

# Factors Associated with Utilization of Insecticide Treated Nets among Residents of Kamwenge Town Council-Kamwenge District-Uganda

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## Abstract

Background: Malaria continues to be a leading cause of morbidity and mortality in sub-Saharan Africa. In Uganda, malaria remains the leading cause of morbidity, accounting for 30 to 50 percent of outpatient visits, 15 to 20 percent of admissions, and 9 to 14 percent of inpatient deaths. The first national-wide Insecticide Treated Nets (ITNs) coverage campaign was launched in 2010 targeted at households with pregnant women and children below 5yrs of age. The study assessed factors associated with utilization of Insecticide Treated Nets (ITNs) among residents of Kamwenge Town Council, Kamwenge District-Western Uganda. Methodology: The study design was cross-sectional in which data were collected using an interviewer administered structured questionnaire and analyzed using Stata version 13. Results: A total of 285 respondents were interviewed of which 39.7

**Index terms**— residents Insecticide treated nets (ITNs), utilization.

## 1 I.

Background malaria is the leading cause of morbidity and mortality in the tropical region accounting for 3.2 billion deaths with its peak of 1.2 million in 2013 and Malaria mortality has been steadily decreasing since 1990 but 90% of the deaths occurred in Africa with Uganda having the third highest number of malaria cases after Democratic Republic of Congo and Nigeria [1], [2], [4].

The World Health Organization's Global Malaria Programme recommends use of Insecticide-Treated Nets (ITNs) as one of the three major means of malaria vector control to reduce malaria transmission but in 2013, only 49% of the people at risk in Sub Saharan Africa had access to ITNs yet ITNs efficacy against malaria episodes of approximately 50% [2], [3], [4], [5].

Uganda adopted a policy of universal LLIN coverage of one net per two persons to protect all people from malaria and conducted a community mass campaigns and through public health facilities that target pregnant women and children under 5 years on a routine basis and several community mass distribution of nets since 2010 [6].

However the utilization of ITNs in Kamwenge Town Council is still not known and the study aimed at determining the factors that influence utilization of ITNs among residents of Kamwenge Town Council.

## 2 II.

### 3 Methodology a) Study Design and setting

This was a household based survey that was conducted in Kamwenge Town Council that the main town of the district and a centre for most of the activities like Administrative services, business and other social amenities located in Western Uganda a distance of 400km from the capital city Kampala by road.

## 4 b) Sample Size estimation, sampling procedure and data collection

The sample 299 was determined using a standard formula by Kish Leslie (8) assuming a standard error of 5% and 77.1% of households with at least one insecticide-treated net in Tooro region and 10% non-response was included [8, ??9]. Kamwenge Town council was selected purposively because it in the( D D D D )

F Results: A total of 285 respondents were interviewed of which 39.7% were male. Ownership of ITNs was 60% whereas utilization in the night prior to the study was 54.4%. The factors associated with the ownership of the ITNs included: marital status: married respondents ( $p=0.05$ ), level of education ( $p=0.001$ ), knowledge of malaria cause ( $p=0.033$ ), presence of children under 5 years ( $p=0.025$ ). The factors associated with the utilization of ITNs included: marital status of the respondents: married respondents ( $p=0.018$ ), education level ( $p=0.009$ ), presence of children under five years ( $p=0.048$ ), knowledge of cause of malaria ( $p=0.019$ ), having faced challenges in using ITNs ( $p=0.001$ ), and malaria episode in the last one month ( $p=0.011$ ).

## 5 Conclusion:

The study concludes that the ownership and utilization of ITNs were low since they were all below the national target of universal coverage. The factors statistically associated with the ownership of the ITNs included: marital status, level of education, knowledge of malaria cause and the number of children under 5 years in a household. The factors statistically associated with the utilization of ITNs were marital status, education level of the respondents, and presence of children under five years of age in the household, having knowledge about malaria, having faced challenges in using ITNs in the past and malaria episode in the last one month.

center of the district and has a mix of people from different backgrounds. A household list for each ward was obtained with the aid of the ward agents and they were used to randomly assign households to different research assistants during the data collection process. Household heads were interviewed and incase they were absent, the oldest household member 18 years and above was selected for the interview using a structured questionnaire that contained both close and open ended questions.

