UTILISATION OF INSECTICIDE TREATED NETS IN HOUSEHOLDS WITH CHILDREN UNDER 5 YEARS IN MUHORRO SUB COUNTY, KIBAALE DISTRICT, UGANDA

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Declaration

I hereby declare that the work presented in this dissertation is original and that no study of this kind has ever been submitted for the award of a degree in any university as a whole or in part, except where acknowledged.

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Dedication

I dedicate this thesis to my dear parents for the support rendered to me during my initial stages of education. They opened the doors of success to me.

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List of abbreviations and acronyms

AMREF:	African Medical and Research Foundation
CDC:	Centre for Disease Control
FGD:	Focused Group Discussion
GTZ:	Germany Agency for Technical Cooperation
ITNs:	Insecticide Treated Nets
LC:	Local Council
MCP:	Malaria Control Programme
MOH:	Ministry of Health
NGOs:	Non Governmental Organizations
RBM:	Roll Back Malaria
UNICEF:	United Nations Children's Fund
WHO:	World Health Organization

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Abstract

Insecticide- treated nets are the most powerful malaria control tool if used correctly. Yet up to date, utilization is still unacceptably low: only 3 percent of African children are currently sleeping under an ITN, and about 20 percent are sleeping under any kind of net. Worse still, malaria continues to be the leading cause of child mortality and morbidity. The aim of this study was to investigate the intra-household factors that affect the utilization of ITNs in households with children under five. The study specifically sought to identify the intrahousehold practices that affect the use of ITNs among the under five; examined the knowledge, attitudes, perceptions and beliefs of caregivers towards the usage of ITNs; and lastly analysed the affordability of ITNs by households with children under five years. This study was conducted in four (4) villages from Muhorro sub-county Kibaale district which were randomly selected and used a cross sectional design. The study findings show that first; there were intra-household factors that affected utilization of ITNs in households with children under five. These factors that affected utilization include; type of household structure, number of people sleeping in the household, intra-household gender relations, sleeping arrangements, disruption of sleeping patterns due to visitors and cultural rituals and functions. These factors affect consistency in utilization of ITNs and proper deployment. Secondly, knowledge on ITNs was found to be low though general knowledge about mosquito nets was found to be high. Utilization was also affected by poor perceptions, beliefs and attitudes that discourage caregivers from using the ITNs. Thirdly, access to ITNs was very inadequate and unavailable within the study community. The majority of the people being peasants, there were insufficient incomes and therefore ITNs were not a priority given the level of poverty. This study concluded that financial inadequacies at the household level, poor perceptions of caregivers and intra-household dynamics impact negatively on effective utilization of ITNs among the under fives. I would therefore recommend that; public-private partnership be adapted to ensure availability of ITNs and insecticides in local shops and other outlets including arrangements at village level to re-treat the nets, the economic level of caregivers should be boosted to counteract the financial inadequacies, adoption of a behaviour change strategy to transform caregivers' perceptions, beliefs and attitudes; and massive education of the community.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Malaria is a leading cause of morbidity and mortality worldwide, especially in pregnant and young children, and particularly Tropical Africa where at least 90 percent of malaria deaths occur (UNICEF 2005). More than three quarters of global malaria deaths occur in underfive children living in malarious countries in Sub-Saharan Africa (WHO 2003), where 25 percent of all childhood mortality below the age of five (about 800,000 young children is attributable to malaria) (WHO 2003). In Uganda, malaria accounts for 25-40 percent of all out patient visits at health care facilities. Up to 20 percent of all hospital admissions and 15 percent of in-patient deaths are due to malaria (MOH 2006). About 30-40 percent of all fevers seen in health centres in Africa are due to malaria with huge seasonal variability between rainy and dry seasons. At the end of the rainy season, it is less than 10 percent and more than 80 percent as the rainy season winds up.

One of the most effective tools for malaria prevention is the insecticide treated mosquito net (ITN). Consistent use of ITNs can reduce malaria transmission by up to 90 percent (Gimning et al 2003) and overt as much as 44 percent of all cause mortality among children under five (Lengeler 2002). With use of ITNs, an overall reduction in child mortality of 17 percent could be demonstrated, with six lives saved per every 1,000 children protected. There is also evidence that if more than 80 percent of households in an area sleep under an ITN, malaria transmission is significantly reduced, which can benefit people who do not use an ITN themselves (CDC 2008). A simple mosquito net treated with an insecticide is a proven and cost effective way to repel or kill mosquitoes carrying the parasite that causes malaria. Dipping nets in a solution of a parathyroid insecticide transforms the net from a simple physical barrier into a physical and chemical barrier that can repel or kill the female anopheles mosquito, which is responsible for transmitting malaria parasite. Parathyroid insecticides are effective for up to 12 months, after which the nets must be retreated. While the evidence based on the effectiveness of ITNs in reducing malaria transmission has grown

rapidly in recent years, utilization rates for ITNs in most African countries have not, yet 90 percent of mortality is due to malaria (WHO 2006). Malaria continues to be the leading cause of death among the under fives despite various interventions to control it.

