Research Article

Examining Institutional Preparedness in Handling Malaria: A Case Study of Mwinilunga District, Zambia

*1 Ernest Chewe

About Author

1 Department of Public Administration, School of Humanities and Social Sciences, Information and Communication University (ICU), Lusaka, Zambia

ABSTRACT

The main purpose of this study was to examine institutional preparedness in handling malaria control in Mwinilunga District of Zambia. It was guided by the following objectives, which were to identify the challenges faced by public health institutions in implementing effective malaria prevention and control measures. To assess the capacity and preparedness of health institutions to respond to malaria outbreaks, including resource availability, staff training, and surveillance systems. To analyse the role of community engagement and behavioural practices in influencing the success of malaria prevention efforts in Mwinilunga District. The study employed a case study design. A total sample of 50 respondents were sampled using probability sampling by purposive sampling method. Semi-structured questionnaires and key-informant interviews were used for data collection. The collected data was analysed in form of descriptive and inferential statistics with the aid of Microsoft Word and Excel. From the research findings, the study highlighted significant gaps in the preparedness and effectiveness of health institutions in Mwinilunga District to manage malaria outbreaks. Addressing these gaps through enhanced training, better resource allocation, and robust surveillance systems is essential for reducing malaria incidence. Engaging the community through culturally relevant education and communication strategies is also crucial for fostering preventive behaviours and improving health outcomes. Strengthening these areas will not only control malaria more effectively but also contribute to the overall improvement of public health in the district. The study recommends that, allocate more resources to ensure the adequate supply of ITNs, RDTs, and antimalarial drugs. This funding should also support training programs, infrastructure improvements, and the establishment of robust surveillance systems, Establish and maintain comprehensive malaria surveillance systems to enable early detection and timely response to outbreaks. This includes improving data collection, analysis, and reporting mechanisms within health institutions. Implement regular evaluations of healthcare workers to identify training needs and improve service delivery. Feedback from these evaluations should be used to inform training programs and support professional development. Expand health education programs using culturally sensitive communication strategies to improve the uptake of malaria prevention measures. Engage local leaders and use local languages to enhance the effectiveness of health education initiatives.

Contact @ Ernest Chewe
enest.mche@gmail.com

1. INTRODUCTION
1.1. Background of study
Zambia has been making concerted efforts towards malaria control, including the implementation of the National Malaria Strategic Plan (NMSP), which emphasizes reducing the incidence and mortality of malaria through vector control, prompt diagnosis, effective treatment, and sustained surveillance. Malaria has plagued mankind throughout history and remains one of the major challenges to global health. The disease contributes a considerable burden in endemic countries with premature deaths, disability from illness and it impedes on social and economic development (Berthod *et al.*, 2017). According to the World Malaria Report 2015, the global burden of the disease was estimated at 214 million cases and 438 000 deaths worldwide, with the African region accounting for 80% of the cases and 90% of the deaths. Malaria prevalence is now at 15% in Zambia, and Luapula province reported the highest level of malaria prevalence, with 32.5% (Zambia MIS, 2015). Almost all these cases and deaths are caused by Plasmodium falciparum, one of the four malaria parasite species that affect humans. The others are P.vivax, P.ovale, and P. Malariae (Philips *et al.*, 2021). Most people at risk of the disease live in areas of relatively stable transmission, there; infection is common and occur with frequency that some level of immunity develops (WHO, 2020). Malaria disease and deaths in other areas of the world occur mainly among individuals who lack immunity and are infected with P. falciparum in areas where appropriate diagnosis and treatment is not available. The total number of cases in sub-Saharan Africa is estimated at five million per year and yet the actual number is believed to be at least four times higher (Aregawi, 2009). Despite these distressing burden records, there has been a reduction in the numbers of malaria cases and malaria-related deaths. The incidence of malaria that takes into account population growth is estimated to have decrease by 37% globally between 2000 and 2015. Malaria death rate has also decreased by 60%. These reductions are attributed mainly to vector control (WHO, 2017).

Malaria Early Warning Systems are advocated as a means of improving the opportunity for preparedness and timely response. In Zambia, malaria is one of the priority diseases for Integrated Disease Surveillance and Response (IDSR) and falls under the category of diseases of public health importance. The four pillars of disease surveillance include; epidemic preparedness and response, laboratory surveillance, data management and training and supervision. Malaria epidemics occur in two malaria epidemiological zones – the western highlands and the arid, semi-arid lowlands of northern Kenya. The epidemics are associated with unusual climatic conditions especially rainfall accompanied by other factors like suitable temperatures that favor breeding and longer survival of the malaria vectors. Malaria poses an enormous health and economic burden in Kenya, being a leading cause of morbidity and mortality in the country. Recognizing this fact, the government of Kenya in consultation with local and international stakeholders undertook a comprehensive malaria program review which provided information leading to the development of the National Malaria Strategy (NMS) 2009-2017. The malaria surveillance and response system for the epidemic-prone districts, managed by the Division of Disease Surveillance and Response, is an important part of Kenya's 2009-2017 monitoring and evaluation plan. Epidemic thresholds for malaria have been set for four to six sentinel facilities in each of these districts.

1.2. Statement of the problem
North-western Province recorded highest total incidence, ranging from 867/1000 in 2013 to 847/1000 in 2015. In 2013, 51% of cases were laboratory-confirmed; however, this increased to 80% of malaria cases by 2015. The incidence of laboratory-confirmed malaria among pregnant women increased from 49/1000 in 2013 to 64/1000 in 2015.The incidence in pregnancy was highest in Luapula (131/1000 in 2013, 207/1000 in 2014 and 177/1000 in 2015). For three years, malaria incidence was higher among under 5 children (756/1000) compared to 5 years and older (275/1000). Malaria incidence in Zambia has substantial variation by province and age group, and possible increases in pregnant women. This study identified high incidence in Northwestern and Luapula Provinces as well as pregnant women and children under five. These provinces and risk groups should be prioritized for malaria prevention and control programs. Malaria resurgence cases have been reported in various countries with 75 reports of malaria resurgence occurring in some countries including Zambia indicating weakening of Malaria programs as the most reported cause of resurgence (91%) owing to poor execution of control programs, overall complacency, purposeful cessation of control activities and noncooperation at community level in malaria programs (Cohen *et al.*, 2012). Mwinilunga District Health data indicates that there has been a reduction in the incidence rates from 2005 to 2009 where malaria incidence reduced from 318.6/1000 population to 3.5/1000 population respectively. However, from 2010 there has been a steady increase in incidence from the lowest record of 3.5/1000 population in 2009 with no case fatality to 10.6/1000 population with recorded case fatalities in 2014 despite implementation of community malaria interventions (DHIS, 2014). The established strategy is a strategy set at primary health care level for implementation of all malaria interventions being a link to the community for malaria interventions. It is not known whether this situation of resurgence is due to weakening of malaria control programs at community level, or could be partly due to decrease in community acceptance or participation in malaria programs (Cohen *et al.*, 2012). The use of Community Health Workers is one of the policy strategies adopted in the implementation of malaria community interventions (MOH, 2010) and the Alma Ata review attributes success of preventive and curative interventions to CHWs efforts (Christopher *et al.*, 2011; Pallas *et al.*, 2013). There is however very little evidence on fidelity to the implementation processes of the malaria strategy to evaluate any lapses to the strategy following the resurgent reports despite attribution of success of reduced global morbidity and mortality incidences of malaria District under study.

