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Original Paper

Socio-economic and Socio-cultural factors affecting malaria control interventions in Zambia: *A Survey of Milenge District, Luapula Province*

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ABSTRACT

Background: Malaria remains one of the leading causes of morbidity and mortality in Zambia. Despite Zambia implementing a number of interventions aimed at controlling malaria, the disease prevalence remains high (above 50%) in Milenge district, Luapula province. This is a cause of great concern. The aim of this study was to determine key socio-economic and socio-cultural practices affecting malaria control interventions among communities in Milenge district.
Methods: A cross-sectional survey was conducted at four rural Health Centres in Milenge district in 2015. A total of 192 randomly selected adult patients and/or their caregivers were interviewed using a structured questionnaire. Descriptive and inferential statistics were used to analyse data using Statistical Package for Social Sciences (SPSS) version 20 software.
Results: Farming and fishing was the most common occupation among respondents (91.15%, n=175) indicating a low socio-economic status. Educational level ($p<0.001$; $\chi^2=29.52$), occupation ($p<0.003$; $\chi^2=16.07$) and monthly income ($p<0.001$; $\chi^2=23.80$) significantly associated with knowledge of malaria transmission and prevention interventions. Although there was a strong association between knowledge of malaria transmission and use of ITN for malaria ($p<0.001$; $\chi^2 = 31$), about 20% indicated using unconventional methods such as indigenous local herbs to treat or prevent malaria and 3% reported consulting traditional healers.
Conclusion: Low socio-economic status was the main key factor affecting malaria control interventions in Milenge district. Socio-cultural practices such as traditional belief systems and use of unconventional herbal medicines were still practiced in spite of sufficient knowledge of malaria transmission and the use of ITN for malaria. The socio cultural factors that came up as affecting malaria control are the migration practices of the fishermen.

Key words: Malaria, social-economic, socio-cultural factors, preventive measures, malaria control interventions, Zambia

1. Introduction

Malaria is a life-threatening infectious disease caused by the protozoan parasite Plasmodium. According to the World Health Organization (WHO) 2015 fact sheet, an estimated 214 million cases and 438 000 deaths of malaria occurred in 2015 [1]. Between 2000 and 2015, malaria incidence fell by 37% globally; during the same period, malaria mortality rates decreased by 60%. Remarkably, an estimated 6.2 million malaria deaths have been averted globally since 2000 [1]. However, Sub-Saharan Africa (SSA) region which continues to carry a disproportionately high share of the global malaria burden was estimated to record 89% of global malaria cases and 91% of global malaria deaths by the end of 2015. Moreover, about 15 countries in SSA account for majority (80%) of malaria cases and 78%

deaths globally [1].

A growing body of evidence links malaria control measures to a number of socio-economic and cultural factors in many African countries. Hlongwana and colleagues [2], in Swaziland highlighted that success of malaria control measures can sometimes be influenced by the community in which such measures are being implemented. Similarly, Jombo and others [3] in Nigeria found that failure in malaria control was attributable to the continued failure to consider community malaria related socio-cultural factors. These factors may be at variance with standard control measures and account for the sustained prevalence of malaria in Africa. On the other hand, a study by Haji and colleagues [4] conducted in Zanzibar revealed that malaria control can be achieved through understanding and redirection of residents' behavioural patterns as a strong support for the control measures administered. In rural Benin, Mensah & Kumaranayake [5] found that predisposing characteristics of the household head such as age, knowledge of malaria, education, and the size of the household significantly had an impact on the incidence of malaria. Elsewhere, Yadav and others [6] in their study in India found that that level of education, type of occupation and economic status were responsible for giving the environment for transmission of malaria in their setting. Clearly, national strategies aimed at reducing malaria transmission and spread may therefore need to incorporate socio-economic determinants operating at community level in order to produce positive outcomes in populations at risk.