Increased national and international funds have boosted the deployment of Insecticide Treated Mosquito Nets (ITNs). About half of African countries have waived taxes and tariffs on nets, netting material and insecticides. Since 2002, African countries started scaling up free of charge or highly subsidized provision of mosquito nets for under-5 years and pregnant women in rural areas. As a result there has been a substantial increase in mosquito net coverage in African countries (UNICEF 2005). In Uganda, one in four households has at least one net and 12 percent own more than one. The proportion of households with at least a net doubled from 13 percent in 2000-2001 to 26 percent in 2004-2005 (Uganda HIV AIDS Sero-behavior survey 2004-2005). The proportion of children less than five years sleeping under a mosquito net the previous night was at 7.3 percent and those sleeping under an ITN the previous night were 3.2 percent.

Randomized controlled trials in Kenya, Ghana, the Gambia and Burkina Faso have demonstrated that wide scale use of ITNs can reduce child mortality by around one-fifth, saving an average of 6 lives for every 1,000 children aged 1-59 months protected each year (Lengeler C 2002). In an area of intense perennial transmission in Western Kenya, ITN use reduced episodes of clinical malaria and anaemia in infants by greater than 60 percent (Karuiki et al 2003) and reduced by nearly one third the incidence of sick child visits to peripheral health facilities.

However, some studies have indicated low utilization of ITNs among the under five. There is a wide gap between net possession and use. Where as the targets set by governments is to ensure children under five years access and sleep under insecticide treated nets (WHO 2003), use by vulnerable groups requires that a household own a net, and that the most vulnerable groups be given priority for sleeping under the net. Usage seems to be affected by intra-household factors such as the extent to which nets are used at all, family sleeping patterns, decision making in regard to who should sleep under an Insecticide treated Net

and who actually uses the net. Given the fact that malaria in Uganda continues to be the major cause of child mortality and morbidity in Uganda, yet ITNs have been made accessible to the population, the child mortality rates due to malaria are expected to decline which has not yet been realized. It is upon this background that this study explores the intra-household factors that affect net utilization in Uganda.

1.2 Statement of the Problem.

Insecticide- treated nets are the most powerful malaria control tool to be developed and as such they have been an important component of global and national malaria control policies since mid-1990s. Yet up to date, utilization is still unacceptably low: only 3 percent of African children are currently sleeping under an ITN, and about 20 percent are sleeping under any kind of net (Oresanya et al 2008). Worse still, malaria continues to be the leading cause of child mortality and morbidity in spite of government, NGOs and the private sector's interventions to ensure that the children under five, who are most vulnerable access, own and sleep under ITNs.

Utilization of ITNs by under fives requires that households own nets. Whereas programmes to ensure children access ITNs have been vigorous, utilization rates seem not to be a mirror of ownership rates. Expanded ownership of ITNs can only make a substantial reduction in malaria mortality only if the nets are used properly by under fives. But to what extent are nets that are owned actually used? If a household owns a net, which household members are most, and least, likely to sleep under it? How many family members sleep under a net, and what are the most common groupings under a net? What happens to these patterns when the family acquires more than 1 net? There seemed to be unanswered questions which this study sought to provide. Several studies on ITNs among children under five have concentrated on effectiveness of ITNs in malaria control, accessibility, availability and ownership of ITNs: no study had been done to investigate the intra-household factors that affect the utilization of ITNs in households with children under five years which this study sought to investigate.

1.3 Objectives of the Study

1.3.1 General Objective

The general objective of this was to examine the Intra-household factors that affect the utilization of ITNs in households among the under fives.

1.3.2 Specific Objectives

The study sought:

- 1. To identify the Intra-household practices that affect the use of ITNs among the under fives.
- 2. To examine the knowledge, attitudes, perceptions and beliefs of caregivers towards the usage of ITNs.
- 3. To determine the affordability of ITNs by households with children under five years.

1.4 Scope of the study.

This research investigated the intra-household factors affecting utilization of insecticide treated nets in households with children under five years with a focus on the nature of household structure, sleeping arrangements/family sleeping patterns and decision making in regard to who in the household determines who is to sleep in the ITN. The research also examined the knowledge, attitudes, perceptions and beliefs of caregivers towards the usage of ITNs and determined the affordability of ITNs by households with children under five years. The study was conducted in four villages from Muhorro sub-county which were randomly selected. 11 men and 11 women were randomly selected from each village using multi-stage cluster sampling and 35 key informants were purposively selected.

1.5 Significance of the Study.

The findings of this study contribute to the existing body of knowledge concerning the complex nature of malaria prevention among children under five years and specifically the intra-household dynamics that affect the use of ITNs among children under five years. It also contributes to the understanding of intra-household factors that affect the use of ITNs and the challenges involved in the prevention of malaria among children under five years.

The findings of this study can a source of information to non- Governmental Organizations, government and private enterprises who are involved in the promotion of ITNs in the fight against malaria among children. The study can be useful to the policy makers, the ministry of health specifically in the department of malaria control. The information obtained provide useful guide for formulating appropriate policies and programs for the promotion of ITNs. The findings also provide up to date literature for academicians and the findings can be used as a basis for further research on ITNs in malaria prevention. The gaps identified can be explored for further research especially in regard to coverage.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This section provides background understanding on other research studies that have been carried out regarding Insecticide treated mosquito nets use. It focuses on the accessibility of ITNs in the households by under fives; knowledge, attitudes, perceptions and beliefs of caregivers towards ITNs and affordability of ITNs by the caregivers as the main thematic areas. It should be noted that, a lot of research studies have been carried out on ITNs especially in regard to availability, accessibility and utilization in general, but no study has been carried out to investigate the intra-household factors that affect utilization of ITNs in the household with children under five years. The purpose of this literature review was to identify gaps that needed to be filled.

