

Challenges and Opportunities in Combating Infectious Diseases in Sierra Leone: A Narrative Review of the Role of Community Health and Internal Medicine

Mohamed Alie Sankoh¹, Bernadette Charity Yabome Bangura¹, Mohamed Jan Jalloh², Daniel Monya Pambu³, Mohamed Lamin Turay⁴, Joseph David Koroma⁴

¹Department of Clinical Medicine, Nanjing Medical University, Nanjing, China.

²Department of Clinical Medicine, Guangxi Medical University, Nanning, China.

³Biology Department, Concordia College Moorhead, Minnesota, USA.

⁴Department of Clinical Medicine, College of Medicine and Allied Health Sciences, University of Sierra Leone, Freetown, Sierra Leone.

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ABSTRACT

In Sierra Leone, people continue to face significant and ongoing health challenges due to a high prevalence of infectious diseases, with malaria, tuberculosis (TB), and HIV/AIDS posing a more significant threat. These illnesses not only pose serious threats to the population's overall well-being but also strain the healthcare system and impact socioeconomic development in the region. Addressing these health issues requires comprehensive efforts, including improved healthcare access, education on prevention, and effective treatment initiatives. Despite intense efforts, the healthcare system in the country still struggles, with the aftermath of the Ebola outbreak making things even more demanding. This review examines how community health initiatives and practices in internal medicine can help fight infectious diseases. It delves into the current challenges posed by malaria, tuberculosis, and HIV/AIDS, underlining the importance of actions led by communities, partnerships between the government and NGOs, and strategies to prevent diseases. The review also discusses the importance of internal medicine in managing complications associated with infectious diseases and the critical issues posed by gaps in healthcare infrastructure, social determinants, and inadequate disease surveillance. It also emphasises the potential for improved healthcare delivery through capacity building, innovative technologies, and better alignment between public health activities and clinical medicine practices. By placing emphasis on the significance of a comprehensive and integrated approach, this analysis provides valuable insights into how Sierra Leone can effectively strengthen its response to infectious diseases. This strategy aims not only to improve health outcomes for its population but also to establish a more resilient healthcare system that can better protect and serve the needs of the community over time.

Keywords - Public Health Interventions, Internal Medicine, Infectious Diseases, Community Health, Sierra Leone

INTRODUCTION

Background and Context

Sierra Leone struggles with the burden of many infectious diseases, with malaria, tuberculosis (TB), and HIV/AIDS being the most critical threats. Malaria predominates, accounting for about 40% of all outpatient visits, with pregnant women and children under five years being the most vulnerable in the population. It is one of the contributing factors causing high morbidity and mortality despite the widespread use of insecticide-treated nets (ITNs) and other interventions (World Health Organisation, 2024). Similarly, tuberculosis remains a significant public health problem due to poor diagnostic facilities, limited access to treatment, and the stigma associated with the disease (Yendewa et al., 2018; Sejie & Mahomed, 2023). HIV/AIDS is not benign in this discourse on other infectious diseases previously controlled but remains highly underdiagnosed, limited to the

availability of antiretrovirals even when clinical expertise is available, more so in rural surroundings (CDC, 2024).

The country's health system has been under enormous strain for years due to several outbreaks of infectious diseases, including the tragic outbreak of the Ebola virus between 2014 and 2016. The Ebola epidemic was an eye-opener as it helped reveal the significant weaknesses in the health system, such as inadequate health infrastructure, lack of human resources for health, and limited capacity for disease surveillance (Cancedda et al., 2016). Despite that, many post-Ebola recovery programs have been designed to boost areas considered weak, emphasising the recovery of the health system and preparing for the future (Bertone et al., 2014).

Rationale for the Review

There is increasing recognition of the value of integrating a defined measure of community health with internal medicine practices to reduce the burden of infectious diseases in Sierra Leone. Such integrated community health strategies, malaria prevention campaigns, and community tuberculosis treatment programs have been instrumental in curbing the spread of contagious diseases (EDCTP, n.d.; Moyo, Mhango et al., 2023). However, aligning these strategic public health programs with internal medicine practices will maximise the benefits accrued toward effective clinical outcomes. Internal medicine is also critical in the management of complications resulting from infectious diseases such as severe malaria-related anaemia and TB/HIV co-infections (Sachs, 2001; Yendewa et al., 2018). Combining public health and clinical intervention, this strategic approach would increase Sierra Leone's bargaining power in its battle against chronic and infectious diseases (Cancedda et al., 2016; Sejie & Mahomed, 2023).

