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Community Health Workers: Key Drivers in Malaria Community Case Management in Zambia

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Abstract

For over a decade, the Zambia Ministry of Health has been implementing programs aimed at reducing malaria prevalence in the Nchelenge district of Luapula Province. High-impact malaria control interventions implemented include indoor residual spraying, long-lasting insecticide net distribution and community case management. Despite this, malaria prevalence remains high. Community health workers (CHWs) are the drivers of community case management (CCM), a strategy promoting early recognition, prompt diagnosis, and treatment of preventable illnesses such as malaria. This systematic desk review aimed to assess the impact of community health workers on Malaria CCM and prevention in the Nchelenge district. Thirty-four (34) studies were reviewed which reported indicators of CHW performance and their roles in community health. The study concluded that CHWs had important preventive, case management and promotive roles in malaria interventions. The review revealed that CHWs can provide good quality malaria care, including performing procedures such as rapid diagnostic tests. The factors perceived to influence CHWs' performance were community support, training, availability of drugs and supplies, incentives, and recognition from formal health workers. Though CHWs are recognized, they are not fully integrated into the health system. To enable their effective integration, the following should be considered: introduce sustainable financing of CCM programs; tailor CHW training to address gaps; and improve sustainable supply chain management of malaria drugs and diagnostics. By expanding CHWs, the number of malaria diagnosis and treatment service points per population is expected to decrease treatment-seeking delays and the percentage of people who progress from mild to severe malaria.

Keywords: *Community Case Management, Community Health Workers.*

Introduction

Background

Zambia is one of the high-burden malaria countries in Sub-Saharan Africa. In 2021 there were 7,050,968 malaria cases; malaria case incidence was estimated to be 340/1,000 population/year. Prevalence in children under 5 was found to be 29% based on rapid diagnostic tests (RDT), and the incidence of inpatient malaria deaths was 8/100,000 population per year [1]. Malaria transmission occurs all year round, with variations in transmission intensity across the country. In Zambia, 77% of the total population resides in rural areas where the risk of malaria infection is 4.5 times greater than in urban areas [2].

The economic burden of malaria arises from the costs associated with service delivery of interventions, income loss among infected individuals, effects on workforce time, productivity losses and potential declines in investment. Malaria among school-going children is associated with lower school attendance in areas of high malaria transmission zones [3].

In Zambia, malaria programs are integrated within the health care system at all levels from national to community level. The National Malaria Elimination Program is making strides

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in sustaining political support, country ownership and evidence-based programming. Zambia has succeeded in lowering the malaria prevalence in the Southern Province. However, over the years, significant resources have been invested and various malaria interventions aimed to lower the prevalence in Luapula Province, but malaria prevalence has steadily remained high as shown in Figure 1 [4].

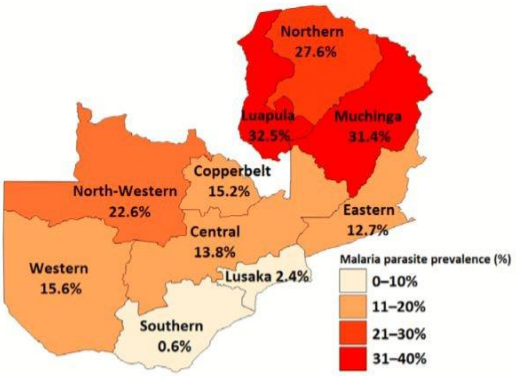

Figure 1. A Map of Zambia Showing the Variation in Malaria Transmission, with Lower Rates in the South Where Coordinated Control Measures have been successful, and Higher Rates in the North Where Similar Efforts have been less effective.