2.1 Perceptions, attitudes, knowledge and beliefs of using bed nets

Insecticide treated nets (ITNs) are the mainstay in Malaria prevention. As a vector control intervention, they are effective in preventing malaria morbidity and mortality in a range of epidemiological settings. In reducing densities and infectivity of malaria vectors, they reduce overall transmission and protect all individuals within a community (WHO 2006). Mosquito nets have been advocated for as the most preventive tools against malaria especially in sub-Saharan Africa.

In a study carried out in Mbarara on the perceptions about Malaria prevention (Nuwaha 2002), avoiding mosquitoes was the most common method mentioned for prevention of malaria. Other preventive strategies mentioned include boiling of drinking water, improved sanitation, clearing of bushes around the compound, avoiding cold weather, good nutrition, burning mosquito coils, screening of buildings, taking anti-malarials regularly and closing windows early. While most people in this study said ITNs were efficacious both in preventing mosquito bites and malaria, they expressed ignorance of insecticide treated nets and could not tell whether a bed net was treated or not. There were some doubts about the bed net efficacy in preventing malaria. Participants mentioned that some households sleep

under mosquito nets but their children die of malaria. Whether mosquito nets work or not remains a myth in the minds of some people.

From the above analysis, it seemed to be clear that there are factors within the household which hinder ITN use that needed further investigation. Barriers towards use of bed nets that would negate their use include; being expensive, being difficult to keep from holes, being inconvenient by increasing heat and sweating, causing suffocation and that it is impossible to buy a net for everybody in a big family. Some people said that they use bed nets when mosquitoes are plentiful but keep them where there are no mosquitoes in the dry season. In a study carried out in Mbarara district, western Uganda, found that mosquitoes were perceived as a cause of malaria but at the same time use of bed nets was low (26 percent). People who did not use bed nets cited discomfort due to heat and humidity; and the high cost of ITNs as reasons for non use (Nuwaha 2002). This therefore accounted for low usage of ITNs.

In a baseline study on malaria in Uganda in districts of Mukono, Jinja, Mbarara and Arua, it was found out that 99 percent of respondents knew about malaria with a high level of knowledge that mosquitoes are the main cause of malaria. Nearly half of the urban respondents 48.3 percent observed that the use of nets was the most effective way to prevent malaria. While among rural respondents there was limited knowledge of the best method for prevention. This literature available looked at perceptions and attitudes in general. This study specifically focussed on perceptions, attitudes, knowledge, and beliefs of using ITNs in households with children under five making a difference from the previous studies.

2.2 Utilization of Mosquito nets.

A review on community acceptance of bed nets has shown that various factors influence the use of bed nets, including cultural, behavioural and demographic factors, ethnicity, accessibility, gender relations and seasonality of malaria. Several authors have concluded that although ITNs are effective, local perceptions, acceptance and use of ITNs, as well as use of other preventive methods, are invaluable in malaria control programmes (Winch et al

1997). It is also known that even if ITNs are purchased and used correctly, they must be retreated quite often and therefore the insecticide must be recognised and accepted. Further to this, the local acceptance of insecticide may be influenced by its toxicity, the local terms used to translate the chemicals and the meaning attached to these terms.

In a study carried out in Western Kenya, community reactions were assessed before the introduction of permethrin-treated bed nets. Although malaria was found to be an important disease, ITNs were believed to be only partially beneficial because of the perception that malaria had multiple causes, and further to this, fear was expressed that chemicals used to treat ITNs were associated with use of family planning (Alaii et al 2003). In this study, mosquito numbers, relative wealth, number of household occupants and the education level of the head of the household had no effect on adherence. Excessive heat was often cited as a reason for not deploying the child's ITN. Other important reasons for non adherence were disruption of sleeping arrangements, indicating that ITNs were not readily redeployed in the face of shifting sleeping patterns due to visitors, funerals, house construction and other events. Lack of motivation and technical problems like room to hang child's net also affects consistency in utilization of an ITN.

In a study carried out in Mukono District, it was emphasized that the cost of ITNs followed by their non availability were constraints to their use. Similarly, over half of participants in all the 10 FGDs thought that chemicals used to treat the nets were very harmful to adults, children and pregnant women (Mbonye et al 2005). The difference between treated and non treated nets was also not known. People believed that all nets were treated with a chemical. Over half of the participants in all FGDs seemed to believe that ITNs are treated with chemicals which affect pregnant women, especially their breathing and that if the chemicals can kill mosquitoes instantly, they can also kill people. This perception was held by non users mainly, although users also believed that it in addition causes feeling of excessive heat and suffocation at night due to use of ITNs (Mbonye at al 2005). This study investigated the caregivers in households with children under five in regard to acceptability of ITNs. At a baseline interview in Mali none of the 132 households were using ITNs. The most common reasons for not treating their nets were cost (59 percent), availability (23 percent) and lack of knowledge regarding the effectiveness of ITNs in preventing malaria (11 percent). However, 93 percent of those who did not treat their nets during the study stated that cost was the main reason. In the village of Piron, 10 of 73 households stated that they had previously treated their bed nets and had seen the benefits of ITNs but were not retreating their nets, because there were no net treatment services available in close proximity to their households (Rhee et al 2005). This study investigated perceptions held towards children sleeping under ITNs in a different cultural setting from that of the previous studies since cultures vary across time and space.