## 6 c) Ethical Considerations

Ethical approval was obtained from the Mountains of the Moon University, Directorate of Postgraduate Studies & Research seeking permission to conduct the study which was presented to the officials of the Kamwenge Town and written informed consent was obtained from the study participants.

## 7 d) Data Analysis

Data was analysed using STATA version 13 for data analysis, Chi square test was used to identify the factors that influence the utilization of ITNs. To identify the factors that are associated with utilization of ITNs, logistic regression analysis was used in which bivariate logistic regression was first used to identify the factors that could be associated with utilization of ITNs at a pvalue  $<0.05$  and the factors that were turned out to be associated with utilization of ITNs in the bivariate analysis were included into a multivariate logistic regression model to cater for the effect of confounders and effect modifiers and identify the independent predictors of utilization of ITNs.

## 8 III.

## 9 Results

### 10 a) Demographic Characteristics

A total of 285 respondents were surveyed in July 2017. Majority of the respondents were aged 30-49 years 151(53%) with a mean age of 39.7 years, females 172 (60.4%) and married 221(77.8%) more demographic characteristics shown in table 1.

### 11 d) Factors associated with utilization of ITNs among residents of Kamwenge Town Council

The factors that were identified to have a statistically significant relationship with the utilization of ITNs in the bivariate analysis at a p-value  $<0.05$  included: marital status, level of education, occupation, religion, knowledge of malaria cause, number of children under 5 years in a household, malaria experience in the last one month and challenge in using ITNs. These were included in a multivariate logistic regression model to identify the predictors of utilization of ITNs as shown in table 5 below:

## 12 Discussions

More than a half of the respondents 54.4% had slept under ITNs the night prior to the study. This could be because some people do not have the bed nets and others prefer not to use them. This agrees with Uganda

Malaria Indicator Survey [6] findings that reported that 69% of the de facto household population slept under an ITN the night before the survey.

Of the 159 households that had a child below 5 years, 54(34%) reported that no child had slept under an ITN [10] also found out that despite the fact that ownership has been stable, available evidence shows that utilization of ITNs among children under five years of age has been low which is a gap between ownership and utilization is large.

Marital was found to statistically association with the utilization of the ITNs whereby married respondents slept under ITNs 8 times more than the divorced (aOR=8.4, 95 CI: 1.44-49.40, p=0.018), widows also slept under ITNs 12 times more than the divorced (aOR=12, 95% CI: 1.70-84.05, p=0.013) and the single respondents also slept under the ITNs 4 times more than the divorced ones. Given the fact they are in stable relationships, sleeping patterns could also be quite stable hence a high level of using ITNs than the divorced whose relationships are not stable.

The study found a statistically significant association between education level of the respondents and the use of ITNs whereby respondents who had attained secondary level of education slept under ITNs 6 times more than the un educated ones (aOR=6, 95% CI: 1.57-25.65, p=0.009) and the ones who had attained a tertiary level of education also slept under ITNs 2 times more than the un educated ones. This implies that such respondents are informed about the use of the ITNs and end up using the more than the uneducated who may not know. This finding is in line with findings of the study by Binka and others [11] who found out that demographic characteristics like age, education, size of household and ethnicity also influence use of bed nets.

Households in which there were children under five years of age used ITNs more than those in which there were no children and the association between the numbers of children in the household was statistically associated with the use of ITNs with households with one child using ITNs 2 times more than those in which there are no children and household with two children 3 times more than those without any children. This could be due to the fact that the Government of Uganda promotes use of mosquito nets by pregnant women and children under five years by providing mosquito nets to such women when they were pregnant which increases the ownership as well as use. This could also be due to the fact that the parents want to protect their children from malaria. This is in line with the findings by Biadgilign et al, [12] on determinants of ownership and utilization of insecticide treated nets for malaria control in Eastern Ethiopia that showed that households which had at least one under-five child the odds of owning any net was about 60% higher than those with no under-five children.

Having knowledge about malaria cause was statistically associated with the utilization of ITNs. The knowledgeable respondents slept under ITNs 0.5 times more than those who were not knowledgeable (aOR=0.5; 95% CI: 0.26-0.90, p=0.019). This implies that knowing how to prevent increases possibility for such people to sleep under ITNs and this is in agreement with findings of studies by Berhane, and Worku, 2012 [13] that documented that the key factors which explain the use of ITNs for malaria prevention relate to perceptions, attitude and retention level of ITNs and that use of ITNs was found to be low among people with little knowledge on malaria prevention methods.