Problem Statement

Zambia first piloted CCM in 2009 in selected districts in Lusaka and Southern Province. Integrated Community Case Management (iCCM) has been intensively expanded across multiple provinces since 2013, with coordinated support from a range of partners to the National Malaria Elimination Centre (NMEC). CHWs are the drivers of the iCCM program. It is expected that by expanding CHWs, the number of malaria diagnosis and treatment service points per population will decrease treatment-seeking delays and the percentage of people who progress from mild to severe malaria or die from malaria. However, this needs further investigation in the high-burden districts of Zambia. The MoH and development partners have been implementing high-impact malaria control interventions such as indoor residual spraying and iCCM aimed to reduce the malaria prevalence in the Nchelenge district for over a decade [5]. Table 1 shows the malaria intervention package implemented in the Nchelenge district [6]. Despite these efforts, malaria prevalence remains high.

Table 1. Malaria Interventions Implemented by the NMEC and Partners in Nchelenge District

Malaria Indicator	***Interventions for High Malaria Transmission***
>/=500 cases/1,000 population; >15% parasite prevalence	-Uninterrupted availability and rational use of malaria commodities at all levels. -Quality case management at all levels. -Scale up community case management. -Strengthen quality assurance activities and mentorship. -Distribution of long-lasting insecticide-treated nets - mass campaigns and routine. -Indoor residual spraying. -Entomologic surveillance. -Enhanced epidemiologic surveillance. -Social and behaviour change activities.

Purpose and Objectives

The purpose of the study was to document the impact of community health workers on community case management of malaria with a focus on Nchelenge district in Luapula Province. The specific objectives were: 1) Evaluate the effectiveness of CHWs on malaria community case management. 2) Identify barriers faced by CHWs in the implementation and sustainability of CCM and 3) Provide recommendations for improving CHW's effectiveness to support the scale-up of CCM and malaria prevention interventions.

Achievements

Zambia developed the National Community Health Strategy (2022-2026) to reposition and expand the formal health sector and strengthen linkages with the informal sector. It is designed to guide the strengthening of community health mechanisms to improve the provision of preventive, promotive and minor curative health services. The strategy recognises CHWs as important players in delivering primary healthcare services at the community level. Overall, having a community health strategy is pivotal for improving public health, reducing disease burdens, and achieving sustainable health outcomes in Zambia.

Zambia's National Malaria Elimination Strategic Plan - 2022-2026 indicates that all suspected malaria cases should receive parasitological testing, and all confirmed cases should receive effective anti-malarial treatment within 24 hours with artemisinin-based combination therapy. The provision of quality basic health services within 5 km or one hour's travel from households in Zambia is embedded in the community health strategy [7]. The NMEC works towards a target in pre-elimination areas of one CHW providing malaria diagnosis and treatment per 750 people, but this may be revised to one CHW per 500 people in higher-burden settings [8]. This demonstrates that CHWs in Zambia play an important role in delivering various community health services at the household level including CCM for malaria.

Through the MoH, Zambia has shown its commitment to community health by establishing a dedicated Community Health Unit within the Department of Public Health. This unit is mandated to coordinate and oversee community health services at all levels.

Zambia has demonstrated its commitment to implementing CCM as a core intervention to reduce the malaria burden as evidenced by various strategies and programmes being implemented at the community level. The premise of iCCM is that early intervention can cure uncomplicated malaria cases before they require intensive treatment at health facilities, and severe cases can receive timely treatment.

As a significant achievement, CHWs are trained by the MoH and development partners to identify the signs and symptoms of the three leading causes of global childhood mortality: diarrhoea, pneumonia, and malaria. Following this training, CHWs are equipped to manage uncomplicated malaria cases and refer severe cases to the nearest health facility.

Limitations

The study did not review papers published in other languages such as studies from francophone West Africa which may have provided further insights. The study did not assess the quality of papers included in this review because most were not primary research.

Materials and Methods

The study collected data through a systematic review of 34 peer-reviewed papers and grey literature (unpublished reports, presentations and evaluations) that described CHWs, their roles, and ways of working regarding iCCM. The systematic review of the roles and challenges of CHWs and related cadres in iCCM provided several key insights.

