

**KNOWLEDGE, ATTITUDE AND PRACTICES TOWARDS UTILIZATION OF  
INSECTICIDE TREATED MOSQUITO NETS IN PREVENTION  
OF MALARIA AMONG THE RESIDENTS OF  
NAMUWONGO ZONES A AND B**

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**DECLARATION**

I declare that the work contained in this research report is mine and has never been presented before any academic institution for any award.

KATUUTU HILDA

Signature .....

Date.....

**APPROVAL**

This research report titled, “Knowledge, attitude and practices towards utilization of insecticide treated mosquito nets in prevention of malaria among the residents of Namuwongo Zones A and B”, was under my supervision as the University supervisor. It is now ready for submission.

MR. KAJJABWANGU RONALD

Signature .....

Date.....

## **DEDICATION**

I dedicate this work to my parents Mr. and Mrs. Kawamara Mishac, my brother Kawamara Ronnie, niece Kawamara Ariana and friend Baliremwa Sandra.

## ACKNOWLEDGEMENT

I thank my parents Mr. and Mrs. Kawamara Mishac and my brother Kawamara Ronnie for all the financial and material support in my life and throughout this course. I also give a standing ovation to their parental love to me. They have really been a cordial compliment to my life.

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## **OPERATIONAL DEFINITIONS**

- Attitude - This was the perception of respondents about the use of ITNs in the prevention of malaria. It can be positive or negative.
- Knowledge - This was the level of understanding respondents had on the use of ITNs in the prevention of malaria.
- Practice - This meant the different ways how respondents used ITNs in the prevention of malaria.

## ABBREVIATION OF TERMS

CVI	-	Content Validity Index
DRC	-	Democratic Republic of the Congo
DDT	-	Dichlorodiphenyltrichloroethane
ITNs	-	Insecticide Treated Mosquito Nets
LLIN	-	Long-lasting insecticide-treated net
KAP	-	Knowledge, Attitude and Practices
KCCA	-	Kampala Capital City Authority
MOH	-	Ministry of Health
SP	-	Sulfadoxine - Pyrimethamine
RDT	-	Rapid Diagnostic Blood Testing
UBOS	-	Uganda Bureau of Statistics
UDHS	-	Uganda Demographic Household Survey
UMIS	-	Uganda Malaria Indicator Survey

## ABSTRACT

In several African settings, ITNs reduced the death of children less than 5 years by about 20% (WHO, 2014). In Sub Saharan Africa (SSA), more than one malaria case occurred per 1000 which accounted for 90% of global death and ITN use was less than 35% by 2014 in the region. This indicates poor rate of ITNs use.

The main aim of the study was to assess knowledge, attitude and practices towards utilization of insecticide treated mosquito nets in prevention of malaria among the residents of Namuwongo Zones A and B.

The study employed a descriptive cross sectional study using quantitative method of data collection. A total of 276 respondents were randomly selected and data was collected using interview guided questionnaires.

The study found relatively good knowledge about ITNs use where; majority 259(94%) of the respondents had ever heard of ITNs, and 243(88%) knew they were used to prevent malaria. A slack awareness was evident where 179(65%) thought that shops and markets were the best places to get ITNs while 193(70%) wrongly thought that ITNs were not retreatable.

Attitudes were generally negative, because majority believed that; 171(62%) it was not important to sleep under an ITN every day, 160(58%) mosquitoes could still bite through ITNs, 152(55%) ITNs could make it difficult for them to get up during the night, 171(62%) it took much time to tuck the net each night, 166(60%) ITNs could lead to suffocation, 201(73%) ITNs had bad odour and 178(64%) drugs used to retreat ITNs were unsafe.

Practices were poor since; 152(85%) did not always check for holes in their ITNs, 120(67%) displayed ITNs at time of convenience, 110(61%) did not have ITNs on all beds, 168(94%) never retreated their ITNs and 118(66%) had untidy ITNs, 129(72%) households had no ITN hangs, 132(74%) had unfavourable sleeping arrangements to enable good display of ITNs, 104(58%) had ITNs with holes, in 107(60%) households, ITNs were not folded and 113(63%) of the respondents could not make a good illustration of ITN display.

In conclusion, respondents had fairly good knowledge about ITNs use, but with negative attitude which could have led to the poor practice. The researcher therefore suggests that; government should reinforce education to the public on the importance of ITN use in prevention of malaria so as to change the attitude which will in turn improve on practice.

## CHAPTER ONE

### 1.0 Introduction

This chapter presents the background, problem statement, purpose, specific objectives, research questions, significance and conceptual framework of the study.

### 1.1 Background

Insecticide-treated mosquito nets (ITNs) are a form of personal protection that repel and prevent mosquito bites that would cause malaria (World Health Organization (WHO), 2012). Malaria is an intermittent and remittent fever caused by a protozoan parasite that invades the red blood cells and is transmitted by infected female anopheles mosquitoes in many tropical and subtropical regions (Terefe, Ayanto and Gurmano, 2015).

ITN is one of the most effective and cost friendly malaria prevention measures (WHO, 2013a). This is because it reduced malaria cases by 18% (262 to 214 million) and deaths from an estimated 839,000 in 2000 to 438 000 in 2015, a decline of 48% worldwide (WHO, 2015). Of these, 90% deaths occurred in Africa (where ITNs were not properly used), 7% in South-East Asia and 2% in Eastern Mediterranean Region (WHO, 2015). Malaria costs an estimated \$12 billion in lost productivity in Africa (Terefe et al., 2015) which made it imperative to study the utilization of ITNs.

Globally the actual use of ITNs was 70-73% where 85% was in urban areas and 57% to 73% in rural areas (WHO, 2014). In North America, ITNs use was 98% (WHO, 2012), in Latin America ie; Guatemala, Chile and Bolivia, ITNs use was less than 50% in 2014 (Obol, Atim and Moi, 2013a). In Asia, ITN use generally was at 68% where; in Saud Arabia, India, China, Japan and Korea, it ranged between 65 and 88%. In Indonesia, Bangladesh, Kazakhstan and Turkmenistan, ITN use was less than 50% (WHO, 2013b) and 90% in China malaria risky areas (China Centre for Diseases Control and Prevention, 2011).

In Africa, ITNs reduced the death of children under 5 years by about 20% (WHO, 2014). Sub Saharan Africa (SSA) had less than 35% ITN use, less than 5% of children slept under ITNs (Sangare et al., 2012). Malaria accounted for 60% of outpatient visits, 30% of hospitalizations among children under 5 years of age, and 11% maternal mortality (Vijayakumar et al., 2009) and only 55% of the population accessed ITNs by 2014 (WHO, 2015).

In West Africa, ITN coverage was; Sierra Leone (87.6%), Togo (96.7%) and in the ‘Horn of Africa; Ethiopia, Eritrea and Somalia (91%) (Bennett, 2014). The gap was; in 2014, an estimated 269 million of the 834 million (32.3%) people at risk of malaria in Sub-Saharan Africa lived in households without any ITNs (WHO, 2015). Household ITN access was 56% in 2014 and 67% in 2015, usage was 46% in 2014, 55% in 2015 among children under 5 years (WHO, 2015). Up to 3.8 billion dollars could be saved over 10 years by increasing the lifespan of nets from 3 years to 5 years (Uganda Malaria Indicator Survey (UMIS), 2012).

In East Africa, ITNs use was 30-50% and below 5% in rural areas (Abol et al., 2013). In Tanzania, ITNs use was less than 35% (Mazigo et al., 2010), in Kenya malaria was estimated at 18% of outpatient consultations and 6% of hospital admissions, about 80% of the population was at risk for malaria due to low ITN use, 27% (about 12 million people) lived in areas of epidemic and seasonal malaria transmission. Uganda ranked 3<sup>rd</sup> in malaria deaths in Africa with 52% in children (Obol, Atim and Moi, 2013a). ITNs use was 35% in households, 43% in children under age 5, and 47% in pregnant women, 10% in the rest of the population (WHO, 2014). There were 28% of households who had at least one net for every two people (UDHS, 2011) and only 8% of households had three or more ITNs which fell far short of the 2010 target of 50% (UBOS, 2010).

ITNs use in Namuwongo Zone was low basing on evidence that over 60% of hospital visits to Kisugu Health Centre III located in Namuwongo were malaria cases. This made it necessary for the researcher to carry out this study to assess the knowledge, attitude and practices of the community members towards the utilization of ITNs in the prevention of malaria since it is the most cost effective method of malaria control as per the standard of living of people in the area.

## **1.2 Problem statement**

ITNs should be regularly and properly used by every member of the family in order to control malaria (WHO, 2012). In Uganda, malaria accounted for about 30–50% of the outpatient burden, 35% of hospital admissions and 9-14% of inpatient deaths (Kampala Capital City Authority Report, 2014). In Namuwongo Zone, malaria accounted for over 60% of admissions and caused severe anaemia in children, placental malaria, death, abortion, and stillbirth to the pregnant mothers (Kisugu Health Centre III, 2015).

The Ministry of Health distributes ITNs free of charge to all people especially the vulnerable groups that included children under 5 years and pregnant mothers in their communities (MOH, 2012). There were two methods for malaria control especially during pregnancy. These were

chemoprophylaxis using sulfadoxine - pyrimethamine (SP) and ITN use (MOH, 2014). Despite those efforts, malaria was still prevalent.

If ITN use is not given adequate attention; outpatient burden, hospital admissions and inpatient deaths may increase in the area and other parts of the country with the same problem. A positive move may enhance the social and economic development of communities. This thus attracted the researcher to carry out this study to contribute to sustainable control of the disease.

### **1.3 Purpose of the study**

The study assessed the knowledge, attitude and practices towards utilization of insecticide treated mosquito nets in prevention of malaria among the residents of Namuwongo Zones A and B between 2000 and 2016 with the aim of enhancing awareness to create positive perception and right use of ITNs that would promote ITN use thus good health.

### **1.4 Specific objectives of the study**

The specific objectives included the following;

- i. To examine the level of knowledge of Lower Namuwongo Zone residents towards utilization of mosquito nets in prevention of malaria.
- ii. To assess the attitude of Lower Namuwongo Zone residents towards utilization of mosquito nets in prevention of malaria.
- iii. To examine the practices of Lower Namuwongo Zone residents towards utilization of mosquito nets in prevention of malaria.

### **1.5 Research questions of the study**

The study answered the following research questions;

- i. What is the level of knowledge of Lower Namuwongo Zone residents towards utilization of mosquito nets in prevention of malaria?
- ii. What is the attitude of Lower Namuwongo Zone residents towards utilization of mosquito nets in prevention of malaria?
- iii. What are the practices of Lower Namuwongo Zone residents towards utilization of mosquito nets in prevention of malaria?



## **1.6 Significance of the study**

The study findings will help the Ministry of Health get more information about ITNs utilization and this will assist in allocating adequate resources aimed at increasing ITNs coverage and use. This will include delivering more free of charge ITNs to communities most especially those most hit by malaria.

The ministry will also base on the results to reinforce information dissemination about the prevention of malaria through ITN utilization. This could be through empowering residents' knowledge, attitude and practices towards mosquito net use in malaria prevention by using the different mass media channels; such as televisions, radios and newspapers.

The study findings will be based upon by policy makers to design appropriate policies that will help to increase mosquito net use. For instance, giving free mosquito nets to every malaria patient discharged from the health centres and following them up in their communities to ensure proper ITNs use.

Also the findings will help the health care service providers assess the level of knowledge, attitude and practices of patients towards mosquito net use in the prevention of malaria and apply the necessary help. This could be through advising them about better ways of using ITNs; such as when the net should be displayed, how it should be hanged, when and how to be retreated among other issues. This will improve service delivery thus clients satisfaction.