Given the above studies, it was clear that many studies had been carried out on utilization of ITNs. However, none of these studies specifically focussed on utilization of ITNs among the under fives with emphasis on the intra-household factors which this study addressed. This study aimed at bridging the information gap on the status of ITN utilization among the children under the age of five years and determining the factors within the household that predict utilization.

2.3 Affordability of ITNs

According to the policy and strategy for ITNs, over 80 percent of people living in malaria endemic areas of Uganda are supposed to sleep under ITN. The majority of these people purchase their ITNs from the unsubsidized commercial market. However, vulnerable groups can obtain subsidized ITNs (MOH 2003). The government of Uganda has put in place programs that target the vulnerable groups supplemented by NGOs and the private sector. All this is done to ensure that the vulnerable groups especially children under five access and sleep under the ITNs. Prices are kept low in the commercial market in both urban and rural areas due to economies of scale as well as competition among ITN suppliers and retailers. Government helps by providing enabling environment which includes generic promotion of ITN products as well as a supportive fiscal and regulatory environment.

Government and NGOs provide a system of targeted subsidies that focus on vulnerable groups. These comprise the biologically vulnerable (pregnant women, under fives) and the socio-economically vulnerable for instance the very poor, orphan headed households and displaced populations. Subsidies are targeted and implemented in such away that the private sector is not undermined but rather supported, wherever possible.

Latest surveys in Uganda indicate that 25.8 percent of rural households have at least one net, while 59.9 percent of urban households have a net (MCP/MOH 2006). However, in Tanzania and other African countries including Uganda, there are no by laws which address the common practice of men sleeping under the only net in the household even though children under five are the most at risk from malaria (Marslend 2006). This accounts for the continued high child mortality rates due to malaria in sub-Saharan Africa.

To improve accessibility to ITNs by target population in rural areas, distribution is carried out mainly through national health services (Fixed post and outreach mobile team) in Djibouti. However, NGOs and Community based association are involved in ITN promotion and distribution in the peri-urban and urban areas. In the study conducted in Mukono district about preventing malaria in pregnancy, participants knew that mosquito nets were a useful preventive measure against malaria and that pregnant women and children were supposed to sleep under nets since they are the most vulnerable groups. However the availability and use of nets in this community was found to be very low. Over three quarters of participants in all the FGDs and key informant interviews reported that very few people in the community use mosquito nets (Mbonyi et al 2005). This study therefore seeks to establish why utilization is still low specifically among the under fives.

In the same study, another constraint to ITNs access was the cost and uncaring husbands. Over three quarters of women in this study complained that men did not care about the health of their wives and their children. Men were reported not to prioritize the issue of health. Women thought that men use their money on items like alcohol and forget about buying nutritious foods and providing health care to their families. Women participants at Kimenyedde sub-county said that they fear to buy mosquito nets because their husband would question them about the source of the money. This is because women in this community are not expected to have money, or if they have money, the husbands feel obliged to know its source. More than half of the women participants in all the FGDs expressed fear that if a woman bought a net, the husbands would suspect that she got the money from another man (Mbonyi et al 2005). This study specifically investigated affordability of ITNs to under fives within the household setting which was not covered in the previous studies.

2.4 Ownership versus utilization of ITN

Two important RBM indicators for monitoring progress towards the set target are the proportion of households which own one or more nets and the proportion of under-five children who sleep under a net. Net ownership is important to assess the effectiveness of the distribution channels of the RBM program and suggest program modifications where there are lapses. However, utilization is the crucial indicator that can generate the desired epidemiological impact (Macintyre 2006). Few studies have examined the difference between the two indicators. A meta-analysis of household surveys on net utilization and ownership found a wide gap between net possession and use. ITN ownership was found to be between 0.1 percent and 28.5 percent, while use among children less than five years of age ranged between 0 percent and 16 percent (Korenromp 2003). This is still unacceptably very low to have an impact on reduction of malaria episodes among the under fives.

Equality is a major issue in ITN ownership. Net ownership has been found to be lowest among the poorest households (UNICEF 2005); thus possibly linking possession to the cost of the net (Guyatt 2002). Authors of a study conducted on the effect of lowering tariffs on nets and netting materials predict that reducing tariffs on insecticides and ITNs from 42 percent to 0 percent and the tariff on netting materials from 40 percent to 5 percent would increase demand for ITNs by 9–27 percent (Simon 2002). Wiseman *et al* reported a significant association between good access roads to the community and net ownership (Wiseman 2007). Perceived risk of malaria and benefits of the nets by the population also drive demand. Onwujekwe *et al*, in a Nigerian study, found that households with a recent attack of malaria and those with higher willingness to pay were more likely to purchase a net than their counterparts (Onwejekwe et al 2003). Such communities have a perceived need for utilizing ITNs.

Utilization has, however, been found to vary with seasons of the year and acceptability of the nets in terms of size, colour and shape. Binka *et al* showed that the time of the year during which the nets are delivered affects use. In their study, 99 percent of the net recipients were found to use the nets during rainy season, while only 20 percent used it during the dry season (Binka et al 1997). Demographic characteristics like age, education, size of household and ethnicity also influence use of bed nets. Some studies show that children are less likely to use nets, particularly in rural areas, while others found no significant association between age and net use. The current study explored more demographic characteristics like sex, income and occupation in addition to education and age.