Having faced challenges in using ITNs in the past was also statistically associated with the use of ITNs where by the respondents who had no challenges slept under ITNs 6 times more than those that had challenges. This is due to the fact that such challenges like heat and allergies inconvenience the people's sleep and discourage use of the ITNs. This is in line with the findings of the study by [14] that found that the main reasons for not using LLINs were inconveniences due to heat, no LLIN and LLIN is washed or torn, [16] also reported similar findings such as forgetfulness, unavailability of nets, net washed, fatigue, illness, and heat.

Respondents who had suffered from malaria in the last one month slept under ITNs 0.4 times less than the ones who had not suffered from malaria and the relationship between malaria experience and ITNs use was statistically significant (aOR= 0.4, 95%CI: 0.20-0.81, p=0.011). This implies that suffering from malaria does not influence the use of ITNs but Onwujekwe et al, in 2013 reported a different findings that perceived risk of malaria and benefits of the nets by the population also drive demand and that households with a recent attack of malaria were more likely to purchase net than their counterparts and that such communities have a perceived need for utilizing ITNs [15].

V.

## 13 Conclusions

Utilization of ITNs was found to be 54.4% and almost a half of the respondents surveyed did not sleep under the net a night prior to the study. The factors that were found to be significantly associated with the use of ITNs are marital, education level of the respondents, presence of children under five years of age in the household, having knowledge about malaria, having faced challenges in using ITNs in the past and malaria experience in the last one month. F benefits of use of mosquito nets, strategies to deal with unwanted or damaged ITNs and other bed nets should be put in place since people are still using torn and old ITNs.

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<sup>2</sup>© 2019 Global Journals 1

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Year 2019 14 Volume XIX Issue II Version I ( D D D D ) F Medical Research  Global Journal of	Variable in years Sex  Marital status  Level of Ed- ucation Occu- pation  5years Religion No children under   the household  Ownership of ITNs	Age Sex  Marital status  Education Occu- pation  Religion No children under  the household  Ownership of ITNs	Category 10-29 30-49 50-69 70 and above Female Male Single  Married Divorced  Widow No Education Primary Secondary Ter- tiary Business Civil Ser- vant Farmer Housewife Bornagain Catholic Islam Protestant 0 1 2 3  4 1-5 6-10 11-16 17-22 No Yes	Frequency, n (%) 72 (25.3) 151 (53) 56 (19.7) 6 (2) 172 (60.4) 113 (39.6) 19(6.7)  222(77.8) 15(5.3)  29(10.2) 136 (47.7) 96 (33.7) 37 (13) 16 (5.6) 45 (15.8) 16 (5.6) 210(73.7)  14 (4.9) 28(9.8) 150(52.6) 12(4.2) 95(33.3) 126(44.2) 77(27.0) 17(6.0) 59(20.7)  6(2.1) 186 (62.3) 90 (31.6) 8 (2.8) 1(0.35) 114(40) 171(60)
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[Note: © 2019 Global Journals 1]

Figure 1: Table 1 :

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Variable	ITN ownership		X <sup>2</sup>	P-value
	No n (%)	Yes n (%)		
Age				
10-29	30(41.7)	42(58.3)		
30-49	55(36.4)	96(63.6)	3.17	0.366
50-69	25(44.6)	31(55.4)		
70 and above	4(66.7)	2(33.3)		
Sex				
Female	67(38.9)	105(61.1)	0.20	0.656
Male	47(41.6)	66(58.4)		
Marital status				
Single	10(52.6)	9(47.4)		
Married	82(36.9)	140(63.1)	12.50	0.006*
Divorced	12(80.0)	3(20.0)		
Widow	10(34.5)	19(65.5)		
Education level				
No Education	68(50.8)	66(49.2)		
Primary	43(43.9)	55(56.1)	33.55	0.001*
Secondary	1(2.7)	36(97.3)		
Tertiary	2(12.5)	14(87.5)		
Occupation				
Business	14(31.1)	31(68.9)		
Civil	0(0.0)	16(100.0)	17.51	0.001*
Servant	97(46.2)	113(53.8)		
Farmer				
Housewife	3(21.4)	11(78.6)		
Religion				
Bornagain	15(53.6)	13(46.4)		
Catholic	62(41.3)	88(58.7)	4.10	0.252
Islam	3(25.0)	9(75.0)		
Protestant	34(35.8)	61(64.2)		
Number of children <5 years				
0	62(49.2)	64(50.8)		
1	25(32.5)	52(67.5)		
2	21(35.6)	38(64.4)	10.90	0.028*
3	6(35.3)	11(64.7)		
4	0(0.0)	6(100.0)		

