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# Assessing The Knowledge, Attitude and Practices of Malaria Prevention and Treatment in Mansa District, Luapula Province, Zambia

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## ABSTRACT

**Introduction:** Malaria continues to be a major public health problem in Zambia with more than 16 million people at risk and 2015 estimates show that there were over 5 million malaria cases. Children under five years and pregnant women are at the greatest risk. Despite Zambia's interventions including universal insecticide-treated bed-net (ITN) coverage and indoor residual spraying (IRS) in targeted areas strides in the fight against malaria, the situation in Luapula Province is totally different with the highest incidence in pregnancy, 131/1000 in 2013, 207/1000 in 2014, and 177/1000 in 2015. This research therefore assessed the knowledge, attitudes, and practices of malaria prevention and treatment in Mansa, Luapula province of Zambia.

**Material and Methods:** A descriptive cross-sectional study design adopting both qualitative and quantitative study approaches was used on 270 study participants who included community members, pregnant women and health personnel in Mansa ward of Mansa district. The participants were sampled using simple random and purposive sampling techniques. Data was collected using questionnaires, interview guides, and focus group discussions. The quantitative data was analyzed using SPSS statistical software, while the qualitative was thematically analyzed.

**Results:** Out of the 270 participants**,** knowledge of malaria transmission being due to mosquito vector was very high and seen in 270 (100%), however, other perceptions of transmission were; drinking contaminated water 3(1.1%), eating a lot of mangoes 7(2.6%) and coming in contact with a sick patient 207(76.7%). Participants negative attitudes stood at 196 (72.6%) and bad practices was 153(56.7%). Education level was strongly associated with knowledge (p=0.000), attitudes (p=0.001) and practices (p=0.004).

**Conclusion:** Even though knowledge levels on malaria were high and comparable to other studies, however, some attitudes and practices were negative among the participants. On the contrary, healthcare providers had the right attitude towards malaria prevention and control. Community Health Workers are very important in the fight against malaria. The study recommends that creating health promotion messages taking into account the illiterates, involvement of traditional leaders, and giving incentives to community health workers can help in the fight against malaria in Luapula Province.

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## INTRODUCTION

Despite rapid upscale of insecticide-treated nets (ITNs) and indoor residual spraying (IRS), malaria remains a major source of morbidity and mortality in Zambia [1]. Uptake and utilization of these and novel interventions are often affected by knowledge, attitudes, and practices (KAP) amongst persons living in malaria-endemic areas including pregnant women. In Zambia malaria is not just a public health concern, but also a developmental challenge to the nation. On average, there are an estimated 20,000 cases of malaria per day in Zambia with an average of four deaths per day [2]. Malaria infection is a major cause of maternal death,

maternal anaemia, and adverse pregnancy outcome (spontaneous abortion, preterm delivery, growth restriction/low birth weight, stillbirth, congenital infection, and neonatal mortality) in areas, where malaria infection commonly occurs in pregnant women [3].

Malaria is a major cause of morbidity and mortality in Zambia, particularly in highly endemic areas among pregnant women and children under 5 years. The Country is among the 20 countries with the highest malaria incidence and mortality globally, the country carries 1.4% of the flocal malaria case and death burden and 6% of the case burden in East and Southern Africa [4].

According to the USAID Presidents Malaria Initiative FY 2022 Zambia Malaria Operational Plan, the risk of malaria is highest in wetter, rural, impoverished provinces of Luapula, Northern, Muchinga and North Western (11-30% prevalence in 2018) and lowest in Lusaka province (0.1%) and Southern province (<0.1%). This is evidenced by the National malaria incidence which was 386/1000 persons in 2013, 409/1000 in 2014, and 335/1000 in 2015. North-western Province recorded the highest total incidence of 867/1000 and 847/1000 in 2013 and 2015 respectively. In 2013, 51% of cases were laboratory-confirmed; however, this increased to 80% of malaria cases by 2015 [6]. 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 years children (756/1000) compared to 5 years and older (275/1000) [6].

In spite of the interventions being put in place by the government to eliminate malaria in Zambia, there is still a problem when it comes to the knowledge, attitude and practices regarding prevention and treatment of malaria. Most people wait until the problem worsens before they visit the clinic. According to Emebet (2017) [7] there is lack of consistency in delivery of malaria prevention methods and education for pregnant women at ANCs. Gomez-Perez *et al*. (2014) [8] reported that despite the problem of low coverage in pregnancy across the country, pregnant women are still prone to malaria.