2.5 ITNs Vs Malaria prevention

The lives of 400,000 children could be saved every year if African children under five sleep under ITNs (Africa Health 2000). Mosquito nets if properly used and maintained can provide a physical barrier to hungry mosquitoes and provide 46 percent protection against malaria (RBM, 2001). There are positive effects of insecticide treated nets in reducing the mortality and morbidity of children under five years of age and yet coverage remains low.

ITNs reduce malaria morbidity and mortality, but use is limited. A number of studies have found out that ITNs provide varying degrees of protection against malaria morbidity. In a trial of untreated bed nets in the Gambia, nets were found to reduce the number of infective bites but not enough to reduce morbidity from malaria (Snow et al 1988). Malaria decreases with the use of ITNs. The main reason for this is that mosquitoes are not only kept away from the sleeping people, but would die when they come into contact with the insecticide. In subsequent studies, it was demonstrated further that use of ITNs in pregnancy reduces maternal parasitaemia, anaemia and premature deliveries, increases mean birth weight and subsequently reduces neonatal and infant mortality (Dolan et al 1993). This shows that the role of ITNs among the under five in protecting them against malaria should not be ignored. ITNs have a mean protective efficacy against malaria episodes of approximately 50 percent in highly endemic areas of Africa (Langeler and Snow 2004). They have also been found to reduce overall mortality among children by 63 percent in villages using impregnated nets. A recent review has similarly shown that ITNs are highly effective in reducing morbidity and mortality from malaria. Bed nets given to pregnant women have been found to be protective to women and their children against malaria in both high and low malaria transmission areas of Kenya (Guyatt and Ochola 2003).

Knowledge on malaria prevention is low among the people. In a study carried in Mali, most individuals could identify malaria as the most common disease in their village (93 percent), recognise malaria based on clinical symptoms (98 percent), treatment methods (87 percent); however, knowledge of prevention was more limited. Only 35 percent of individuals knew that malaria was transmitted by mosquitoes and less than 40 percent of people knew that one could prevent malaria. Only 17 percent of those individuals stated that using ITNs was an important method of prevention (Rhee et al 2003). The current study examined knowledge of caregivers on the difference between treated mosquito nets and non treated mosquito nets which the previous studies had not examined.

The African summit on Roll Back Malaria (RBM) held in Abuja, Nigeria, on April 25, 2000, set the target of having at least 60 percent of each vulnerable group sleep under an ITN. To monitor progress toward Abuja targets, RBM developed indicators using the number of under-5s or pregnant women from all households, including those that do not own nets, as the denominator. This indicator is appropriate for looking at nationwide progress toward Abuja targets, but the resulting percentage is necessarily constrained by the percent of households owning a net. However, these indicators are general; they do not reveal intra-household net-use patterns which the current study explored.

Few studies look only among net-owning households and analyze if and by whom nets are used, which requires measuring use by under-5s compared to that of other household members. A few studies do address some aspects of intra-household net use, with one in the Gambia concluding that vulnerable groups were more likely than other family members to use a net (D'Alessandro et al 1994). It also found a small margin, adults used nets more than children (but defined children as under 10 years of age) and girls were more likely than boys to use the net A study based on secondary analyses of the Demographic and Health Survey in Uganda concluded that young children were sleeping under a net only because their mothers were using the net (Mugisha et al 2003). Several other studies focusing on who uses the household net were intervention studies where nets were given free to those living in a research area in Kenya (Alaii et al 2003) or to pregnant women attending antenatal clinics in Kenya, or where nets were acquired via vouchers distributed to pregnant women in Tanzania (Tami at al 2006). The first found that adults were slightly more likely than young children to be using the net; and the last 2 found that nets were being used by the groups targeted by the intervention: pregnant women and infants. Because these are intervention sites, however, we do not know whether these findings apply to the general population. This study addresses actual use of nets within the households with children under five years, rather than net ownership.

2.6 The theoretical Framework

The study was informed by the Health Care Utilization Model also referred to as the generic behavioural model. It established and examined factors that facilitate mosquito net utilization within households with children under five years. It was used to investigate intrahousehold practices, perceptions, knowledge, beliefs and attitudes of caregivers towards ITNs in preventing malaria among children under five years. Andersen's (1968) generic behavioural model is the most widely adopted and empirically assessed model of health service utilization.

In Andersen's original behavioural model, there are three major categories of health service utilization determinants. These include; predisposing factors, enabling factors and need factors. The category of predisposing characteristics was used to reflect the fact that some individuals have a propensity to use services than other individuals. These characteristics include age, gender, occupation, ethnicity, religion, formal education, global health services and knowledge about the illness. The enabling factors reflect the fact that while the individual may be predisposed to use health services, he or she does not use them unless he or she is able. Enabling factors include; availability of services, financial resources to purchase services, health insurance and social network support. The need factors refer to the basic and direct stimulus for the use of health services. The individual must perceive some need for use of health services. This depends on perception of severity, total number of days in bed, days missed from work or school and help from outside for caring.

The concept of predisposing characteristics were used to assess the relationship between age, gender, occupation, income, education and the ability of households to use ITNs. Enabling factors investigated whether there were ITNs readily affordable, financial resources to purchase ITNs for all children under five years, capacity to have supportive facilities that enabled net hanging and net re-treatment. The concept of need factors was used investigate how individuals in the household perceive ITNs in preventing malaria and how it affected the household in case a child does not sleep in the ITN. This found out factors that influence the household into acquiring or using ITNs. The need to acquire a mosquito net was based on the fact that individuals hold a belief that buying or sleeping in a mosquito net one can avoid contraction of malaria.