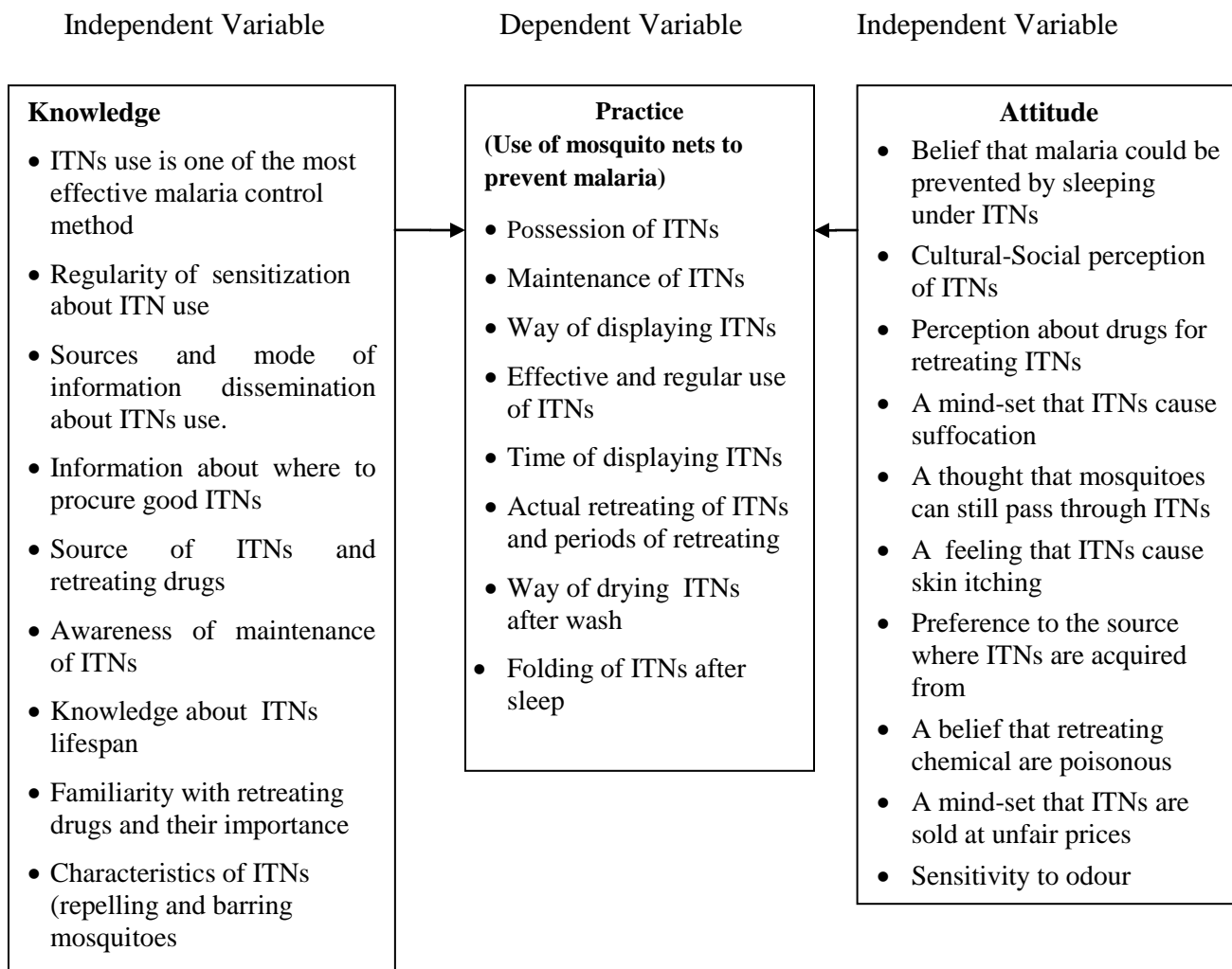
Society members who will access study findings will have better awareness about the knowledge, attitude and practice gaps that hinder them to effectively use ITNs to prevent malaria. This will be based upon to adapt the recommended knowledge, attitude and practice for better malaria prevention.

Results will be a source of reference that will help other researchers, students and other individuals who may undertake similar studies about ITNs use and malaria prevention.

Findings will help the researcher to identify the level of knowledge, attitude and practices of the community members towards ITNs use which information will be based on to know the general population utilization of ITNs. It will be upon this that the researcher will develop recommendations that will be suitable to increase ITN use in the study area.

## 1.7 Conceptual framework of the study

Figure 1: Conceptual Framework of the study



Source: Developed by the Researcher

Knowledge and attitude towards ITN utilization were the independent variables that led to practice which was the dependent variable.

Indicators of knowledge were; ITNs use was one of the most effective malaria control methods, regularity of sensitization about ITN use, sources and mode of information dissemination about ITNs use, information about where to procure good ITNs, source of ITNs and retreating drugs, awareness of maintenance of ITNs, knowledge about ITNs lifespan, familiarity with retreating drugs and their importance, and characteristics of ITNs (repelling and barring mosquitoes).

Indicators of attitude were; belief that malaria could be prevented by sleeping under ITNs, cultural-social perception of ITNs, perception about drugs for retreating ITNs, a mind-set that ITNs caused

suffocation, a thought that mosquitoes could still pass through ITNs, a feeling that ITNs caused skin itching, preference to the source where ITNs were acquired from, a belief that retreating chemical were poisonous, a mind-set that ITNs were sold at unfair prices and sensitivity to odour.

Indicators of practice were; possession of ITNs, maintenance of ITNs, way of displaying ITNs, effective and regular use of ITNs, time of displaying ITNs, actual retreating of ITNs and periods of retreating, way of drying ITNs after wash and folding of ITNs after sleep.

## **CHAPTER TWO: LITERATURE REVIEW**

### **2.0 Introduction**

This chapter presents information reviewed from acknowledged studies by scholars, researchers, reporters and academicians among others. This was cited in relation to study specific objectives that included; examining the level of knowledge, assessing the attitude and practices of residents towards utilization of mosquito nets in prevention of malaria.

### **2.1 An overview of malaria and ITNs**

Malaria was an entirely preventable and treatable disease, provided the currently recommended interventions were properly implemented. Vector control through the use of insecticide-treated nets (ITNs) was one of the preventive measures against malaria (WHO, 2015).

In developing countries, malaria problem became more critical with the development of multi-drug resistance in *P. falciparum*, vector resistance of Dichlorodiphenyltrichloroethane (DDT) and Organo Phosphorous (OP) compounds of insecticides (WHO, 2015).

This development made the governments to direct their efforts to developing vector control programs. These included; selective spraying, personal protection methods including Insecticide Treated Nets (ITNs) that could be carried out by the communities themselves within the primary health care system in conformity with the global malaria control strategy of WHO and environment protection strategies (Myat et al., 2014). There was inadequate time and funding to study the behaviour of vector mosquitoes and vector resistance to insecticide. So, locally appropriate vector control strategy was needed to allow cost effective vector control. ITNs were considered as an added tool in combating malaria since it was very effective, had very negligible adverse effects and cost friendly (Njau et al., 2013).

### **2.2 Related Literature**

#### **2.2.1 Knowledge of residents towards utilization of mosquito nets in prevention of malaria**

##### **2.2.1.1 High knowledge**

###### **2.2.1.1.1 ITN one of the most effective tool**

In a study on malaria knowledge, attitude and practices among migrants from malaria-endemic countries in Evrotas, Laconia, Greece, out of 130 respondents, 117(90%) were trained in the use of

ITNs and knew ITNs as one of the most effective malaria preventive strategy if used regularly (Evlampidou et al., 2013). They knew ITNs were supposed to be retreated after some use and could properly illustrate how to hang an ITN.

#### **2.2.1.1.2 Knowledge about the signs and symptoms of malaria**

In a study on knowledge, attitudes and practices regarding malaria control in an endemic area of southern Iran, it was observed that, majority of the respondents had good knowledge about use of ITNs. They were aware that ITNs were the most effective malaria prevention strategy and knew malaria signs and symptoms due to sensitization about malaria (Hanafi-Bojd, 2011). Similar findings were in Swaziland where out of 320 households surveyed, 289 (93.1%) of the respondents reported that the effective use of ITNs prevents malaria (Khumbulani et al., 2009). Also in a study in south-western Tanzania, all participants reported they had heard of malaria, and 178(80.2%) knew that the ITNs prevented malaria infection and the disease is transmitted by mosquitoes.

#### **2.2.1.1.3 Knowledge about where ITNs should be bought from**

A study carried out in West Africa that assessed household possession and use of insecticide-treated mosquito nets in Sierra Leone 6 months after a national mass-distribution campaign by Bennett et al. (2012) found that, majority of the respondents had good knowledge about ITNs use in the prevention of malaria. This was because 66.7% of respondents knew that an ITN was a major tool in mosquito bites prevention and best ITNs could be bought from pharmacies and health centres basing on the information they had acquired during hospital visits. Majority of them had used them before and had experienced less malaria incidents compared to the past when they did not use them.

#### **2.2.1.1.4 Awareness that ITNs were good for children**

In a prospective hospital-based study about exploring the impact of targeted distribution of free bed nets on households bed net ownership in Sub Saharan Africa, Njau et al. (2013) found out that respondents showed high knowledge about ITNs utilization. Awareness of ITNs was found among 184(80%) of the 230 respondents. Of 130 participants, 117(90%) reported having heard about ITNs as a preventive strategy against malaria and knew ITNs were good for their children. Respondents knew that children were very vulnerable to malaria due to low immunity and could mention the advantages of having children sleep under ITNs which included good health and regular attendance to school.

#### **2.2.1.1.5 Knowledge about how to use ITNs**

Audrey et al. (2009) in a study done in central Africa on free distribution of insecticide treated bed nets to pregnant women in Kinshasa, Democratic Republic of Congo (DRC) revealed that, majority of the respondents had good knowledge on the practices that influenced the durability of ITNs. They knew that having good sleeping arrangements, proper hangs, and well furnished houses favored the durability of ITN and vice versa. This was because they knew the basic requirements for effective ITNs use which knowledge was acquired from the health education talks during hospital visits.

#### **2.2.1.1.6 Understanding of the right sources of information**

In a study on knowledge and misconceptions about malaria among pregnant women in a post-conflict internally displaced persons' camps in Gulu District, Northern Uganda, majority of respondents had high knowledge on the use of ITNs. They reported to have ever heard about malaria and ITNs as one of the preventive strategies with the main source of information being from health centres followed by radio (Obol et al., 2011). Health workers were reliable sources of information because in most cases, it was certified information.

#### **2.2.1.1.7 Knowledge about maintenance of ITNs**

Luyiga (2013) in a study that assessed the level of knowledge, attitudes and practices on malaria prevention and control in Uganda among community members in Nsaabwa Village, Mukono District, found out that, 97.1% of the respondents had good knowledge that ITNs were very effective in malaria prevention and knew that malaria had great danger to human life and it was known to be a disease that could easily kill if not prevented. They mentioned that it was wise of somebody to always check for holes in the ITN and if found, they advised on mending it with a needle and thread to avoid mosquitoes entering the ITNs when one was asleep.

### **2.2.1.2 Low Knowledge**

#### **2.2.1.2.1 Lack of knowledge about the correct period to retreat ITNs**

However, some studies showed low knowledge about ITNs utilization as illustrated below. San, Soe and Shwe, (2013) in a study on knowledge, attitude and practices on Insecticide Treated Nets in Myanmar, found out that, majority of the respondents had fairly low knowledge about retreating ITNs. Out of 256 respondents studied, 54.3% did not know the correct period of use before

retreating an ITN. They did not know ITNs were supposed to be retreated between 6 to 9 months or after 10 to 20 washes.

#### **2.2.1.2.2 Low knowledge about retreating ITNs**

In a study about knowledge, attitude and practice on insecticide treated nets in Myanmar, San *et al.* (2013) reported that, majority of the respondents showed low knowledge about retreating ITNs. Although 174(68.0%) of the respondents had heard about ITN tablets, 83.6% did not know where they could buy the ITN tablets because they had received inadequate training on ITNs use and those that had received training had not taken enough initiative to ask during the free ITNs distribution.

#### **2.2.1.2.3 Did not need more information on ITN use**

In a study carried out in Greece, Evlampidou *et al.* (2013) found out that majority of the respondents had low knowledge regarding information about the use of ITNs. Majority 86(66%) reported that they did not need any more information about malaria and use of ITNs. They thought that they had acquired enough information from their neighbours and friends who used ITNs. This was not safe because some members of the community depended on misconceptions about ITNs use.

In a study on knowledge, attitudes and practices on malaria prevention in project areas of malaria centres of OVHA (Orissa Voluntary Health Association) carried out in Pakistan, out of 256 respondents, majority 221(86.3%) had low knowledge about ITNs use. The 221 respondents did not use ITNs and presented low knowledge about ITNs utilization. Majority 69(31.2%) did not use ITNs because they did not know about them, 67(30.3%) did not have ITNs (Dutta, 2012). They did not know the right places from where to buy ITNs. Majority thought that a genuine ITN can be acquired from any where such as markets. All the respondents reported that they had inadequate sensitization and education about ITNs partially due to unreliability of health care services in rural areas.

#### **2.2.1.2.4 Misuse**

Minakawa *et al.* (2008) in a study on unforeseen misuses of bed nets in fishing villages along Lake Victoria posed low knowledge about the use of ITNs. They revealed that, there were weaknesses in information dissemination and communication activities in some areas near water bodies during ITNs distribution campaigns. This lowered the value that community members placed on the correct use of nets as some thought that even if they do not sleep under ITNs, they would not suffer from malaria.

#### **2.2.1.2.4 Life span of ITNs**

In a study in Gambia, on awareness and knowledge about Insecticide Treated Nets (ITNs) amongst pregnant mothers, knowledge about ITNs use was relatively low. Out of 256 respondents studied, 166 (64.8%) had heard about ITNs. Among them, 54.7% did not know the life span of ITNs. Although 174 (68%) of the respondents had heard about ITN tablets, most of the respondents did not know where they could buy the tablets for retreating the ITNs (83.6%) (Runsewe-Abiodun et al, 2012). Also in a study in Oromia and Amhara regional states, Ethiopia, some respondents never knew where to procure ITNs from as illustrated by 32.5%, and 38(8.7%) of the respondents did not think that they needed ITNs (Baume et al., 2009).

In a study on free distribution of insecticide treated bed nets in Kinshasa, majority of the respondents had low knowledge on the durability of ITNs because they could not actually tell the life-span of ITNs. Majority revealed that it could last for 3 months while the least 28.1% reported 6-9 months which was a low lifespan yet it could last beyond one year according to WHO standards (Audrey et al., 2009).

#### **2.2.1.2.5 Malaria could be prevented by good sanitation not ITNs**

In a total of 398 respondents who participated in the study that assessed the knowledge, attitude and practice about malaria and ITNs utilization among pregnant women in Shashogo District in Southern Ethiopia, Fuge et al., (2015) revealed that, their overall knowledge towards use of ITNs was low. There were only 15.6 % of the mothers who associated mosquitoes with malaria and knew ITNs as a major preventive measure. Majority of them (65.6 %) opposed ITNs as a major preventive strategy to malaria and revealed good environmental sanitation would prevent malaria other than use of ITNs.