In Zambia, Malaria is endemic in all parts of the country [7]. It also remains one of the leading causes of morbidity and mortality [8]. In a growing population of about 15 million people distributed within 10 provinces [9], the malaria burden in Zambia is divided into three epidemiological zones: Zone 1— Areas where malaria control has markedly reduced transmission and parasite prevalence is <1% (e.g. Lusaka province and surrounding districts); Zone 2 — Areas where sustained malaria prevention and control have markedly reduced transmission and where parasite prevalence is between 1% and 14% in young children at the peak of transmission (e.g. Central, Copperbelt, North-Western, Southern, and Western Provinces, respectively); Zone 3 — Areas where progress in malaria control has been attained, but not sustained; where lapses in prevention coverage have led to resurgence of infection and illness; and where parasite prevalence in young children is 15% or more at the peak of the transmission season (e.g. Eastern, Luapula, and Northern and Muchinga province, respectively) [7]. Zambia, like other WHO member states, has adopted the three key interventions strategy to control malaria which include: prompt and effective treatment with artemisinin-based combination (ABC) therapies; use of insecticide treated nets (ITNs) by populations at risk; and indoor residual spraying (IRS) with insecticide to control the vector mosquitoes [1, 10]. Other malaria preventive measures include intermittent preventive treatment in pregnancy (IPTp), intermittent preventive treatment in infants (IPTi) and larval source management such as larval habitat manipulation /modification [1].

Despite these malaria control interventions being implemented, some of the areas in the world particularly in sub-Saharan Africa are still experiencing high malaria prevalence [1] possibly due to failure of these malaria control measures to achieve the desired target. Zambia, a low-middle-income country (LMIC), faces a number of social-economic and cultural factors which influence patterns of malaria transmission. This is in addition to agricultural development practices and population movement. Within the geographical landscape of Zambia, it is not uncommon to find that some malaria control interventions which have been successful in some areas may not produce desired results in other areas of the country. Arguably, this may be due to interplay numerous and diverse socio-cultural and socioeconomic factors among other reasons.

Milenge District is the most southerly district in the Luapula Province of Zambia. According to the 2010 Zambia National Census of Population, the population in Milenge district was about 43,649 people. The district is rural and under- developed, lacking decent roads and transport infrastructure. Its southern boundary is the Luapula River which divides Zambia from DR Congo. The district lies roughly between the Chembe Ferry to Mansa road in the west and the Kapalala Ferry to Samfya road in the east *(Figure 2)*. A single gravel road runs through the central part of the district from Chembe in the west following the north-west bank of the Lwela River, passing through Milenge Boma, Milambo and Lwela Mission, eventually connecting to the provincial capital, Mansa in the north-west. Majority of the population in the district lives along the shallow valley of the Lwela River. The district is gently undulating flat plateau with an elevation of about 1200m, consisting of woodland and wooded grassland interspersed with dambos [11].

Culturally, Milenge has two main ethnic tribes: the Ushi and Lala people that have settled in district for many years. The Ushi is the main ethnic grouping and its people mostly practice subsistence farming in the district. In the western part of the district, an agricultural system locally called *'chitemene'* system is practiced, while fishing is done in the eastern part of the district. With the district devoid of major industrial economic activity, peasant farming and informal fishing are practiced by most dwellers. Illiteracy levels remain high with most parents opting to withdraw their children from school in preference to have them help in farming and fishing [12].

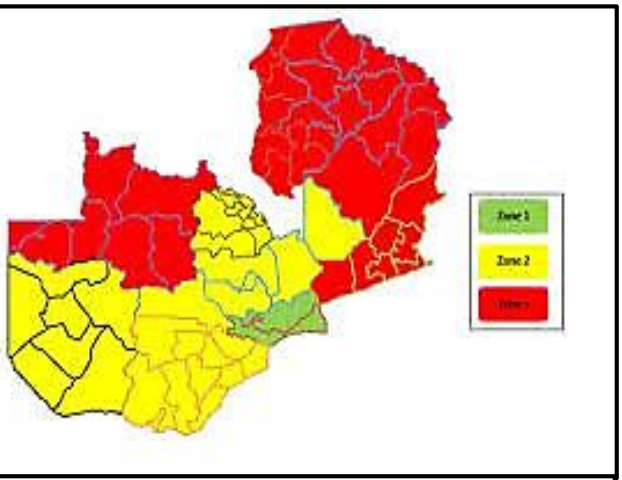

Figure 1: Malaria epidemiological zones. [Source: 2015 Zambia Malaria Operational Plan (Available at: https://www.pmi.gov/docs/default-source/default-document-library/malaria-operational-plans/fy-15/fy-2015-zambia-malaria-operational-plan.pdf?sfvrsn=3)