1.3. General objective
The general objective of this research was at examining Institutional effectiveness and preparedness in handling Malaria

cases through assessing performance and quality of service in malaria prevention and control programs, in Mwinilunga District of Zambia. Specific objectives of the study were to assess the effectiveness of Institutional planning for prevention and control of Malaria and Control in malaria prevention and control interventions. To identify the challenges faced by public health institutions in implementing effective malaria prevention and control measures. To analyse the role of community engagement and behavioral practices in influencing the success of malaria prevention efforts in Mwinilunga District

1.4. Conceptual framework

This study was guided by the Health Belief Model (HBM) and the Integrated Disease Surveillance and Response (IDSR) framework. The HBM posits that health-related behavior is influenced by individuals' perceptions of disease severity, susceptibility, benefits of taking preventive action, and barriers to taking such action (Rosenstock, 1974). In the context of malaria control, this model helps to understand community behaviors towards the use of preventive measures, such as ITNs and IRS, and seeking treatment. Mwendera *et al.* (2017) defines a theory as "a set of interrelated concepts, definitions, and propositions that present a systematic view of events or situations by specifying relations among variables in order to explain and predict the events or situations." Theories are by their nature abstract, and appear formidable and difficult to use (Bosher *et al.*, 2007). Nonetheless, they have the capacity to simplify and systematize complex processes. Theories are absolutely useful in the development of communication campaigns since they make the process easier and less time-consuming than a campaign that starts from scratch without any guiding principles" (ibid). Unfortunately, many practitioners see theories as ivory-tower creations with little relevance to the real world (ibid). Another dilemma for communication planners is that people using their common sense theories and believing them to be as valid as scientific or well-grounded working theories (Chanda, 2011). Mass Communication theories have been applied in several communication campaigns often criticize their work. Some of these theories can be used in health education campaigns, such as the malaria communication campaign under review in this thesis, Collective action theory seeks to understand how groups of individuals can cooperate to overcome social dilemmas. Collective action arises when people collaborate on joint action and decisions to accomplish an outcome that involves their interests or well-being (Counihan *et al.*, 2012). Collective-action problems are typically characterized by interdependency among the participants, so that the contributions or efforts of one individual influences the contributions or efforts of others, no wider benefits are produced, and all are worse off if they each act to maximize their own narrow self-interests. The economic theory of collective action is concerned with the provision of public goods through the collaboration of two or more individuals and with the impact of externalities on group behaviour (Kathleen, 2002). In the informal sector, collective action is key because they are assumed to work under the government's radar hence lack the negotiating rights and access to formal dispute resolution mechanisms.

2. LITERATURE REVIEW

This section aims to present a critical review of existing literature on the research subject, drawing on empirical studies. As defined by Kombo (2006), a literature review entails an account of publication by accredited scholars and researchers, including exploratory documents like books, magazines journals and dissertation relevant to the study.

Bollin (2003), posit that successful implementation of strategic plans is critical to the achievement of organisational aims and objectives. A strategic plan is implemented through "the realisation of tactical and operational plans, which include programs, projects and actions sequences".

In a study conducted in Uganda, Getahun *et al.* (2010) found that only 40% of healthcare workers had received training in malaria case management in the past two years. This gap in training leads to inconsistencies in service delivery and undermines the effectiveness of malaria control programs. Effective control and treatment of malaria presents enormous logistical challenges. The key to addressing the challenge of reducing the burden of malaria is an integrated approach that combines preventative measures, such as long-lasting insecticide-treated bed nets (LLINs) and indoor residual spraying (IRS), with improved access to effective anti-malarial drugs. However, malaria is a disease that stems from and causes poverty, and many at-risk populations live in extremely destitute, remote areas. Poor, rural families are the least likely to have access to these preventative measures that are fundamental to malaria control, and may live kilometres from the nearest healthcare facility. They are also less able to afford treatment once infection has occurred

In addition to the human cost of malaria, the economic burden of the disease is vast. It is estimated that malaria costs African countries more than US$12 billion every year in direct losses even though the disease could be controlled for a fraction of that sum. For Nigeria alone the direct loss to the economy is estimated at GBP530 million annually Up to 40% of African health budgets are spent on malaria each year and on average, a malaria-stricken family loses a quarter of its income through loss of earnings and the cost of treating and preventing the disease Malaria causes an average loss of 1.3% of economic growth per year in Africa. Effective control and treatment of malaria presents enormous logistical challenges. The key to addressing the challenge of reducing the burden of malaria is an integrated approach that combines preventative measures, such as long-lasting insecticide-treated bed nets (LLINs) and indoor residual spraying (IRS), with improved access to effective anti-malarial drugs. However, malaria is a disease that stems from and causes poverty, and many at-risk populations live in extremely destitute, remote areas. Poor, rural families are the least likely to have access to these preventative measures that are fundamental to malaria control, and may live kilometres from the nearest healthcare facility. They are also less able to afford treatment once infection has occurred.

In addition to the human cost of malaria, the economic burden of the disease is vast. It is estimated that malaria costs African countries more than US$12 billion every year in direct losses, even though the disease could be controlled for a fraction of that sum. For Nigeria alone the direct loss to the economy is

estimated at GBP530 million annually. Up to 40% of African health budgets are spent on malaria each year and on average, a malaria-stricken family loses a quarter of its income through loss of earnings and the cost of treating and preventing the disease Malaria causes an average loss of 1.3% of economic growth per year in Africa.

Community engagement is a cornerstone of effective malaria prevention and control. Studies have shown that community involvement in health interventions leads to better health outcomes by promoting the adoption of preventive behaviors and increasing the use of healthcare services. Community health workers (CHWs) play a critical role in engaging communities, providing health education, distributing ITNs, and encouraging the use of preventive measures (Dubbeling, 2009).

Research has demonstrated that CHWs who receive adequate training and support are more effective in mobilizing communities and promoting health-seeking behavior. For instance, a study by Druetz *et al.* (2015) found that communities with active CHWs had higher rates of ITN usage and lower malaria incidence compared to communities without CHWs. CHWs serve as a link between the healthcare system and the community, helping to bridge gaps in knowledge and access to healthcare services.

However, cultural beliefs and misconceptions about malaria pose significant challenges to community engagement. In some communities, malaria is perceived as a normal part of life, reducing the perceived need for preventive measures. Misconceptions about the causes of malaria, such as associating it with supernatural forces or blaming it on environmental factors unrelated to mosquito bites, can hinder the adoption of preventive behaviors. Dubbeling (2009), found that in Mwinilunga District, traditional beliefs about malaria transmission and treatment influenced health-seeking behavior, with some community members preferring traditional healers over formal healthcare services.

Effective health education programs are essential for addressing these misconceptions and promoting behavioral change. Health education initiatives that are culturally sensitive, use local languages, and involve respected community leaders have been shown to be more successful in encouraging the uptake of preventive measures. A study in Malawi by Kathleen (2002). Demonstrated that a community-based health education program, which included the use of local languages and engagement with community leaders, led to a significant increase in the use of ITNs and a reduction in malaria incidence. Malaria prevention must go hand in hand with community participation. Unless individuals in communities see the merits of preventing the illness, even the best-designed prevention strategies might not be used. It is necessary to understand how a community perceives febrile illness, the importance placed on it in people's belief systems regarding illness in general, and what existing behaviors are practiced that can either complement or hinder preventive measures. According to the Zambia National Malaria Control Centre (NMCC), only 30% of health facilities have functional microscopy, while many health facilities in Zambia do not have Laboratories and Technicians due to a shortage of trained and qualified staff (President's Malaria Initiative, 2011). To extend

laboratory diagnosis to more peripheral levels in Zambia, the National Malaria Control Centre (NMCC) has introduced RDTs in rural health centres and villages for use by Community Health Workers (CHWs), with more than 2 million RDTs purchased and distributed during the year 2010 (President's Malaria Initiative, 2011. A study done in Kenya showed that overall malaria testing in public health facilities was low. Findings showed that, of the 880 febrile patients attended to in 88 facilities, 19.8% and 28.7% of children under five and patients above five years respectively had malaria test done (Juma *et al.*, 2011). Another study done in Tanzania showed that despite the fact that laboratory malaria diagnostic services were available in all study health facilities, standard criteria for who to test was lacking and test results were underutilized in management of patients. Request for laboratory malaria test was unguided as some clinicians requested the test always while others ordered the test infrequently (Derua *et al.*, 2011). The researchers concluded that improving the quality of malaria diagnosis in Tanzania should, therefore, take into consideration patients, clinicians and laboratory staff related factors, which most likely contribute to the performance. A study by Kamau (Tanzania, 2019) demonstrated that the presence of a functional malaria surveillance system significantly reduced malaria incidence by enabling early detection and rapid response to outbreaks. The implementation of a comprehensive surveillance system led to a decline in malaria cases by 30% over three years (Boateng, Ghana, 2020). These findings underscore the importance of strengthening surveillance systems and ensuring that health institutions have the capacity to collect, analyse, and act on surveillance data effectively