#### **2.2.1.2.6 Characteristic of ITNs**

In a study on utilization of insecticide treated nets among pregnant women in Gulu, northern Uganda in the post conflict IDP camps of Gulu district, it was found that pregnant women had low knowledge regarding the characteristics of ITNs in prevention of malaria since they could not identify them. They did not know that ITNs repelled mosquitoes and acted as barriers to mosquitoes (Obol et al., 2011). This indicated low knowledge about ITN use which influenced its utilization.



### **2.2.1.2.7 Light threatens mosquitoes**

In a study about the utilization of insecticide treated nets in households with children under 5 years in Muhorro Sub County, Kibaale District, Uganda, respondents had low knowledge on utilization of ITNs in the prevention of malaria. They thought that, sleeping in a room with electricity would not necessitate them to use ITNs because mosquitoes would be scared away by the light and heat (Bashinyora, 2010).

### **2.2.1.2.8 Most effective in malaria prevention**

Luyiga (2013) in a baseline study on malaria in Uganda among districts of Mukono, Jinja, Mbarara and Arua, found out that, there was relatively low knowledge on ITNs use as an effective way to prevent malaria. Nearly half (51.7%) of the urban respondents did not know that the use of nets was the most effective way to prevent malaria and some respondents from low income families never knew that ITNs were retreatable. While among rural respondents, there was limited knowledge of the best method for malaria prevention.

## **2.2.2 Attitude of residents towards utilization of mosquito nets in prevention of malaria**

Runsewe-Abiodun et al. (2013) in a study about awareness and Knowledge about Insecticide Treated Nets (ITNs) amongst pregnant mothers in Ogun State, Western- Nigeria, found a positive attitude towards ITNs use in malaria prevention. Out of 256 respondents; 133(52.0%) perceived that malaria could be prevented even if one resided in a malaria endemic area, 139 (54.3%) believed that malaria could be prevented if one slept inside a mosquito net, 221(86.7%) believed that sleeping inside an ITN at night reduced mosquito bites and 192(75%) expressed willingness to buy ITNs if they did not get one for free. They also believed that the drugs used to retreat ITNs were safe.

### **2.2.2.1 Believed that it was comfortable for the to sleep under ITNs**

In a descriptive study on the assessment of knowledge, attitude and practice about malaria and ITNs utilization among pregnant women in Shashogo District, Southern Ethiopia, Fuge, Ayanta and Gurnamo (2015) showed that, attitude towards ITNs use was positive. It was found out that, 70% of the respondents perceived ITNs use was comfortable and saved them from malaria infection. Majority who had suffered from malaria in the recent past revealed that ITNs use was not as a discomfort as suffering from malaria.

Nkondjio et al. (2013) in a study on the impact of cyfluthrin (Solfac EW050) impregnated bed nets on malaria transmission in the city of Mbandjock, Cameroon found out that, majority of the

respondents who had receive enough education about ITNs use knew that ITNs, if used properly could not lead to suffocation. They revealed that ITN users who suffocated had other health complications.

#### **2.2.2.2 Good to use ITNs regularly**

In a cross-sectional study about knowledge, attitudes, and practices about malaria and its control carried out at Iringa Regional Hospital in south-western Tanzania, Humphrey (2011) reported that respondents had a general positive attitude towards ITNs use because they were scared of malaria since it was regarded a serious disease. They highly believed that regular ITN use was very advantageous if malaria infection was to be controlled. They did not suspect any health problem related to drugs used to retreat ITNs and were ready to retreat their nets if they got the drugs.

#### **2.2.2.3 ITNs scent**

Wanzira et al. (2013) in a study on Long-lasting insecticide-treated bed net ownership and use among children under 5 years of age following a targeted distribution in central Uganda, found out that ITNs were manufactured with a good scent that could attract people to use them. This was because earlier ITNs were complained of having bad odour that could at times lead to vomiting.

#### **2.2.2.4 Training about ITN use**

A study in Muhorro Sub County, Kibaale District by Bashinyora (2010) reported that, majority of the respondents who had got enough training about the use of ITNs had a positive attitude towards their use. They believed that their children could easily suffocate at night due to poor hanging of ITNs despite the fact that less than 5% of the respondents had reported children suffocating at night due to net contact. They also never believed that when they were sick, ITNs would make them sweat too much to lose a lot of body fluids that would make them sick. Trained respondents also believed that, a sick child should always sleep under an ITN as it reduced mosquito bites and the drugs did not lead to a chemical reaction to intensify the sickness. Respondent attributed suffocation to other factors such as respiratory tract infections and defects other than sleeping under an ITN.

#### **2.2.2.5 Prevented mosquito bites**

In a study about utilization of insecticide treated nets among pregnant women in Gulu: a post conflict district in northern Uganda, majority of the respondents (98%) believed that ITNs use was good. Up to 95% of the respondents believed ITNs prevented mosquito bites and hence controlled malaria transmission. Majority (97%) perceived ITNs as effective at preventing mosquito bites; they

believed that no mosquito could pass through an ITN in good condition. Majority 96% of the respondents who possessed ITNs were willing to continue using them (Obol et al., 2013b).

#### **2.2.2.6 Time to tuck the ITN**

Kulkarni et al. (2010) in a study on contribution of integrated campaign distribution of long-lasting insecticidal nets coverage of target groups and total populations in malaria-endemic areas in Madagascar, showed good attitude regarding the effectiveness of regular and correct ITNs use. Respondents were worried that they might become seriously ill with malaria if they did not use ITNs regularly and correctly. They also revealed that it did not take much time to tuck in a net to prevent mosquitoes from entering into the net.

#### **2.2.2.7 Good history of use**

Graves et al. (2009) in their study about factors associated with mosquito net use by individuals in households owning nets in Ethiopia found out that, ITN users believed that a well displayed ITN prevented mosquitoes from accessing its user during sleep. Majority of the respondents had a good attitude towards the use of ITNs since 91.3% believed that they needed ITNs because they had ever used them and were saved from malaria infection.

#### **2.2.2.8 Unsafety of retreating drugs**

Despite being educated about the importance of ITNs, some people just felt that they did not need them as reported by Zewdneh et al. (2011) in a study on knowledge, attitude and practices about ITNs, in Sri Lanka. Some communities in limited resource countries of South America and Asia; Bolivia and Bangladesh respectively felt that they did not need ITNs hence negative attitude. They had a mind-set that the drugs used to treat the net were unsafe and could easily suffocate them to death.

#### **2.2.2.9 Mindset the ITNs are only necessary to some people**

In a study carried out in Myanmar, about the challenges in universal coverage and utilization of insecticide-treated bed nets among migrant plantation workers, Myat et al. (2014) found out that majority of the respondents had negative attitude towards ITNs use. Respondents had a mind-set that ITNs were only good for them (the migrant workers). They were thought to have less resistance to malaria and other environmental conditions. Majority did not believe that a mere mosquito bite would make them very sick with malaria.

### **2.2.2.10 Itching of ITNs**

It was believed that ITNs itched some of the users. A study in Piron, Mali, on use of Insecticide treated nets following a malaria education intervention by Rhee et al. (2005) observed that, majority of the respondents had negative attitudes towards ITNs use among children. They believed that they itched them and caused excessive heat which made them cry. The parents were disturbed by the noise which disrupted their sleep. So they left them to sleep without ITNs which portrayed negative attitude.

### **2.2.2.11 Hanging of ITNs**

A study in Nigeria by Adekanmi and Foluso (2015) found that, majority (66.7%) of the respondents had negative attitude towards ITNs. They did not use ITNs because they felt inconvenienced with the daily hanging yet mosquitoes were not plenty every day. Tucking in the net at night was an inconvenience to many respondents who had ITNs. However, ideally a well hanged ITN is thought to be more effective in denying mosquitoes access to ITN users compared to a poorly hanged ITN. If it is cone shaped, it should be hanged directly above the bed and if triangular, it should have four well stretched strings.

### **2.2.2.12 A feeling that one has enough information about ITNs use**

A prospective study by Skarbinski et al. (2011) on the impact of health facility-based insecticide treated bed net distribution in Malawi, found out that respondents showed poor attitude towards acquiring additional information about ITNs use. This was because they did not need any more information about malaria because they had heard it before. This was not good attitude because malaria prevention trends change over time and thus the need to always get updated information.

In a study that assessed the level of knowledge, attitude and practices of pregnant women concerning the use of ITNs in Anambra State, South-east Nigeria, majority of the respondents refused to use ITNs due to misconceptions from their neighbours which led to negative attitude. These included suffocation, skin itching and irritation (Ukibe et al., 2014). Similar findings were in a study carried out in Bhutan where respondents reported itching after using ITNs (Zangypo et al., 2011). Itching from the use of ITNs could result from the chemical components or as a manifestation of hypersensitivity reaction from the physical component of the nets.

### **2.2.2.13 Increased Heat**

A study on international population movements and regional *Plasmodium falciparum* Malaria elimination strategies done in Ghana, found negative perceptions about sleeping under a bed net among the respondents. These included; too much heat at night was due to sleeping under ITNs, mosquitoes could still bite through ITNs and bed nets could not allow in enough air which led to suffocation (Tatem and Smith, 2010). However, most of the respondents that gave such answers based their fears on rumours and misconceptions hence negative attitude.

### **2.2.2.14 Level of education about ITNs**

In Niger, some of the respondents refused to use ITNs simply because they “heard” ITNs killed someone or they “did not work”. This notion suggested high degree of misconception and misinformation as reported by Isah and Nwobodo (2009) in a study carried out on awareness and utilization of insecticide treated mosquito nets among pregnant mothers at a tertiary health institution. This reason for non-use of ITNs was popular among women with poor educational background and was a very important barrier militating against the use of ITNs in this part of the world. This made them to develop a negative attitude towards ITNs use.

Iwashita et al. (2010) in a study on sleeping arrangement and house structure effect on bed net use in villages along Lake Victoria, revealed that majority of the respondents had poor attitude on the use of ITNs. Majority thought that ITNs increased bed temperatures and this was a general problem in most homesteads in the study which was feared to increase if they slept under ITNs.

### **2.2.2.15 Attitude about the odour of ITN**

In a study on community knowledge, attitudes and practices (KAP) on malaria prevention in Swaziland, it was observed that some respondents developed a negative attitude towards ITNs use because of the odour suspected to be from the drugs used to treat them. Different people were allergic to different things in their environment where smell was one of the major allergies people had (Khumbulani, 2009). The odour from ITNs caused some people to vomit or get sleepless nights which made them uncomfortable and hated sleeping under them.

According to Ukibe et al. (2014) in a study in Anambra state, South-East Nigeria, findings showed negative attitude. Out of 420 respondents who owned nets, 235 (56%) refused to use them. They had a mind-set that, they had inadequate space to hang nets, their houses had door and window nets

thus did not need any other nets, ITNs did not work (Kilian et al., 2013), nets caused itching, heard ITNs killed someone as also reported by Isah and Nwobodo (2009).

#### **2.2.2.16 Perception about the time to use ITNs**

In a study on evaluation of the 2011 long-lasting insecticide-treated net distribution for universal coverage in Togo, people had different negative perceptions on the use of ITNs. These included; ITNs were perceived to be expensive, it was difficult to mend holes, they were inconvenient by increasing heat hence sweating, caused suffocation and that it was impossible to buy a net for everybody in a big family (Stevens et al., 2013). Some people were of a view that use of bed nets was necessary when mosquitoes were plentiful and were not aware that even a few mosquito bites led to malaria.

#### **2.2.2.17 Attitude about the cost of an ITN**

Soleimani-Ahmad et al. (2014) in a study on the community knowledge and practices regarding malaria and long-lasting insecticidal nets during malaria elimination programme in an endemic area in Iran, showed that, there was a high awareness of ITNs utilization, but did not influence the actual ITNs usage. Majority were of a view that ITNs were sold at unfair prices and that it did not necessarily mean that whoever slept under an ITN would not get infected with malaria. It was upon this argument that some respondents never used ITNs. This also indicated negative attitude towards ITNs use.

#### **2.2.2.18 Preference of the shape of the ITN**

In a study that investigated the use of rectangular insecticide-treated nets for malaria control in Chipinge District, Zimbabwe, the use of ITNs was dependent on ones preference to its shape. Respondents would rather not sleep under an ITN if it was not the preferred shape despite high knowledge on its effectiveness in the prevention of malaria. Rectangular mosquito nets were preferred to conical shaped nets because they were believed to cover a large surface area (Sande et al., 2012). This meant that they could hardly come in contact with the skin thus prevented mosquito bites compared to other shapes of mosquito nets.

#### **2.2.2.19 A belief the ITNs prevented malaria**

According to Magha et al. (2013) in nationwide studies on ownership and use of ITNs in Sub Saharan Africa, there were high doubts about the effectiveness of ITNs in the prevention of malaria. Participants mentioned that some people slept under mosquito nets but their children still died of

malaria. They revealed that, whether mosquito nets helped in the prevention of malaria or not remained a myth to them.

#### **2.2.2.20 Though ITNs were of low quality**

In a study in rural Northwest Tanzania, Humphrey, (2011) reported that, respondents had a negative attitude towards the use of ITNs in regard to the source. It was found that 53% preferred to use mosquito nets they had bought themselves to ones they had acquired free of charge and only 18.5% could not afford buying a mosquito net themselves if they had not got one for free. They thought that, free of charge ITNs were of low quality and could expose them to mosquito bites and the eventual malaria infection. The study further noted that this was due to the fact that some people that slept under ITNs also suffered from malaria.