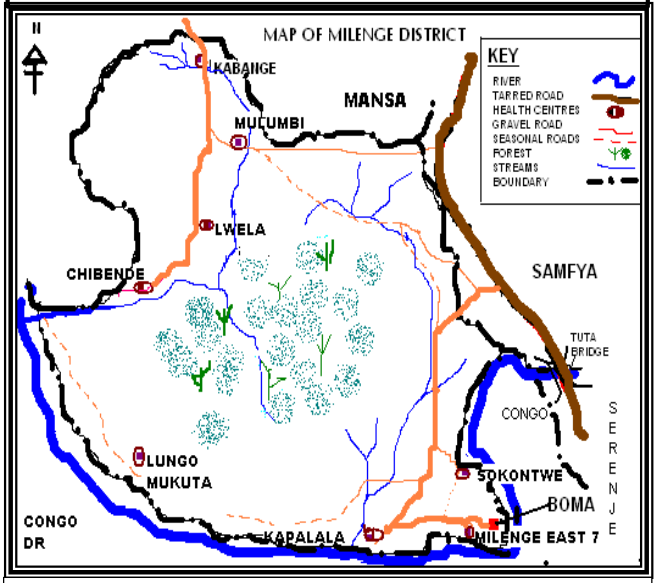

Figure 2: Map of Milenge district in Luapula province of Zambia. [Source: http://www.luapulaprovince.gov.zm/districts/milenge.html]

Located in Zone 3 of epidemiological zones, Milenge district is one of the area in Zambia were Malaria disease prevalence is still high with over 51% confirmed cases in 2014. This is of great concern. According to the 2015 District Action Plan for Milenge district, Malaria was ranked as the top cause of morbidity and mortality in the district in 2014 with an estimated prevalence of about 500 per 1000 of population [12]. Preliminary data obtained from the District Health Management Information System (DHMIS) revealed an upsurge in malaria cases in the past five years (2010 – 2015) in Milenge district *(Table 1)*.

The Government Republic of Zambia through its Ministry of Health (MoH) has in the recent past invested huge resources to implement WHO recommended malaria control measures in Milenge district. This has been done at no cost to the population in an effort to combat the infectious disease. Despite the lack of a district hospital in the area, key health services continue to be provided by the District Health Management Team (DHMT) through its rural health centres. Among these services include, malaria diagnosis and treatment, IPTs services to pregnant women, and community preventive services such as IRS and ITN distribution etc. Patients requiring higher level of care are referred to Mansa General Hospital for further treatment and care. Notwithstanding these efforts, the overall prevalence of malaria infection remains relatively high, particularly among the under-five children *(Table 1)* [12]. There could be several reasons which explain this occurrence in Milenge district where the nationally desired decline in malaria prevalence has seemingly been challenging to attain.

This study aimed to explore the community-related socio-economic and cultural factors affecting malaria control interventions in Milenge district. As Mensah & Kumaranayake [5] earlier highlighted, variations in socio-economic characteristics are significant in explaining the incidence of malaria, even in an endemic malarial setting. An understanding of the community-related factors that affect the success of malaria control interventions in Milenge District is vital. This will help the Ministry of Health design effective strategic interventions that will address identified barriers to malaria control measures in the district. Consequently, the attendant specific objectives were to identify demographic characteristics of the communities' relation to malaria control measures in place in the district; identify social, economic and cultural practices, including belief systems surrounding malaria control, and determine the relationship between community knowledge of malaria and practice of prevention interventions.

2. Methodology

Study design & setting

A cross-sectional survey was conducted in Milenge district, Luapula province of Zambia. Stratified random sampling was used to selected study sites and participants. Out of eight rural health centers in Milenge district, four were randomly selected namely Lwela, Kapalala, Sokontwe and Milenge East health centres, respectively.