The review included evidence retrieved from 8 databases namely: CHW Central, CINAHL Plus, ERIC, Global Health, LILACS, MEDLINE, PubMed and WHO, highlighting the diverse sources and comprehensive nature of the analysis. The review included a wide variety of study designs, encompassing randomized control trials, quasi-experimental, pre-post interventional, longitudinal and cohort, cross-sectional, case study, and secondary data analysis. The review excluded papers not focused on CHW work in CCM in low- and middle-income countries.

Results

The findings have been presented in 3 sections that correspond with the study objectives, namely: effectiveness of CHWs on CCM; barriers faced by CHWs in the implementation and sustainability of CCM and, improving CHWs' effectiveness to support scale-up of CCM.

Effectiveness of CHWs on Malaria Community Case Management

The Southern and Central Africa International Centers of Excellence for Malaria Research (ICEMR) conducted a study that showed higher mortality in children who lived far from the health facilities in the Nchelenge district. Each additional kilometre from the hospital was associated with a 4% increase in odds of death, with a median distance to the hospital of 14 km in children who died from severe malaria compared to 3 km in those who survived [9]. Figure 2 shows that children from Mununga village in Nchelenge district had high case fatality confirming that remoteness from the hospital causes delays in care [10].

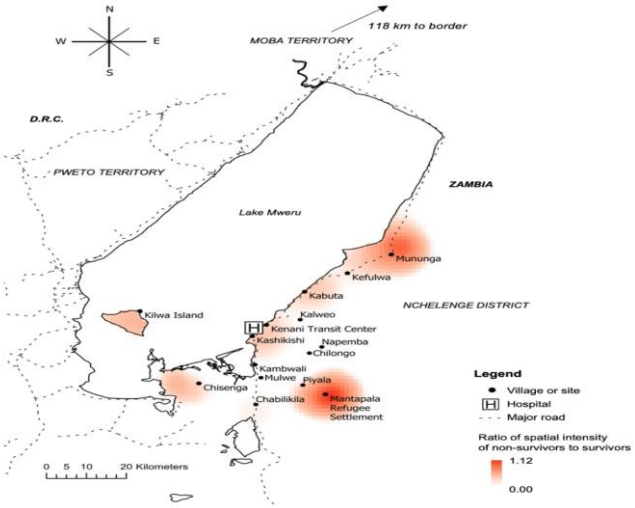

Figure 2. Malaria Mortality in Nchelenge District in 2022

To address this situation, Zambia is implementing iCCM as a core intervention to reduce the malaria burden. iCCM is premised on the notion that when patients are reached earlier, uncomplicated cases of malaria can be cured before they need intensive treatment usually offered at the health facilities and severe cases will have the opportunity to get treatment in time [11].

CHWs are the driving force behind iCCM and they play significant roles in malaria interventions, including case management, prevention through health surveillance, and health promotion specific to malaria. However, CHWs in Zambia are not fully integrated into the health system. Ensuring sustainable financing to iCCM programs; tailoring CHW training to address the identified gaps; improving sustainable supply chain management of malaria drugs and diagnostics and addressing regulatory challenges in the local contexts are critical

factors in effectively integrating CHWs in the health system.

The review indicated that CHWs could deliver high-quality malaria care, including procedures like rapid diagnostic tests. Key facilitating factors include proper training, clear guidelines, and consistent supportive supervision. For the sustainable success of CHW programs, it is essential to strengthen the health system's capacity to support commodity supply, supervision, and the appropriate treatment of referred cases. The available evidence on referrals from the community to health facilities indicates that this area requires priority focus. Studies on iCCM indicate that adding tasks does not diminish the quality of malaria CCM, provided there is adequate training and supervision [12].