#### **2.2.2.21 ITNs meant for females**

Karema et al. (2012) in the study on the trends in malaria cases, hospital admissions and deaths following scale-up of anti-malarial interventions between 2000 and 2010 in Rwanda, reported poor attitude of respondents towards ITNs use. Respondents believed that, ITNs were only meant for females and children because they were more at risk of malaria than other people in the community. This was poor attitude because malaria affected every community member indiscriminately.

#### **2.2.2.22 Save money for ITNs for other basic needs**

In a study carried out about the use of insecticide treated bed nets among pregnant women in Kilifi District, Kenya., Njoroge et al. (2009) found negative attitude towards ITNs use in regard to the price they are sold. Some respondents never used ITNs because they thought that were sold very expensively and that they would rather use that money for other personal more pressing needs. Some respondents (45%) revealed that, they could not go without taking alcohol because they want to save money to buy a mosquito net from which they do not derive a direct benefit. Others revealed that, they could not go without stocking enough food in their houses and divert the money to buying mosquito nets. However they were ready to utilize ITNs if they could access them for free of charge.

#### **2.2.2.23 A perception that some people are too strong for ITNs**

Some respondents especially males believed that they were too strong to be infected by malaria which did not necessitate them to use ITNs as observed in a study in Eastern Rwanda by Kateera et

al. (2015). This showed a negative attitude towards ITNs use. As a result, they believed that sleeping under ITNs daily was not necessary which predisposed them to malaria infection.

#### **2.2.2.24 Unsafe to ill people**

According to Obol et al. (2013) in a study done in northern Uganda, respondents knew the importance of ITNs but never regularly used them because they believed that the drugs used to treat and retreat them had dangerous chemical components to their lives. They preferred falling sick from malaria and treat it rather than inhaling chemical components that would make them develop dangerous diseases such as cancer, that they would not be able to treat. They did not recommend critically ill patients to sleep under newly acquired ITNs because they thought that, the chemicals in ITNs would worsen their condition. This illustrated negative attitude towards ITNs use.

#### **2.2.2.15 Preference to mosquito repellants**

Kiwuuwa and Mufubenga (2008) in a study on the use of insecticide treated bed nets by pregnant women in Luwero district, Uganda, found out that ITNs were not as effective as other malaria preventive strategies thus negative attitude towards ITNs use. They preferred using mosquito repellants such as mosquito coils and planting mosquito repellent plants around their homes than actually sleeping under ITNs which they thought were dangerous to their lives.

### **2.2.3 Practices of residents towards utilization of mosquito nets in prevention of malaria**

In a study carried out in Myanmar, Myat et al. (2014) noted that, majority 53% of the respondents consistently utilized ITNs. This was mostly influenced by the geographic location of the respondents. People who were in mosquito infested areas consistently used ITNs because they never wanted mosquito bites which could predispose them to malaria.

#### **2.2.3.1 Ownership of ITN**

In households containing pregnant women, ownership of ITNs ranged from 3 to 44%, in a summary article of data from 2003 to 2007 from 15 African nations (Eisele et al., 2009). In Ethiopia overall household ownership of ITNs reduced from 66% in the 2007 to 49% (Deressa et al., 2011).

#### **2.2.3.2 Washing of ITN**

A study by Stevens et al. (2013) on evaluation of the long-lasting insecticide-treated net distribution for universal coverage in 2011 in Togo revealed that, majority of the respondents had good practices towards ITNs use. Findings showed that, 97.7% of the respondents owned bed nets and



94% used and regularly washed them. They used them all seasons through even if mosquitoes were not plenty.

### **2.2.3.3 Mending of holes**

In a study on Insecticide-treated net (ITN) ownership, usage, and malaria transmission in the highlands of western Kenya, Atieli et al. (2010) found out that, LLINs that developed holes were frequently washed but were mended. Mending holes was good because it controlled mosquitoes from accessing inside the ITNs which could lead to mosquito bites.

### **2.2.3.4 Time of display**

Emmanuela et al. (2011) in a study on knowledge, attitudes and practices regarding malaria and mosquito net use among women seeking antenatal care in south-western Tanzania, found out that respondents had good practice in the use of ITNs. They displayed ITNs when entering the bed and immediately folded them after sleep to avoid mosquitoes entering the nets during the day. This study investigated whether community members folded their bed nets after sleep to assess the level of blocking mosquitoes from entering the nets.

### **2.2.3.5 Folding of ITN**

A study carried out in Zambia by Eisele et al. (2011) showed that, respondents used ITNs very well because they folded them well after use which portrayed good practice. Folding ITNs meant that there were fewer chances of mosquitoes entering and staying inside the ITNs which could predispose the users to mosquito bites.

### **2.2.3.6 Way of hanging an ITN**

In a study on use of insecticide treated nets by pregnant women and associated factors in a predominantly rural population in northern Ethiopia, practice on use of bed nets and ITNs was reported to be high. Mebrahtom and Wakgari (2008) revealed that, 97.7% of the respondents owned bed nets and 94% were sleeping inside the nets and took enough time to hang them properly. ITNs use was more among pregnant mothers who knew the importance of ITNs right from the information given during antenatal care.

### **2.2.3.7 Holes in ITNs**

In a study on the utilization of insecticide treated nets in households with children under 5 years in Muhorro Sub County, Kibaale District, good practice was portrayed. It was found that majority of

respondents used ITNs. More than 90% of the household members were using nets and always took time to mend them when they developed holes. They were always very careful when hanging them to avoid the nets being torn (Bashinyora, 2010). They in most cases used threads and needles to mend all the holes that developed to ensure that no mosquito enters at night during sleep (Ochomo et al., 2013). They revealed that, an ITN which had holes was far more dangerous than sleeping without a mosquito net because whichever mosquito entered found it difficult to get out which increased the frequency of biting and possibilities of catching malaria.

#### **2.2.3.8 Number of times to wash an ITN before retreating**

In a study carried out in Northern Uganda, majority of the respondents had good practice regarding retreating ITNs. They washed ITNs the recommended 20 times before retreating them. They revealed that, ITN retreatment helped in restoring the protective value of ITNs as the chemicals were potent enough to kill or repel mosquitoes (Obol et al., 2013). On the other hand, in a study done in Luwero district in central Uganda, half of the respondents retreated nets with an insecticide within the last 6 months yet they had washed it more than the 20 recommended times which indicated fair practice (Kiwuwa and Mufubenga, 2008).

#### **2.2.3.9 Should target households**

Eisele et al. (2009) in a cross-national analysis of 15 survey datasets, having sufficient intra-household access to an ITN, defined having more than one ITN per two household occupants as a strong determinant of individual use of ITNs. Households in Sierra Leone with more than 5 people were less likely to have sufficient ITN to occupant ratios. This highlights a limitation of the mass distribution campaign, in that households were limited to a maximum of three LLINs. Given that greater intra-household access to an ITN was a strong predictor of use, this suggests an effort should be made to target large households with additional nets if possible. Similarly, households without at least one child under five years and households without a woman of reproductive age were less likely to own more than one ITN which indicated poor practice.

#### **2.2.3.10 Washing of ITNs**

Zewdneh et al. (2011) in a study done in Ethiopia revealed that, majority of the respondents had poor practice towards ITNs use. 90(81.8%) of those who had bed-nets had never treated them with an insecticide. Participants who had bed nets washed them once in a year. Majority (40%) however

washed ITNs twice in a year. This made them very dirty and uncomfortable to sleep in. This increased the chances of malaria infection among people in malaria infested areas.

#### **2.2.3.11 Hanging of ITNs**

Findings in a study on claims about the misuse of insecticide-treated mosquito nets, by Eisele et al. (2011) showed that, in Malaysia, majority of the respondents did not use mosquito nets if they did not have anywhere to hang them. This was because majority of the respondents reported that ITNs came in contact with them during sleep due to poor hanging. Other people especially men did not bother using ITNs. This portrayed poor practice.

#### **2.2.3.12 Possession of ITNs**

There were poor practices regarding possession and use of ITNs among some respondents. In Achi, a rural community in Enugu state of Nigeria, only 11.4% had ever heard of ITNs. A study conducted in the 6 geopolitical zones of Nigeria showed household ownership of ITN to be 10.1%, but only 1.7% of children under the age of 5 slept under them (Oreanya et al. 2008). Also in Kenya, O'Meara et al. (2011) noted that, few people in Western Kenya owned ITNs in relation to the national expected coverage estimates.

#### **2.2.3.13 Hanging**

Findings from two cross-sectional surveys in thirteen malaria endemic districts of Bangladesh entitled, 'free distribution of insecticidal bed nets improved possession and preferential use by households' carried out by Ahmed et al. (2011) found out that, 51% of the respondents did not own ITNs and 71% did not sleep under ITNs the night before data collection and 75% reported irregular use of ITNs. They did not use ITNs because they felt inconvenienced with the daily hanging of ITNs yet not all days mosquitoes were plenty.

#### **2.2.3.14 Life span of ITNs**

In a study about community knowledge and practices regarding malaria and long-lasting insecticidal nets during malaria elimination programme in an endemic area in Iran, Asia, it was found out that frequent washing of ITNs and direct drying from sunlight reduced their life span as they easily developed holes. It was found out that 92% had poor practices because they dried bed nets in direct sunlight and they got torn within three months and only 18.5% of households slept under bed nets the night before the survey (Ahmadi, 2014). This use rate was lower than the targeted coverage (80%) which was recommended by WHO.

### **2.2.3.15 Number of ITNs in the household**

Still in Iran, Hanafi-Bojd (2011) in a study on the knowledge, attitudes and practices regarding malaria control in an endemic area of southern Iran Asia, despite a high bed net coverage, over 25% of members reported not to have slept under a bed net the night before the survey. Some males irregularly used ITNs because they had fewer nets compared to the number of household members. Household socio-economic status, number of bed nets, type and amount of sleeping spaces were key determinants of bed net use (Wiseman et al., 2007).

### **2.2.3.16 Misuse of ITNs**

Widespread ITN misuse in Africa was overblown by media report as shown by Allan et al., (2012) in an observational study of material durability of three World Health Organization-recommended Long-Lasting Insecticidal Nets in Eastern Chad. Reports noted that ITNs were used for fishing, and covering crops which was not actually true in many cases. However, in different areas, ITNs were put to different uses that included, caging animals, catching silver fish and fencing seedling from damage by animals. This incident was investigated in the present study and respondents revealed that ITNs were mainly meant for prevention of malaria.

### **2.2.3.17 Misuse of ITNs for other purposes**

In a longitudinal study on freely distributed bed-net use among Chano Mille residents, south Ethiopia, it was found out that ITNs were poorly used which led them to wear out so easily. Others misused them in activities like fishing and covering crops instead of sleeping under them (Loha et al., 2013). Some of them also complained that after a few months of using the ITNs, they could no longer block and repel mosquitoes which forced them to irregularly use them (WHO, 2011). Most of the ITNs were poorly managed after sleep which made them to be cut by different sharp objects that led to development of holes.

### **2.2.3.18 Folding of ITNs**

Masangwi et al. (2012) in a study on community knowledge variation, bed-net coverage and the role of a district healthcare system, and their implications for malaria control in southern Malawi, found out that, the poor sleeping arrangement reduced the life span of ITNs because they were poorly stored after use. Some nets were folded in windows which highly predisposed them to tearing faster than expected.

Yukich et al. (2009) in a study on costs and cost-effectiveness of vector control in Eritrea using insecticide-treated bed nets noted that, 93 % of the houses visited had no ceiling, structures onto

which nets were usually hung. It was plausible that lack of a place to hang or a need to improvise, such as by tying a long string from wall to wall onto which a net could be secured as well as difficulty in securing nets around floor-based sleeping arrangements, were some reasons for reduced likelihood of bed net use. Lack of bed net hangings increased the likelihood of poor bed net use.

#### **2.2.3.19 Hanging of ITNs**

In a study in Zambia, it was found out that most respondents poorly hanged mosquito nets. Majority did not properly display the nets to provide enough space for them to sleep. They poorly hanged the nets which brought them in contact with people (respondents) during sleep which increased the chances of mosquito bites (Pulford et al., 2011). ITN use among such households was not taken as a must since majority who lacked ITN hangs slept without ITNs despite having them in their houses.

#### **2.2.3.20 Poor displaying of ITNs**

In a study on free distribution of insecticidal bed nets in thirteen malaria endemic districts of Bangladesh, showed that respondents had poor practice in the use of ITNs as regards displaying them. Respondents made their beds and displayed their ITNs some hours before they got into the bed (Ahmed et al., 2011). This was poor practice because this made it easier for mosquitoes to enter into bed nets which exposed the respondents to mosquito bites.

#### **2.2.3.21 Frequency of washing**

Atieli et al. (2011) found out that some respondents over washed their ITNs which made them to easily tear. Frequent washing of nets increased loss of fabric integrity as majority washed them more than 20 times in 6 months which led to more wearing out of nets compared to ones that were not frequently washed.

#### **2.2.3.22 Frequency of retreating**

Hlongwana et al. (2009) in a study on Knowledge, attitudes and practices (KAP) on malaria in Swaziland: a country earmarked for malaria elimination, it was established that, some respondents did not regularly retreat their ITNs after washing them the recommended number of times. Majority, 70% never bothered to buy retreating drugs after the ones they were given during free distribution got over even if they knew where to buy them. Many respondents were not well conversant with genuine retreating drugs while others never knew where to acquire them from since even the few available health centres never sold them.