Study population

The study population consisted of adult patients aged >20 years and/or their caregivers who were accessing health services at the study sites at the time of data collection.

Table 1. *Malaria prevalence trends in Milenge District (2010 – 2014)*

Variables	2010	2011	2012	2013	2014
Confirmed cases under 5 years	7286	11602	12848	14423	13920
Confirmed cases above 5 years	6011	8740	10167	11522	13525
Total confirmed cases	13297	20342	23015	25945	27445
Prevalence confirmed cases			**47%**	**50%**	**51%**
Clinical cases under 5 years	1451	1300	2052	4500	1932
Clinical cases above 5 years	1343	1490	2275	3895	2450
Total clinical cases	2794	2790	4327	8395	4382
Total cases confirmed and clinical	16091	23132	27342	34340	31827
District population			**49384**	**51730**	**54127**

Source: Milenge District Health Management Team, DHMIS 2015

Sample size determination

A representative sample of 381 participants was estimated using the formula: $n = Z^2P(1\text{-}P)/e^2$ where; $Z = (1.96)^2$ for 95% confidence interval set at $\alpha = 0.05$; P = prevalence estimate at 0.53 (based on 53% prevalence estimate); e = maximum tolerable error at 5% (i.e. ±0.05) for the prevalence estimate based on a population size estimate of 54,000 (current local DHMT estimate). The sample was further stratified by facility where 192 participants were attained (i.e. 48 participants attained at each of the four selected health facilities in the district), giving a response rate of 50.4%.

Data collection

A structured interviewer-administered questionnaire was used to collect quantitative data. Variables of interest included: demographic and socioeconomic characteristics, cultural practices and knowledge about malaria transmission, symptoms and prevention practices. The data collector (undergraduate pharmacy student) was trained in interview techniques. For purposes of collecting data, the questionnaire was directly translated in the indigenous local language Bemba spoken in the area. Field data collection was undertaken for 30 days in March 2015.

Data analysis

Quantitative data analysis was done using SPSS v.20 *(IBM SPSS Inc., Chicago, IL, USA)* and tables generated using Microsoft Excel 2010 software. Frequencies and proportions were used to describe variables of interest. Pearson's Chi-square test with continuity correction was used to determine associations between dependent and independent variables. Where more than 20% of the expected frequency was <5, Fisher's exact test was used. For statistical significance, a p-value <0.05 was accepted.

Ethical considerations

Ethical approval was granted by the University of Zambia, School of Medicine Research Ethics Committee *(IRB00001131 of IORG0000774)*. Informed consent was obtained from each participant. All data collected was confidentially managed and no names of participants or the personal details were used at any time. Permission to conduct the study at public health facilities was obtained from the Ministry of Health District Medical Office and facility officer in-charge, respectively.

3. Results

Demographic characteristics of respondents

The sample consisted of 37% (n=71) males and 63% (n=121) females. The majority of the respondents were aged between 25 and 35 years representing 61.98% (n=119), with the least being those aged above 55 years old 6.77% (n=13). Also, about 76% (n=146) were married. Further, the majority of the participants had no formal education and very few, less than 50%, attained primary, secondary and tertiary education, respectively. Farming and fishing was the most common occupation among respondents (91.15%, n=175). Additionally, most respondents (52.08%) indicated migrating to farming and/or fishing camps where the dwelling is mostly temporal as pointed out by 51.04% (n=98) of the respondents. In terms of the monthly income, most respondents (72.4%, n=139) earned less than ZMW300 (approximately US$0.3) per month whereas those who earn above ZMW1000 (approximately US$10) per month accounted for only 10.4% (n=20).

Knowledge of malaria transmission and prevention

Understanding how people think malaria is transmitted is a major step in comprehending control measures used. Table 3 shows that most of the respondents over 50% (n=100) rightly pointed out that malaria can be transmitted to humans by mosquito bites infected with malaria parasites. This is followed by those who think a combination of getting soaked in rain water and mosquito bites, about 23.44% (n=45), can transmit malaria.