Scope of the Review

This narrative review has examined the challenges and opportunities of the convergence of community health programs with internal medicine practices toward alleviating the infectious disease burden in Sierra Leone. Positive results concerning malaria, TB, and HIV/AIDS will be taken as examples to assess current strategies in public health and internal medicine. In particular, the review will focus on existing efforts in community health programs, such as malaria prevention and TB treatment models, and how these programs may be strengthened through better integration with clinical practices of internal medicine (CDC, 2024; Sejie & Mahomed, 2023). Furthermore, lessons learned during the phase of post-Ebola recovery and how those lessons could inform future public health and clinical initiatives aimed at mitigating infectious disease burdens in Sierra Leone will also be reviewed (Bertone et al., 2014; Sachs, 2001).

OVERVIEW OF INFECTIOUS DISEASES IN SIERRA LEONE

Malaria

Malaria is considered one of the most common and life-threatening infections in Sierra Leone, carrying a significant burden on the disease profile of the nation. Malaria transmission is very high in Sierra Leone and is considered one of the highest transmissions worldwide. A study indicated that the condition affects a reasonably large proportion of under-five children, with a prevalence rate of 43.4% in the Western Area (J. M. Koroma et al., 2022). For instance, control measures such as the distribution of ITNs, indoor residual spraying, and community-based activities have had some success. However, the country still faces enormous resource and infrastructure challenges in responding effectively to the problem (J. M. Koroma et al., 2022; Wang et al., 2021). Despite that fact, malaria exerts a very high socioeconomic cost by placing a heavy financial burden on families through healthcare bills, lost productivity, and chronic health complications (Andrade et al., 2022).

Tuberculosis (TB)

Tuberculosis remains a significant challenge to public health concerns in Sierra Leone, especially concerning co-infection from HIV. The widespread presence of TB is aggravated by factors including multidrug-resistant TB (MDR-TB) and the COVID-19 pandemic, which made access to timely diagnosis and treatment of cases challenging (J. A. Koroma et al., 2024). Recent studies also highlight that Sierra Leone struggles to provide

favourable treatment outcomes due to delays in diagnosis, poor adherence to medication among patients, and various logistics issues related to most rural areas. The co-infection of TB and HIV also complicates therapy and management, as is usually the case in most metropolitan areas with high prevalence rates of HIV infection (Lakoh et al., 2020). Public health interventions for TB control are also imperative, particularly in HIV-endemic areas, where issues of finance and implementation challenges may arise.

HIV/AIDS

Social stigma, coupled with low levels of available resources for management, perhaps makes HIV/AIDS a silent pandemic in Sierra Leone. The national statistics place the prevalence at about 1.5% among adults. In reality, it could be even higher, specifically in critical communities that may not be very forthcoming to health services due to associated stigma (Baldeh et al., 2023). HIV significantly impacts the healthcare system through spending and availability of resources, affecting other related co-infections such as TB (Lakoh et al., 2020). Interactions between HIV and TB are complex; there is an increased risk of developing active TB among patients living with HIV, resulting in increased morbidity and mortality (Djomand et al., 2014). Efforts at integrating HIV and tuberculosis treatment programs have been made, but resource allocation, infrastructure, and patient adherence remain significant problems (Lakoh et al., 2019, 2020).

These infectious diseases pose severe challenges to the health system in Sierra Leone. Despite continuous efforts by the government and foreign organisations, deficiency in healthcare delivery, finances, and infrastructure is one of the significant drawbacks to the nation's ability to manage and effectively cure malaria, tuberculosis, and HIV/AIDS with focused treatments.