### **2.2.3.23 Time of display**

Matovu et al. (2009) in a study on equitability of bed net ownership and utilization in Tanzania reported that, in homes that used candles, ITNs easily developed holes. This was because they easily caught fire as these people were preparing their beds for sleep. Some respondents preferred displaying their ITNs during the day when they had good sight of their beds than in the dark during night when they did not have reliable sources of light. This was dangerous because it provided chance for mosquitoes to hide in the nets.

In conclusion, majority of the respondents in the above studies had good knowledge about ITNs in prevention of malaria, however they had negative attitude towards ITNs use which translated into poor practice thus high malaria prevalence despite health sector measures that included distribution of free ITNs.

## CHAPTER THREE: METHODOLOGY

### 3.0 Introduction

This chapter includes; research design, source of data, study setting, sample size calculation, sampling technique, sampling procedure, study variables, inclusion criteria, exclusion criteria, data collection techniques, data collection instruments and measurement, data collection procedure, data analysis, quality control, dissemination of the study results, ethical issues and limitations of the study.

### 3.1 Research Design

The study adapted a descriptive cross sectional study design in which quantitative data collection methods and analysis were used. Quantitative research approach was used because it enabled the researcher to get much information from a big number of respondents (Shahrokh and Dougherty, 2014).

Descriptive cross sectional study design helped the researcher to collect data at a point in time about the current use of ITNs in Namuwongo Zones A and B using interview guide questionnaires. The study was carried out from 2<sup>nd</sup> July to 16<sup>th</sup> July 2016. This eventually enabled the researcher to describe findings about knowledge, attitude and practices of respondents on the utilization of ITNs with frequencies.

### 3.2 Sources of data

The study was based on both primary and secondary data.

**3.2.1 Primary data;** Here information was derived directly from the respondents by use of structured interviews using structured interview guided questionnaires and observation checklist. The researcher observed the study participants for a period of 2 weeks during which the study was carried out.

**3.2.2 Secondary data;** This was information from acknowledged studies in relation to the study. These mainly included; on-line journals, electronic books, library books, research dissertations, learning websites, etc.

### 3.3 Study setting

The study was carried out in Namuwongo Zones (A and B) located in Namuwongo village, Namuwongo Parish, in Makindye Division. Namuwongo village has a slum called "Soweto"; that is

divided into seven zones namely: Industrial Area View, Go-Down, Kasanvu, Namuwongo A, Namuwongo B, Kanyogoga/Masengere and Yoweri Kaguta (YOKA). These zones had over 20,000 people living in very confined spaces, averaging 2 rooms for a family of at least 4 members (Tenywa, 2013).

The area was bordered by Lugogo to the north, Nakawa to the northeast, Kiswa and Bugoloobi to the east, Muyenga to the southeast, Kisugu and Kabalagala to the south, Kibuli to the west and Kololo to the northwest (Kamukama, 2012). The neighborhood is located approximately 6 kilometres (3.7 mi), by road, southeast of the Kampala City. The coordinates of Namuwongo are: 0°18'29.0"N 32°36'44.0"E (Latitude: 0.308050; Longitude: 32.612223) (Nasasira, 2014).

### 3.4 Study Population

There is an estimated population of 2200 people in Namuwongo zones 'A' and 'B'. These included estimates of 892 adults and 1,308 children. Each household had an average of 6 members which made an average of 366 households in the two zones. The study population was adult residents. The target population comprised of all residents of Namuwongo A and B zones. From a target population of 2200 people and accessible population of 892 adults were considered for the study and it was from this that a sample size was drawn.

### 3.5 Sample Size Calculation

A total of 276 respondents who were household heads were selected from an accessible population of 892 adult residents of Namuwongo Zones A and B. The researcher selected the 276 respondents from 366 households in the area. Sample size was determined by the Slovenes formula because it helped to derive samples from a relatively small accessible population that was below 1000 people.

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

Where; n = Sample size

N = Population size

e = standard margin of error (5% or 0.05)

$$n = \frac{892}{1 + 892(0.05 \times 0.05)}$$

$$n = \frac{892}{1 + 892(0.0025)}$$



$$n = \frac{892}{1 + 2.23}$$

$$n = \frac{892}{3.23}$$

n= 276 respondents

### **3.6 Sampling**

#### **3.6.1 Sampling Technique**

The study used probability sampling to select respondents where every individual in the population had an equal chance of being selected. The researcher used simple random sampling to select the respondents from their homes. This method was very fair, unbiased and easy to carry out.

#### **3.6.2 Sampling procedure**

The researcher moved home to home and where an adult resident was found, he or she was informed about the purpose of the study and requested to join the study. Ones who consented were selected to take part in the study. The preferred members were household heads found at home during the time of study. The researcher moved around the two zones until the required number of 276 respondents was achieved.

### **3.7 Study variables**

The independent variables were knowledge and attitude towards ITNs use.

The dependent variable was practice towards ITNs use.

Indicators of knowledge were; ITNs use was one of the most effective malaria control method, Regularity of sensitization about ITN use, sources and mode of information dissemination about ITNs use, information about where to procure good ITNs, source of ITNs and retreating drugs, awareness of maintenance of ITNs, knowledge about ITNs lifespan, familiarity with retreating drugs and their importance, and identifying the characteristics of ITNs (repelling and barring mosquitoes).

Indicators of attitude were; a belief that malaria could be prevented by sleeping under ITNs, cultural-social perception of ITNs, perception about drugs for retreating ITNs, a mind-set that ITNs caused suffocation, a thought that mosquitoes could still pass through ITNs, a feeling that ITNs

caused skin itching, preference to the source where ITNs were acquired from, a belief that retreating chemical are poisonous, a mind-set that ITNs are sold at unfair prices and sensitivity to odour.

Indicators of practice were; possession of ITNs, maintenance of ITNs, way of displaying ITNs, effective and regular use of ITNs, time of displaying ITNs, actual retreating of ITNs and periods of retreating, way of drying of ITNs after wash and folding of ITNs after sleep.

### **3.8 Data Collection techniques**

The researcher used different approaches of data collection that were guided by specific objectives or research questions. Interview guided questionnaire and observations checklist were used.

### **3.9 Data Collection tools**

The study used interview guide questionnaires and observation checklist to collect data for the study

#### **3.9.1 Interview guide Questionnaires**

The study used questionnaires to collect data. The researcher physically asked the respondents questions and then recorded the information from them. Interviews were used because; they enabled the researcher to establish rapport with potential participants and therefore gained their cooperation, captured verbal and non-verbal responses such as body language, helped to keep the respondents focused and also allowed the researcher to clarify ambiguous answers and where appropriate, sought follow-up information. It had four sections; A which consisted of questions that assessed the socio-demographic characteristics, section B consisted of questions that assessed knowledge, section C consisted of questions that studied the attitude and D that consisted of questions that examined the practices of community members towards ITNs use.

#### **3.9.2 Observation checklist**

The presence of nets in the household were confirmed by visual check by the interviewer (all respondents had accepted the researcher to see their bed nets). Items of interest were; status of nets, way they were hanged, number of ITNs in comparison with family members and sleeping arrangements among other issues.

### **3.10 Data Collection Procedure**

The researcher moved around the community from home to home with the help of the local leaders while collecting data. On reaching the home, the former first inquired whether there was any adult member most preferably a home head.

In homes where one of the two was found, the local administrator introduced the researcher and the latter informed the home member of the study and its purpose then sought for the consent to participate in the study. Strict confidentiality to all information received was assured to the respondents before interviewing. Members who consented were interviewed and then moved to the next household.

### **3.11 Data analysis**

After data collection, the pre-coded data was entered manually questionnaire by questionnaire and then analyzed using Statistical Package for Social Scientists (SPSS) computer program. Data was run in this program where tables were developed and then transferred to Microsoft word where data was interpreted in a written form. This was used to find the relationships between variables by use of correlation (bivariate analysis). Univariate analysis was calculated using Chi-tests which helped to establish the most significant factors within variables. This was based on whether a household had any ITN or did not possess any. Multivariate analysis was done by regression analysis where average mean from knowledge and attitude outcomes was regressed against the average mean from the practice outcomes.

### **3.12 Quality Control**

#### **3.12.1 Pilot study**

The research tool was pretested in a pilot study proposed to be carried out in Kamwanyi Zone Kabalagala Parish. This helped to make necessary adjustments before the study was carried out in Namuwongo Zones (A and B). Redundant questions that did not add any value to the study were removed.

#### **3.12.2.1 Inclusion Criteria**

The study included all adult residents of Namuwongo Zones, A and B who were found at home during the time of study and consented to take part.

#### **3.12.2.2 Exclusion Criteria**

The study did not consider all individual who were not in position to give valid data for the study. These included; the sick and those that were not mentally sound.

#### **3.12.3 Validity of the tool**

The researcher tested the ability of the tool to yield dependable results through interviewing some selected respondents in Kamwanyi zone about their knowledge, attitude and practice about

mosquito net use. The questionnaire was administered to different respondents to which helped to validate the responses from the questions according to the objectives. After the assessment of the interview guided questionnaire, the necessary adjustments were made bearing in mind the objectives of the study. Then a Content Validity Index (CVI) was computed using the following formula.

$$\text{CVI} = \frac{\text{Number of questions declared valid}}{\text{Total number of questions in the questionnaire}}$$

A minimum of 0.75 of CVI was used to test validity.

### **3.12.3.1 Reliability of the tool**

Here the researcher tested whether the interviewed respondents gave consistent results on the same test questions. To ensure reliability of the instrument, the researcher used the test-retest method. Here the interview guided questionnaire was given to 15 people and after one week, the same questionnaire was given to the same people and the Cronbach Alpha was computed using SPSS. Ranges of 0.8 to 0.99 were considered levels of significance in relation to the findings between the variables.

### **3.13 Dissemination of the study results**

Five copies of the findings were produced. One was submitted to International Health Science University, School of Nursing, the second copy was submitted to IHSU Library, and the third and fourth copies was submitted to local administrators of Namuwongo Zones (A and B) respectively while the fifth copy was retained by the researcher for personal reference.

### **3.14 Ethical Issues**

The researcher got a letter of introduction from IHSU Research Ethics Office that introduced her to the local administrators of Namuwongo Zones (A and B). These granted the researcher permission to carry out the study in the area. Administrators then introduced the researcher to the local residents through home to home visit. Confidentiality was assured to all respondents before they were interviewed. The respondents were only included in the study after they understood the purpose of the study and had consented to take part. The study was voluntary and the respondents deserved the right to withdraw at any time of his or her wish.

### **3.15 Limitations of the study**

The researcher faced the following challenges during the course of the study

- Some respondents withheld information regarding mosquito net use because they feared being ashamed of improper ITNs use.
- Poor weather conditions disturbed the researcher during home to home data collection. This prolonged the time of study completion.
- Study completion was delayed by the reluctance of some respondents to answer the required questions in time.

## CHAPTER FOUR: RESULTS

### 4.0 Introduction

This chapter presents the findings of the study based on the specific objectives that included; assessing knowledge, attitude and practices of community members in Namuwongo Zones A and B in the utilization of ITNs in the prevention of malaria in the study area.

### 4.1 Findings on the social demographic characteristics of the respondents

*Table 1: Social demographic characteristics of the respondents* N=276

<b>Indicators</b>	<b>Category</b>	<b>Frequency</b>	<b>Percent</b>
Gender of the respondent	Males	70	25.4
	Females	206	74.6
Age of the respondents	18-30 years	100	36.2
	31-40 years	45	16.3
	41-50 years	55	19.9
	51 years and above	76	27.5
Marital status of the respondents	Single	61	22.1
	Married	168	60.9
	Separated/divorced	19	6.9
	Widow/widower	28	10.1
Occupation of the respondents	Housewife	179	64.9
	civil servant	28	10.1
	self employed	54	19.6
	Student	15	5.4
Education levels of the respondents	No formal education	55	19.9
	Primary	124	44.9
	Secondary education	50	18.1
	Tertiary	28	10.1
	Others	19	6.9
<b>Total</b>		<b>276</b>	<b>100.0</b>

Out of the 276 respondents that participated in the study, majority; 206(75%) were females, 100(36%) were between 18 and 30 years, 168(61%) were married, 179(65%) were housewives, and 124(45%) had primary level of education.

#### 4.2 Findings on the knowledge of respondents towards the utilization of ITNs in the prevention of malaria

Table 2: Knowledge of respondents towards the utilization of ITNs in the prevention of malaria  
N=276

Indicators	Category	Frequency	Percent
Respondents had ever heard of ITNs	Yes	259	94
	No	17	6
Source of information about ITN use	Health workers and community leaders	74	79
	Family members and friends	20	21
Had routine education about ITN use in their communities	Yes	52	19
	No	224	81
Uses of ITNs	Prevention of malaria	243	88
	For fishing, wedding, covering crops etc.	33	12
Best sources of ITNs	Shops, markets	179	65
	Pharmacy, Drug shop, and health centre	97	35
Characteristics of a good ITN	Should cover the whole bed, sized holes to block mosquitoes, repel mosquitoes	226	82
	Coloured, elastic, able to cover the head	50	18
Respondents knew that ITNs were retreatable	Yes	83	30
	No	193	70
Number of times an ITN should be washed before retreating	Less than 20 times	77	28
	More than 20 times	199	72
Life span of an ITN	Less than a year	213	77
	More than a year	63	23
<b>Total</b>		<b>276</b>	<b>100.0</b>

Majority 259(94%) of the respondents had ever heard of ITNs, 177(64%) were educated about ITNs, 243(88%) knew that ITNs were used to prevent malaria, 179(65%) thought that shops and markets were the best places to get ITNs, and 193(70%) never knew that ITNs were retreatable.