Table 2. *Socio-economic and demographic characteristics of respondents (n = 192)*

Characteristics	Proportion (n, %)
Gender	
• Male	71 (36.98%)
• Female	121 (63.02%)
Age group	
• 25-35 years	119 (61.98%)
• 36-45 years	46 (23.96%)
• 46-55 years	14 (7.29%)
• >55 years	13 (6.77%)
Marital status	
• Single	33 (17.19%)
• Married	146 (76.04%)
• Others	13 (6.81%)
Highest education level attained	
• No formal education	102 (53.13%)
• Primary	65 (33.85%)
• Secondary	13 (6.77%)
• Tertiary	12 (6.25%)
Main source of Income	
• Farming/fishing	175 (91.15%)
• Formally employed	12 (6.25%)
• Others	9 (4.69%)
Migrate to farming or fishing camp	
• Yes	100 (52.08%)
• No	92 (47.92%)
House at the farming or fishing camps	
• Permanent house	2 (1.05%)
• Temporal house	98 (51.58%)
• Other	90 (47.37%)
Estimated Monthly Income	
• < ZMW300	139 (72.40%)
• ZMW300-1000	33 (17.19%)
• >ZMW1000	20 (10.42%)

Table 3. *Individual and combined transmission modes*

Sets of transmission modes	Proportion (n, %)
Bite of mosquitos infected with malaria parasites only	100 (52.08%)
Bite of mosquitos infected with malaria parasites and other	15 (7.81%)
Getting soaked in rain water only	1 (0.52%)
Getting soaked in rain water and bite of mosquitos infected with malaria parasites	45 (23.44%)
Getting soaked in rain water, bite of mosquitos infected with malaria parasites and other	27 (14.06%)
Getting soaked in rain water, bite of mosquitos infected with malaria parasites and witchcraft	2 (1.04%)
Other	2 (1.04%)
Total	192 (100.00%)

Table 4. *Use of WHO recommended malaria control measures*

Individual and combined Interventions	Proportion (n, %)
None of the preventive measures	1 (0.52%)
Trimming bushes around the house only	1 (0.52%)
Sleeping in bed nets only	35 (18.23%)
Sleeping in bed nets and trimming bushes around the house only	116 (60.42%)
Sleeping in bed nets and spraying insecticide	4 (2.08%)
Sleeping in bed nets, spraying insecticide and trimming bushes around the house	35 (18.23%)
Total	192 (100.00%)

The World Health Organization (WHO) recommends 3 key interventions to control malaria and these include: prompt and effective treatment with artemisinin-based combination therapies; use of insecticide treated nets (ITNs) by people at risk; and indoor residual spraying with insecticide to control the vector mosquitoes [1]. Other malaria preventive measure includes intermittent preventive treatment in pregnancy (IPTp), intermittent preventive treatment in infants (IPTi) and larval source management such as larval habitat manipulation /modification [11]. Table 3 shows the use of individual and combined malaria control measures by participants in the sample. Among the WHO recommended control measures analysed include: (1) the use of bed nets, (2) spraying insecticide and (3) trimming bushes around the house (as larval habitat manipulation). In the sample, the majority (60.4%) of the respondents indicated using a combination of Sleeping in bed nets and trimming bushes around the house only, followed by those

who use sleeping bed nets only and a combination of sleeping in bed nets, spraying insecticide, and trimming bushes around the house only who accounted for about 18% of the sample.

Cultural practices and beliefs influencing malaria control interventions

While analysis of methods adopted for treatment of malaria by the respondents reviewed that: all (100%, n = 192) respondents indicated visiting the health facilities (hospital\clinic) in the district, only about 20% (n=38) indicated using unconventional methods such as indigenous local herbs to treat or prevent malaria and very few (3%) consulting traditional healers (Table 5). To determine whether there is a relationship between malaria control interventions employed by the participants and their demographic and socio-economic characteristics among others, this study made use of the chi-square analysis. Table 6 presents the chi-square test results. Among the participants' characteristics analysed, the results show that only their education level, occupation and monthly income have a statistically significant with malaria control measures. This is evident given the large chi-square values which are, respectively, 30, 16 and 24 and small p-values <0.05.