2.4. Table: Disease Burden, Challenges, and Current Interventions for Malaria, Tuberculosis, and HIV/AIDS in Sierra Leone

Disease	Prevalence	Mortality Rate	Key Challenges	Current Interventions
Malaria	Prevalence: 28%-35% annually, highest among children under 5. Cases: ~2 million annually (2022).	Mortality: 20-25% of hospital deaths among children under 5. ~8,000 deaths annually (WHO, 2022).	<ul style="list-style-type: none"> - Insecticide resistance affecting bed nets and spraying. - Limited access to healthcare in rural areas. - Seasonal outbreaks during the rainy season (May-October) 	<ul style="list-style-type: none"> - Mass distribution of ITNs. - Indoor residual spraying (IRS) campaigns. - Community health workers (CHWs) administering rapid antimalarial treatments.
Tuberculosis (TB)	Incidence: 292 cases per 100,000 people (WHO, 2022). Cases: ~24,000 annually.	Mortality: ~6,000 deaths annually, primarily due to delayed diagnosis and MDR-TB.	<ul style="list-style-type: none"> - Co-infection with HIV (~25% of TB patients). - Rising MDR-TB cases. - Stigma leading to delayed healthcare-seeking behavior. 	<ul style="list-style-type: none"> - Directly Observed Therapy (DOT) for adherence. - Establishment of MDR-TB treatment centers. - Routine TB screening within HIV care programs.
HIV/AIDS	Prevalence: 1.5% (UNAIDS, 2023).	Mortality: ~3,500 deaths annually. High mortality	- Inadequate access to antiretroviral therapy	- Free ART programs offered nationwide.

	<p>Cases: ~78,000 people living with HIV</p>	<p>among youth aged 15-24</p>	<p>(ART).</p> <ul style="list-style-type: none"> - Stigma and discrimination within communities. - Weak linkage from diagnosis to sustained treatment 	<ul style="list-style-type: none"> - Community-led HIV testing and awareness campaigns. - Prevention of mother-to-child transmission (PMTCT) programs.
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ROLE OF PUBLIC HEALTH INTERVENTIONS

Community Health Programs

Community-based involvement has been vital in the fight against infectious diseases like malaria, tuberculosis, and HIV in Sierra Leone. Malaria, being among the key contributors to morbidity and mortality in this country, has greatly benefited from comprehensive public health campaigns, including the distribution of ITNs and increased access to diagnostic facilities. In 2020, Sierra Leone reported that a reason for the reduction rates is that 80% of households have possessed at least one ITN (World Health Organisation, 2024). CHWs have also played a significant role in spreading preventive measures, educating the population on sleeping on ITNs, and seeking timely treatment (World Health Organisation, 2024). However, the impact of these interventions varies across sociodemographic groups, with factors such as income levels, education, and family size influencing ITN usage. Additionally, geographical disparities, such as limited access to health services in remote areas, and cultural beliefs surrounding illness and treatment-seeking behavior, also shape the outcomes of public health efforts. This successful result has been consistent with global trends in the effectiveness of community-led interventions in low- and middle-income countries supported by international organisations worldwide (Cohen et al., 2012).

Community health programs also played a critical role in controlling TB. Although the prevalence of TB is high in Sierra Leone, however adherence and treatment outcomes have been improved with community-based treatment interventions, such as DOT and short-course programs. However, treatment difficulties remain, especially for multi-drug-resistant TB, in which community involvement in detection and treatment monitoring has been critical in filling the gaps in healthcare service delivery (The Global Fund, n.d.). A further complication of disease management has been the interaction between TB and HIV, considering the high rates of co-infection. Community outreach and testing programs have significantly reduced the incidence of TB among HIV-positive patients, but significant work remains to be done to improve linkages to care (CDC, 2024).

In the case of HIV, community health programs have taken on different challenges. Specifically, despite a well-documented hidden epidemic of HIV/AIDS, CHWs have been employed to lead awareness campaigns and testing among underserved communities. These interventions are essential in finding new cases and preventing further spread. Integrating community health and HIV/TB control indicates the potential for saving lives by handling diseases concurrently (Bien et al., 2023).

Disease Prevention and Management

Community health interventions in Sierra Leone have indeed curbed the burden of disease incidence, particularly in rural and underserved communities. The introduction of ITNs, intermittent preventive treatment for pregnant women (IPTp), and mass drug administration campaigns account for the dramatic decline in malaria prevalence. Fully integrated into routine health care delivery, these programs have ensured timely interventions even among the most vulnerable populations, such as pregnant women and children (Cohen et al., 2012; World Health Organisation, 2024). The continued strengthening of malaria control illustrates the more significant achievement of preventive measures, reducing disease burdens and increasing access to healthcare.