Notwithstanding the fact that malaria is still a serious problem, in some parts of Zambia, many pregnant women are still not taking advantage of the available malaria prevention methods delivered by malaria intervention programs. This research, therefore, sought to assess the knowledge, attitudes and practices of malaria prevention and treatment in Mansa District of Zambia. The results will help the policymakers on management of malaria in the study area.

## MATERIAL AND METHODS

### *Research Design*

The research design used in this research was a cross-sectional descriptive study. The design was chosen as it is considered the most appropriate, relevant and provided the needed data at less financial cost and in the shortest possible time.

### *Sample*

To estimate the sample size, Slovin's formula was used:

$$n = \frac{N}{1+(N)(e)2},$$

where: n = sample size, N = population and, e= desired margin of error. In this study N =29,029, e = 0.05

$$n = \frac{29,039}{1+(29,039)(0.05)2}$$

$$n = \frac{29,039}{1+(29,039)(0.0025)}$$

$$n = \frac{29,039}{1+72.5975} = \frac{29,039}{73.5975} = 395$$

Therefore, the proposed sample size was 395.

However, only 270 individual respondents, with two focus group discussions and three in-depth interviews with Sisters in charge at the three healthcare facilities in the Ward were sampled due to challenges related to data collection as a result of the Covid-19 pandemic.

### *Sampling Procedures and Data Collection*

The participants included in the study were community members of Mansa ward which also included pregnant women and Health workers. Simple random sampling was used to select the community members. Also included in the study participants were selected Healthcare providers from all three facilities in the area which included the Sister-In-charge at the Health facilities and a healthcare provider at the ANCs.

The sample size of 270 comprised community members from the zones divided as 30 participants from seven wards and 60 participants from the Senama First Level Hospital ward because it has a bigger catchment area. For the two FDGs, one comprised 10 pregnant women who came for ante-natal services and the other was composed of seven Community Health Workers from the three Health Care Facilities. The in-depth interviews were conducted with the Sisters in charge of the Health Facilities.

Questionnaires were administered to participants by hand and face-to-face interviews were conducted on participants. This was done by research assistants, drawn from the Ward Development Committee, who were trained by the Principal Researcher before the administering of the questionnaires. The questionnaires



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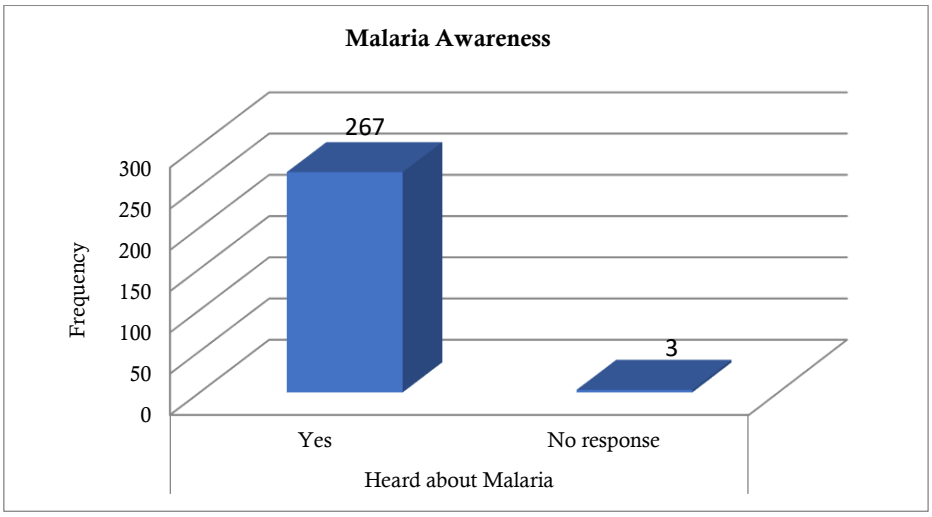



**Fig. 1.** Malaria Awareness

**Table 1.** Malaria Transmission

| Malaria Transmission | Frequency | Percentage |
|---|---|---|
| Drinking contaminated water | 5 | 1.9 |
| Eating contaminated food | 1 | 0.4 |
| Eating a lot of Mangoes | 15 | 5.6 |
| Bite of mosquito | 265 | 98.1 |
| Coming into close contact with a malaria patient | 208 | 77.0 |

were administered to community members randomly, this was to ensure that each individual in a population was accorded an equal and non-zero chance of being sampled.