#### 4.2.1 Measure of the independent variables (slept under ITNs in the last seven days before the study)

The study found out that out of 276 respondents that were included in the study, 179 respondents regularly used ITNs while 97 never regularly used them. The researcher decided to measure the utilization of ITNs in the prevention of malaria by comparing those who slept under ITNs in the last seven days before the study against those that didn't.

#### Knowledge of respondents towards the utilization of ITNs in the prevention of malaria

Table 3: Knowledge of respondents towards the utilization of ITNs in the prevention of malaria

Characteristic	Indicator	Used ITNs regularly	Never used ITNs regularly	Total	Percent	P-value
Had routine education about ITN use	Yes	42	10	52	19	0.00763
	No	137	87	224	81	
Uses of ITNs	Prevention of malaria	163	80	243	88	0.0356
	Fashion	16	17	33	12	
Best sources of ITNs	Shops, markets	111	68	179	65	0.1824
	Pharmacy, Drug shop, and health centre	68	29	97	35	
Characteristics of a good ITN	Should cover the whole bed, sized holes to block mosquitoes, repel mosquitoes	172	54	226	82	8.51752E-17 (0.0000)
	Coloured, elastic, able to cover the head	7	43	50	18	
Life span of an ITN	Less than a year	121	92	213	77	4.5767E-06 (0.0000)
	More than a year	36	27	63	23	
Had knowledge about retreating ITNs	Yes	56	27	83	30	0.549939
	No	123	70	193	70	
When should an ITN be displayed	On entering beds	174	60	234	84	1.36812E-14 (0.0000)
	Any time	05	37	42	16	
It was necessary to fold an ITN	Yes	172	79	251	91	8.33879E-05 (0.0000)
	No	07	18	25	09	
Could make good display of ITNs	Yes	117	10	127	46	8.64053E-19 (0.0000)
	No	62	87	149	54	
		<b>179</b>	<b>97</b>	<b>276</b>	<b>100</b>	

Key

H-ITN Had slept under ITNs in the last seven days before the study



NH-ITN      Never slept under ITNs in the last seven days before the study

Bivariate analysis from the table above shows that respondents' knowledge towards helmet was highly associated with its use. Findings showed that, the following factors were significant; could make good display of ITNs ( $P=0.0000$ ), characteristics of a good ITN ( $P=0.0000$ ), when should an ITN be displayed ( $P=0.0000$ ), it was necessary to fold an ITN ( $P=0.0000$ ) and routine education about ITN use in their communities ( $P=0.0076$ ), awareness about life span of an ITN ( $P=0.0000$ ) and uses of ITNs ( $P=0.0356$ ). However, knowing the best sources of ITNs and having knowledge about retreating ITNs were not significant factors in the use of ITNs.

#### 4.3 Findings on the attitude towards the utilization of ITNs in the prevention of malaria

Table 4: Findings on the attitude towards the utilization of ITNs in the prevention of malaria

N=276

Indicators	Category	Frequency	Percentage
ITNs were of any benefit	Yes	243	88%
	No	33	12%
Whether it was important to sleep under an ITN every day	Yes	105	38%
	No	171	62%
Whether ITNs prevented against mosquito bites	Yes	265	96%
	No	11	4%
Whether ITNs prevented annoyance from mosquitoes	Yes	22	8%
	No	254	92%
Whether mosquitoes don't bite through the net	Yes	116	42%
	No	160	58%
Whether getting up in the night when using an ITN was not difficult	Yes	124	45%
	No	152	55%
Whether it did not take much time to stuck the net each night	Yes	105	38%
	No	171	62%
Whether ITNs could not lead to suffocation	Yes	110	40%
	No	166	60%
Whether ITNs should be free of charge	Yes	235	85%
	No	41	15%
Whether ITNs should be sold at affordable prices	Yes	255	92%
	No	21	8%
Whether mosquito nets had good odour	Yes	75	27%
	No	201	73%
Whether respondents thought that drugs used to retreat were safe	Yes	98	36%
	No	178	64%
<b>Total</b>		<b>276</b>	<b>100.0</b>

Majority 243(88%) of the respondents agreed that ITNs were beneficial, 265(96%) believed ITNs prevented against mosquito bites, 235(85%) agreed that ITNs should be free of charge and 255(92%) said ITNs should be sold at affordable prices.

However, some respondents had negative attitudes towards ITNs use in the prevention of malaria, where; 171(62%) believed that it was not important to sleep under an ITN every day, 254(92%) did not believe that ITNs prevented annoyance from mosquitoes, 160(58%) had a mind-set that mosquitoes could still bite through ITNs, 152(55%) believed ITNs could make it difficult for them to get up during the night, 171(62%) believed that it took much time to tuck the net each night, 166(60%) believed that ITNs could lead to suffocation, 201(73%) were irritated by the ITN odour, and 178(64%) believed that drugs used to retreat ITNs were unsafe.

*Table 5: Findings on the attitude towards the utilization of ITNs in the prevention of malaria*

*N=276*

<b>Attitude</b>		<b>Slept under ITNs</b>	<b>Never slept under ITNs</b>	<b>Total</b>		<b>P-value</b>
ITNs as one of the most effective tools in malaria prevention	Yes	170	70	240	87	1.84562E-07 (0.0000)
	No	09	27	36	13	
Everybody should sleep under an ITN	Yes	76	15	91	33	7.62355E-07 (0.0000)
	No	93	82	185	67	
ITNs could not lead to suffocation	Yes	89	21	110	40	3.618E-06 (0.0000)
	No	90	76	166	60	
Thought that drugs used to retreat were safe	Yes	108	08	116	42	3.57486E-17 (0.0000)
	No	71	89	160	58	
		<b>179</b>	<b>97</b>	<b>276</b>	<b>100</b>	

The study found out that ITNs were among the most effective tools in malaria prevention 240(87%) with a significance level of (P=0.0000), they also believed that everybody should sleep under an ITN 185(67%) (P=0.0000), they 166(60%) wrongly believed that ITNs could lead to suffocation (P=0.0000) AND 160(58%) of the respondents believed that drugs used to retreat ITNs were unsafe (P=0.0000)

#### 4.4 Findings on the practices of respondents towards the utilization of ITNs in the prevention of malaria

Table 6: Practices of respondents towards the utilization of ITNs in the prevention of malaria  
N=276

Indicators	Category	Frequency	Percent
Had ever used ITNs	Yes	198	75
	No	78	25
Had any ITNs	Yes	157	57
	No	119	43
Slept under ITNs in the last seven day before the study	Yes	179	65
	No	97	35
Total		276	100
Sources of ITNs	Shops	72	40
	Pharmacies	39	22
	Health centres	32	18
	Drug shops	27	15
	Markets	9	5
Period respondents had slept under ITNs	Days	11	6
	Weeks	39	22
	Months	70	39
	Years	59	33
Had ever retreated their ITNs	Yes	11	6
	No	168	94
Washed their ITNs	Yes	140	78
	No	39	22
Total		179	100
Frequency of washing ITNs	After 6 months	39	28
	After 3 months	63	45
	After a month	25	18
	After a week	13	9
Total		140	100
Always checked for holes	Yes	27	15
	No	152	85
Time ITNs were displayed	When entering the beds	59	33
	Immediately it got dark, any time of convenience, when mosquitoes were too many	120	67
All beds had ITNs	Yes	110	61
	No	69	39
ITNs were not only on children's beds	Yes	98	55
	No	81	45
ITNs had hangs	Yes	50	28
	No	129	72
Sleeping arrangements favored good display of ITNs	Yes	47	26
	No	132	74
ITNs never had holes	Yes	75	42
	No	104	58
ITNs had holes and were mended	Yes	98	55
	No	81	45
ITNs were tidy	Yes	61	34
	No	118	66
ITNs were folded	Yes	74	40
	No	107	60
Respondents could make good display of ITNs	Yes	66	37
	No	113	63
Total		179	100

Majority 179(65%) currently slept under ITNs at the time of the study, 72(40%) of the respondents got ITNs from shops, 70(39%) had slept under ITNs for months, 140(78%) washed their ITNs, 152(85%) did not always check for holes in their ITNs, 120(67%) displayed ITNs at time of convenience, 110(61%) did not have ITNs on all beds, 98(55%) households ITNs were not only on children's beds but even on other beds, 168(94%) never retreated their ITNs and washing was done after months as reported by 63 (45%).

There were 179 respondents out of 276 who slept under ITNs in the last seven days before the study. In 129(72%) households had no ITN hangs, 132(74%) had unfavorable sleeping arrangements to enable good display of ITNs, 104(58%) had ITNs with holes, in 98(55%) households, ITNs had holes and were mended, 118(66%) had untidy ITNs, in 107(60%) households, ITNs were not folded and 113(63%) could not make a good illustration of ITN display.

## CHAPTER FIVE: DISCUSSION OF RESULTS

### 5.0 Introduction

This chapter presents the discussions of results. They are based on study findings in relation to the study specific objectives.

### 5.1. Discussion of findings

#### 5.1.1 Discussion of findings on the knowledge of respondents in the utilization of ITNs in prevention of malaria.

Bivariate analysis shows that respondents' knowledge towards helmet was highly associated with its use. Findings showed that, the following factors were significant; could make good display of ITNs ( $P=0.0000$ ), characteristics of a good ITN ( $P=0.0000$ ), when should an ITN be displayed ( $P=0.0000$ ), it was necessary to fold an ITN ( $P=0.0000$ ) and routine education about ITN use in their communities ( $P=0.0076$ ), awareness about life span of an ITN ( $P=0.0000$ ) and uses of ITNs ( $P=0.0356$ ). However, knowing the best sources of ITNs and having knowledge about retreating ITNs were not significant factors in the use of ITNs

Routine education about ITN use was one of the significant factors ( $P=0.0076$ ). Majority 259(94%) of the respondents had ever heard of insecticide treated mosquito nets and 243(88%) knew that they were used to prevent malaria. This implied good knowledge on use of ITNs because ideally an ITN is designed to prevent malaria by acting as a barrier to mosquitoes during sleep. Since malaria is caused by parasites spread by anopheles mosquitoes through biting, use of ITNs prevents mosquito biting and thus malaria prevention. Respondents who had that knowledge had higher chances of avoiding malaria infection compared to others who never had. Similarly, Evlampidou et al. (2013) in a study in Evrotas, Laconia, Greece, also found out that respondents had high knowledge about ITNs as one of the most effective malaria preventive strategies if used regularly. However, the results are not in line with a study carried out by Luyiga (2013) in Uganda among districts of Mukono, Jinja, Mbarara and Arua, who found relatively low knowledge about ITNs use as an effective way to prevent malaria. Nearly half (51.7%) of the urban respondents did not know that the use of nets was the most effective way to prevent malaria.

Policy implication: despite the fact that most respondents knew that ITNs were used to prevent malaria, the Ministry of health should ensure that all community members know about the different malaria preventive measures because malaria is the commonest illness in Uganda.

Being aware of the time an ITN should be displayed was associated with utilization of ITNs ( $P=0.0000$ ). Majority 234(84%) knew the time when an ITN should be displayed. Most of the respondents with ITNs knew that an ITN should be displayed when one is entering the bed which was right knowledge.

Policy implication: Having good knowledge about the time and way of displaying the ITNs should be a government initiative through the different health talks through the health care service providers.

Having facts about the necessity of folding ITNs was highly associated with the utilization of ITNs in the prevention of malaria (0.0000). This was due to the fact they had received education about the utilization of ITNs. Knowing that an ITN should be folded implied that the users realized its importance where it would be kept free of ITNs.

Most of the respondents could explain how to display an ITN which was good knowledge about the utilization of ITN. This was associated with ITN use ( $P=0.0000$ ). This was because most of them had received education about ITN use thus knew how to use them.

Policy implication: the Ministry of Health should disseminate information about ITN use through printing brochures, flyers, calendars, and magazines among other media so that people can learn how to display ITNs.

There were 193(70%) of the respondents who never knew that ITNs were retreatable and 53(64%) thought that ITNs were supposed to be washed more than 20 times before retreating which was low knowledge. Retreating and minimum washing (between 10 to 20 times before retreating within six months) could maintain ITNs with properties that repel mosquitoes and thus minimize mosquito bites. If an ITN is frequently washed, it loses its tone making it easy to get torn and at the same time, loses drugs that repel mosquitoes. Similarly, in a study done in Myanmar, San et al. (2013) found out that majority of the respondents had low knowledge about retreating ITNs though most of them had ever heard of ITN tablets. Also 83.6% did not know where they could buy the ITN tablets because they had received inadequate training on ITNs use. Also in a study by Luyiga (2013) in Uganda among districts of Mukono, Jinja, Mbarara and Arua, found out that, some respondents from low income families never knew that ITNs were retreatable. However, Evlampidou et al. (2013) in a study done in Greece, found out that respondents knew that ITNs were supposed to be retreated after some time of use and could properly illustrate how to hang an ITN.

