ORIGINAL ARTICLE

Knowledge, Attitudes and Practices Towards Malaria Prevention in the Nyimba Urban Clinic Catchment Area, Zambia: A Cross-Sectional Study

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ABSTRACT

Background: Malaria remains a major public health problem in Zambia. Knowledge, attitudes and prevention practices influence the uptake and sustainability of malaria control interventions. This study assessed knowledge, attitudes and practices towards malaria prevention in the Nyimba Urban Clinic catchment area of Nyimba District, Zambia.

Methods: A quantitative, descriptive cross-sectional study was conducted among adult household heads or delegated household heads in the Nyimba Urban Clinic catchment area. Participants were selected using simple random sampling. Data were collected using a structured questionnaire and analysed using Microsoft Excel and Statistical Package for the Social Sciences version 26.0. Descriptive statistics were used to summarize participant characteristics and malaria prevention measures. Associations between demographic characteristics and attitudes were assessed using the chi-square test. Ethical approval was obtained from the Lusaka Apex Medical University Biomedical Research Ethics Committee.

Results: Of 384 targeted participants, 350 participated, giving a response rate of 91.1%. Most participants were aware of malaria, and 53.0% had good knowledge of malaria prevention. Positive attitudes towards malaria prevention were reported by 89.0% of participants. Good malaria prevention practices were reported by 97.4% of participants. Sleeping under insecticide-treated nets was the most commonly practised prevention method. Level of education was significantly associated with attitude towards malaria prevention ($p = 0.035$).

Conclusion: The community in the Nyimba Urban Clinic catchment area had generally good knowledge, positive attitudes and good practices towards malaria prevention. However, context-specific strategies are still needed to strengthen prevention uptake and address the persistent malaria burden.

INTRODUCTION

Malaria remains one of the world's major public health problems and continues to cause substantial morbidity and mortality in endemic countries. In sub-Saharan Africa, the burden is particularly high

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among children under five years of age and pregnant women. Malaria is also a major cause of illness and death in Zambia, where transmission patterns vary by geography, season and environmental conditions.[1-4]

The malaria transmission triangle comprises the host, the parasite and the vector, all of which are influenced by environmental factors. The host contributes to transmission through behaviours that affect exposure to infected mosquitoes and the uptake of preventive interventions. Community cooperation with health facilities and community health workers therefore remains central to malaria prevention and control.[4,5]

Previous studies have reported varying levels of knowledge about malaria in different communities. Some studies have shown improved understanding that mosquitoes transmit malaria, although this knowledge does not always translate into improved uptake of interventions.[6] Other studies have demonstrated an association between knowledge about malaria and malaria prevention practices.[7,8] These findings suggest that behaviour change remains an important component of malaria prevention and control.

Failure to consider community knowledge, attitudes and practices may limit the sustainability of malaria control programmes because local practices are shaped by the realities, beliefs and constraints within each community.[9] This study therefore assessed knowledge, attitudes and practices towards malaria prevention in the Nyimba Urban Clinic catchment area of Nyimba District, Zambia, where malaria remains a significant public health concern despite ongoing interventions such as health education, insecticide-treated nets and environmental management.[10,11]

METHODS

A descriptive, quantitative cross-sectional study was conducted in the Nyimba Urban Clinic catchment area of Nyimba District, Eastern Province, Zambia. Nyimba District covers an estimated land area of 10,495 km^2. According to the 2022 Zambia Statistics Agency census, the district had a population of 136,238. The Nyimba Urban Clinic catchment area had an estimated population of 20,743, of whom 9,546 were adults.

The catchment area was selected because of the high incidence and prevalence of malaria. Using Yamane's formula at a 95% confidence level, a sample size of 384 was calculated from the adult population of 9,546. The formula was selected because it allows sample size estimation from a known and relatively large population.

The study included household heads or delegated household heads who were aged 18 years or older, lived in the catchment area and provided informed consent. Participants were selected using simple random sampling. A register of households in the Nyimba Urban Clinic catchment area was compiled, and households were randomly selected from this register.

Data were collected using a structured questionnaire administered by the researcher. Data cleaning and analysis were performed using Microsoft Excel and Statistical Package for the Social Sciences version 26.0. Descriptive statistics were used to summarize demographic characteristics, knowledge, attitudes and practices. Knowledge, attitude and practice scores were classified using predefined scoring categories. The chi-square test was used to assess associations between demographic characteristics and attitude towards malaria prevention. Statistical significance was set at $p < 0.05$.