3. METHODOLOGY
3.1. Research design
The study utilized a descriptive survey design, which is appropriate for exploring and understanding the current state of institutional effectiveness and preparedness in malaria control. Descriptive research is valuable for identifying patterns, trends, and relationships within the data, providing a clear picture of the existing situation. The survey design allows for the collection of data from a large sample, enabling generalization of findings to the broader population (Getahun *et al.*, 2010).

3.2. Research method
The use of mixed methods, combining both quantitative and qualitative approaches, enhances the depth and breadth of the research. Quantitative methods provide numerical data that can be statistically analyzed, offering insights into the prevalence of certain practices, attitudes, and challenges. Qualitative methods, such as in-depth interviews and focus group discussions, provide rich, detailed information about the experiences and perspectives of respondents, adding context and meaning to the quantitative findings. This combination of methods ensures a holistic understanding of the factors affecting malaria control in Mwinilunga District (Kok, 2015). The study used purposive sampling to select healthcare professionals and CHWs with direct experience in malaria control, ensuring that the sample includes knowledgeable and relevant respondents. Simple random sampling was employed to select community members

from various areas within the district, ensuring a representative sample. A total sample size of 50 respondents was targeted, with 20 healthcare professionals, 10 CHWs, and 20 community members. This sample size is considered sufficient to provide reliable data for analysis while being manageable within the study's time and resource constraints. The researcher adopted questionnaires as the main research instruments because they increase confidentiality and allow respondents to give more detailed information. The questionnaires were also chosen because they are easy to use and increase the leverage upon which respondents can give archived information. Two sets of questionnaires were developed one was given to health workers while the other to community members, the questionnaires had a combination of open and closed ended questions.

3.3. Research approach

Semi-structured interview guides were prepared to assist the researcher interview key respondents. The researcher felt that this was the most appropriate approach as it left room for change of wording, explanations and adding or removing some questions. This method was also useful because it gave room for unclear issues to be clarified as well as participants to elaborate on their responses Druetz *et al.* (2015) (The collected data was analyzed using Microsoft Excel as well as Statistical Package for Social Scientists (SPSS) where simple descriptive statistics were obtained and results were summarized as graphs and pie charts for discussions. Albrito (2012) states that data processing and analysis starts in the field, with checking for completeness of the data and performing quality control checks after collecting data from a household. This follows sorting the data by instrument used. Some ethical considerations for this study included obtaining informed consent from participants, ensuring anonymity and confidentiality, and minimizing any potential harm to the participants (Mwendera *et al.*, 2017).

4. RESULTS AND DISCUSSION

4.1. Overview

This chapter presents the findings from the data collected, organized according to the thematic areas developed from the study objectives. The discussion interprets these findings in the context of existing literature and theoretical frameworks, providing i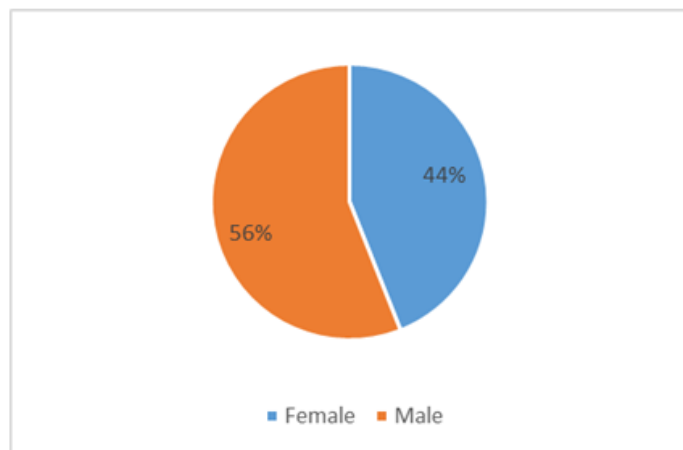nsights into the effectiveness of malaria control strategies in Mwinilunga District. The results are presented in a structured format, starting with the background characteristics of respondents and followed by findings related to the specific objectives of the study.

The respondents were asked to indicate their gender by ticking the appropriate column they belonged. The purpose was to find out the number of males and females who actually participated in the study the study revealed that of above demonstrates that of the 50 respondents who were interviewed for this study, these were female accounting for (44%) and males accounting for (56%). Therefore, it can be deduced that the majority of respondents who participated in this survey were male and the minority were female.
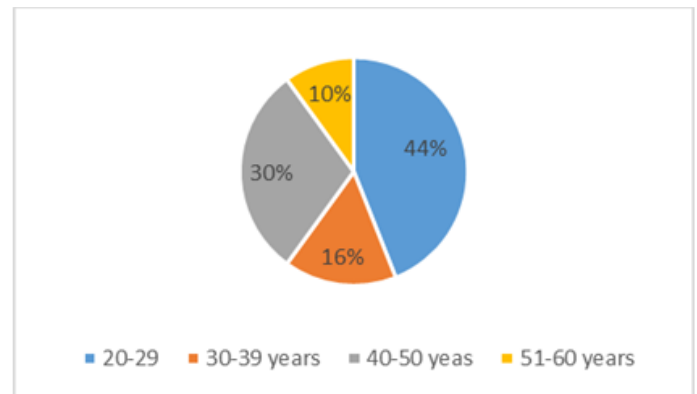
Figure 2. Age group of respondents

The above depicted the age distribution of respondents who participated in the study. The purpose was to find out the average age of the employees who were actively involved in the operations of the organization .The majority of the respondents fell between the ages of 20 – 29 with a percentage of 44% while the least was 10% for those between the ages of 51 – 60 years respectively.
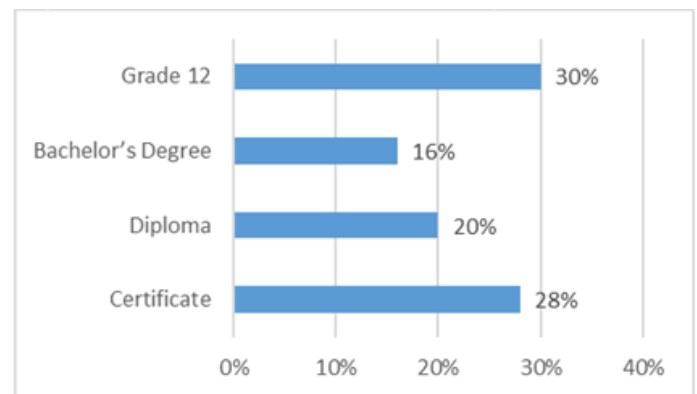
Figure 3. level of education of respondents

The above figure presents different answers that were given by the respondents after the question, "what is your level of education? The researcher sought to establish the academic qualifications of the respondents. On the basis of the education level results shows that out of 50 respondents involved in a study, of those who participated accounting for (45%) indicated that they had diplomas followed by those who held Bachelor's Degree (16%). Those that had certificate qualifications scored