An Interview guide was used to collect data from some healthcare providers at the ANCs. This was done after obtaining written consent from the prospective participants in the respective clinics.

### *Data Analysis*

Data was analysed using Statistical Package for Social Scientists (SPSS) version 20. The responses were coded or categorized then numbers were assigned to each response before they were entered and analysed. Wilcoxon rank-sum test was used to set the grading scores for discrete variables (such as knowledge, attitude, public perception and behavior/practice) as well as evaluating whether statistical association exists in the prospective groups.

The statistical analysis of categorical variables (such as responses to questions on knowledge, attitude, behavior/practice and public perceptions) was performed using Chi-square test to assess the association between pregnant women and KAP towards malaria. A $p\text{-value} < 0.05$ was considered statistically significant. Spearman correlation test was applied to estimate the relations of knowledge, attitude and practice in this study. Qualitative data was analysed using thematic analysis.

## RESULTS

The levels of awareness on malaria were different in the study participants. Of all the participants 267 (98.9%) heard about malaria (Fig.1). When asked about what causes malaria, all participants, 270 (100%) including the two FGDs, were aware that malaria was caused by a mosquito. All the participants were also aware that if not treated, malaria would kill. To better understand the knowledge that the respondents had on malaria, they were further asked on 'what transmitted malaria?' Their responses are shown in Table 1.

The majority of the participants were aware that high temperature/fever 270 (100%), vomiting 270 (100%), headache, 268 (99.3 %) chills 264 (97.8%) were Malaria symptoms. However poor knowledge regarding loss of energy, 1(0.4%), sweating, 7 (2.6%), body pains, 10 (3.8%), loss of appetite, 16 (5.9%) and dizziness 6 (2.2%) as Malaria symptoms was observed amongst the participants.



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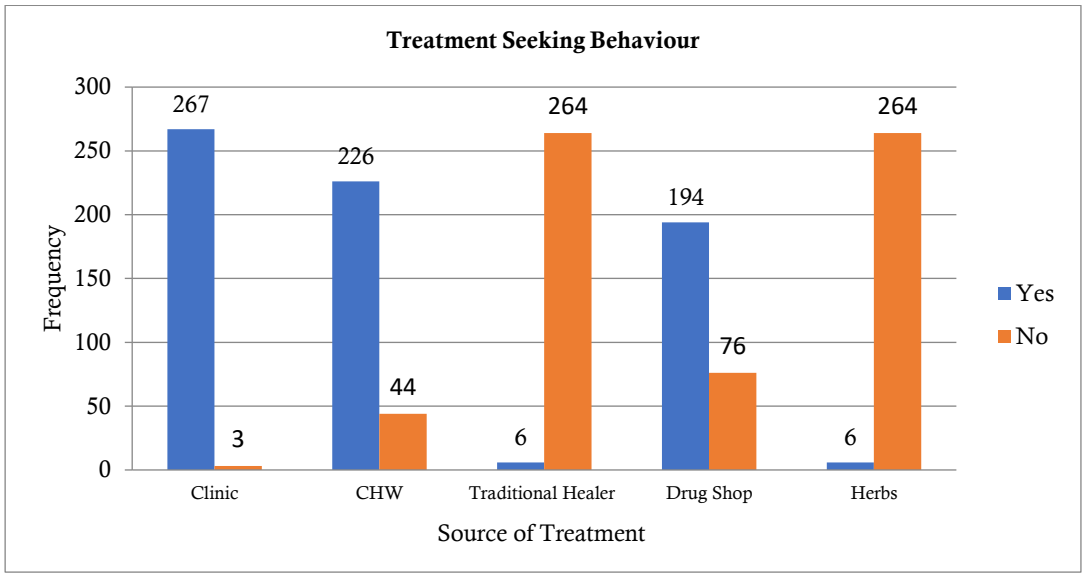



**Fig. 2.** Treatment Seeking Behaviour

Sleeping in ITNs and spraying insecticides topped on the list of malaria control and preventive measures. In response to the questions on malaria prevention and control, 265 (98.1%) indicated that sleeping under an insecticide treated mosquito net and having their homes sprayed with insecticides were some of the measures; with only 67 (24.1%) indicating that wearing long sleeved clothes could help in the prevention and control of malaria. 132 (48.9%) participants indicated that clearing bushes around the homes and 174 (64.4%) admitted that cleaning dark corners in the house could also be measure to control and prevent malaria.