Consolidation efforts on TB prevention and treatment programs, particularly in urban areas with high HIV prevalence, have also posted significant gains. Nevertheless, severe delays in diagnosis and the emergence of drug resistance to TB remain essential challenges. The priority concern of public health authorities and non-governmental organisations (NGOs) remains early detection and management in rural areas (Bien et al., 2023; The Global Fund, n.d.). While being addressed by public health interventions, these challenges reduced the incidence of diseases and improved the quality of care in previously neglected regions.

Government and NGO Collaboration

The efforts in fighting infectious diseases have been highly assisted by collaborations involving the government, international organisations, and NGOs in Sierra Leone. For example, the partnership between the Global Fund and the Sierra Leonean government has been essential in fast-tracking the country's responses to diseases such as HIV, TB, and malaria. In 2024, new grants were launched to strengthen health systems and enhance disease control measures. This has further built the country's capacity to fight these infectious diseases (The Global Fund, n.d.). These collaboration efforts have improved resource allocation, infrastructure, and capacity-building among health providers, especially within rural and hard-to-reach areas (Future Commission on a Global Health Risk Framework for the National Academy of Medicine Secretariat, 2016).

A closer examination of the roles of these stakeholders reveals that NGOs often complement government efforts by providing on-the-ground support, especially in underserved areas. However, conflicts can arise when there is a misalignment of priorities, such as differing timelines for project implementation or resource allocation. Despite these challenges, synergies can be achieved through effective coordination mechanisms, such as regular stakeholder meetings and shared accountability frameworks, which ensure that all parties work toward common health goals. Additionally, partnerships with international organisations offer critical funding and technical expertise, though reliance on external resources can pose sustainability challenges if not carefully managed.

The World Health Organization (WHO) and the United Nations International Children's Emergency Fund (UNICEF) have contributed equally to strengthening Sierra Leone's capacity to manage infectious diseases through technical and financial support in surveillance, vaccine distribution, and the general health system. This has been instrumental in containing outbreaks and reducing mortality, especially in post-conflict countries with limited health infrastructure (Murray et al., 2012; Musoke et al., 2023). The success of these initiatives testifies to sustained collaboration by the government and NGOs to address public health challenges in Sierra Leone.

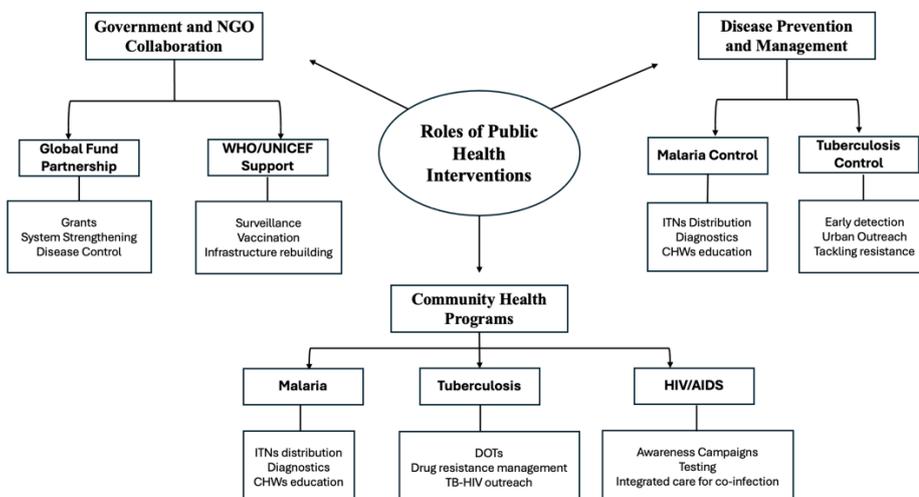


Fig. 1: A flowchart illustrating the role of public health interventions in combating infectious diseases in Sierra Leone, highlighting key components such as community health programs, disease prevention and control efforts, and collaboration between the government and NGOs.