Ethical approval was obtained from the Lusaka Apex Medical University Biomedical Research Ethics Committee (LAMUBREC; reference number 00417-22). Permission to conduct the study was also obtained from the Ministry of Health through the Nyimba District Health Office and from Nyimba District Council. Participants were informed about the purpose, risks and benefits of the study, and about their right to decline or withdraw from participation. Written informed consent was obtained before data collection.

RESULTS

Participant characteristics

Of the 384 targeted participants, 350 took part in the study, giving a response rate of 91.1%. Participants were aged 18 to 73 years, with a median age of 34 years and an interquartile range of 16 years. Most participants were female (62.6%), married (73.1%) and Christian (96.6%). Secondary and tertiary education had been attained by 28.0% and 7.1% of participants, respectively.

Table 1: Demographic characteristics of participants (n = 350)

Variable	Category	Frequency	Percentage
Sex	Male	131	37.4
	Female	219	62.6
Religion	Christian	338	96.6
	Muslim	12	3.4
Level of education	Basic	79	22.6
	Primary	125	35.7
	Secondary	98	28.0
	Tertiary	25	7.1
	Never attended school	23	6.6
Marital status	Single	69	19.7
	Married	256	73.1
	Divorced	10	2.9
	Widowed	15	4.3

Knowledge of malaria prevention

Knowledge was measured using a three-point Likert scale with a total score of 13. Scores were categorized as poor knowledge, average knowledge and good knowledge. Most participants were aware of malaria (95.7%). Overall, 53.0% had good knowledge, 45.0% had average knowledge and 2.0% had poor knowledge of malaria prevention.

Table 2: Knowledge about malaria prevention methods (n = 350)

Question	Response	Frequency	Percentage
Do you know what malaria is?	Unaware	15	4.3
	Aware	335	95.7
Is malaria preventable?	Wrong response	11	3.1
	Correct response	339	96.9
Have you heard about malaria prevention methods?	Not heard	14	4.0
	Heard	336	96.0
What transmits malaria?	Wrong response	25	7.1
	Correct response	325	92.9
What are the indoor malaria prevention methods?	Fumigation/keeping windows and doors closed in the evening	10	2.9
	Indoor residual spraying	126	36.0
	Insecticide-treated bed net	214	61.1
What are the outdoor malaria prevention methods?	Insecticide spray	123	35.1
	Avoiding weeds	117	33.4
	Avoiding stagnant water	110	31.4

Knowledge score categories were as follows: poor knowledge, 1-7 points (0%-50%); average knowledge, 8-11 points (51%-75%); and good knowledge, 12-13 points (>75%).

Attitudes towards malaria prevention

Attitude was defined as receptiveness to malaria prevention methods. A positive attitude was defined as agreement with more than 50% of the attitude statements. A negative attitude was defined as agreement with 50% or fewer of the attitude statements. Overall, 89.0% of respondents had a positive attitude towards malaria prevention methods, while 11.0% had a negative attitude.

Table 3: Attitudes towards malaria prevention methods (n = 350)

Statement	Response	Frequency	Percentage
Are you at great risk of getting malaria if you sleep under a treated mosquito net?	Strongly disagree	9	2.6
	Disagree	280	80.0
	Agree	57	16.3
	Strongly agree	4	1.1
Do mosquito nets make you feel hot?	Strongly disagree	15	4.3
	Disagree	213	60.9
	Agree	102	29.1
	Strongly agree	20	5.7
Indoor residual spraying does not prevent malaria.	Strongly disagree	16	4.6
	Disagree	180	51.4
	Agree	127	36.3
	Strongly agree	27	7.7
Does indoor residual spraying take much of your time?	Strongly disagree	25	7.1
	Disagree	230	65.7
	Agree	69	19.7
	Strongly agree	26	7.4
Is clearing the surrounding area an effective way of preventing malaria?	Strongly disagree	1	0.3
	Disagree	51	14.6
	Agree	278	79.4
	Strongly agree	20	5.7

On chi-square testing, level of education was significantly associated with attitude towards malaria prevention (p = 0.035). Sex (p = 0.622), age (p = 0.067), marital status (p = 0.324) and religion (p = 0.121) were not significantly associated with attitude.

Malaria prevention practices

Practices were defined as the prevention methods that participants used. Good practice was defined as scoring more than 50% of the practice questions, while poor practice was defined as scoring 50% or less. Overall, 97.4% of participants had good malaria prevention practices. Sleeping under an insecticide-treated net was the most common practice.