2.7 The Conceptual Framework



Fig 1: Utilization of ITNs within the households with children under five years. The utilization of ITNs is influenced by the socio demographic factors like age, sex, education level, occupation, income of the household and marital status that work through the intra-household factors like structure of the household, number of household occupants, sleeping arrangements and decision making. Utilization is also influenced by perceptions towards ITNs, beliefs, attitudes, knowledge on proper use in terms of consistence in usage and re-treatment. Therefore, with the good intra-household practices, perceptions and attitudes towards ITNs, utilization is possible manifested through proper deployment of ITNs, consistence on usage and net re-treatment. This leads to increased utilization of ITNs within households with children under five years.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter presents an overview of the study design and methodology. It presents how the study was conceptualized, designed and executed. It shows the methods, the sample size and sampling procedures that were used. It also gives the ethical standards and problems that were encountered during the data collection exercise.

3.1 Research Design.

The research design was cross- sectional, where women and men were studied to have views that were representative of all sexes. Cross-sectional design being a short time achieving type of study, involved studying different people at the same time to get a quick picture of the factors affecting utilization of ITNs in the household at that particular time. Both quantitative and qualitative methods were used. The quantitative methods were used establish the social, economic and psychological factors within the household affecting utilization of ITNs. It was also used to show association between the social demographic characteristics of respondents and utilization of ITNs within the household. Qualitative methods were used to investigate perceptions, attitudes, beliefs and knowledge on ITNs and establish intra-household factors responsible for low usage of ITNs. The key informant interviews were used to obtain views and experiences of service providers and community leaders.

3.2 The Area and Population of study.

The study was conducted in Muhorro Sub-County Kibaale District. Kibaale district is located in the mid-western Uganda. Kibaale District borders Hoima District in the north, Kiboga and Mubende in the east, and Kyenjojo in the south, Kabarole, Bundibugyo and Lake Albert in the west. Kibaale district has an estimated total population of 412,427 according to 2002 population census. The majority of the population are peasants who depend on subsistence agriculture for food and as a source of income. The district is inhabited mainly by Banyoro and Bakiga, and other tribes include; Batooro, Bafumbira,

Bamba, Banyarwanda, Bakoonjo and Banyankole. The district is composed of 1 district hospital, 4 health centre IV, 19 Health centre III, and 24 Health centre II. The area was purposively chosen because Kibaale district is among the districts where malaria is highly endemic. Malaria is the leading cause of morbidity in the district standing at 46 percent compared to the country's average of 25-40 percent and accounts for 42.6 percent of all deaths compared to 15 percent national average. The infant mortality rate is 90/1000 live birth higher than 88/1000 live births for Uganda.





Source: www.kibaale.go.ug/.../Map%20of%20Kibaale%20District%20by%20Sub%20Counties

3.3 Sample Selection and Size.

Muhorro Sub-County was selected to represent Kibaale district because it is one of the subcounties where free net distribution to under fives was done by Ministry of Health in 2008. It was therefore assumed that children under five years own nets. The target of the interview was caregivers in the households. Multistage cluster sampling was used to select one parish to avoid personal bias and obtain representative ness of all parishes in the subcounty. From the selected parish, four zones were selected using simple random sampling. A sampling frame consisting of households with children under five years in the selected zones was constructed with the assistance of the local council chairpersons.

Systematic random sampling was used to select 11 men and 11 women caregivers from each of the selected zones. From the sampling frame, a starting household with children under five years was chosen at random, and thereafter at regular intervals, other households with similar characteristics were selected. The total number of respondents in the sample survey was 88 respondents. The respondents were selected randomly because random selection is done without personal bias of the researcher, sample repetitiveness can be estimated and statistical tests used to analyze the data assume random selection. Caregivers including both men and women was done to avoid gender bias and also because it is the responsibility of these caregivers to look after children under five.

The following categories of key informants were selected purposively; 4 traditional birth attendants, 4 secretaries for health, 4 community resource persons, 1 chairperson LCIII, 1 Chairperson LCII, 4 Chairpersons LCI, 4 Secretaries for women, 1 in charge Health Centre III, 1 Mid wife, 4 Opinion leaders, 1 District Malaria focal person and 1 District Director of Health Services. The total qualitative sample was equal to 35 key informants. These key informants were included in the study because they were considered to be more knowledgeable about ITNs as a strategy to malaria prevention among children under 5 years and know more about the lives of children under five years in different households.

3.4 Data Collection

3.4.1 Research Instruments

The research instruments were of two categories, namely; interview schedule for structured interviews and interview guide for key informants. The interview schedule and guides were divided into four sections of socio-demographic characteristics, intra-household practices, utilization and affordability.

3.4.2 Ethical considerations and Procedure

The researcher got an introductory letter from Makerere University. The letter was presented to the Chief Administrative Officer Kibaale District who introduced him to the District Director of Health Services and the Sub-County Chief Muhorro Sub-County and the LCIII Chairperson of the area who introduced him to the LCII Chairperson. At the LCII level, the officials introduced the researcher to different LCI officials.

With the assistance of LCI Personnel, appointments were made with the selected respondents. The interviews were conducted in homes of respondents or offices of the informants. Structured interviews lasted 35 to 40 minutes while the in-depth interviews lasted for about 1 hour.