Majority 179(65%) of the respondents thought that shops and markets were the best places from where to buy ITNs. This showed low knowledge which could lead respondents to buy ITNs of poor quality because not all shops and markets sell genuine products. Also majority of the shop keepers do not have adequate knowledge on the products they sell, thus they could lack facts about the good ITNs and how to use them. Further still, shops and markets have different products and if put together with ITNs could reduce their efficacy and thus lower their quality to perform the desire purpose. Similarly, Dutta (2012) noted that respondents did not know the right places from where to buy ITNs. Majority thought that a genuine ITN can be acquired from any where such as usual markets. However, in a study done in Sierra Leone in West Africa, Bennett et al. (2012) found that, majority 66.7% knew the right places where to buy ITNs from. They knew ITNs could be bought from pharmacies where there were health workers who could educate them about their right use.

Policy implication: Despite the fact that the government ensures provision of ITNs to the vulnerable people such as children and pregnant mothers in health facilities, the health care providers should also take the initiative to always provide free of charge ITNs in communities and even have subsidized ITNs in health facilities under the cost sharing program in health care. The government should also regulate on the laws regarding importation of ITNs basing on their quality. Also ITNs should be produced locally to save the amount of money spent on importing them since malaria is a problem that will not stop in Uganda since mosquito breeding is very difficult to control.

### **5.1.2 Discussion of findings on the attitude towards the utilization of ITNs in the prevention of malaria**

The study found out that ITNs were among the most effective tools in malaria prevention 240(87%) with a significance level of ( $P=0.0000$ ), they also believed that everybody should sleep under an ITN 185(67%) ( $P=0.0000$ ), they 166(60%) wrongly believed that ITNs could lead to suffocation ( $P=0.0000$ ) and 160(58%) of the respondents believed that drugs used to retreat ITNs were unsafe ( $P=0.0000$ )

Majority 265(96%) of the respondents believed that ITNs prevented against mosquito bites and 243(88%) agreed that they were beneficial to the users and believed that everybody should sleep under an ITN 185(67%) ( $P=0.0000$ ). This was positive attitude because ITNs repelled and barred mosquitoes from reaching the users during sleep. There was low malaria incidence among respondents who were currently using ITNs as compared to others who never used them. This implied that they had less expenditure and more time for work compared to those who had malaria.

Similarly in a study in Shashogo District, Southern Ethiopia, Fuge et al. (2015) found positive attitudes towards ITNs use whereby 70% of the respondents perceived ITN use as beneficial because it saved them from malaria infection. In contrary Ukibe et al. (2014) in a study in Anambra state, South-East Nigeria, findings showed negative attitude on the effectiveness of ITNs as they believed that mosquitoes could still bite through ITNs.

Policy implication: the government should emphasis on disseminating information on the need for everyone to regularly use ITNs because they are effective in prevention of malaria. The government should also ensure that good quality ITNs that do not easily tear are allowed on the market. This will attract the public to develop positive attitude towards their use.

A good number of respondents 235(85%) agreed that ITNs should be free of charge or be sold at affordable prices so that every community member gets access to them. This indicated positive attitude because this would attract more community members to possess and use ITNs. Similarly, in a study done in Sierra Leone, Eisele et al. (2009) in a cross-national analysis of 15 survey datasets, having sufficient intra-household access to an ITN, defined having more than one ITN per two household occupants, as a strong determinant of individual use of ITNs. Households in Sierra Leone with more than 5 people were less likely to have sufficient ITNs to occupant ratios though they were free of charge. In contrary a study carried out in Ethiopia by Fuge (2015) showed that, ITNs were sold at unfair prices and this could potentially have discouraged them from buying ITNs.

Policy implication: despite the fact that the government freely distributes ITNs to the public, a few people access them and it done on an irregular basis. There are malpractices in the distribution program where a single person can get more than 5 ITNs while there are people that go without any which all jeopardize malaria prevention program.

Poor attitude was shown where 171(62%) did not believe that it was important to sleep under an ITN every day and 254(92%) did not believe that ITNs could prevent annoyance from mosquitoes. To ensure effective malaria prevention, ITNs should be properly used daily to minimize chances of mosquito bites. Irregular use of ITNs led to malaria infection which blame was shifted to quality of ITNs which was not ideally right. In relation, a study done in Eastern Rwanda by Kateera et al. (2015) showed that majority of the male respondents had negative attitude towards ITNs use. This was because they believed that sleeping under ITN was not necessary because they were too strong to get malaria from mosquito bites. Also Singh et al. (2013) in nationwide studies on ownership and



use of ITNs in Sub Saharan Africa, found high doubts about the effectiveness of ITNs in the prevention of malaria. Participants mentioned that some people slept under mosquito nets but their children died of malaria. However, a study in Nigeria, Runsewe-Abiodun et al. (2013) revealed that majority 139 (54.3%) perceived that malaria could be prevented if one slept inside a mosquito net, 221(86.7%) believed that sleeping inside an ITN at night reduced mosquito bites and 192(75%) expressed willingness to buy ITNs if they did not get one for free.

Suffocation was among the most feared side effects of sleeping under an ITN as reported by 166(60%) respondents ( $P=0.0000$ ). Medically, an ITN is designed to allow enough fresh air to enable good respiration. It could be that respondents, who suffocated when they used ITNs, had other health complications or never followed the proper instructions of using an ITN. Similar findings by Khumbulani et al. (2009) in a study carried out in Swaziland showed that, different people were allergic to different things in their environment where smell was one of the major allergies people had. On the contrary, Antonio-Nkondjio et al. (2013) in a study done in the city of Mbandjock, Cameroon found out that, majority of the respondents who had received enough education about ITNs use knew that if used properly, ITNs could not lead to suffocation. They revealed that ITN users who suffocated had other health complications.

Policy implication; the government should ensure that they make enough research about the complaints such as inadequate aeration of the ITNs and suffocation to discover the cause of the problem because ideally suffocation is not one of the challenges an ITN user expected to find. It could be that these people use them wrongly which causes them complications.

Most 160(58%) of the respondents believed that drugs used to retreat ITNs were unsafe ( $P=0.0000$ ). They thought that if the drugs can repel a stubborn mosquito, then what of human life. They believed that drugs could cause lung cancer and other respiratory difficulties. This was negative attitude because the drugs were tested and proven safe for use. The same findings were found in a study done in Northern Uganda by Obol et al. (2013) who showed that, respondents never regularly used ITNs because they believed that the drugs used to treat and retreat them had dangerous chemical components to their lives which were thought to cause cancer. On the contrary, Runsewe-Abiodun et al. (2013) in a study done in Ogun State, Western- Nigeria, found a positive attitude about ITNs and malaria prevention. Out of 256 respondents, 192(75%) expressed willingness to buy ITNs if they did not get one for free and also knew that the drugs used to retreat ITNs were safe.

Policy implication: the Ministry of health should ensure that should make enough sensitization about the benefits of sleeping under treated ITNs and should be made aware of the safety of the drugs used to retreat them. This could be through public sensitization from health care providers so that the general public develops confidence in them.

Negative attitudes still prevailed where 160(58%) of the respondents thought that mosquitoes could still bite through ITNs. This could be true in cases when an ITN is not well displayed., but when a mosquito net is well displayed and is in good condition, mosquitoes cannot have chances into the net thus have no access to the user to bite them and predispose them to malaria infection. It could be that, those who that believed mosquitoes could still bite through ITNs did not have well displayed net or their nets were in poor conditions (having holes). In contrast, in a study carried out in Gulu; Obol et al. (2013b) found out that up to 95% of the respondents believed ITNs prevented mosquito bites and no mosquito could bite through an ITN which is well displayed.

Policy implication: the government should educate the public about the quality of ITNs they should buy if they fail to get one for free. They should also ensure proper handling so that they did not develop holes that users might blame on the quality of ITNs.

Further still, 171(62%) of the respondents minded about the time they spent to tuck the net each night while others found it inconveniencing to wake up at night if they had slept under an ITN. This was poor attitude which indicated laziness because it takes very little time to tuck an ITN or to get out of it during the night. This could have led to reluctance to display the net thus provided mosquitoes chance to sneak into the net and bite them. Similarly, a study done in Bangladesh by Ahmed et al. (2011) found that, majority 66.7% felt inconvenienced with the daily hanging of ITNs yet mosquitoes were not plenty every day. Tucking the net at night was an inconvenience to many respondents who had ITNs. On the contrary, Kulkarni et al. (2010) in a study done in Madagascar, showed positive attitude regarding the effectiveness of regular and correct ITNs use. Respondents were worried that they might become seriously ill with malaria if they did not use ITNs regularly and correctly. They also revealed that it did not take much time to tuck a net to prevent mosquitoes from entering the net.

Policy implication: the healthcare sector should disseminate information on the best ways users should tuck their ITNs so that they do not allow mosquitoes inside.

Up to 201(73%) of the respondents believed that ITNs had a bad odour. ITN drugs were given a scent that could not irritate the user. It could be that respondents who were inconvenienced by the odour of ITNs were just allergic to it. This created fear among ITNs users which could have contributed to their low use thus high malaria prevalence. Similarly, Zewdneh et al. (2011) in a study done in Sri Lanka found out that most of the respondents had a mind-set that the drugs used to treat the nets were unsafe and could easily suffocate them to death which was negative attitude. The odour from ITNs caused some people to vomit or get sleepless nights which made them uncomfortable and hated sleeping under ITNs. However, in a study done in central Uganda, Wanzira et al. (2013) found out that ITNs were manufactured with a good scent that could attract people to use them. This was because earlier ITNs were complained of having bad odour that could at times lead to vomiting.

Policy implication; ITNs should be designed with a good scent that may not cause nausea and vomiting among the users. This may attract more people complaining of bad odour to utilize ITNs regularly

### **5.1.3 Discussion of findings on the practices of respondents towards the utilization of ITNs in the prevention of malaria.**

Majority 198(75%) of the respondents reported that they had ever used ITNs and 179(65%) were currently sleeping under them. This indicated good practice because regular use of ITNs prevented mosquito bites. It could be from the benefits of not having suffered from malaria in the recent past when they used ITNs. In contrast, Ukibe et al. (2014) in a study in Anambra state, South-East Nigeria, showed that out of 420 respondents who owned nets, 235 (56%) refused to use them. However, Kulkarni et al. (2010) in a study done in Madagascar, showed good practice regarding the effectiveness of regular and correct ITNs use. Respondents were worried that they might become seriously ill with malaria if they did not use ITNs regularly and correctly.

Majority 72(40%) of the respondents got ITNs from shops and 70(25%) had been with them for just months which meant that they had just started using ITNs by the time of the study. This implied that respondents could have had poor quality ITNs because the best ITNs could be acquired from health facilities where there were health workers who knew about their storage and instructions of use. Researchers personal findings also proved that most mosquito nets sold in local shops are of low quality because the shop keepers are profit oriented. On the contrary, Duta (2012) revealed that,

majority of the respondents had good practices towards ITNs use. Findings showed that, 97.7% of the respondents owned bed nets and 94% used them and regularly washed them.

Findings showed that 168(94%) of the respondents had never retreated them and majority washed them after a long period of time. This was a poor practice because ITNs are supposed to be retreated after at least 6 months of use. This could have reduced the effectiveness of ITNs thus could no longer repel mosquitoes and lowered the quality of ITNs since untidy ITNs could not favour good sleep. In line with these findings, Hlongwana et al. (2009) in a study in Swaziland established that, some respondents did not regularly retreat their ITNs after washing them the recommended number of times. However, Atieli et al. (2010) in a study in the highlands of western Kenya, found out that some respondents over washed their ITNs which made them to easily tear. Different findings still showed in a study done in Myanmar where respondents consistently used ITNs because these areas had a lot of mosquitoes and consistently retreated them so that they could repel mosquitoes (Myat et al., 2014).

Policy implication: the Ministry of Health has not done enough to ensure that retreating drugs are available to the general at the health facilities so that people easily access them. The public should even be informed about the way they should use those drugs to that they dnot cause them any harm.

A good number 152(85%) of the respondents did not always check for holes in their ITNs which was poor practice. Given the poor sleeping arrangements they had, it was easy for ITNs to develop holes thus they needed to regularly check for holes. This could not have provided enough chance to users to take the initiative to check for holes in the ITNs because ITNs were completely removed and hide somewhere during the day. They only had to bring them when time for sleeping had reached. However in a study in Muhorro Sub County, Kibaale District, located in South Western Uganda, good practice on ITNs use was portrayed. It was found that majority 90% of the household members were using nets and always took time to check and mend holes in ITNs. They were always very careful when hanging them to avoid the nets being torn (Bashinyora, 2010)

Displaying ITNs was in most cases done at any time of convenience or when mosquitoes were too many as reported by 120(67%) of the respondents. This was poor practice because displaying an ITN at any time gives mosquitoes chance to enter and bite the user during sleep. However, in a study carried out in south-western Tanzania, there was good ITN use because respondents displayed ITNs when entering the bed and immediately folded them after sleep to avoid mosquitoes entering the nets during the day (Emmanuela et al., 2011).

In 179(65%) households, there was at least one ITN and ITNs were not on children's beds only. This implied that respondents at least knew that ITNs were beneficial and needed by every family member. This was good practice because every member of the family is vulnerable to malaria infection. It could be that, some beds that never had ITNs was due to the fact that household heads did not have enough money to buy for all of them. Similarly Stevens et al. (2013) in a study done in Togo, revealed that, majority of the respondents had good practices towards ITNs use. Findings showed that, 97.7% of the respondents owned bed nets and 94% used them and regularly washed them. They used them all seasons through even if mosquitoes were not plenty.