CLINICAL PRACTICES IN INTERNAL MEDICINE

Diagnosis and Treatment Approaches:

Vital clinical practices that are central to the diagnosis and treatment of malaria, TB, and HIV in Sierra Leone involve the foundation of therapy for these infectious diseases. Diagnosis of malaria is mainly made through clinical presentation, supported by rapid diagnostic tests (RDTs), while treatments are based on artemisinin-based combination therapies (ACTs) (Akinosoglou & Pasvol, 2011). In severe cases, particularly those that require intensive care due to complications such as organ failure, intravenous artesunate is used (Akafity et al., 2024). TB uses diagnostic methods such as sputum microscopy, X-rays of the chest, and culture. However, there are considerable limitations in adhering to treatment regimens, combined with an increased challenge from MDR-TB, which affects the outcomes of treatment (Pradipta et al., 2020; Toft et al., 2022). Treatment of infection with HIV involves ART according to guidelines recommended by the WHO. However, inadequate healthcare infrastructure makes providing complete care in most places challenging.

Some of the critical challenges facing Sierra Leone's healthcare infrastructure include a lack of diagnostic tools, a shortage of medical personnel, and inadequate health facilities, all of which impede clinical practices. Due to such limitations, late diagnosis and treatment in rural areas add to the disease burden (International Council of Mining Metals (ICMM), n.d.).

Internal Medicine's Role in Infectious Disease Management:

Internal medicine also plays a critical role in complication management with infectious diseases and addresses the long-term consequences of these diseases. For example, in patients with HIV, physicians are responsible not only for suppressing the virus itself but also for opportunistic infections and various chronic conditions arising from long-standing infections, such as cardiovascular disease and renal complications (Cofrancesco & WU, 2001). According to these examples, internal medicine specialists play a vital role in managing acute respiratory complications among TB cases. They also facilitate acute kidney injury in severe malaria cases (Akinosoglou & Pasvol, 2011; Pradipta et al., 2020).

Internal medicine is an indispensable interdisciplinary approach in infectious and non-infectious comorbidities since the health system is fragile. Internal medicine specialists should cooperate with other specialities, such as pulmonology and nephrology, to manage complex cases. However, resource shortages and gaps in specialised training enhance the challenges (Murad et al., 2023).

Challenges in Integrating Public Health and Clinical Medicine:

A fundamental challenge in Sierra Leone is the apparent weak linkage between public health and internal medicine. Public health initiatives such as great malaria prevention efforts, including the free distribution of ITNs in many malaria-prone areas, do not always translate into clinical practice and result in lapses in follow-up care that patients who advance to severe malaria will require (Sahu et al., 2020). For instance, during the 2017 mass ITN campaign, while there was a significant reduction in malaria incidence, hospitals reported challenges in managing severe cases that were not caught early due to weak referral systems between community health workers and clinics. This highlights the need for better integration between preventive efforts and clinical care to manage complex malaria cases effectively.

This disconnect extends to TB and HIV care as well. Public health initiatives, such as DOTS for TB, have the aim of ensuring drug compliance but are generally hard to implement in rural areas and, therefore, lead to poor outcomes (Mbanje et al., 2024). A case study from Kono District in 2022 showed that while DOTS improved compliance rates in urban areas, many patients in remote villages discontinued treatment due to limited follow-ups and lack of transportation. Such examples underscore the importance of adaptive strategies that address the unique needs of different geographical areas. Moreover, the programs on HIV prevention sometimes fail to target susceptible groups like women and children, further adding to the burden of complications managed by internal medicine clinics (Wijesinghe & Alexander, 2020). In one instance, a maternal health program in

Freetown recorded a rise in HIV-related complications among pregnant women because prevention campaigns focused primarily on general awareness, neglecting antenatal care integration.

Addressing these challenges requires stronger collaboration between public health programs and clinical services to create seamless patient care pathways. For example, linking community health workers with hospitals for timely referrals and follow-ups can improve continuity of care. The successful partnership between the Sierra Leonean government and NGOs to combat Ebola in 2014 illustrates how coordinated referral systems between public health and clinical services can improve outcomes, a model that could be applied to malaria and TB care. Furthermore, expanding healthcare infrastructure, particularly in rural areas, will ensure clinical services are available to support public health efforts (Sarantopoulos et al., 2024). Integrating electronic health records across public health and clinical settings could also enhance coordination, tracking, and long-term management of infectious diseases. This approach is already being piloted in the Western Area Urban District, where early results show improved follow-up care and a reduction in missed appointments, suggesting that digital tools could bridge the public health-clinical gap effectively. Having adequate and quality healthcare facilities to support public health activities will guarantee outcome improvements in infectious disease indications.