Focus group discussions were held with 10 (ten) pregnant women and 7 (seven) Community Health Workers (CHWs). The findings indicated that all the participants had heard about malaria and that knowledge levels were high. The women indicated that their source of information about malaria was mostly the clinics/health centers. One of the women explained:

'*We know what malaria is and that it is caused by the bite of a mosquito. We usually get information like this from the health centers or the Community Health Workers that we interact with in the community'*.

A second woman explained that as the clinic gives them information about malaria, they are also told the symptoms which include fever, headaches, vomiting and joint pains. All the women indicated that they could relate to these symptoms. The Community Health Workers also explained during their FGD that they carry out Health Education among community members within the communities and teach them about Malaria, its symptoms and even prevention measures.

CHW 1: '*We are first trained by the Health Center staff and given a lot of details about malaria. These trainings are usually done twice a year. Then we go into the communities and hold community meetings or even door to door campaigns where we teach the community members about malaria, the way it is transmitted, the symptoms and even methods of prevention and treatment*'.

***Attitudes Towards Malaria***

The participants were then asked where they would go to seek treatment if they had symptoms of malaria. Clinics, community health workers, Drug shop or pharmacy, Tradition healers as well as herbalists were mentioned as sources of treatment by the participants when they suspect they have malaria.

However, some respondents 6 (2.2%) even mentioned the traditional healers and use of local herbs as alternative sources. The participants were further asked how soon they would seek treatment if they suspected that they have malaria. Participants' attitude towards seeking treatment early were very poor as only 3 (1.1%) indicated that they would seek prompt treatment if they suspected that they had malaria.

After further questions, 168 (62.2%) strongly agreed that malaria is a serious and life-threatening disease while 102 (37.8%) agreed. 162 (60.0%) of the respondents when asked if they thought malaria can be transmitted from one person to another like the common cold, strongly agreed, 99 (36.7%) agreed and 9 (3.3%) disagreed as presented.

To the question, what is the best way to prevent oneself from getting malaria, 162 respondents representing 60.0% strongly agreed that avoiding mosquito bites was the best, with 103 agreeing, and 5



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**Table 2.** Association between Knowledge and Demographic Variables

| N=270 | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Variable** | **Category** | **Frequency** | **%** | **Knowledge** | | | ***p-value*** |
| | | | | **Low** | **Medium** | **High** | |
| Gender | Female | 171 | 63.3 | 17 | 130 | 24 | 0.281 |
| | Male | 99 | 36.7 | 8 | 66 | 24 | |
| Age | Below 30 years | 34 | 12.5 | 5 | 23 | 6 | 0.219 |
| | 30-40 years | 57 | 21.0 | 0 | 45 | 12 | |
| | 41-50years | 106 | 39.3 | 14 | 74 | 15 | |
| | Above 50 years | 73 | 26.9 | 6 | 53 | 14 | |
| Education Level | No formal Education | 164 | 60.7 | 17 | 128 | 17 | 0.000* |
| | Primary Level | 7 | 2.6 | 0 | 7 | 0 | |
| | Secondary Level | 25 | 9.2 | 4 | 21 | 0 | |
| | Certificate Level | 35 | 13.0 | 1 | 13 | 20 | |
| | Diploma Level | 31 | 11.4 | 2 | 26 | 3 | |
| | Bachelor's Degree Level | 5 | 1.9 | 0 | 0 | 50 | |
| | Master's Degree Level | 3 | 1.1 | 0 | 0 | 0 | |