Table 4: Malaria prevention practices (n = 350)

Question	Response	Frequency	Percentage
Do you sleep under a mosquito net?	No	34	9.7
	Yes	316	90.3
What personal protective measures do you currently use?	Do nothing/other	24	6.9
	Spraying insecticides/burning mosquito coils/burning cow dung or leaves	13	3.7
	Sleeping under a treated mosquito net/clearing vegetation around the house/draining stagnant water/wearing long-sleeved clothing	313	89.4
Which protection measure do you prefer most?	Do not know/other	14	4.0
	Burning mosquito coils/spraying insecticide	48	13.7
	Clearing vegetation around the house/sleeping under a treated mosquito net	288	82.3
Why do you prefer this protection technique?	Other/do not know	7	2.0
	It is free	190	54.3
	Easy to use/cheap/better at stopping mosquitoes	153	43.7

Question	Response	Frequency	Percentage
How often do you tuck in your treated mosquito net when you go to bed?	Never	22	6.3
	Sometimes/not every night	58	16.6
	Always/every night	270	77.1

DISCUSSION

Principal findings

This study found that most participants in the Nyimba Urban Clinic catchment area had good knowledge, positive attitudes and good practices towards malaria prevention. Only 2.0% of participants had poor knowledge, while 89.0% had a positive attitude and 97.4% had good malaria prevention practices. Education level was significantly associated with attitude towards malaria prevention.

Knowledge of malaria prevention

The high level of awareness observed in this study is consistent with findings from other malaria-endemic settings, where communities often recognize malaria as a common and preventable illness. Similar findings have been reported in Saudi Arabia and other settings, where high levels of malaria knowledge were observed among study participants.[12,13] The high level of awareness in Nyimba may reflect the continuing malaria burden in the area and repeated community sensitization activities.

In this study, 61.1% of participants identified insecticide-treated nets as an indoor malaria prevention method. This proportion was lower than that reported in a study among pregnant women in Chilenje, Lusaka, where 86.0% of participants reported insecticide-treated net use as a preventive measure.[14] Differences in study population, setting and programme exposure may explain the variation.

Most participants correctly identified mosquitoes as the vector that transmits malaria. This finding is comparable to a study conducted in four malaria-endemic provinces of Zambia, where 89.6% of participants knew that the female Anopheles mosquito transmits malaria.[12]

Attitudes towards malaria prevention

The study found a high proportion of positive attitudes towards malaria prevention. Education level was significantly associated with attitude, suggesting that formal education may influence acceptance of malaria prevention methods. However, some participants still agreed with the statement that indoor residual spraying does not prevent malaria, indicating that targeted health education remains necessary to clarify the role and limitations of specific prevention methods.

The finding of generally positive attitudes is similar to reports from Nigeria, where most participants had positive attitudes towards malaria prevention and control.[15] Positive attitudes may reflect repeated health promotion messages and community familiarity with malaria prevention interventions.

Malaria prevention practices

Most participants reported good malaria prevention practices, and 90.3% reported sleeping under a mosquito net. This is higher than findings from some rural Zambian settings, where use of treated mosquito nets was lower.[10] The difference may reflect improved dissemination of malaria prevention information and access to insecticide-treated nets in the study area.

The use of insecticide sprays or mosquito coils was less preferred. This may be due to cost, concerns about smoke or chemicals, or inconvenience. Similar findings have been reported in other settings, where chemical-based methods were used less frequently by some communities.[16]

Limitations

- Some participants were busy at the time of data collection, which may have affected the completeness of responses.
- Authorization from the Nyimba District Council Secretary was delayed, which reduced the time available for data collection.
- The study was conducted outside Lusaka, and limited time and logistical constraints may have affected fieldwork.
- Some eligible participants were unwilling to participate, and some questionnaire sections were left blank.

CONCLUSION

This study showed that community members in the Nyimba Urban Clinic catchment area generally had good knowledge, positive attitudes and good practices towards malaria prevention. Education level was significantly associated with attitude towards malaria prevention. Despite these favourable findings, context-specific strategies are needed to strengthen the uptake of prevention methods and reduce the persistent malaria burden in the catchment area.

What is already known on this topic

- Knowledge about malaria and its prevention has improved in many communities, although knowledge does not always translate into intervention uptake.
- Community knowledge, attitudes and practices influence the sustainability of malaria control programmes.
- Local context and household constraints shape the use of malaria prevention methods.

What this study adds

- Education level was significantly associated with attitude towards malaria prevention in the Nyimba Urban Clinic catchment area.
- Most participants had good knowledge, positive attitudes and good practices, yet malaria remains a public health concern in the area.
- The findings support the need for context-specific interventions that go beyond general awareness creation.

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Competing interests

The authors declare that they have no competing interests.

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