Furthermore, a mixed methods study was conducted among 125 CHWs providing either dual malaria and pneumonia management or malaria management alone for children aged 4 to 59 months. Performance was assessed using knowledge tests, case scenarios of sick children, review of CHWs' registers, and observation of CHWs in the dual management arm assessing respiratory symptoms. The study revealed that CHWs in the dual-and single-illness management arms had similar performance concerning the overall knowledge of malaria (dual 72%, single 70%); eliciting malaria signs and symptoms (50% in both groups); prescribing antimalarials based on case scenarios (82% dual, 80% single); and correct prescription of antimalarials from record reviews (dual 99%, single 100%). In the dual-illness arm, scores for malaria and pneumonia differed on overall knowledge (72% vs 40%, $p < 0.001$); and correct doses of medicines from records (100% vs 96%, $p < 0.001$). According to facility records, 82% of the children with fast breathing had received an antibiotic. From observations 49% of CHWs counted respiratory rates within five breaths of the physician (gold standard) and 75% correctly classified the children [13]. The factors perceived to influence CHWs' performance were community support and confidence, continued training, availability of drugs and other necessary supplies, and cooperation from formal health workers [14]. With appropriate training that emphasizes pneumonia assessment, adequate supervision, and provision of drugs and necessary supplies, CHWs can provide integrated treatment for malaria and pneumonia.

The findings reveal that CHWs are crucial in driving malaria CCM, especially in regions where healthcare infrastructure is limited. With adequate training, CHWs can detect malaria early since they live in the community as shown in Figure 3 [15].

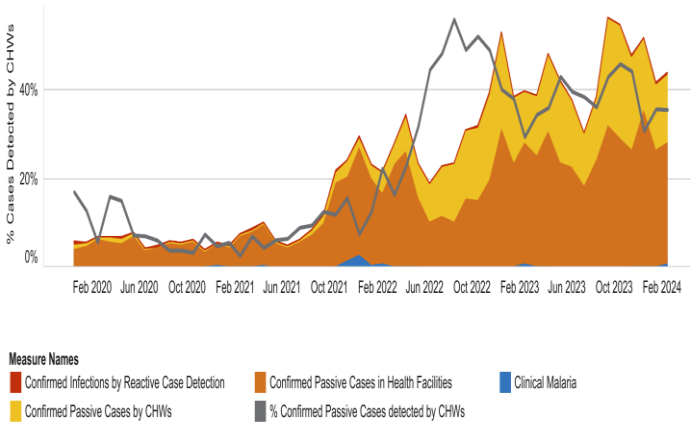

Figure 3. Malaria Cases by Health Facility or Community Detection, Luapula Province 2020-2024

CHWs bridge the gap between formal healthcare systems and rural communities, enabling more effective malaria control and treatment. They serve as a driving force for malaria CCM as follows:

1. Early detection and treatment: CHWs are trained to recognize the early symptoms of malaria and provide prompt treatment. This early intervention is critical in reducing the severity of the disease and preventing complications that can arise from delayed treatment.
2. Access to remote areas: CHWs often come from the communities they serve, which allows them to reach remote and underserved areas. Their presence ensures that people in these regions have access to malaria diagnosis and treatment without needing to travel long distances to health facilities.
3. Education and awareness: CHWs play a key role in educating communities about malaria prevention, including the importance of using insecticide-treated bed nets and eliminating stagnant water where mosquitoes breed. By raising awareness, they help reduce the incidence of malaria.
4. Monitoring and reporting: CHWs are involved in tracking and reporting malaria cases to health facilities. This data collection is vital for understanding the spread of malaria, identifying hotspots, and implementing targeted interventions.
5. Cost-effective care: Utilizing CHWs is a cost-effective way to manage malaria in resource-limited settings. They reduce the burden on formal healthcare systems by handling less severe cases at the community level, allowing health facilities to focus on more complex cases.
6. Trust and cultural sensitivity: CHWs are often from the same community, and they have a deep understanding of local customs, beliefs, and languages. This cultural competency helps them gain the trust of community members, making their interventions more effective.