CHALLENGES IN COMBATING INFECTIOUS DISEASES

Healthcare System Weaknesses:

The healthcare system of Sierra Leone is incapacitated by weaknesses that prevent it from effectively responding to these infectious diseases. Fundamental among these is the need for more healthcare infrastructure and several well-equipped hospitals, diagnostic centres, and laboratories in most of the country (Kodali, 2023; Pieterse & Saracini, 2023). Consequently, there is a limitation in healthcare resources such as medications, diagnostic tools, and devices for medical treatment that affect providing timely attention to diseases like malaria, TB, and HIV (Moyo, Dzobo, et al., 2023). In addition, these shortages are compounded by a significant shortage of healthcare professionals. Sierra Leone's healthcare workforce is very low, especially considering the WHO recommendations, with an average of 0.2 doctors per 1,000 people (Kallon et al., 2023).

The recent Ebola and COVID-19 outbreaks sharply exposed the wide vulnerabilities of the healthcare system, highlighting the urgent need for systemic reforms to improve healthcare delivery and enhance disease response capacity (Moyo, Mhango, et al., 2023). Efforts to strengthen the health system, like new grants launched by the Global Fund to support the fight against HIV, TB, and malaria, mark progress in this regard. Much remains to be done to build a robust health infrastructure capable of handling the infectious burden of the disease (The Global Fund, n.d.).

Social and Economic Barriers:

Social and economic factors are substantial barriers to controlling infectious diseases in Sierra Leone. A high level of poverty presents a significant limiting factor to seeking health services and medications for a considerable proportion of the population (Nyaruba et al., 2022). These economic challenges also often make people not seek medical care in time, with delayed diagnosis and treatment of diseases such as malaria, TB, and HIV infections (P. N.-J. Mahama et al., 2022). Furthermore, the settlement conditions are usually characterised by congestion, lack of hygiene, and absence of clean water. This is very conducive as it increases the spread of infectious diseases (Furnival-Adams et al., 2019; Tusting et al., 2015).

Illiteracy among people is also an aggravating factor since most individuals have low primary health education. Most need help understanding disease prevention methods and treatment regimens (Lal, 2021). In addition, cultural beliefs and practices may interfere with modern medical interventions. For example, people in rural areas would still resort to traditional healers, delaying diagnosis and aggravation of conditions (Braveman, 2011). Diseases like HIV also carry a social stigma that further makes people shy away from seeking care or complying with treatment (Cofrancesco & WU, 2001; Wijesinghe & Alexander, 2020).

Disease Surveillance and Data Gaps:

The availability of surveillance systems and reliable data collection helps effectively manage a disease condition. Sierra Leone still needs to improve its disease surveillance infrastructures to limit early detection and timely response against infectious disease outbreaks (Buckee et al., 2018). In the absence of such systems, several undiagnosed or later-diagnosed cases of diseases avert timely public health interventions (P. N. -jonaam Mahama et al., 2023). This was evident during the Ebola and COVID-19 pandemics when the minimal capability for surveillance impeded timely responses and aggravated the transmission of infection (Silenou et al., 2021).

Moreover, without dependable and updated data on the incidence and prevalence of diseases, planning evidence-based health policies and efficient resource allocation is also problematic (Unger et al., 2020). Investment in newer disease surveillance technologies, including digital health and artificial intelligence, could improve data collection and real-time disease monitoring and enhance outbreak preparedness (Jones-Konneh et al., 2023; Sarantopoulos et al., 2024). These data gaps must be narrowed to develop appropriate health interventions and policies responsive to the dynamic landscape of infectious diseases in Sierra Leone (Wong et al., 2024).