The result is significant at $p < 0.05$

**Table 3.** Association between Attitude towards Malaria and Demographic Factors

| N=270 | | | | | | |
|---|---|---|---|---|---|---|
| **Variable** | **Category** | **Frequency** | **Percentage** | **Attitude** | | ***p-value*** |
| | | | | **Positive** | **Negative** | |
| Gender | Female | 171 | 63.3 | 46 | 125 | 0.263 |
| | Male | 99 | 36.7 | 27 | 71 | |
| Age | 18-30 years | 34 | 12.5 | 13 | 21 | 0.662 |
| | 30-40 years | 57 | 21.0 | 15 | 42 | |
| | 41-50 years | 106 | 39.3 | 26 | 77 | |
| | Above 50 years | 73 | 26.9 | 19 | 54 | |
| Education Level | No formal Education | 164 | 60.7 | 43 | 119 | 0.004* |
| | Primary Level | 7 | 2.6 | 2 | 5 | |
| | Secondary Level | 25 | 9.2 | 13 | 12 | |
| | Certificate Level | 35 | 13.0 | 3 | 31 | |
| | Diploma Level | 31 | 11.5 | 13 | 18 | |
| | Bachelor's Degree Level | 5 | 1.9 | 0 | 5 | |
| | Master's Degree Level | 3 | 1.1 | 0 | 3 | |

The result is significant at $p < 0.05$

(1.9%) disagreeing. From the respondents, 161 (59.6%) strongly agreed that anyone could get malaria, 102 (37.8%) agreed, and 1 person strongly agreed with 6 respondents (2.2%) agreeing. Sleeping under a mosquito net during the night as a way of malaria prevention had 153 (56.7%) respondents strongly agreeing, 106 (39.3%) agreeing, 3 (1.1%) strongly disagreeing and 8 (3.0%) disagreeing.

From the total, 53 respondents (19.6%) strongly agreed that they could treat themselves in the event that they had malaria, 7 (2.6%) agreed with 202 (74.8%) and 8 (3.0%) strongly disagreeing and disagreeing respectively. 146 (54.1%) of respondents strongly agreed that only children and pregnant women are at risk of getting malaria and 96 (35.6%) agreed. However, 96 (35.6%) strongly disagreed with 7 (2.6%) disagreeing.

The respondents were asked if they thought one could spontaneously recover from malaria without seeking any treatment. The table shows that 73 (27.0%) strongly agreed, 11 (4.1%) agreed, 183 (67.8%) strongly disagreed and 3 (1.1%) agreed. 70 (25.9%) of respondents strongly agreed that close contact with a person suffering from malaria should be avoided. 184 (68.1%) agreed, 4 (1.5%) strongly disagreed with 12 (4.4%) disagreeing.

Community attitude towards malaria especially among pregnant women were mixed with both good and bad attitudes being observed. The key players in the



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**Table 4.** Association between Practices and Demographic Factors

| N=270 | | | | | | |
|---|---|---|---|---|---|---|
| **Variable** | **Category** | **Frequency** | **Percentage** | **Practice** | | ***p-value*** |
| | | | | **Good** | **Bad** | |
| Gender | Female | 171 | 63.3 | 74 | 97 | 0.678 |
| | Male | 99 | 36.7 | 43 | 55 | |
| Age | Below 30 years | 34 | 12.5 | 11 | 23 | 0.082 |
| | 30-40 years | 57 | 21.0 | 25 | 32 | |
| | 41-50years | 106 | 39.3 | 54 | 49 | |
| | Above 50 years | 73 | 26.9 | 25 | 48 | |
| Education Level | No formal Education | 164 | 60.7 | 43 | 119 | 0.000* |
| | Primary Level | 7 | 2.6 | 2 | 5 | |
| | Secondary Level | 25 | 9.2 | 13 | 12 | |
| | Certificate Level | 35 | 13.0 | 3 | 31 | |
| | Diploma Level | 31 | 11.4 | 13 | 18 | |
| | Bachelor's Degree Level | 5 | 1.9 | 0 | 5 | |
| | Master's Degree Level | 3 | 1.1 | 0 | 3 | |

**Table 5.** Association between Knowledge, Attitudes and Practices

| **Variable** | **Categories** | **Knowledge** | | | ***p-value*** |
|---|---|---|---|---|---|
| | | **Low** | **Medium** | **High** | |
| Attitude | Positive | 1 | 66 | 7 | 0.001 |
| | Negative | 24 | 131 | 41 | |
| Practice | Good | 2 | 112 | 3 | 0.000 |
| | Bad | 23 | 85 | 45 | |

fight against malaria are the clinics and the community health workers. This was brought out in the discussion with both the pregnant women and the CHWs.