In regard to ethical considerations, the rights of individuals and institutions were respected. The researcher first sought consent of all the respondents prior to the interviews and respondents were assured of confidentiality of their responses and that information would not be used for anything else other than that of the study (see the appendix for the copy of the consent form).

3.5 Data Analyses

3.5.1 Quantitative Data Analysis

The data was edited before, during and after leaving the respondents. The researcher checked for uniformity, accuracy, consistency, legibility and comprehensibility. It was coded and tabulated using SPSS program. Chi-square tests were calculated using

independent variables such as age, sex, level of education and income and some of dependent variables like affordability, decision making, and awareness, proper and consistent deployment of ITNs.

3.5.2 Qualitative Data Analysis

Before data collection, tentative themes and their concepts were identified. Data was analysed during and after data collection. Before data collection, tentative themes were identified. The tentative themes were intra-household practices, perceptions, knowledge, beliefs and attitudes, utilization and affordability. The tentative code categories are given in the conceptual framework. The tentative themes and code categories were either confirmed or new ones formulated during data collection. After data collection, data was analysed using QSR N6 (Nudist) program to allow bringing together of similar views from different respondents together. Data from key informants was typed in MS Word and each interview saved in a separate file. The files were imported into QSR N6 program. Nodes were developed according to the sub-themes of intra-household factors, knowledge, perceptions, beliefs and attitudes, utilization and affordability. A report was developed from each of the nodes being a representative of views of all respondents.

3.6 Limitations of the Study

The delimitations of the study were the small geographical area. One sub-county may possibly not be representative of all communities. Therefore, the sample of 88 respondents and key informants might not represent the views of all communities in Kibaale district in particular and Uganda at large. The limitations of the study included; failure of key informants to fulfil appointments made with them and poor road network. Because of the rainy season the roads connecting to the Parishes that had been selected were impassable and a car could not access them. For these limitations a motorcycles were hired to transport the interviewers and three call backs were made to reduce on low response rate and ensure that all the key informants were interviewed.

CHAPTER FOUR

DEMOGRAPHIC VARIABLES AND INTRA-HOUSEHOLD PRACTICES

4.0 Introduction

This chapter presents findings and discussion of the study. Generally, the findings and discussion will examine utilization of ITNs specifically focussing on the intra-household practices in households with children under five. Presentation of results has been done concurrently with discussion of the same. Comparison with previous studies on Insecticide Treated nets in Uganda and in Africa will be done to bring out the bigger picture.

The results presented in this study are based on structured interviews with a random sample of 88 respondents and 28 key informants. It was not possible for the researcher to meet 35 key informants as the original plan was. This was due to the tight schedule of some of the key informants and others were not present in the community by the time the interviews took place as has been indicated in the limitations of the study. The study found out low utilization of ITNs among the under fives due to the intra-household dynamics that will be discussed in the coming sections.

Insecticide treated nets have been proved to reduce all-cause child mortality by 14-33 percent in rural sub-Saharan Africa. ITNs have been promoted to protect the most susceptible to severe malaria: children under five and pregnant women. However, expanded ownership of mosquito nets can make a substantial reduction in malaria morbidity and mortality only if the nets are used and the most vulnerable household members are given priority for sleeping under them. But to what extent are nets that are owned actually used? If a household owns a net, which household members are most, and least, likely to sleep under it? How many family members sleep under a net, and what are the most common groupings under a net? What are the socio-cultural and economic factors within the household affect proper use of the ITNs in the household among the under fives? All answers to these questions will be given in the proceeding sections of this study.

4.1 Socio-demographic characteristics of the study participants

The socio-demographic characteristics are critical in understanding the results of this study. Using the generic behavioural model of Andersen, they predispose individuals within the household to use or not to use ITNs. Description of the basic characteristics of respondents interviewed in this study provides the background for interpreting findings on utilization of ITNs in households with children under five. These include; age, marital status, level of education and occupation.

4.1.1 Age of Respondents

In terms of age, this study classified the participants into seven age groups with the purpose of trying to reveal how the various age categories varied in their understanding of utilization of ITNs among the under fives. The age of respondents ranged from 19 - 71 years with the majority aged between 35 - 39 years comprising of 26.1 percent, followed by those aged between 25 - 29 years (25.0 percent) and 19 - 24 years (20.5 percent) as shown on the table below.

Age	Frequency	Percentage
19 – 24 Years	18	20.5
25 – 29 Years	22	25.0
30 – 34 Years	13	14.80
35 – 39 Years	23	26.1
40 – 44 Years	4	4.5
45 – 49 Years	5	5.7
50 +	3	3.4
Total	88	100

 Table 1: Age group of respondents

As presented in the table above, majority of the respondents in this study were between 20-39 years. This is due to the fact that 20-39 years lies within the reproductive age group that is so active where these care givers are expected to have children. In the age group of 50+ years, had some care givers with children under five who were also interviewed due to the African tradition where children are sent to stay with their grand parents and child upbringing being part of the roles played by the elderly.

4.1.2 Marital Status

Marital status is important in African tradition as children are expected to be raised up in marriage set up due to shared responsibilities between the couples. In terms of marital status, 73.9 percent of the study participants were married, 10.2 percent divorced/separated, 10.2 percent living together/cohabiting, 3.4 percent single and 2.3 percent widowed as presented in the table below.