Figure 1. Gender of respondents

28%, lastly were those with grade 12 at 30%.The data showed that majority of the respondents that had attained some level of education whose opinions and views were well informed.
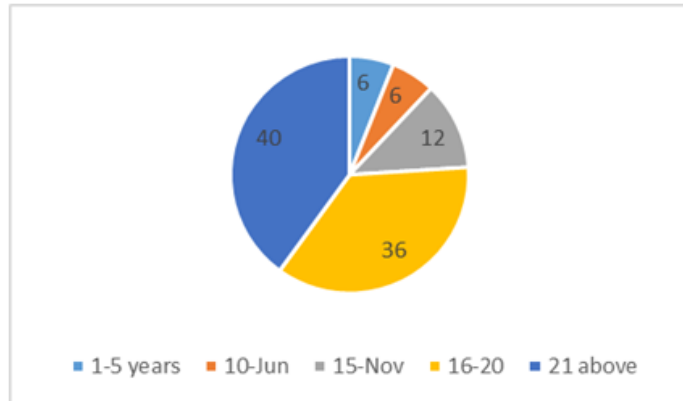

Figure 4. Respondent's years of work in the organization

Therefore, the 1-5 Years is the lowest score, representing 6% of the entire population whereas 6-10 Yrs. was represented with a percentage of 21%, In addition to this, respondents that have spent 11-15 years. Occupied 9% of the population, whereas respondents who had worked at the council between 16-20Yrs occupied 18% and lastly respondents that had served more than 21 Yrs. above occupied 46% of all the respondents that managed to attempt to the question.

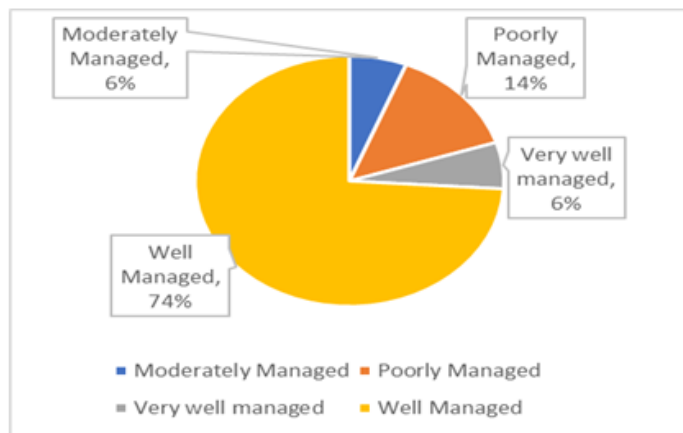How well are the resources allocated for planning managed at the council?

Figure 5. Effectiveness of institutional planning for prevention and control of malaria prevention and control interventions.

The above figure presents answers given by the respondent after the question "How well are the resources allocated for planning managed?" According to the results presented, 74% of the respondents described the resources allocated managed at the council "Well managed, were as 14% of the respondents confirmed by describing the resources allocated managed to be "Poorly managed. In addition to this, 6% of the respondents confirmed that the resources allocated managed at council are "Very well managed" same as some of the respondents that described the process to be "Moderately managed." and well presented in the graph above.
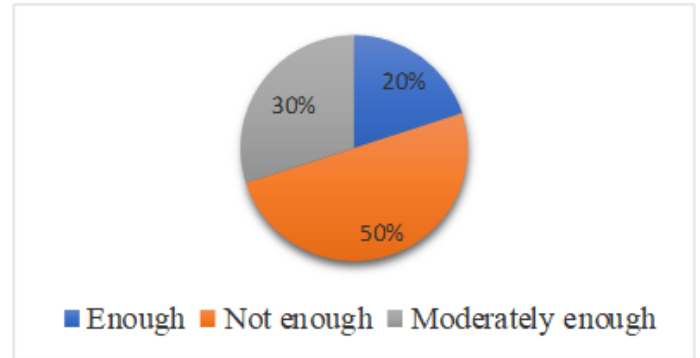

Figure 6. Allocation towards Malaria programmes as a district enough?

Malaria imposes an economic burden for human populations in many Africa countries, and this may be reduced through house screening initiatives. (World health organisation, 2012b). The number of partners providing malaria funding has significantly increased in the same period. The respondents however, indicated that allocation was not enough at 50% while moderately enough was at 30% and finally enough at 20%, hence there is need for ministry of health do up their game in mwinilunga district to ensure that enough resource allocation is done in malaria preparedness and prevention.
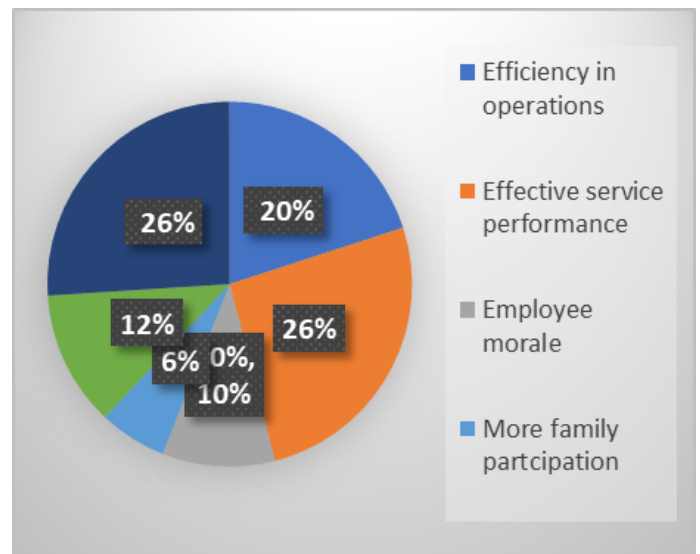

Figure 7. what are the key indicators of successful Malaria incidence preparedness and control mechanisms?

The above figure provides different key indicators of successful Malaria incidence preparedness and control mechanisms. The respondents indicated enhanced collaboration, less records of malaria related deaths, more family participation, effective service performance and efficiency in operations.

The above graph presents three different responses that were given by the respondents on how you measure the effectiveness of Malaria incidence preparedness and control mechanisms. Therefore 64% of the respondents described "Enhanced service delivery" with the frequency of 32 of 50 as the method that is used to measure the impact of resource management or

Figure 8. How do you measure the effectiveness of Malaria incidence preparedness and control mechanisms?

administrative performance. Whereas 24% of the respondents described the method as "improved employee satisfaction" with a frequency of 12 and lastly 12% of the respondents described the method as "increased efficiency" with a frequency of 6 from the total 50. (Alam *et al.*, 2012) points that improved employee performance is a systematic process that helps employees do their jobs better.
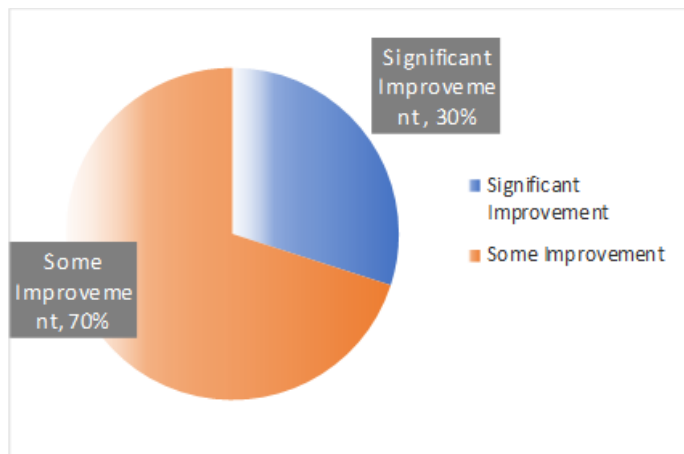

Figure 9. Performance on malaria incidence preparedness and control mechanisms.
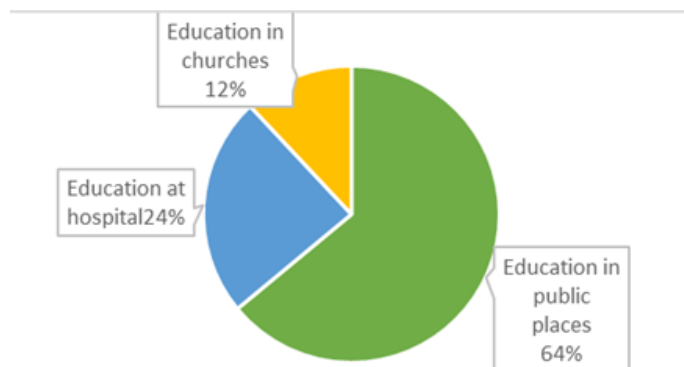

Figure 10. Malaria services sensitization methods currently used

According to the results given in the graph, respondents have noticed some positive changes in administrative performance since improvements in Malaria incidence preparedness and control mechanisms.70percentage of the respondents noticed "Some Improvements" whereas 30% of the respondents has observed "Significant Improvements."