Barriers Faced by CHWs in the Implementation and Sustainability of CCM

A review of systematic challenges to the scale-up of iCCM from 6 countries in Sub-Saharan Africa highlighted the following: deployment, supervision, motivation and retention of CHWs; maintaining reliable supply chains; demand-side barriers to utilization, weak monitoring and evaluation systems and need for supportive government policies and engagement to achieve sustainable progress [16]. Multiple public health literature identifies several barriers to the implementation and sustainability of CCM. These include: 1) Inadequate compensation since CHWs are unpaid or receive only short-term allowances, leading to financial instability and decreased motivation. 2) Insufficient training and supervision: Lack of continuous training and supportive supervision hinders CHWs' ability to provide high-quality care and stay updated with best practices. 3) CHWs often face shortages of essential supplies, such as rapid diagnostic tests, medications, and protective equipment, which impedes their effectiveness. 4) The addition of multiple tasks without adequate support sometimes leads to burnout and decreased job satisfaction. 5) Inadequate integration with formal health systems results in poor referral mechanisms and follow-up care, reducing the effectiveness of CCM. 7) Difficulties in accessing remote or underserved areas due to transportation issues and geographical barriers often limit the reach of CHWs. 8) Lack of clear policies and support from health authorities creates uncertainty and hinders the long-term sustainability of CHW programs. 9) Challenges in collecting, managing, and reporting health data can affect the monitoring and evaluation of CCM programs, leading to gaps in service delivery and resource

allocation [17]. Addressing these barriers is essential for the effective implementation and sustainability of CCM programs that are primarily led by CHWs.

Discussion

CHWs have consistently been recognized as crucial players in community health interventions through various systematic reviews. CHWs have been shown to improve various health outcomes, including reducing child mortality, improving maternal health, managing preventable diseases like malaria and chronic diseases like HIV/AIDS and tuberculosis, and increasing vaccination rates. These findings underscore the importance of investing in CHWs and addressing the systemic barriers they face to ensure the sustainability and success of community health interventions. Integrating CHWs into formal health systems can enhance the reach, efficiency, and effectiveness of malaria control efforts, particularly in regions where healthcare access is constrained.

While CHWs are acknowledged as critical, systematic reviews also point out challenges such as the need for adequate training, supervision, resources, and support to sustain these programs over time. Addressing these challenges is essential for maximizing the impact of CHW programs. Various barriers identified need to be addressed to increase CHW efficiency, effectiveness and sustainability of CCM in the communities they serve. Nevertheless, individual interventions are less effective therefore implementation of multiple interventions is necessary for get significant impact [18].

Multiple studies highlight the importance of supportive policies, financial support and government ownership in facilitating the scale-up of iCCM programs. As noted, Zambia has been implementing CCM for over a decade, however, implementation is constrained by the lack of adequate financial resources with CHWs, the drivers of iCCM are financially sustained by NGOs and development partners.

Emerging experiences from community health programs emphasize the crucial role of supportive policies, financial backing, and strong government ownership in scaling up integrated iCCM) programs. In Zambia, although CCM has been implemented for over a decade, and integrated into government strategies such as the Community Health Workers strategy (2022-2026) supporting CHWS faces significant challenges due to inadequate budgets. The burden of supporting CHWs, who are the primary drivers of iCCM, often falls on NGOs and development partners rather than the government. This reliance on external funding sources poses a threat to the long-term sustainability of iCCM programs. Without consistent financial support and government involvement, the scalability and continuity of these programs are at risk, potentially undermining the health gains achieved to enhance the sustainability and effectiveness of iCCM in Zambia, the government must take ownership by ensuring regular and sufficient funding and institutionalizing the role of CHWs within the health system. This approach would help mitigate the dependency on external donors and create a more stable and resilient healthcare delivery system. This is further supported by a study which was conducted in Gambia whereby there was a 33% reduction in child mortality when there were greater investments in CHWs for over a decade, however, this was followed by a decline in financial support and no significant impact was measured [19].

Further research is needed to develop sustainable and appropriate remuneration models for CHWs, who are largely unpaid or receive short-term allowances from NGOs. These models may be crucial for ensuring enduring job satisfaction, commitment, and retention of CHWs, particularly given the substantial resources invested in their

selection, training, and equipping before they begin providing services. Additionally, the sustainability of community health programs, including iCCM, which rely on CHWs, requires further investigation. The findings in this study point towards implementation research in these areas.