Majority 107(58%) of the observed ITNs had holes which gave mosquitoes to enter into the nets thus increasing the chances of mosquito bites. However, some 102(55%) ITNs had holes and were mended but not all of them. It is a good practice to always check for holes in ITNs and get mended if found but according to observations, not all holes were mended which still predisposed the ser to mosquito bites. Majority of the respondents had good practice which could have reduced malaria incidence. In a closely similar study done in Western Kenya, Atieli et al. (2010) found out that, respondents always mended holes in their ITNs to avoid mosquito bites. Mending holes was good because it controlled mosquitoes from accessing inside the ITNs which could lead to mosquito bites.

There were 133(72%) households without ITN hangs which made ITNs use difficult. Given the inadequate space and the poor sleeping arrangements in most households, it was not easy to have proper ITN hangs. Lack of hangs could lead to poor display which could let the mosquitoes into the net. In line with these findings, a study done in Zambia, showed that most respondents poorly hanged mosquito nets. Majority did not properly display the nets to provide enough space for them to sleep which brought them in contact with the users during sleep thus eased and increased mosquitoes bites. In contrast, a study carried out in Enugu, Nigeria, Edelu et al. (2010) showed that respondents were always very careful during hanging and spreading the ITNs over their beds before they slept. Also Bashinyora (2010) in a study carried out in Uganda noted that, respondents were always very careful when hanging nets to prevent them from being torn. They in most cases used threads and needles to mend all the holes that developed to ensure that no mosquito enters at night during sleep (Ochomo et al., 2013).

There were unfavourable sleeping arrangements to enable good display of ITNs in 137(74%) households which made regular ITN use difficult. The study area was a slum with a high population

with congested ram shackled houses that were small yet had large families. This led to inadequate space especially during sleeping which led to poor sleeping arrangements. Most houses had congested rooms that a bed was shared by more than two people especially the children which made ITN display difficult. In contrast, in a study in Zambia, Pulford et al. (2011) revealed that majority of the respondents displayed ITNs well which prevented mosquito bites and malaria because their houses were spacious enough to enable them display their ITNs well.

ITNs were generally dirty as observed from 122(66%) households, not folded 107(60%) and respondents could not make a good illustration of ITN display 113(63%). Dirty ITNs could not attract respondents to regularly use them which could have increased malaria incidence in the area. Unfolded ITNs and failure to make a good illustration of ITN display could have harboured mosquitoes during the day or allow mosquitoes inside the nets even if they were in good conditions hence biting respondents during sleep. On the contrary, a study in Zambia, Eisele et al. (2011) showed that respondents used ITNs very well because they folded them after use which portrayed good practice.

## **CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS**

### **6.0 Introduction**

This chapter presents the conclusions and recommendations of the study. They are based on study findings in relation to the study specific objectives.

### **6.1 Conclusion**

The study assessed the level of knowledge, attitude and practices of community members in Namuwongo zones A and B in the utilization of ITNs in the prevention of malaria.

The study found relatively good knowledge about ITNs use because respondents had ever heard of ITNs and knew they were used to prevent malaria. However, lack of awareness on; the right places from where to buy ITNs and retreating them created doubt about their awareness on the efficacy and effectiveness of ITNs.

Generally respondents had negative attitude towards the utilization of ITNs in the prevention of malaria. Majority believed that; mosquitoes could still bite through ITNs, could make getting up at night difficult, took much time to tuck the net each night, could lead to suffocation, ITNs had a bad odour, drugs used to retreat ITNs were unsafe, did not believe that ITNs prevented annoyance from mosquitoes and believed that it was not important to sleep under an ITN every day.

Majority never retreated their ITNs, did not get them from right places as majority got them from shops within a few past months, did not always check for holes, display was in most cases done when it immediately got dark and washed them after 3 months which was a very long period. This indicated poor practice.

However, majority of the respondents reported that they had ever used ITNs and were currently sleeping under them.

From the observation, ITNs utilization was also poor where; majority never had hangs, never had favorable sleeping arrangements to enable good display, some had holes while others had been mended, were untidy, not folded and majority could not make a good display of an ITN. However, majority of households had at least one ITN and were not only on children's beds.

### **6.2 Recommendations**

The study suggests the following reforms to be done

### **6.2.1 The government/Ministry of Health**

- Should emphasize education talks on the benefits of sleeping under an ITN over fears such as suffocation and perceptions that mosquitoes can still bite through ITNs. This should be done over the different media channels such as radios, televisions and newspapers.
- Drugs used to retreat ITNs should even be made more available to the public more especially through health care facilities so that people can access them free of charge.
- The Health care teams in different communities should be empowered to give door to door education on utilization of ITNs in the prevention of malaria. They should physically visit the households and check the state of ITNs and advise them accordingly.
- Both print and visual media such as newspapers, posters, flyers, brochures, radios and televisions would be instrumental in educating the public on use of ITNs. This would enable majority of the community members to get the information easily since the processes followed in ITNs use would be illustrated.

### **6.2.2 Health workers**

- They should inform all the patients with malaria about the use of ITNs, the right places where to buy them from and how to maintain them. They should be informed that the right ITNs should be bought from pharmacies and health centres. This is because ITNs from such places meet the health care standards set by the Uganda Bureau of Standards (UBOS).
- They should provide the governments with periodical reports on malaria prevalence, so that proper arrangements are done to provide more free of charge ITNs to the public through mass distribution campaigns.
- They should educate community members on the safety of drugs used to retreat ITNs. All myths that associate ITNs with suffocation, cancer and skin irritation should be nullified and users should be informed that if they face any of them, they should first seek medical advice before putting the blame on ITNs.
- They should mobilize more ITNs from the Ministry of Health so that they distribute them to the community members. This will significantly increase the proportion of people having them which may in the end attract many to use ITNs.



### **6.2.3 Community members in Namuwongo**

- Before using an ITN, they should read all the instructions so that they do not make any mistakes during use.
- They should ensure that they get the right information on use and efficacy of ITNs to rule out rumours such as; mosquitoes can still pass through the ITNs and that drugs used to retreat ITNs are not safe.
- They should always wash ITNs before use to minimize the odour caused by the retreating drug which may discourage them to use ITNs.
- They should wash and retreat ITNs regularly so that they remain effective (bar and repel mosquitoes).
- They should always sleep under ITNs even if mosquitoes are few.
- They should ensure that every bed in the home has an ITN so that everyone sleeps under it and should be on a regular basis.
- Should ensure that ITNs are displayed when one is entering the bed and that every one displays it well by firmly tucking it at every end of the bed.

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**APPENDIX I: CONSENT FORM**

Dear Respondent, I am **Katuutu Hilda**, a student of International Health Sciences University Kampala pursuing a bachelor’s degree in Nursing Science. You are requested to participate in this study about; **Knowledge, Attitude and Practices towards utilization of insecticide treated mosquito nets in the prevention of malaria among residents of Namuwongo Zones (A and B)**. Information provided will be confidential and strictly for research purpose only. Your time and cooperation will be highly appreciated.

**Respondent:** I agree to participate in this research project. I will be orally interviewed in privacy by the researcher and she will record my responses. The study is to identify **the utilization and hindrances to ITNs use in order to enhance use of ITNs to promote health**. My name will not be used; the exercise will take a short time and I may decline to answer any question or quit.

It is entirely voluntary and does not entail any foreseeable risks. I will be given a copy of the dated and signed consent form to keep.

**Signed/Thumb print**..... **Date**.....

**Investigator** ..... **Date**.....

## APPENDIX II: QUESTIONNAIRES

**Title: Knowledge, Attitude and Practices of Namuwongo Zones (A and B) residents towards use of insecticide treated mosquito nets in prevention of malaria.**

### SECTION A: SOCIO-DEMOGRAPHIC CHARACTERISTICS

1. What is your gender?

- a) Male  b) Female

2. How old are you?

- a) 18-30 years  b) 31-40 years   
c) 41-50 years  d) 51 years and above

3. What is your current Marital Status?

- a) Single  b) Married   
c) Separated  d) Divorced   
e) Widow/widower  f) Others (specify) .....

4. What is your occupation?

- a) House wife  b) Civil servant   
c) Self-employed  d) Student   
f) Others, (specify).....

5. What is your level of education?

- a) No formal education  b) Primary   
c) Secondary  d) Tertiary education   
e) Others, (specify) .....

## SECTION B

### Knowledge of residents towards use of mosquito nets in prevention of malaria

**Instruction: Tick the most appropriate answer or give your own view where applicable**

1. Have you ever heard of insecticide treated mosquito nets?

a) Yes

b) No

2. What are ITNs used for?

<b>a</b>	Prevention of malaria	
<b>b</b>	Fishing, wedding, covering crops, increase heat at night around the bed, caging animals, others	

3. What is the best source of the net?

<b>a</b>	Shop, market	
<b>b</b>	Pharmacy, Drug shop, health centre, others.	

4. i) Do you get routine education about the use of ITNs in your community?

a) Yes

b) No

5. What are the characteristics of a good ITN?

<b>a</b>	Should cover the whole bed, sized holes to block mosquitoes, repel mosquitoes	
<b>b</b>	Coloured, elastic, able to cover the head	

6. Are ITNs retreatable?

a) Yes

b) No

7. Where should ideal retreating drugs be acquired from?

<b>a</b>	Health centres, pharmacies and drug shops	
<b>b</b>	Markets, vendors, hardwares and pesticide shops	

8. How many times should ITNs be washed before retreating?

<b>a</b>	Less than 10 times	
<b>b</b>	Between 10 and 20 times	
<b>C</b>	Above twenty times	

9. How long should an ITN last?

<b>a</b>	Less than a year	
<b>b</b>	More than a year	

### SECTION C

#### Attitude of residents towards utilization of mosquito nets in the prevention of malaria

No	Item	SD	D	NT	A	SA
1	ITNs are of benefit					
2	It is important to sleep under an ITN every day					
3	ITN is one of the most effective tools in the prevention of malaria					
3	ITNs prevent against mosquito bites					
4	ITNs prevent annoyance from mosquitoes					
5	Mosquitoes don't bite through the net					
6	Getting up in the night when using an ITN is not difficult					
7	It does not take much time to tuck the net each night					
8	Nets cannot lead to suffocation					
9	ITNs should be free of charge					
10	ITNs should be sold at affordable prices					
11	Mosquito nets have a good odour					
12	Drugs used to retreat are safe					
13						

## SECTION D

### Practices of residents towards utilization of mosquito nets in the prevention of malaria

**Instruction: Tick the most appropriate answer or give your own view where applicable**

1. Have you ever used an insecticide treated mosquito net?

a) Yes  b) No

2. Do you currently sleep under an ITN?

a) Yes  b) No

3. Where did you obtain your ITN from?

a) A shop  b) A pharmacy

c) A drug shop  d) A health center

e) A market

4. For how long have you had bed nets in this house?

a) Days  b) Weeks

c) Months  d) Years

5. Have you ever retreated your ITN?

a) Yes  b) No

6. How many times have you retreated your net in the last one year?

<b>a</b>	Once or twice	
<b>b</b>	More than two times	

7. Do you wash your ITN?

a) Yes  b) No



8. How often do you wash your bed nets?

<b>a</b>	After a week	
<b>b</b>	After a month	
<b>c</b>	After 3 months	
<b>d</b>	After 6 months	
<b>e</b>	Others ( specify)	

9. Do you always check for holes in your ITN?

a) Yes  b) No

10. At what time do you actually display your ITN?

<b>a</b>	When entering the bed	
<b>b</b>	Immediately when it gets dark, any time of convenience, when mosquitoes are too many, others (specify).....	

The researcher will also use the observation checklist below on issues regarding respondents' practices towards use of mosquito nets in prevention of malaria. Only those respondents who will accept the researcher to observe their nets will be tested using this method.

<b>No</b>	<b>Question</b>	<b>Response</b>	
		<b>Yes</b>	<b>No</b>
11	Do respondents have any ITN on the bed?		
12	Do all beds have ITNs?		
13	ITNs are not only on children's beds		
14	Do ITNs have hangs?		
15	Does sleeping arrangements favour good display of ITNs?		
16	ITNs don't have holes.		

17	ITNs had holes and were mended.		
18	Are ITNs clean?		
19	Are ITNs folded?		
20	Can respondents make a good illustration of displaying an ITN?		

**Thanks for your cooperation**

**APPENDIX III: MAP SHOWING STUDY AREA**



**APPENDIX IV: INTRODUCTORY LETTER AND CORRESPONDENCE**



*making a difference in health care*

**Office of the Dean, School of Nursing**

Kampala, 24<sup>th</sup> June 2016

*C/mw hei  
Namuwongo 'A' & 'B'  
VILLAGES,  
BUKWA/INTAKWA Division*



*Recommended by  
C/mw hei,  
KUNGU JOTHY  
0782478793  
0702882804*

Dear Sir/Madam,  
RE: ASSISTANCE FOR RESEARCH

Greetings from International Health Sciences University.

This is to introduce to you **Katuutu Hilda**, Reg. No. **2013-BNS-TU-021** who is a student of our University. As part of the requirements for the award of a Bachelors degree in Nursing of our University, the student is required to carry out research in partial fulfillment of her award.

Her topic of research is: **Knowledge, attitude and practices towards use of insecticide treated nets in the prevention of malaria among residents of Namuwongo Zones A and B**

This therefore is to kindly request you to render the student assistance as may be necessary for her research.

I, and indeed the entire University are grateful in advance for all assistance that will be accorded to our student.

Sincerely Yours,  
  
*Ms. Agwang Agnes*  
Ag. Dean, School of Nursing

*Recommended*  
  
*Kwaka Swaka  
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