculosis, and Food Insecurity in Africa-A Syndemics-Based Scoping Review. *Int J Environ Res Public Health*. 2022 Jan 19;19(3):1101. doi: [10.3390/ijerph19031101](https://doi.org/10.3390/ijerph19031101).
73. Carney T, Rooney JA, Niemand N, Myers B, Theron D, Wood R, et al. Transmission Of Tuberculosis Among illicit drug use Linkages (TOTAL): A cross-sectional observational study protocol using respondent driven sampling. *PLoS One*. 2022 Feb 15;17(2):e0262440. doi: [10.1371/journal.pone.0262440](https://doi.org/10.1371/journal.pone.0262440).
74. World Health Organization. Africa's fight against TB: the gains and the challenges [Internet]. Africa Renewal - United Nations. 2022 Apr [cited 2023 Oct 10]. Available from: <https://www.un.org/africarenewal/magazine/africa%E2%80%99s-fight-against-tb-gains-and-challenges>
75. Uwimana J, Zarowsky C, Hausler H, Jackson D. Engagement of non-government organisations and community care workers in collaborative TB/HIV activities including prevention of mother to child transmission in South Africa: opportunities and challenges. *BMC Health Serv Res*. 2012 Aug 2;12:233. doi: [10.1186/1472-6963-12-233](https://doi.org/10.1186/1472-6963-12-233).
76. Barter DM, Agboola SO, Murray MB, Bärnighausen T. Tuberculosis and poverty: the contribution of patient costs in sub-Saharan Africa—a systematic review. *BMC Public Health*. 2012 Nov 14;12:980. doi: [10.1186/1471-2458-12-980](https://doi.org/10.1186/1471-2458-12-980).
77. Atkins S, Heimo L, Carter DJ, Ribas Closa M, Vanleeuw L, Chenciner L, et al. The socioeconomic impact of tuberculosis on children and adolescents: a scoping review and conceptual framework. *BMC Public Health*. 2022 Nov 23;22(1):2153. doi: [10.1186/s12889-022-14579-7](https://doi.org/10.1186/s12889-022-14579-7).
78. Franck C, Seddon JA, Hesselting AC, Schaaf HS, Skinner D, Reynolds L. Assessing the impact of multidrug-resistant tuberculosis in children: an exploratory qualitative study. *BMC Infect Dis*. 2014 Aug 1;14:426. doi: [10.1186/1471-2334-14-426](https://doi.org/10.1186/1471-2334-14-426).
79. Stillson CH, Okatch H, Frasso R, Mazhani L, David T, Arscott-Mills T, et al. 'That's when I struggle' ... Exploring challenges faced by care givers of children with tuberculosis in Botswana. *Int J Tuberc Lung Dis*. 2016 Oct;20(10):1314–1319. doi: [10.5588/ijtld.15.0989](https://doi.org/10.5588/ijtld.15.0989).
80. Moscibrodzki P, Enane LA, Hoddinott G, Brooks MB, Byron V, Furin J, et al. The Impact of Tuberculosis on the Well-being of Adolescents and Young Adults. *Pathogens*. 2021 Dec 8;10(12):1591. doi: [10.3390/pathogens10121591](https://doi.org/10.3390/pathogens10121591).
81. Meyerson KA, Hoddinott G, Garcia-Prats AJ, Tomlinson M. Caregiver-child separation during tuberculosis hospitalisation: a qualitative study in South Africa. *S Afr J Psychol*. 2021 Sep 1;51(3):409–421. doi: [10.1177/0081246320962729](https://doi.org/10.1177/0081246320962729).
82. Citro B, Soltan V, Malar J, Katlholo T, Smyth C, Sari AH, et al. Building the Evidence for a Rights-Based, People-Centered, Gender-Transformative Tuberculosis Response: An Analysis of the Stop TB Partnership Community, Rights, and Gender Tuberculosis Assessment. *Health Hum Rights*. 2021 Dec;23(2):253–267.