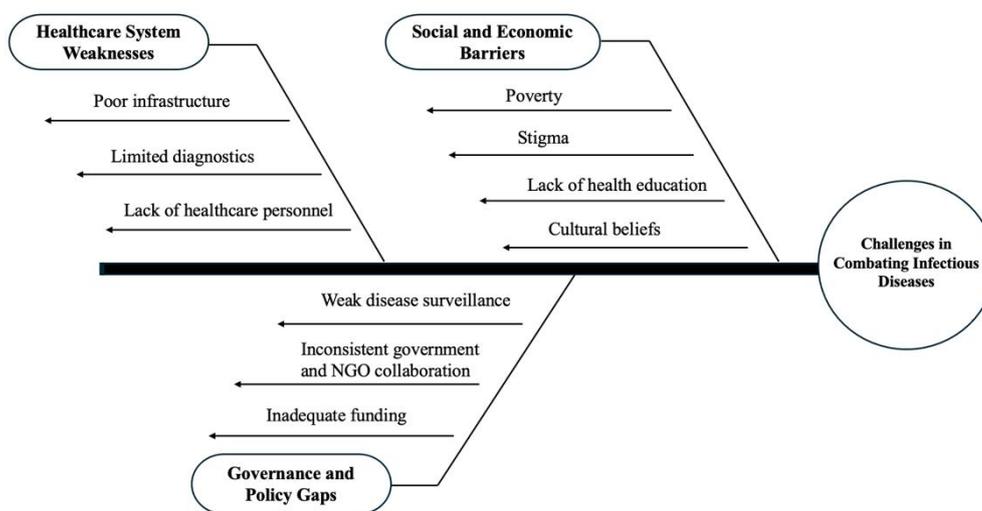


Fig 2: A fishbone diagram illustrating critical challenges in combating infectious diseases, categorised under healthcare system weaknesses, social and economic barriers, and governance and policy gaps.

OPPORTUNITIES FOR IMPROVED INTEGRATION

Potential for Public Health-Internal Medicine Collaboration:

The merging of internal medicine with public health can be effectively pursued to fight against infectious diseases in Sierra Leone. Public health and internal medicine have been kept parallel for many years. However, a growing recognition evidences an immense and remarkable improvement in patient outcomes by bringing these two disciplines together. Aligning community health interventions with internal medicine would ensure that health professionals adopt a holistic disease prevention, diagnosis, and treatment approach. The healthcare delivery models in integrated care have shown how uniquely enhanced the collaboration between public health and clinical care could be, giving a more holistic framework for the care field (Shahzad et al., 2019).

Appropriate professional collaborations between public health and internal medicine could enhance disease management outcomes. For instance, early detection and treatment before outbreaks can occur are facilitated when disease surveillance systems are integrated into clinical practice (Tewarson, 2023). Improvement of quality care through such synergies could reduce mortality rates in such regions as Sierra Leone, with infectious diseases such as malaria, tuberculosis, and HIV common in its setting. Another excellent example is

how revitalised integrated disease surveillance and response (IDSR) ensured effective public health collaboration to control infectious diseases in Sierra Leone following the Ebola outbreak (Njuguna et al., 2019).

Capacity Building and Training:

Management of infectious diseases can be supported not just by collaboration but also by capacity-building solid programs for health professionals. Training in both public health principles and practices of internal medicine would contribute to filling the gap between prevention and treatment. Systematic reviews have identified that capacity-building interventions are effective in low- and middle-income countries with limited resources (DeCorby-Watson et al., 2018; Naal et al., 2020). In Sierra Leone, developing training that better integrates public health and clinical medicine will be central in training health workers amidst the complex requirements for infectious disease control.

A program such as the integrated infectious disease capacity-building evaluation (IDCAP) implemented in Uganda, which focused on infectious disease training of mid-level practitioners, could serve as a model for Sierra Leone. These programs have provided healthcare workers with the necessary education to handle various responsibilities effectively at the public health and clinical levels (Miceli et al., 2012). Innovative e-learning approaches have taken on added significance in resource-constrained environments to help keep healthcare professionals updated and current, enhancing service delivery from a distance (Aryee et al., 2024).

Increasing health system partnerships between academic institutions and public health organisations is equally critical to attaining comprehensive health reform. This can include developing advanced training programs to prepare the future workforce for emerging infectious disease outbreaks (Di Ruggiero et al., 2020). Global health initiatives and capacity building in the Middle East and North Africa have shown that such a program would allow Sierra Leone to replicate it to better its health outcomes (Fanelli et al., 2020).

Innovative Approaches to Health Delivery:

The novel health delivery methods, especially in the use of technology, provide Sierra Leone with some promising approaches for incorporating public health and internal medicine. Mobile health (mHealth) interventions, known to have worked well in other developing countries, may bridge the gap between public health initiatives and clinical care. Such interventions may be most useful where direct access to healthcare services may be limited because of the remoteness or issue of underservice. A systematic review of mHealth interventions identifies their potential role in improving health outcomes through remote monitoring, data collection, and health education (Hoque et al., 2020). In Sierra Leone, the mobile solution can be used as part of health solutions for infectious disease control through tracking in real-time, communication between health professionals, and providing consultations remotely (Osei & Mashamba-Thompson, 2021).