In contrast to the foregoing chi-square test results, Table 7 shows the results of the chi-square test between knowledge of malaria transmission by mosquito bite and different, specific, malaria prevention measures as pointed out by the respondents. The results indicate existence of a relationship with the use of bed nets with a chi-square (χ^2) value of about 31 and a p-value <0.001.

4. Discussion

Demographic and socio-economic factors

The majority of the participants in the sample were female. Also, the majority fell in the youth age group and more than half are married. Slightly more than half have no formal education and the main source of income is farming/fishing with less than ZMW300 (~US$0.3) as the monthly income, for the majority. Owing to their livelihood activities, most of the participants migrate to farming/fishing camps where the housing structures are temporal. Such evident limited financial resource base and potentially poor housing infrastructure during farming/fishing periods signal limited use of malaria control measures.

Knowledge of malaria transmission and prevention

Regarding knowledge about malaria, the findings show that a few had misconceptions on how malaria is transmitted and believed it could be transmitted by other means other than mosquito bites. This is in line with a study done in Nigeria where the same trend was also reported [18]. Slightly more than half of the respondents indicated otherwise. This indicates knowledge of how malaria is transmitted may have an effect on malaria control measures used. In turn this has an implication for the persistent high disease burden experienced in the district. Among the WHO recommended malaria preventive measures and others, a combined use of bed nets and larval habitat manipulation were most practiced by the majority of the respondents. Less than half of the sample indicated using sleeping beds nets only and a combination of bed nets, spraying insecticide and larval habitat manipulation. This shows that participants mostly use multiple malaria preventive measures as opposed to just one.

While the entire sample indicated going to the health centre/clinic to seek malaria treatment, some of them still pointed out other alternatives such as consultation with a traditional healer and the use of local herbs. This to some extent shows the degree to which cultural practices are employed. Further analysis showed that the education level, occupation and monthly income of the participants are the only factors with a statistically significant relationship with malaria control measures. Low level of formal education is mostly to negatively affect adoption of some malaria prevention measures. This is possibly due to the fact that, those who have acquired higher level of formal education are better able to comprehend and appreciate new malaria prevention innovations. Such individuals are able to understand health education messages such as correct use of ITNs and malaria drugs from health care workers. Moreover, the knowledge that malaria transmission by mosquito bite, specifically, significantly influences the use of sleeping bed nets as a malaria prevention intervention.

Socioeconomic activities and their influence on malaria control

Regarding occupation, certain occupations may bring people into contact with infected anopheles mosquitoes [13]. Farming and fishing were the primary occupation of the majority of the respondents in the study area. This was understandable, given the rural nature of the district. Since farming and fishing tend to increase human and vector contact, occupation was found to be one of the factors which are at variance with malaria control measures aimed at decreasing human-vector contact in the district. The results of this study are in line with the findings by WHO [13] and Sharma [14]. Evidence from the WHO [13] suggested that the occupations in agricultural sector are the most risky when it comes to malaria infection and transmission. In India, Sharma [14] found that many people continue to struggle between the balance of providing their daily basic necessities and engaging in the fight against

malaria. Similarly in Zambia, many people in Milenge district tend to neglect malaria prevention and control measures while engaging in agricultural practices that put them at risk of malaria infection, just to earn a living.

In addition, the monthly income may positively or negatively influence malaria control measures. The effect maybe positive if part of the financial resources are used to purchases ITNs, insecticides and afford decent housing structures limiting their exposure to malaria transmitting vectors, assuming the level of income is large enough for the household of course. Conversely, the effect maybe negative for financially constrained households with a lot of competing needs for the little income earned. These arguments are somewhat consistent with those by Mwange [15], who reported that poor people tend to have worse malaria practices compared to the non-poor. Other scholars [6] [16] argued that Malaria is a disease of poverty because wealthy people can often afford better protective measures against malaria infection. Even though the relationship between migration to farming/fishing camps and malaria prevention measures was found to be insignificant, it might be hindering malaria control measures in the district. Many people who rely on farming/fishing as their main occupation tend to migrate to fishing/farming camps. This traditional practice puts the community at greater risk of malaria infection since they dwell in temporal grass-thatched houses, which offers little protection against human vector contact. Furthermore, these migrants tend to settle in far flung areas across the Luapula River in the Democratic Republic of Congo where health services provided by the government are not available. This in turn limits access to prompt treatment of malaria cases. This socio-cultural practice of seasonal migration most likely leads to poor treatment seeking behaviour due to long distances from farms and/or fishing camps to health service provision points in the district.