83. Amah P. How grantees are helping to save lives in Rural Nigeria [Internet]. *Stop TB Partnership*. 2023 [cited 2023 Oct 11]. Available from: www.stoptb.org/global/awards/cfcs/
84. Jefferies M, Rauff B, Rashid H, Lam T, Rafiq S. Update on global epidemiology of viral hepatitis and preventive strategies. *World J Clin Cases*. 2018 Nov 6;6(13):589–599. doi: [10.12998/wjcc.v6.i13.589](https://doi.org/10.12998/wjcc.v6.i13.589).
85. World Health Organization - Africa (WHO-Africa). Hepatitis [Internet]. 2022 [cited 2023 Oct 1]. Available from: <https://www.afro.who.int/health-topics/hepatitis>
86. Global Burden of Diseases Study (GBD). Death Trends and Disability Adjusted Life Years for Viral Hepatitis. 2019. Available from: <https://vizhub.healthdata.org/gbd-results/>
87. World Health Organization. 91 million Africans infected with Hepatitis B or C. WHO | Regional Office for Africa>. 2022 Jul. Available from: <https://www.afro.who.int/news/91-million-africans-infected-hepatitis-b-or-c>
88. Coste M, De Sèze M, Diallo A, Carrieri MP, Marcellin F, Boyer S, et al. Burden and impacts of chronic hepatitis B infection in rural Senegal: study protocol of a cross-sectional survey in the area of Niakhar (AmbASS ANRS 12356). *BMJ Open*. 2019 Jul 17;9(7):e030211. doi: [10.1136/bmjopen-2019-030211](https://doi.org/10.1136/bmjopen-2019-030211).
89. Kolbila L, Adjei CA, Kyei JM, Agyemang-Prempeh C, Fosu PK. Perceived Supportive Care Needs of Adolescents With Chronic Hepatitis B in a Resource-limited Setting. *J Patient Exp*. 2022 Jun 7;9:23743735221106596. doi: [10.1177/23743735221106596](https://doi.org/10.1177/23743735221106596).
90. Makoni M. New scorecard reveals Africa's hepatitis cost. *Lancet*. 2019. Jun 29: 393. Available from: www.thelancet.com
91. World Health Organization. Viral Hepatitis Scorecard 2019 African Region. [cited 2024 Jan 25]. Available from: https://www.afro.who.int/sites/default/files/2019-07/Viral_Hepatitis_Scorecard_2019_v3_Print_Single_SC_A4%20%282%29.pdf

92. World Health Organization. Viral Hepatitis Scorecard 2021 African Region. [cited 2024 Jan 25]. Available from: https://www.afro.who.int/sites/default/files/2022-07/Viral_Hepatitis_Scorecard_%20WHD%202022_o.pdf
93. Lesi O. The burden of viral hepatitis in the WHO Region of Africa. *Open Access Government*. 2019. Available from: [viral-hepatitis/67856/](https://www.openaccessgovernment.org/viral-hepatitis/67856/)
94. Chabrol F, Noah Noah D, Tchoumi EP, Vidal L, Kuaban C, Carrieri MP, et al. Screening, diagnosis and care cascade for viral hepatitis B and C in Yaoundé, Cameroon: a qualitative study of patients and health providers coping with uncertainty and unbearable costs. *BMJ Open*. 2019 Mar 20;9(3):e025415. doi: [10.1136/bmjopen-2018-025415](https://doi.org/10.1136/bmjopen-2018-025415).
95. Fukuoka T, Bessho K, Hosono S, Abukawa D, Mizuuchi T, Ito K, et al. The impact of treatment on the psychological burden of mothers of children with chronic hepatitis C virus infection: a multicenter, questionnaire survey. *Sci Rep*. 2022 Dec 21;12(1):22116. doi: [10.1038/s41598-022-25519-1](https://doi.org/10.1038/s41598-022-25519-1).