CHWs form another essential component in innovative health delivery. They also act as a linkage to the community and health facilities in providing public health messages, facilitating disease prevention, and aiding patients in navigating the system of care. A scoping review regarding the role of CHWs within primary health care depicted their potential to improve health outcomes, especially in resource-poor settings (Van Iseghem et al., 2023). With the integration of CHWs within Sierra Leone's formal healthcare system, public health initiatives and clinical services could align to enhance infectious disease response.

Innovative strategies related to access to care, such as telemedicine and digital health, have also strengthened the health system in low—and middle-income developing countries (Frost et al., 2021). Innovations like these allow for the coordination and interlinking of public health and clinical services to support comprehensive patient care across the continuum of prevention, diagnosis, and treatment. For example, telemedicine can be instituted in Sierra Leone's health system to solve the problems created by distance and infrastructure deficiencies, especially in rural areas (Saleh et al., 2019).

Innovative solutions also help prevent infectious diseases. This approach to health at the community level, as illustrated by the asset ecosystems model, underlines a very active role of the local communities in disease control and prevention. These models leverage available resources and community networks to foster

resilience and promote health from the grassroots level (Oseni & Shannon, 2021). Such approaches would increase effectiveness in Sierra Leone's current state of public health because communities would be taking ownership and more completely participate in such prevention efforts.

Incorporating public health into internal medicine in Sierra Leone introduces the country to the rest of the world. It presents opportunities to include the best global infection prevention and control practices. The WHO has developed training curricula on infection prevention and control that can quickly be adopted for Sierra Leone, enabling health workers with the requisite skills to manage infectious diseases (World Health Organisation, n.d.). Further enhancing the training and promoting continuous education will also increase the country's capacity to deal with outbreaks in the future.

CONCLUSION

Sierra Leone's fight against infectious diseases such as malaria, tuberculosis, and HIV/AIDS requires a robust, integrated healthcare system that combines the best of public health and internal medicine. This analysis focuses on the significant hurdles to attaining such integration, which range from limited healthcare infrastructure and socioeconomic constraints to data gaps in disease surveillance. However, it also finds substantial areas for improvement, mainly through better collaboration between public health programs and internal medicine practices. Strengthening community health initiatives, investing in healthcare worker training, and leveraging innovative technology like mobile health can help to close the existing gaps. Sierra Leone can improve its ability to control and reduce the effects of infectious diseases by developing stronger linkages between community-based programs and clinical techniques. Sustainable progress will necessitate ongoing investment in healthcare infrastructure, legislative reforms, and a commitment to increasing public health and clinical capacity. Finally, an integrated and comprehensive approach is required to ensure a healthier future for all Sierra Leoneans.

ABBREVIATIONS

TB – Tuberculosis

IPTp - Intermittent Preventive Treatment for pregnant women

NGOs - Non-governmental organisations

UNICEF - United Nations International Children's Emergency Fund

RDTs - Rapid Diagnostic Tests

IRS - Indoor residual spraying

PMTCT - Prevention of mother-to-child transmission

ACTs - Artemisinin-based Combination Therapies

MDR-TB - Multidrug-resistant Tuberculosis

ART - Antiretroviral Therapy

ITNs - Insecticide-Treated Nets

DOTS - Directly Observed Treatment, Short-course

WHO - World Health Organization

IDSR - Integrated Disease Surveillance and Response

IDCAP - Integrated Infectious Disease Capacity-building Evaluation

mHealth - Mobile Health

CHWs - Community Health Workers

DECLARATIONS

Ethics approval and consent to participate: The study was approved by the ethics committee of the selected universities. Informed consent was obtained from all participating students, ensuring their participation was voluntary and their confidentiality was maintained throughout the study.

Conflict of Interest: The authors declare that the research was conducted without any commercial or financial relationships that could be construed as a potential conflict of interest.

Availability of data and materials: The datasets used and analysed during the current study are available from the corresponding author upon reasonable request.

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