Limitations of the study

This survey was limited to selected communities of Milenge district and thus the findings may not be generalizable to the entire population of Luapula province. Moreover, the cross-sectional nature of the study did not explore the element of causation. Further study using a longitudinal approach and qualitative paradigm may be required to better understand the phenomena at play in Milenge district and to generate a testable hypothesis.

Recommendations

Findings of this study reveal that high malaria prevalence in Milenge district is being potentially exacerbated by socio-economic factors and socio-cultural practices among communities in the district. The Ministry of Health will do well to design and implement context-specific and locally targeted community education interventions to address the knowledge gaps impeding effective malaria control in Milenge district.

5. Conclusion

Low socio-economic status was the main key factor affecting malaria control interventions in Milenge district. Socio-cultural practices such as traditional belief systems and use of unconventional herbal medicines were still practiced in spite of sufficient knowledge of malaria transmission and the use of ITN for malaria. The socio cultural factors that came up as affecting malaria control are the migration practices of the fishermen.

Declaration of interest:

The authors declare no conflict of interest associated with this work.

Author contributions:

EZ conceptualized the study and developed the protocol. GM supervised collection of data, ACK, MM and AB analysed the data. All authors contributed to developing this article.

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FACTS ABOUT MALARIA

Malaria is a life-threatening disease caused by parasites that are transmitted to people through the bites of infected female *Anopheles* mosquitoes. Symptoms usually appear *10–15 days* after the infective mosquito bite. The first symptoms – fever, headache, and chills– may be mild and difficult to recognize as malaria. *If not treated within 24 hours*, *P. falciparum* malaria can progress to severe illness, often leading to death.

Children with severe malaria frequently develop one or more of the following symptoms: *severe anaemia, respiratory distress in relation to metabolic acidosis, or cerebral malaria*. In adults, multi-organ involvement is also frequent. In malaria endemic areas, people may develop partial immunity, allowing asymptomatic infections to occur. Between *2010 and 2015*, malaria incidence among populations at risk (the rate of new cases) *fell by 21% globally*. In that same period, malaria mortality rates among populations at risk fell by 29% globally among all age groups and by 35% among children under 5. Despite a 60% fall some provinces in Zambia still show a high incidence of malaria. The WHO African Region carries a disproportionately high share of the global malaria burden. *In 2015, the region was home to 90% of malaria cases and 92% of malaria deaths*. In Zambia more than four million people are affected by malaria and it accounts for *30% out-patient visits, 50% under 5 hospital admissions and 20% maternal deaths.*

Malaria is *preventable and curable*, and *increased efforts* are *dramatically reducing the malaria burden in many places*. Vector control (*insecticide-treated mosquito nets and indoor residual spraying – are effective in a wide range of circumstances*) is the main way to prevent and reduce malaria transmission. Anti-malarial medicines can also be used to prevent malaria especially for travelers from non-endemic areas. *Early diagnosis* (RDT kits have been made available at health institutions in Zambia) and *treatment of malaria reduces disease and prevents deaths*. It also contributes to reducing malaria transmission. The best available treatment, particularly for *P. falciparum* malaria, *is artemisinin-based combination therapy (ACT) and for severe malaria Quinine is still the drug of choice.*

"The importance of Pharmacists in Malaria Control is to provide Awareness & Concern about Vector Control because insufficient awareness in the community leads to high morbidity & mortality. Easy accessibility to the Pharmacist puts them at an advantage to counsel the community on awareness about causes, preventive measures, symptoms, diagnosis (emphasis on importance of blood smear examination), treatment and rational use of prescribed medicines".