96. Freeland C, Mendola L, Cheng V, Cohen C, Wallace J. The unvirtuous cycle of discrimination affecting people with hepatitis B: a multi-country qualitative assessment of key-informant perspectives. *Int J Equity Health*. 2022 May 31;21(1):77. doi: [10.1186/s12939-022-01677-6](https://doi.org/10.1186/s12939-022-01677-6).
97. Mude WW, Fisher CM, Richmond J, Gautier RL, Wallace J. Social impacts of living with chronic hepatitis B in South Sudanese community in Australia. *Ethn Health*. 2022 Apr;27(3):529–541. doi: [10.1080/13557858.2020.1782849](https://doi.org/10.1080/13557858.2020.1782849).
98. Abaah D, Ohene LA, Adjei CA. Physical and social well-being of family caregivers of persons with hepatitis B associated chronic liver disease in Ghana: a qualitative study. *BMC Prim Care*. 2023 Mar 24;24(1):82. doi: [10.1186/s12875-023-02041-5](https://doi.org/10.1186/s12875-023-02041-5).
99. Janke EA, McGraw S, Garcia-Tsao G, Fraenkel L. Psychosocial issues in hepatitis C: a qualitative analysis. *Psychosomatics*. 2008 Nov-Dec;49(6):494–501. doi: [10.1176/appi.psy.49.6.494](https://doi.org/10.1176/appi.psy.49.6.494).
100. World Health Organization. Social Determinants. Global Tuberculosis Programme. 2023. Available from: <https://www.who.int/teams/global-tuberculosis-programme/populations-comorbidities/social-determinants>
101. Mokomane Z. Role of families in social and economic empowerment of individuals. In: United Nations Expert Group Meeting on Promoting Empowerment of People in Achieving Poverty Eradication, Social Integration and Full Employment and Decent Work for All; September 2012; pp. 10-12.
102. Ochola EA, Karanja DMS, Elliott SJ. Local tips, global impact: community-driven measures as avenues of promoting inclusion in the control of neglected tropical diseases: a case study in Kenya. *Infect Dis Poverty*. 2022 Aug 5;11(1):88. doi: [10.1186/s40249-022-01011-w](https://doi.org/10.1186/s40249-022-01011-w).
103. Schmid J, Morgenshtern M, Turton Y (Jessie). Contextualized Social Work Education: A Critical Understanding of the Local. *J Soc Work Educ*. 2022;58(4):719–732. doi: [10.1080/10437797.2021.1969300](https://doi.org/10.1080/10437797.2021.1969300)
104. Anthonj C. Contextualizing linkages between water security and global health in Africa, Asia and Europe. *Geography matters in research, policy and practice. Water Secur*. 2021;13:100093. doi: [10.1080/10437797.2021.1969300](https://doi.org/10.1080/10437797.2021.1969300)
105. Cerf ME. The Sustainable Development Goals: Contextualizing Africa's Economic and Health Landscape. *Glob Chall*. 2018 Jun 21;2(8):1800014. doi: [10.1002/gch2.201800014](https://doi.org/10.1002/gch2.201800014).
106. Daftary A, Padayatchi N. Social constraints to TB/HIV healthcare: accounts from coinfecting patients in South Africa. *AIDS Care*. 2012;24(12):1480–6. doi: [10.1080/09540121.2012.672719](https://doi.org/10.1080/09540121.2012.672719).
107. Friends of the Global Fight. Backing Civil Society to End the AIDS, Tuberculosis and Malaria Epidemics. Global Fund to Fight AIDS, Tuberculosis and Malaria; 2019.
108. Govender K, Cowden RG, Nyamaruze P, Armstrong RM, Hatane L. Beyond the Disease: Contextualized Implications of the COVID-19 Pandemic for Children and Young People Living in Eastern and Southern Africa. *Front Public Health*. 2020 Oct 19;8:504. doi: [10.3389/fpubh.2020.00504](https://doi.org/10.3389/fpubh.2020.00504).