

# Attitudes and Perceived Impact of Insecticide Treated– Bed Nets on Malaria Control in Rural Tanzania

Alphonse, J.<sup>1</sup>, Maganira, J.<sup>1</sup> and Mwangonde, B.J.<sup>1\*</sup>

<sup>1</sup>Department of Biosciences, Solomon Mahlangu College of Science and Education, Sokoine University of Agriculture, P.O. Box 3038 Morogoro, Tanzania

\*Corresponding author: [bmwangonde@sua.ac.tz](mailto:bmwangonde@sua.ac.tz)

## Abstract

*Insecticide-treated nets (ITNs) are the most powerful malaria control tool if used correctly. Yet up to date, utilization is still low. The aim of this study was to investigate the intra-household factors that affect the utilization of ITNs in rural households in Morogoro Urban district. In addition, this study analysed the reasons for ITNs non-use in households with children under five years. Questionnaire, interviews and observation were the key tools for data collection for the study. The intra-household factors affecting the utilization of ITNs reported in this study include, chemical substances impregnated in the nets (36%), household financial inadequacy (24%), warmth and discomfort of the nets (24%) and skin irritability (17%), among others. The general community knowledge about mosquito nets was found to be high (91%); however, the knowledge of ITNs was low (30%). In addition, it was found that the ITNs were inadequately accessible in the study community. Based on the results of this study, adequate accessibility of ITNs and community education related to the use and their significance is recommended.*

**Key words:** Insecticide treated bed-nets; attitude; malaria; Morogoro CBD

## 1 Introduction

Insecticide-treated nets (ITNs) are the current widely adopted malaria preventive measures in endemic regions (Ikeako *et al.*, 2017). ITNs are impregnated with insecticides such as pyrethroid, permethrin or deltamethrin which have an excito-repellent effect and kill the malaria vectors that come in contact with the (Ikeako *et al.*, 2017; Kawada *et al.*, 2014; WHO, 2015). ITNs have approximately 50% of mean efficiency strategy for combating malaria in endemic regions such as sub-Saharan African countries (Ikeako *et al.*, 2017; Obol *et al.*, 2014). The ITNs are estimated to reduce children and pregnant women mortality by 60% (Obol *et al.*, 2014).

In 2015, approximately 212 million new cases of malaria and 430,000 malaria deaths occurred worldwide, with more than 90% occurring in Africa (Tizifa *et al.*, 2018; WHO, 2018). In 2017, children aged under 5 years accounted for 61% (266 000) of all malaria deaths worldwide (WHO, 2018). The disease accounts for 40% of public health, 30-50% of inpatient admission and up to 50% of outpatients visiting in areas with high malaria transmission (WHO, 2015). Tanzania is endemic to malaria and constitutes a major cause of illness and death specifically to children under five years of age and pregnant women (WHO, 2015). Ninety three percent of Tanzanians population live in areas where malaria is transmitted in which 20% unstable seasonal malaria transmission occur in endemic areas and 60% characterized as stable perennial transmission. Tanzania ranked fourth (5%) of the seven countries that accounted for 53% of all global malaria deaths in 2017 (WHO, 2018). The country was preceded by Nigeria (19%), Democratic Republic of the Congo (11%), and Burkina Faso (6%) (Ibid.). There have been efforts to control



malaria in Tanzania by both governmental and non-governmental organizations. Effective steps to increase the coverage of the use of ITNs to fight malaria transmission are through the National Insecticide Treated Nets (NATNETS) programme. The programme promotes the national use of ITNs by making nets affordable, accessible and acceptable. The fact that uses of ITNs forms the mainstay effective strategy for combating malaria in children under five years and pregnant women, it has never been that smooth to common people.

Furthermore, there is a substantial investment by the Government of Tanzania through private partnership approach to promote usage of ITNs as an integral strategy for control of malaria vectors. The U.S. President's Malaria Initiative (PMI), CDC Tanzania promotes malaria prevention and control interventions, including providing long-lasting insecticide mosquito nets and indoor residual spray; preventing malaria in pregnancy; improving diagnostics and case management; and monitoring and evaluating malaria-related activities. Through these efforts and others, the proportion of households owning at least one ITN rose from 63% to 92% from 2010 to 2011 (Kramer *et al.*, 2017). The use among children under five years in mainland Tanzania increased from 25% in 2008 to 73% in 2012 (Kramer *et al.*, 2017). Despite of the national and international efforts malaria remains among the top 10 causes of death in the country (CDC, 2018). In addition, many household members do not own ITNs and even those who own it do not consistently sleep under the net. The study aimed at assessing attitude and perceptions of insecticide treated nets use on malaria control in rural Tanzania.

## 2. Material and Methods

### 2.1 Study area

The study was conducted in Kasanga and Kiroka wards in Morogoro rural district and Lukobe ward in Morogoro urban district in Morogoro region. Morogoro region is located between latitude 5° 58" and 10°0"S of the Equator and longitude 35° 25" and 35°30"E. The region is bordered by Arusha and Tanga regions to the North, the Coast region to the East, Dodoma and Iringa to the West, and Ruvuma and Lindi to the South. The elevation of the study areas is about 196m above sea level. Farming is the main occupation of the population. The topography and climate together with human activities in the area highly encourage healthy perseverance of malaria vectors and therefore, malaria transmission.