Pregnant woman 4: '*When we or any member of our families has symptoms of malaria, the best place to go for help is the clinic or the CHWs. However, when one is not getting better even after being to the clinic, one can try the traditional healers because maybe it could be witchcraft'.*

The aspect of traditional healers/herbalists was also brought out in the discussion with the CHWs.

CHW 4: '*As far as we are concerned, it is mostly the pregnant women in the community that use nets. We always encourage the women to avoid using herbs and roots for the treatment of malaria commonly known as Ubulwele bwa mpepo because this might put their lives in danger. Some of the people in the community still see malaria as a result of witchcraft and want to seek help from herbalists and traditional healers and end up dying. We know that under five children and pregnant women as being most susceptible to malaria and therefore we emphasise prompt treatment for them'.*

During the discussion, the question of how soon one seeks treatment after observation of malaria symptoms was raised. Almost all the participants said seeking treatment is usually within 2 to 3 days. Before that, the patient is given painkillers like Panadol (Paracetamol).

Pregnant woman 5: '*When someone is feeling unwell, we normally give Panadol and see if they don't feel better, then we take them to the clinic. Unless the person is a pregnant woman, then we immediately look for the CHW or go to the health facility. For others it is normally seen as witchcraft'.*

***Practices towards Malaria***

The respondents were asked how often they sleep under a mosquito net to which 153 (56.7%) said they always do, 114 (42.2%) said sometimes and 3 (1.1) said they never do. The above table also indicates that eight (3%) of the participants indicated that other members of their households always sleep under a mosquito net, 95.6% (258) respondents said the members of their households only sleep under ITNs sometimes with 1.5% (4) saying mosquito nets are never used in their households.

The repair of holes in mosquito nets received varied responses with no participant saying they always repair the holes, 119 (44.1%) said they do so sometimes and 151 (55.9%) said they never repair tor nets. Fourteen (5.2%) of respondents indicated that they always use mosquito repellents in their homes, with 241 (89.3) saying they only use mosquito coils sometimes and 15 (5.6%) saying they never do.

The majority of respondents, 257 (95.2%) indicated that they sometimes use anti-mosquito spray in their



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homes, with 5 (1.9%) saying they always do and 8 (3.0%) saying they never use spray in their homes. The responses on how often the respondents clean/cut bushes around their houses. Only 1 person (0.4%) said they always cut bushes around their house. 261 (96.7%) said they sometimes cut bushes around their houses with 8 (3.0%) saying they never do.

258 respondents representing 95.6% said they sometimes clean stagnant water near their homes, only 1 respondent (0.4%) said they always do and 11 respondents (4.1%) indicated that they never clean stagnant water around their homes. Participants were asked how soon they go to the clinic to seek treatment when they suspected that they had malaria. The responses had the majority (98.1%) indicating between 2–3 days.

The discussion with the CHWs and even the women raised the question as to whether people use mosquito nets in the area. The answers were very similar from both groups:

CHW 5: '*Yes, although some people use them for fishing or sell them. Our job as CHWs includes the responsibility for monitoring use of ITNs in the community, and we know that some people use the nets for fishing. Some even use them to fence off gardens.'*

The CHWs indicated that the pregnant women still needed to be encouraged to take Intermittent Presumptive Treatment (IPTp) to prevent malaria and anaemia and to accept IRS as an intervention. The women had this to say:

Pregnant woman 6: '*If we are being honest, not everyone in the households sleep under a mosquito net. The nets are mostly left for the pregnant and breastfeeding mothers. The pregnant women are the ones that take malaria more seriously as compared to other members of the community. And because of this the pregnant women sleep under ITNs almost all the time. But sometimes when it's too hot, they do not'.*

The women were asked when they report to the health centres for antenatal and IPTp, they said its usually after the pregnancy starts showing. The discussion highlighted that it is not possible for the women to disclose their pregnancies too early for fear of losing the pregnancy through witchcraft.

***Predictors of Knowledge, Attitudes and Practices on Malaria***

Chi-square test statistic was used to test whether there was any association between the demographic variables with knowledge, attitudes and practices. Only education level was statistically associated with a participant's knowledge of malaria. The statistical test was also applied to test whether there was any association between Knowledge, attitude and practice towards malaria in pregnant women. From the **Table 2**, knowledge of malaria was significantly (p=0.0000) associated with the level of education. From **Table 3** attitudes towards malaria was significantly (p = 0.004) associated with the level of education. From **Table 4**, practices on malaria were significantly (p=0.0000) associated with the level of education. Knowledge was strongly associated with attitudes (p=0.001) and practices (p=0.000) (**Table 5**).