The Zambia national malaria control programme has made great progress in the fight against malaria. The country has solid, consistent and coordinated policies, strategies and guidelines for malaria control with government prioritizing malaria in both national health and strategic plan (MOH) The graph above provides methods currently used in Malaria community sensitization. 12% said churches are best, 24% education for in and out, patients at hospital is best and 50% said education in public places is best.

To identify the challenges faced by public health institutions in implementing effective malaria prevention and control measures.
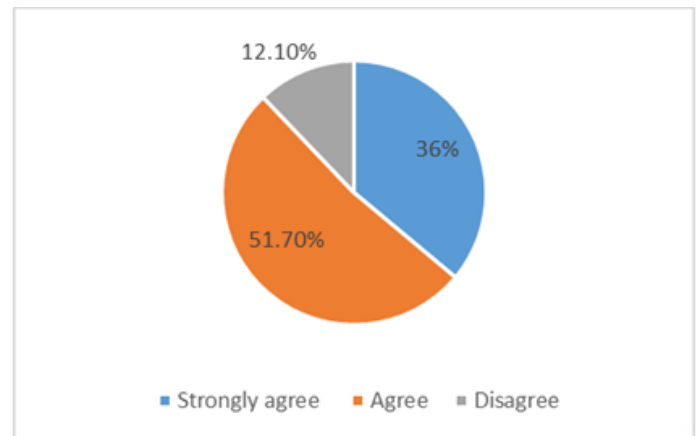

Figure 11. Do you agree that public health institutions face challenges in effective implementation of malaria?

It is evident from the results above that there are challenges faced by public health institutions in implementing effective malaria prevention and control measures accounting for (51.7%) agreed while (36.2%) strongly agreed and (12.1%) disagreed.
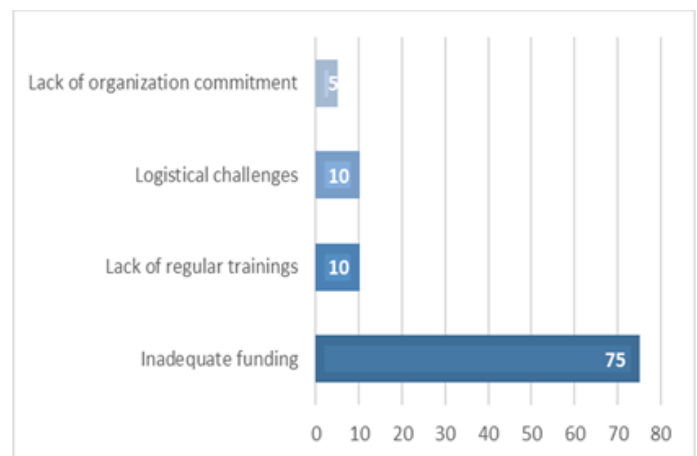

Figure 12. Key institutional challenges in malaria control

The results indicated several significant challenges faced by health

institutions in implementing effective malaria control measures. One of the primary challenges identified was inadequate funding. Approximately 75% of healthcare professionals reported that budget constraints limited their ability to procure essential malaria control supplies such as ITNs, RDTs, and antimalarial drugs. These budgetary limitations led to frequent stockouts, which disrupted the continuity of malaria prevention and treatment programs (Kelly-Hope & McKenzie, 2009).

Logistical challenges were also prevalent, with 10% of respondents citing difficulties in accessing remote communities due to poor road infrastructure and inadequate transportation options. These logistical barriers delayed the distribution of medical supplies and limited the reach of healthcare services. A healthcare professional commented, "During the rainy season, some areas become inaccessible, and we cannot deliver ITNs or provide necessary treatment to those who need it the most" (Njoh 2011).

Training gaps emerged as another critical challenge, with 10% of healthcare professionals and CHWs indicating that they had not received any formal training in malaria management in the past two years. This lack of training affected their ability to provide high-quality care and respond effectively to malaria outbreaks. A CHW expressed concern, stating, "Without regular training, it's difficult to keep up with the latest guidelines and treatment protocols. We need more support to improve our skills and knowledge" (Ababio 2004).
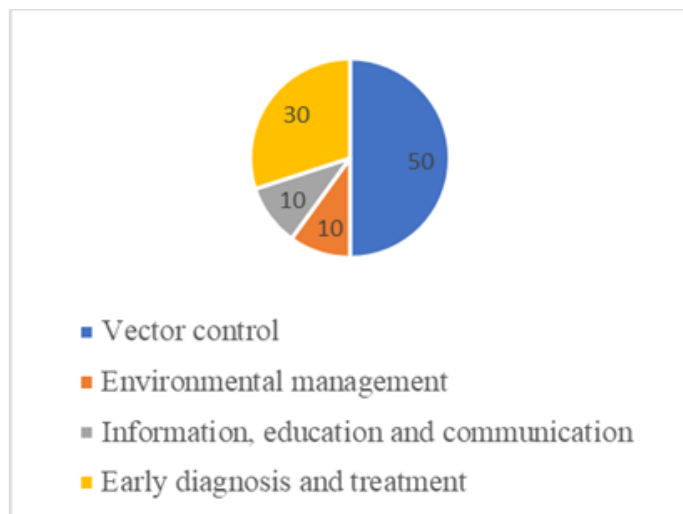

Figure 13. Public health interventions

Public health interventions for malaria include vector control, pharmaceutical-based, environmental management early diagnosis, information, education and communication campaigns, the world health organization's consider these approaches to be fundamental to malaria eradication, however, coverage of these methods in WHO-African region is international targets'.

4.2. Community engagement and behavioural practices

Community engagement is critical factor in influencing the effectiveness of malaria prevention efforts, however, respondents agreed with a representation of (41.4%) while strongly agreed stood at (26.9%) and disagreed was at (13.8%)
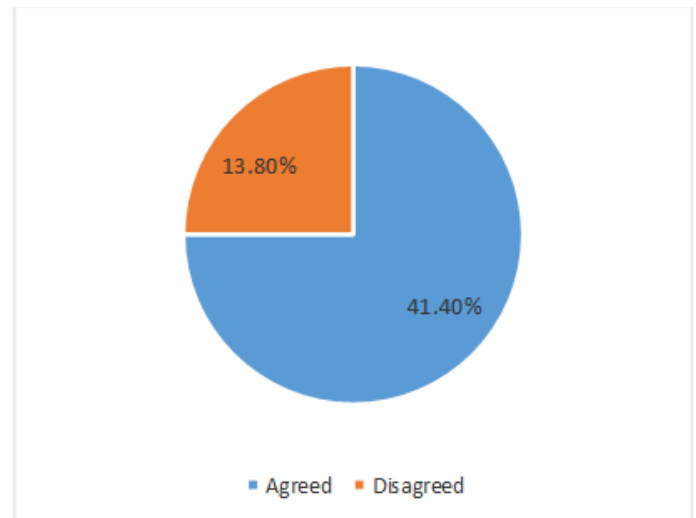