### 2.2 Data collection

Data were collected using a semi-structured questionnaire from two hundred and fifty randomly selected households. Interviews of respondents and observations complimented the information collected via the questionnaire. The information collected from each respondent included among others net ownership, use of mosquito nets and reasons for non-use of ITNs.

### 2.3 Data analysis

Each questionnaire responses were cross-checked for accuracy and consistency and



edited accordingly followed by coding. Thereafter, it was analysed using the Statistical Package for Social Sciences (SPSS version 20) were determined.

## 2.4 Study Permit

The permit for this study was obtained from the Sokoine University of Agriculture (SUA) through students' special project research unit during their final year of study.

## 3. Results

### 3.1 Socio-demographic characteristics of respondents

Table 1 summarizes the socio-demographic characteristics of 250 respondents involved in this study.

**Table 1: Socio-demographic characteristics of the respondents (n = 250)**

Variable		Frequency (n)	Percentage (%)
Respondents Sex	Male	120	48
	Female	130	52
Respondents Age	18-25	65	26
	25-35	108	43
	35-45	77	31
Repondents Education Level	Primary education	35	14
	Secondary education	150	60
	Tertiary education	25	10
	Vocational training	40	16

### 3.2 Knowledge on malaria

Table 2 below summarizes the results for respondent's knowledge on malaria.

**Table 2: Respondent's knowledge on malaria**

Variable		Frequency (n)	Percentage (%)
Causative agent of malaria	Mosquito	179	72
	Plasmodium/protozoa	71	28
Transmission of malaria	Mosquito bite	211	84
	Dirty water	30	12
	Don't know	9	4
Symptoms of malaria	Fever	65	26
	Painful joints	103	41
	Sweating at night	8	3
	Vomiting	74	30

### 3.3 Attitude towards use of ITNs

Table 3 below summarizes the results for respondents toward use of ITNs.



**Table 3: Respondents attitude toward utilization of ITNs (n = 250)**

Variable		Frequency (n)	Percentage (%)
<i>The ownership and use of ITNs</i>	Do not have nets	23	9
	ITNs	149	60
	Ordinary bed nets	78	31
<i>Reason for non-use of ITNs</i>	Warmth and discomfort	59	24
	Cause skin irritability	42	17
	Financial problems	60	24
	Presence of chemicals	89	36

### 3.4 Misuse of mosquito nets in rural communities

The study observed various ways (including protecting garden vegetables and chickens) in which the members of the surveyed households misused the mosquito nets including ITNs as presented in Plate 1.



Plate 1: Protecting ducklets using ITNs.

## 4. Discussion

The study investigated household factors affecting the use of ITNs for malaria control among rural communities in Morogoro, Tanzania. The results of the study show that the majority (76%) of the respondents are aware of malaria vectors and that mosquito bites (84%) are important in the transmission of malaria. However, respondents presented varied symptoms of malaria, which ranged from fever, joint pain, sweating and vomiting. These different responses on the symptoms of malaria among the



respondents may be a result of differences in education level and hence, different symptom presentation although the majority of respondents in this study had secondary school education (60%). About 91% of the respondents used mosquito nets of which about 60% used ITNs suggesting a good community approval of nets to avoid mosquito bites and offer protection against malaria infection not only among children under five years and pregnant women but also the general community.

Similar to the Obol *et al.* (2014) findings elsewhere, this study also found the reasons for non-use of nets being avoiding the perceived side effects of chemical substances impregnated in the nets, increased warmth and discomfort, skin irritability, unpleasant odours as well as financial problems. Some respondents informally reported that when they use nets they become vulnerable to bad dreams and suffocation. Some respondents did not use ITNs for associating them with forced family planning, poor pregnancy outcomes and bearing defective babies. The factors for non-use of ITNs in combination with socio-cultural beliefs may explain the community motive to misuse the nets for malaria control especially ITNs donated by the Government and other donors. To avoid the side effects of the perceived ITNs the rural community use ITNs, among others, to protect vegetable seedling and fence livestock such as chickens. Furthermore, old nets are used to hang washed clothes. Misuse of mosquito nets spares no East African Country (Minakawa *et al.*, 2008; Taremwa *et al.*, 2017). In order to increase community approval in using ITNs negative community perceptions should be clarified through education. This study also reports financial inadequacy in many households as a barrier in accessing ITNs in the absence of Governmental intervention. Financial problems may also be a barrier for alternative means of malaria control such as use of mosquito repellents. The results of this study are consistent with previous studies, which reported that the cost of ITNs impregnation, regular re-impregnation and the availability of ITNs are determinant factors for use of ITNs in malaria prevention (Ikeako *et al.*, 2017; Obol *et al.*, 2014).

## Conclusion

The study has shown that a good number of community members in the study area were knowledgeable about malaria transmission. Nonetheless, there are knowledge gaps on the causative agent of malaria. These gaps must be filled by empowering community members with information about malaria causation and prevention strategies so that such knowledge could be passed on to all people. The use of ITNs for malaria prevention among the study area was not quite low though most respondents cited financial costs and presence of chemicals of ITNs as the main reasons for non-use of ITNs among the community members. Owing to the fact that, malaria can be prevented by simple interventions, schools can serve as a gateway to teaching prevention measures that can be carried out by the students for life and shared within the community. Community members need to acquire positive attitudes such as believing that using ITNs is a safe way of preventing mosquito bites. Also at school, students need communication skills to convince their parents/guardians to obtain ITNs for them, know how to use the ITNs effectively, safely treat a net with insecticide and use mosquito repellent or wear protective clothing when an ITN is not available.



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