## DISCUSSION

The findings of this study indicated that the levels of knowledge on malaria within the community were high with 100 % of the participants having heard about the disease and 99.3% knowing that the disease is transmitted by a mosquito. According to the results obtained in this study, pooled knowledge score on malaria from the participants was generally average high (17.7%), medium (72.7%) and low (9.2%). These findings are in agreement with the findings of a research conducted by Nzooma *et al*. (2016) [8] in four districts in Zambia, which found that knowledge of the mosquito as a vector of malaria was quite high (89.6%). The global picture also seems to be in agreement with this finding as shown in the study by Saha *et al*. (2019) [9] where more than two-thirds of the participants knew that a bite from an infected female mosquito is the way of contracting malaria.

However, myths on the transmission of malaria such as eating a lot of mangoes, drinking contaminated water, eating contaminated food and coming into close contact with a person who has malaria were also reported. The findings on the myths on malaria transmission were also observed by Jumbani *et al*. (2020) [10], in their study in Luangwa and Nyimba districts of the Eastern Province of Zambia, where participants had the notion of eating contaminated food and drinking water were given as causes of malaria. Other misconceptions on malaria transmission in Zambia were also reported by Kanyangarara *et al*. (2018) [11] in a study done in Choma District of the Southern Province of Zambia, where drinking dirty water and dirty surroundings were linked to malaria transmission and in most areas in Zambia, there is a misconception that malaria comes about after being soaked by the rains. Another study in Ethiopia found that members of the community believed that they could prevent malaria by avoiding a sinful nature or guilty behaviour [12], it is therefore not surprising that members of the community in this study also sought help from traditional healers and agreed to using local herbs to treat malaria.

Regarding the misconception on malaria being transmitted by drinking contaminated water or eating contaminated food, other researchers have guided that in areas were malaria and cholera are endemic; the misconceptions arise due to little understanding of the



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transmission dynamics of the two diseases [10]. This assertion is true for Luapula province which apart from being a malaria hotspot episodes of cholera are also reported in the region. The fact that these misconceptions have persisted despite health education campaigns on malaria then calls for paradigm shift on how the malaria messages are being disseminated.

The observed myths and misconceptions on malaria transmission could pose a challenge especially when coming up with malaria control and preventive strategies [12]. This partly explains why despite a good proportion of the participants knowing that malaria was transmitted by the bite of a mosquito, only an average number admitted using mosquito nets as a malaria preventive strategy. FGD findings showed that mosquito nets were being used for fishing in the area and it is therefore, the more reason why the prevalence of malaria is very high in the province. Moreover, health promotion messages must focus on reversing the myths and misconceptions on malaria transmission and also in line with the MIS report finding of 2015 which advocated for educational campaign messages focusing on the link between the bite of a mosquito and malaria transmission [14]. Specifically, for Luapula, where over 60% of the participants had no formal education, the messages must be tailored in such a way that they fit in the local language and terminologies.

The results on attitude towards malaria showed that one's attitude towards malaria is an important aspect in the control of the disease. This was in agreement with those reported elsewhere [15]. They noted that attitude, "a compound of affect, cognition and behaviour" is an important component of malaria control programmes especially in the generation of health promotion messages though this is one area that has not been given enough attention.

Positive and negative attitudes towards malaria were observed in this study. The participants in this study exhibited positive attitude towards avoiding mosquito bites, anyone getting malaria, pregnant women and children being at the greatest risk and going to the health facility for malaria test when they suspected that they had malaria among others. This is similar with findings of the study by Appiah-Darkwah & Badu-Nyarko (2011) [16] in Uganda where, on the whole, the attitude tended towards positive, and was confirmed via FGDs where participants affirmed that residents of Nsaabwa take malaria as a serious problem because now they know that it kills and many children have died from it. However, the positive attitudes did not translate into practicing malaria preventive behaviours amongst respondents. There could be factors responsible for this as behaviour depends on more than just knowledge and attitude. Examples might include local customs, taboos, perceived benefits, etc. These are areas a good BCC campaign could address [16]. The negative attitudes and misconceptions regarding malaria according to this study included Malaria being transmitted from one person to another like the common cold, participants thinking they can treat themselves if they got Malaria, recover spontaneously from Malaria without any treatment and that if someone has got Malaria, people should avoid having close contact with them. These findings are in line with a similar study done in Ethiopia [12]. However, those who exhibited negative attitudes in this study were more compared to the Ethiopian study. This can be attributed to the high number of those with no formal education in this study (60%) compared to only 10.1% in the Ethiopian study. This finding underscores the need for coming up with health promotion messages on malaria prevention and control which are illiterate friendly.