Figure 14. is community engagement a critical factor influencing the effectiveness of malaria prevention efforts.
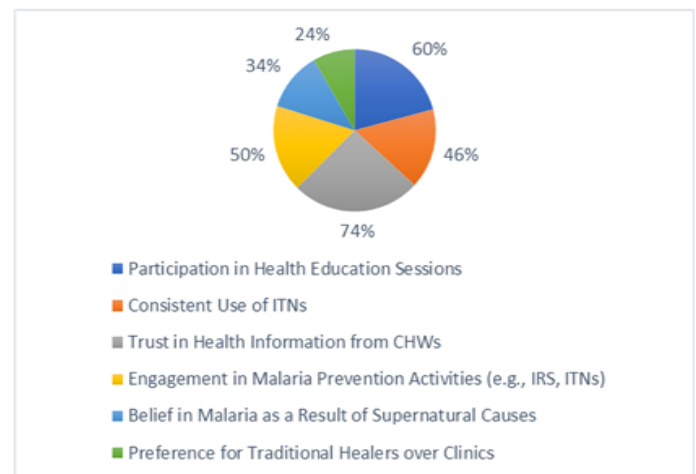

Figure 15. how the community is engaged in the malaria

Community engagement was identified as a critical factor influencing the effectiveness of malaria prevention efforts. Approximately 60% of community members reported participating in health education sessions organized by CHWs. However, only 45% consistently used ITNs, citing issues such as discomfort and lack of awareness about proper usage (Banda, Zambia, 2019). Focus group discussions revealed that culturally tailored health messages delivered by CHWs were more effective in encouraging preventive behaviors. CHWs who used local languages and involved community leaders in health education sessions reported higher levels of community participation and ITN usage. A CHW shared, "When we involve local leaders and use the local language, people are more willing to listen and take action. They trust the information more and are more likely to use ITNs and seek treatment" (Abeku *et al.*, 2004). Traditional beliefs and misconceptions about malaria were also found to influence health-seeking behaviour. Some community members attributed malaria to supernatural causes or environmental factors unrelated to mosquito bites. These misconceptions led to delays in seeking treatment and reduced compliance with preventive measures. A community member

stated, "Some people still believe that malaria is caused by witchcraft or bad air. This makes them hesitant to use ITNs or go to the clinic for treatment" (Abeku *et al.*, 2004).

These findings underscore the importance of continuous community education and culturally sensitive communication strategies to improve the uptake of malaria prevention measures. Engaging community leaders and using local languages can help address misconceptions and encourage behavioural change (Atkinson *et al.*, 2010).
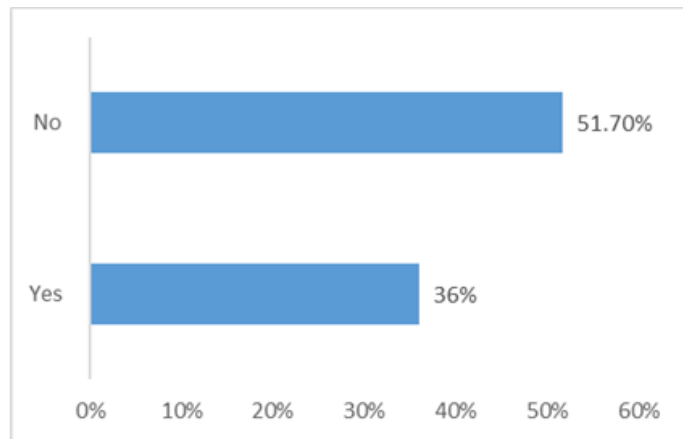

Figure 16. community involvement in health interventions leads to better health outcomes by promoting the adoption of preventive behaviours' and increasing the use of healthcare services.

Community engagement is a cornerstone of effective malaria prevention and control. Studies have shown that community involvement in health interventions leads to better health outcomes by promoting the adoption of preventive behaviors and increasing the use of healthcare services. Community health workers (CHWs) play a critical role in engaging communities, providing health education, distributing ITNs, and encouraging the use of preventive measures.

Research has demonstrated that CHWs who receive adequate training and support are more effective in mobilizing
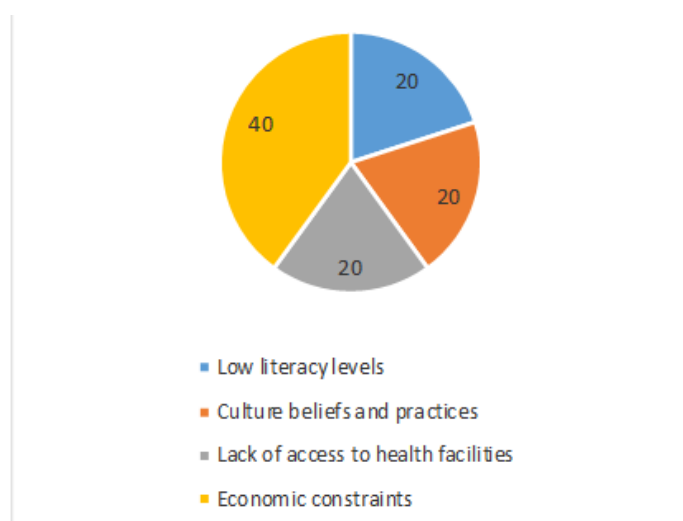

Figure 17. Barriers that hinder effective community engagement and behaviour change

communities and promoting health-seeking behavior. For instance, in a previous study it was discovered that communities with active CHWs had higher rates of ITN usage and lower malaria incidence compared to communities without CHWs. CHWs serve as a link between the healthcare system and the community, helping to bridge gaps in knowledge and access to healthcare services.

Barriers that hinder effective community engagement and behavior change include low literacy level, culture beliefs, lack of access to health facilities and economic constraints (Bardhan & Mookherjee, 2006).

4.3. Background characteristics
Below is a summary of the background characteristic:

4.3.1. Discussion and implication of Findings
The study revealed that of the 50 respondents who were interviewed for this study, these were female accounting for (44%) and male accounting for (56%). Therefore, it can be deduced that the majority of respondents who participated in this survey were male. The study provided different challenges that respondents face in the planning process. The highest score was 44% representing respondents said that there was no support from management. However, 34% said no follow-ups, 22% of the respondents thought there is an ultimate "scarcity of resources".

The study answers given by the respondent after the question "How well are the resources allocated for planning managed?" According to the results presented, 74% of the respondents described the resources allocated managed at the council "Well managed "with the frequency of 37. Were as 14% of the respondents confirmed by describing the resources allocated managed to be "Poorly managed. "With the frequency 7. In addition to this, 6% of the respondents confirmed that the resources allocated managed at council are "Very well managed" with the frequency 3 same as some of the respondents that described the process to be "Moderately managed." and well presented in the graph above.

The question requested the respondents to provide areas they viewed required 'is allocation towards Malaria programmes as a district; 50% said not enough. 30% said moderately enough and 20% said it was enough.

In line with the results provided, 96% of the respondents confirmed with "Occasionally" 2% of the respondents believed that the shortages are "Frequently" observed, as this marks a small percentage saving as middle and Lowest score just like the 2% of the respondents.

In line with the results presented in the graph above, 52% of the respondents were "Involved" in the resource management decision, this served as the highest frequency score from the total. In addition to this, 26% of the respondents were "Not Involved" in the resource management decision. However, 14% of respondents were "Highly Involved" in the resource management decision.

The above graph presents three different responses that were given by the respondents on how you measure the effectiveness of Malaria incidence preparedness and control mechanisms. Therefore 64% of the respondents described "Enhanced service

delivery" with the frequency of 32 of 50 as the method that is used to measure the impact of resource management or administrative performance. Whereas 24% of the respondents described the method as "improved employee satisfaction" with a frequency of 12 and lastly 12% of the respondents described the method as "increased efficiency" with a frequency of 6 from the total 50.