Recommendations to Improve CHWs Effectiveness to Support Scale-up of CCM

Supply Chain Management: Addressing supply chain issues directly impacts the ability of CHWs to deliver timely, effective, and reliable healthcare services, which is crucial for the success of public health interventions. Timely access to essential medicines like antimalarials, antibiotics, and rapid diagnostic tests allows CHWs to promptly treat patients, reducing delays in care and improving health outcomes. Reliable supply chains help prevent stockouts and overstock situations, ensuring that CHWs always have the right number of supplies.

Balancing CHW Workload: Balancing CHWs' workload and aligning it with clear expectations and meaningful incentives leads to higher job satisfaction, better health outcomes, increased motivation, reduced risk of burnout and overall improved performance. This approach not only benefits the CHWs but also the communities they serve, as it ensures consistent and effective delivery of healthcare services. However, CHWs worldwide frequently report adverse effects from heavy workloads, such as higher patient follow-up loss. Moreover, unclear CHW roles can lead to unrealistic expectations from the community or health system, causing CHW demotivation.

Incentives and Motivation: a comprehensive incentive and motivation framework should be established to enhance the efficiency of CHWs in providing malaria CCM. This framework should include both financial and non-financial incentives, such as performance-based bonuses, recognition programs, opportunities for career advancement, and access to continuous professional development [20]. Adequate resources and logistics, including transport, CHW kits, and job aids, significantly enhance CHW motivation and competencies in several ways for example, the provision of transport allows CHWs to reach more patients, especially in remote areas, reducing travel time and fatigue. A combination of financial and non-financial incentives, provided consistently and predictably, generally boosts CHW motivation and performance.

Integration with Health Systems: Implement robust policies that formally recognize and support CHWs as critical players in community health activities. Such policies should ensure that CHWs are adequately trained, compensated, and provided with the necessary resources to perform their duties effectively. Additionally, integrating CHWs into the national healthcare system with clear roles, career progression opportunities, and continuous support will enhance their impact on improving public health outcomes, particularly in underserved communities. Facilitating regular meetings between CHWs and healthcare providers to discuss challenges and coordinate efforts in malaria prevention and treatment. Effective coordination and communication with other health staff have been linked to improved quality of care in Myanmar and greater coverage in hard-to-reach areas in Mozambique [21]. This approach will strengthen the overall health system and ensure the sustainability and scalability of community health interventions.

Supportive Supervision, Mentorship and Training: Provide continuous and comprehensive training that covers both technical skills in diagnosing and treating malaria and soft skills such as communication and community engagement. Integrate new

technologies and updates in malaria treatment protocols into training programs to keep CHWs updated. Implement regular supervisory visits that focus on mentorship rather than inspection. Establish peer-support networks where experienced CHWs can mentor new ones, creating a platform for experience sharing and problem-solving. Regular performance appraisals typically improve motivation and attitudes. Additionally, ongoing training enhances motivation and job satisfaction among CHWs [22].

Monitoring and Evaluation: Utilizing standard operating procedures and programmatic guidelines facilitates quality assurance, especially in settings that implement task shifting. Empowering CHWs to facilitate community monitoring of health programs can strengthen community engagement and enhance CHW satisfaction. For example, in Uganda, CHWs reported that community feedback had a greater impact on their performance compared to feedback from formal supervisors [23].

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Conflict of Interest

The author declares no conflict of interest.

Conclusion

In conclusion, Community Health Workers (CHWs) play an indispensable role as key drivers in the effective implementation of Malaria Community Case Management (CCM). Their deep integration within communities, coupled with their ability to deliver timely and accessible care, positions them as critical agents in the fight against malaria. By ensuring CHWs are well-trained, adequately supported, and provided with the necessary resources, their potential to reduce malaria morbidity and mortality can be fully realized. This study underscores the importance of strengthening CHW programs as a strategic component of malaria control and prevention efforts, ultimately contributing to healthier communities and advancing global health objectives**.**

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