Figure 2: Table 2 :

## 3

Year	Variable			ITN utilization				X 2	P-value		
2019											
16				No n (%)		Yes n (%)					
Volume	10-29	30-49	50-69	Age	32(44.4)	69(45.7)	40(55.6)	82(54.3)	1.13	0.769	
XIX	70 and above			Sex	25(44.6)	4(66.7)	79(45.9)	31(55.4)	2(33.3)	0.018	0.895
Issue	Female	Male	Single	Marital status			93(54.1)	62(54.9)	11.49	0.009*	
II	Married		Divorced	10(52.6)	95(42.8)	13(86.7)	9(47.4)	127(57.2)			
Ver-	Widow			12(41.4)	Education level		2(13.3)	17(58.6)			
sion											
I											
( D D	No	Education	Sec-	79(59.0)	3(8.1)	45(45.9)	55(41.0)	34(91.9)	35.25	0.001*	
D D )	ondary	Primary						53(54.1)			
F											
Medical	Tertiary	Business		3(18.8)	Occupation		13(81.2)	28(62.2)	17.78	0.001*	
Re-	Civil	Servant		17(37.8)	1(6.2)	109(51.9)	15(93.8)	101(48.1)			
search	Farmer	Housewife		3(21.4)	Religion		11(78.6)				
Global	Bornagain	Catholic		17(60.7)	71(47.3)	3(25.0)	11(39.3)	79(52.7)	5.60	0.133	
Jour-	Islam	Protestant	0 1	39(41.0)	Number of chil-		9(75.0)	56(59.0)	10.34	0.035*	
nal	2			dren <5 years		68(54.0)	58(46.0)	47(61.0)			
of				30(39.0)	25(42.4)		34(57.6)				
	3			7(41.2)			10(58.8)				
	4			0(0.0)			6(100.0)				
	Number of people in household										
	1-5			82(44.1)			104(55.9)				
	6-10	11-16		47(52.2)	1(12.5)		43(47.8)	7(87.5)	6.13	0.105	
	17-22			0(0.0)			1(100.0)				

Source: Field data, 2017

\* Significantly associated at  $p < 0.05$ 

Figure 3: Table 3 :

Variable			Bivariate analysis cOR (95% CI)		
Age					
18-29			1		
30-49			0.95 (0.54- 1.67)		
50-69	70 and Above	Female	Sex	0.99(0.49- 2.00)	0
				.4(0.07- 2.32)	
Male				1 1.03(0.64- 1.66)	
Marital status					
Divorced	Married	Single	1	8.70(1.92-39.42)	5.85(1.03-33.33)
Widow	No	education		9.21(1.75-48.53)	Education level 1
Primary	Secondary	Tertiary			1.69(1.03-2.75)
Business	Civil	servant			
Farmer	Housewife				
Bornagain Catholic Islam			1 1.72(0.75- 3.92)		
			4.64(1.02- 21.00)		
Protestant	Number of children < 5years		2.22(1.00-5.25)	0 1 1	1.84(1.03-3.27)
				2	1.59(0.85-2.98)
				3	1.67(0.60-4.64)
Not Knowledgeable	Knowledge of use of ITNs		1.53(0.33-0.85)	Knowledgeable 1	Not knowledgeable 0.44(0.15-1.21)
Had challenge			1		
Had no challenge			4.27(2.50- 7.27)		
Malaria experience in the last one month					
No			1		
Yes			0.42(0.25- 0.69)		

[Note: FIV.]

Figure 4: Table 4 :





## .1 List of abbreviations

## .2 Acknowledgments

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## .3 Competing interests

Authors declare that there is no conflict of interest in this study.

## .4 Authors' contributions

All authors conceived and designed the study; I A, RJ and AM collected, analysed, interpreted the data and drafted the manuscript; ARS critically revised the manuscript. All authors read and approved the final manuscript.

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