According to the results given in the graph, respondents have noticed some positive changes in administrative performance since improvements in Malaria incidence preparedness and control mechanisms.70 percentage of the respondents noticed "Some Improvements" whereas 30% of the respondents has observed "Significant Improvements."

The above figure provides different key indicators of successful Malaria incidence preparedness and control mechanisms. The respondents indicated enhanced collaboration, less records of malaria related deaths, more family participation, effective service performance and efficiency in operations.

The graph above provides methods currently used in Malaria community sensitisation. 12% said churches are best, 24% education for in and out, patients at hospital is best and 50% said education in public places is best.

To identify the challenges faced by public health institutions in implementing effective malaria prevention and control measures.

The study revealed that more respondents accounting for (72.4%) agreed to this fact as opposed to the minority representing (17.2%) who disagreed, (10%) of the respondents neither agree nor disagreed that there challenges faced by public health institutions in implementing effective malaria prevention and control measures.

The results indicated several significant challenges faced by health institutions in implementing effective malaria control measures. One of the primary challenges identified was inadequate funding. Approximately 75% of healthcare professionals reported that budget constraints limited their ability to procure essential malaria control supplies such as ITNs, RDTs, and antimalarial drugs. These budgetary limitations led to frequent stockouts, which disrupted the continuity of malaria prevention and treatment programs (Bollin, 2003).

Logistical challenges were also prevalent, with 10% of respondents citing difficulties in accessing remote communities due to poor road infrastructure and inadequate transportation options. These logistical barriers delayed the distribution of medical supplies and limited the reach of healthcare services. A healthcare professional commented, "During the rainy season, some areas become inaccessible, and we cannot deliver ITNs or provide necessary treatment to those who need it the most" (Berthod et al., 2017).

Training gaps emerged as another critical challenge, with 10% of healthcare professionals and CHWs indicating that they had not received any formal training in malaria management in the past two years. This lack of training affected their ability to provide high-quality care and respond effectively to malaria outbreaks. A CHW expressed concern, stating, "Without regular training, it's difficult to keep up with the latest guidelines and treatment protocols. We need more support to improve our skills and knowledge" (Berthod et al., 2017).

Accounting for (38%) agreed, while (17%) disagreed, (21%) neither agreed nor disagreed and 24% strongly agreed to this assertion, this is evident enough that public health institution face many challenges when implementing malaria prevention due to lack of community participation , lack of understanding, resistance to drugs and insecticide, financial challenges and climate change.

Public health interventions for malaria include vector control, pharmaceutical-based, environmental management early diagnosis, information, education and communication campaigns, the world health organization's consider these approaches to be fundamental to malaria eradication, however, coverage of these methods in WHO-African region is international targets.

4.4. Community Engagement and Behavioural Practices

(79.3%) of the respondents said yes regarding the effectiveness community engagement while (20.7%) said no.

Community engagement was identified as a critical factor influencing the effectiveness of malaria prevention efforts. Approximately 60% of community members reported participating in health education sessions organized by CHWs. However, only 45% consistently used ITNs, citing issues such as discomfort and lack of awareness about proper usage (Bendimerad, 2003). Focus group discussions revealed that culturally tailored health messages delivered by CHWs were more effective in encouraging preventive behaviors. CHWs who used local languages and involved community leaders in health education sessions reported higher levels of community participation and ITN usage. A CHW shared, "When we involve local leaders and use the local language, people are more willing to listen and take action. They trust the information more and are more likely to use ITNs and seek treatment" (Ashley, 2014). Traditional beliefs and misconceptions about malaria were also found to influence health-seeking behavior. Some community members attributed malaria to supernatural causes or environmental factors unrelated to mosquito bites. These misconceptions led to delays in seeking treatment and reduced compliance with preventive measures. A community member stated, "Some people still believe that malaria is caused by witchcraft or bad air. This makes them hesitant to use ITNs or go to the clinic for treatment" (Godschalk, 2003).

These findings underscore the importance of continuous community education and culturally sensitive communication strategies to improve the uptake of malaria prevention measures. Engaging community leaders and using local languages can help address misconceptions and encourage behavioral change (Godschalk, 2003).

Community engagement is a cornerstone of effective malaria prevention and control. Studies have shown that community involvement in health interventions leads to better health outcomes by promoting the adoption of preventive behaviors and increasing the use of healthcare services. Community health workers (CHWs) play a critical role in engaging communities, providing health education, distributing ITNs, and encouraging the use of preventive measures (Kelly-Hope & McKenzie, 2009). Research has demonstrated that CHWs who receive adequate training and support are more effective in mobilizing

communities and promoting health-seeking behavior. For instance, a study by Kelly-Hope and McKenzie (2009) found that communities with active CHWs had higher rates of ITN usage and lower malaria incidence compared to communities without CHWs. CHWs serve as a link between the healthcare system and the community, helping to bridge gaps in knowledge and access to healthcare services.

Cultural beliefs and misconceptions about malaria pose significant challenges to community engagement. In some communities, malaria is perceived as a normal part of life, reducing the perceived need for preventive measures. Misconceptions about the causes of malaria, such as associating it with supernatural forces or blaming it on environmental factors unrelated to mosquito bites, can hinder the adoption of preventive behaviors (Getahun *et al.*, 2010). The study showed that in Mwinilunga District, traditional beliefs about malaria transmission and treatment influenced health-seeking behavior, with some community members preferring traditional healers to formal healthcare services. Too often, malaria control activities are designed with little understanding of the cultural context in which they are supposed to operate. Relief agency staff become frustrated and angry that a seemingly good and logical proposal has failed to capture the interests of the at-risk populations for which it was designed. Additionally, decisions about whether to take action and which actions to take are often based on sociopolitical factors and not necessarily scientific data. These influences must be considered as well when attempting to engage agencies and at-risk populations in malaria control activities.

5. CONCLUSIONS

National malaria programs need to ensure that all people living in areas where the risk of malaria is high are protected through the provision, use and timely replacement of long-lasting insecticidal nets or, where appropriate, the application of indoor residual spraying. A second core intervention should not be introduced as a means of compensating for deficiencies in the implementation of the first. However, spraying may be added in certain situations in order to either prevent or mitigate resistance in areas where nets are routinely used – the decision being informed by local data. When those two interventions are deployed together, an insecticide with a different mode of action to that used on nets should be used for spraying. Supplementary methods may be appropriate in specific settings, for instance larval source. Increase international and domestic financing. There is an urgent need to increase and sustain high-level political commitment and the availability of predictable and long-term financing for malaria programmes. International donors are encouraged to maintain and increase commitments to malaria goals and programmes; new financing solutions should be conceived to tap into emerging development financing and private sector resources. Countries where malaria is endemic are urged to increase the domestic resources directed to strengthening health systems and combating the disease. The study came up with several recommendations from the study findings.

Increase Community Education Efforts: Expand health education programs using culturally sensitive communication strategies to improve the uptake of malaria prevention measures. Engage local leaders and use local languages to enhance the effectiveness of health education initiatives.

Strengthen Partnerships with Community Organizations: Collaborate with community-based organizations and traditional leaders to promote consistent use of ITNs and participation in malaria prevention activities. These partnerships can help build trust and encourage community involvement in health initiatives.

Address Cultural Beliefs and Misconceptions: Develop targeted campaigns to address misconceptions about malaria transmission and treatment. These campaigns should be designed to respect cultural beliefs while promoting accurate information and preventive behaviors.

Increase Funding for Malaria Control Programs: Allocate more resources to ensure the adequate supply of ITNs, RDTs, and antimalarial drugs. This funding should also support training programs, infrastructure improvements, and the establishment of robust surveillance systems.