Specifically, for this study, the health promotion messages needed are those on malaria transmission and control due to the fact that some study participants still think malaria is transmitted by eating a lot of mangoes, eating contaminated food, drinking contaminated water and coming in close contact with a person who has malaria. As explained by Hlongwana *et al.*, (2009) [17], sound knowledge of community beliefs and practices about malaria will help in surveillance and control activities.

The practices regarding malaria control in this study were generally negative. Other than sleeping under an ITN, 262 (97.03%), the other practices towards Malaria control were negative as the participants only indicated putting the malaria interventions into practice only sometimes 270 (100%) and in some cases never 1 (0.4%). These findings have demonstrated that having knowledge on Malaria does not translate into practice and is consistent with what has been observed in Zambia. Despite the knowledge on malaria being high in the population, one would expect that this would translate into low prevalence of malaria but it is not the case in this study where the reported prevalence of malaria in the last 6 months stood at 78.9 %. For example, findings from Nzooma *et al.* (2017) [8], in a study on Malaria in Zambia concluded that the translation of knowledge to improved practice was inadequate.

The study demonstrated that interaction with community health workers was significantly related with seeking malaria treatment early, as well as using antimalarial drugs as an alternative to seeking healthcare from formal health facilities. Other studies have also demonstrated failure at translating knowledge into prevention practices, (Hwang *et al.* 2010) [18] in insisting on chloroquine as an antimalarial therapy based on attitudes; and, in understanding what aspects of malaria were important, such as differentiating mosquitoes as a nuisance as opposed to mosquitoes as a source of infection. Further, Zurovac et al. (2014) [19]



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found that the use of chloroquine for uncomplicated malaria was successfully discontinued in Zambia, the change of policy to treatment with artemether did not translate to adequate point-of-care use of the drug, where both chloroquine and sulphadoxine-pyrimethamine in conjunction with artemether-lumefantrine were in use.

In a recent study conducted in Zambia in Eastern Province, similar findings were reported though the practices were lower compared to what was obtained in this study [10]. In this study, the majority (over 98%) of respondents indicated that they would seek treatment from the health facility within 2 to 3 days after suspecting that they had malaria. This is different from the findings in a Ghanaian study which reported that a relatively good number of respondents (61%) stated they would seek treatment within 24 hours of onset of malaria symptoms. This is in line with the Abuja summit on malaria, which says, "—at least 60% of those suffering from malaria should seek treatment within 24 hours of the onset of symptoms" [20]. However, even the findings of the Ghanaian study were far below the percentage of another study in Swaziland [17] which reported that 90% of respondents would seek treatment within 24 hours of seeing the first symptoms of malaria.

Regarding practices, sleeping under bed nets was the most prevalent method of malaria prevention and control in this study with 57% of participants saying they always use ITNs and 42% said they sometimes used ITNs. Despite the high prevalence of bed nets, an FGD with CHWs revealed that many community members did not use nets properly. They reported that some people use bed nets for fishing. The study by Appiah-Darkwah & Badu-Nyarko (2011) [15] in Ghana had similar findings indicating that sleeping under bed nets was the most prevalent method of malaria prevention and control (87%) although, an FGD with VHTs/CHWs revealed that many community members did not use nets properly as some use them as curtains in their homes.

## CONCLUSION

Even though knowledge levels on malaria were high and comparable to other studies, however, some attitudes and practices were negative among the participants. On the contrary, healthcare providers had the right attitude towards malaria prevention and control. Community Health Workers are very important in the fight against malaria. The study recommends that creating health promotion messages taking into account the illiterates, involvement of traditional leaders, and giving incentives to community health workers can help in the fight against malaria in Luapula Province.

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## CONFLICT OF INTEREST

There is no conflict of interest in this research.

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