REFERENCES

Abeku, T. A., Hay, S. I., Ochola, S., Langi, P., Beard, B., de Vlas, S. J., & Cox, J. (2004). Malaria epidemic early warning and detection in African highlands. *Trends in parasitology, 20*(9), 400-405. https://doi.org/10.1016/j.pt.2004.07.005

Aregawi, M. (2009). *World Malaria Report 2008*. World Health Organization. https://www.who.int/publications/i/item/9789241563903

Atkinson, J. A. M., Fitzgerald, L., Toaliu, H., Taleo, G., Tynan, A., Whittaker, M., ... & Vallely, A. (2010). Community participation for malaria elimination in Tafea Province, Vanuatu: Part I. Maintaining motivation for prevention practices in the context of disappearing disease. *Malaria journal, 9*, 1-16. https://doi.org/10.1186/1475-2875-9-93

Ashley, E. A., Dhorda, M., Fairhurst, R. M., Amaratunga, C., Lim, P., Suon, S., ... & White, N. J. (2014). Spread of artemisinin resistance in Plasmodium falciparum malaria. *New England Journal of Medicine, 371*(5), 411-423. https://doi.org/10.1056/NEJMoa1314981

Alam, K., Tasneem, S., & Oliveras, E. (2012). Performance of female volunteer community health workers in Dhaka urban slums. *Social science & medicine, 75*(3), 511-515. https://doi.org/10.1016/j.socscimed.2012.03.039

Berthod, D., Rochat, J., Voumard, R., Rochat, L., Genton, B., & D'Acremont, V. (2017). Self-diagnosis of malaria by travellers: a cohort study on the use of malaria rapid diagnostic tests provided by a Swiss travel clinic. *Malaria journal, 16*, 1-8. https://doi.org/10.1186/s12936-017-2079-2

Ababio, E. P. (2004). Enhancing community participation in developmental local government for improved service delivery. *Journal of Public administration, 39*(2), 272-289. https://hdl.handle.net/10520/EJC51327

Ababio, E. (2007). Marriage for development: ward committees as partners in participatory democracy. Journal of public administration, 42(7), 614-621. https://hdl.handle.net/10520/EJC51577

ADPC. (2004). *Building disaster risk reduction in Asia: A way forward.* Asian Disaster Preparedness Center. https://www.adpc.net/igo/contents/Publications/publications-Details.asp?pid=251

Albrito, P. (2012). Making cities resilient: Increasing resilience to disasters at local level. *Journal of Business Continuity and Emergency Planning, 5*(4), 291–297.

Bardhan, P., & Mookherjee, D. (2006). Decentralisation and accountability in infrastructure delivery in developing countries. *The Economic Journal, 116*(508), 101-127. https://doi.org/10.1111/j.1468-0297.2006.01049.x

Chikulo, B. (2009). Local governance reforms in Zambia: A review. *Commonwealth Journal of Local Governance*, (2), 98-106.

Bendimerad, S. (2003). *Disaster risk reduction and sustainable development.* World Bank. https://documents.worldbank.org/en/publication/documents-reports/documentdetail/998091468780326344/disaster-risk-reduction-and-sustainable-development

Bollin, C. (2003). *Community-based disaster risk management approach.* Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ). https://www.preventionweb.net/files/1136_CommunityBasedDRM.pdf

Bosher, L. (2008). *The need for built-in resilience. In Hazards and the Built Environment* (pp. 3–19). Routledge. https://doi.org/10.4324/9780203938675

Bosher, L., Dainty, A., Carrillo, P., & Glass, J. (2007). Built-in resilience to disasters: a pre-emptive approach. Engineering, Construction and Architectural Management, 14(5), 434-446. https://doi.org/10.1108/09699980710780728

Christopher, J. B., Le May, A., Lewin, S., & Ross, D. A. (2011). Thirty years after Alma-Ata: a systematic review of the impact of community health workers delivering curative interventions against malaria, pneumonia and diarrhoea on child mortality and morbidity in sub-Saharan Africa. *Human resources for health, 9*, 1-11. https://doi.org/10.1186/1478-4491-9-27

Chanda, P. (2011). Assessment of the use of artemisinin-based combination therapy and rapid diagnostic tests by community health workers for the management of malaria in children under five years: A pragmatic cluster-randomized trial in Zambia. *Malaria Journal, 10*(1), 10. https://doi.org/10.1186/1475-2875-10-10

Chinbuah, M. (2013). Feasibility and acceptability of rapid diagnostic tests for malaria diagnosis in Ghana: Experiences from trial implementation within the Integrated Management of Childhood Illness programme. *Transactions of the Royal Society of Tropical Medicine and Hygiene, 107*(9), 540–547. https://doi.org/10.1093/trstmh/trt055

Cohen, J. M., Smith, D. L., Cotter, C., Ward, A., Yamey, G., Sabot, O. J., & Moonen, B. (2012). Malaria resurgence: a systematic review and assessment of its causes. *Malaria journal, 11*, 1-17. https://doi.org/10.1186/1475-2875-11-122

Counihan, H., Harvey, S. A., Sekeseke-Chinyama, M., Hamainza, B., Banda, R., Malambo, T., ... & Bell, D. (2012). Community health workers use malaria rapid diagnostic tests (RDTs) safely and accurately: results of a longitudinal study in Zambia. *The American journal of tropical medicine and hygiene, 87*(1), 57. https://doi.org/10.4269/ajtmh.2012.11-0554

DMC-SL. (2005). *Towards a safer Sri Lanka: Road map for disaster risk management.* Disaster Management Centre.

Druetz, T., Corneau-Tremblay, N., Millogo, T., Kouanda, S., Ly, A., Bicaba, A., & Haddad, S. (2017). Impact evaluation of seasonal malaria chemoprevention under routine program implementation: a quasi-experimental study in Burkina Faso. *The American journal of tropical medicine and hygiene, 98*(2), 524. https://doi.org/10.4269/ajtmh.17-0599

Dubbeling, M. (2009). Building resilient cities. *Urban Agriculture Magazine, 22*, 3–11. https://www.ruaf.org/sites/default/files/UAM22_0.pdf

Godschalk, D. R. (2003). Urban hazard mitigation: Creating resilient cities. *Natural Hazards Review, 4*(3), 136–143. https://doi.org/10.1061/(ASCE)1527-6988(2003)4:3(136)

Getahun, A., Deribe, K., & Deribew, A. (2010). Determinants of delay in malaria treatment-seeking behaviour for under-five children in south-west Ethiopia: a case control study. *Malaria Journal, 9*, 1-6. https://doi.org/10.1186/1475-2875-9-320

Government of Sri Lanka and Development Partners. (2005). *Post tsunami recovery and reconstruction.* Ministry of Finance and Planning.

Haigh, R., & Amaratunga, D. (2010). An integrative review of the built environment. *Journal of Disaster Resilience in the Built Environment, 1*(1), 11–24. https://doi.org/10.1108/17595901011026454

Kathleen, W. (2002). *A review of control methods for African malaria vectors.* USAID. https://pdf.usaid.gov/pdf_docs/PNACT874.pdf

Kelly-Hope, L. A., & McKenzie, F. E. (2009). The multiplicity of malaria transmission: a review of entomological inoculation rate measurements and methods across sub-Saharan Africa. *Malaria journal, 8*, 1-16. https://doi.org/10.1186/1475-2875-8-19

Kok, M. C. (2015). Performance of community health workers: Optimizing the benefits of their unique position. *Human Resources for Health, 13*(1), 1–7. https://doi.org/10.1186/s12960-015-0092-5

Mwendera, C., de Jager, C., Longwe, H., Phiri, K., Hongoro, C., & Mutero, C. M. (2016). Malaria research and its influence on anti-malarial drug policy in Malawi: a case study. *Health Research Policy and Systems, 14*, 1-14. https://doi.org/10.1186/s12961-016-0108-1

Republic of South Africa (RSA). (2000). *Local Government Municipal Systems Act 32 of 2000.* Government Printer.

Zambia National Government. (n.d.). Parliament of Zambia. http://www.parliament.gov.zm