Marital Status	Frequency	Percentage
Single	3	3.4
Married	65	73.9
Widowed	2	2.3
Divorced/separated	9	10.2
Living together	9	10.2
Total	88	100

 Table 2: Marital status of respondents

The majority of the respondents being married rises out of the social fact that in Africa marriage is the only institution that is socially sanctioned through which children are born and raised. The 10.2 percent of the divorced/separated is due to the misfortunes that affect marital relations leading to divorce or separation. Equally so are those that were found to be living together or cohabiting which has increasingly become common in Uganda and eating into the socially sanctioned institution of marriage. The three care givers found single, 1 out of the three is a lady who had given birth out of wedlock and the 2 were looking after their young siblings who had lost their parents. It is expected that in marriage relationship, child care is the most important component between the couples whereby couples have a moral responsibility of ensuring that children sleep well and are covered properly in the night to protect them against mosquito bites.

4.1.3 Level of education

Education acts as a mechanism of social-economic transformation especially in the field of child development and health care promotion by people staying in the rural areas who constitute 80 percent of the Ugandan population. Wider gaps exist in literacy levels between the urban and rural dwellers in Uganda. The education levels in rural areas still remain low despite the government efforts to promote education for all.

Education level	Frequency	Percentage
No education	19	21.6
Primary education	47	53.4
Secondary education	15	17.0
Post secondary education	5	5.7
Vocational education	2	2.3
Total	88	100

 Table 3: Level of education

As indicated in the table above, the majority of the study participants at least had stopped in primary comprising of 53.4 percent while 21.6 percent had no education. Education being the most important factor of social transformation determines the level with which the community is able to adapt to new changes. This also has to do with how fast the people are able to appreciate the use of ITNs in protecting children under five years against malaria.

4.1.4 Occupation of respondents

Occupation is the basis upon which households are able to survive and meet the daily needs within the household. Occupation also determines the level of income the household is able to have and consequently ability to meet household needs. The respondents in this study community derive their livelihood mainly from farming which is basically subsistence. The table below indicates the cross tabulation between occupation and sex.

	Sex		
Occupation	Male	Female	Total
Farmer	29 (33.0%)	33 (37.5%)	62 (70.5%)
Salaried	5 (5.7%)	4 (4.5%)	9 (10.2%)
Casual worker	5 (5.7%)	1 (1.1%)	6 (6.8%)
Trader/self employed	3 (3.4%)	3 (3.4%)	6 (6.8%)
Unemployed	1 (1.1%)	3 (3.4%)	4 (4.5%)
Student	0	1 (1.1%)	1 (1.1%)
Total	43 (48.9%)	45 (51.1%)	88 (100%)

Table 4: A cross tabulation between occupation and sex

P-value = 0.417 (Pearson chi-square at 0.05 degrees of freedom) In terms of occupation, the majority (70.5 percent) of the study participants were engaged in small scale farming engaged in growing of crops like maize, potatoes, sweet potatoes, beans, ground nuts and bananas. These crops are mainly gown for home consumption and surplus is sold for cash. Agriculture in this community is the dominant economic activity for both revenue and employment. However, this sector does not generate sufficient income to sustain households' requirements. The caregivers who were found to be salaried employees were 10.2 percent of the study participants. These salaried workers were employed as primary school teachers. The self employed had small businesses in form of retail shops within the small trading centres. The smallest percentage of respondents was 1.1 percent who was a student staying with siblings. A cross tabulation between occupation and sex reveal little difference in terms of occupation between the sexes other than in casual labour where out of 6 respondents engaged in casual labour only one was a female. The difference is not statistically significant with a P value of 0.417 (Pearson chi-square at 0.05 degrees of freedom). Generally, majority of the people were engaged in some kind of economic activity that enables them earn a living though not sufficient enough to meet the daily requirements within the households including affordability of ITNs.

4.2 Intra-household dynamics and utilization of nets

In the household, there are factors that determine net ownership and usage by members sleeping within the household. These factors affect effective utilization of ITNs by household members including children under five. Even when the ITN is available in the household, the children under five may not be able to use it properly and consistently due to intra-household dynamics. This section presents findings and discussion on the intra-household factors that impact on utilization of ITNs within the household. It looks at the type of household structure, number of people sleeping in the household, sleeping arrangements in place, and disruption of sleeping patterns due to visitors and cultural rituals and functions. It also seeks to understand whether members in the households have mosquito nets and who specifically uses the nets.

4.2.1 Household structure

The most common household structures are small huts thatched with grass that do have only one room, grass thatched/made of mad and wattle, semi-permanent structures roofed with iron sheets and permanent structures. The different kinds of household structures may favour or deter the use of mosquito nets especially hanging nets. Respondents were asked about the kind of household structure they stay in. The findings in the table below show the
king of household structures in the study population cross tabulated with occupation of participants to find out whether there is a relationship between household structure and occupation and thus affecting proper utilization of ITNs in the household.

	household structure			
Occupation	Grass thatched	Semi-	Permanent	Total
		permanent		
Farmer	14 (22.6%)	41 (66.1%)	7 (11.3%)	62 (100%)
Salaried	1 (11.1%)	4 (44.4%)	4 (44.4%)	9 (100%)
Casual worker	2 (33.3%)	3 (50.0%)	1 (16.7%)	6 (100%)
Trader	0	4 (66.7%)	2 (33.3%)	6 (100%)
Unemployed	1 (25.0%)	3 (75.0%)	0	4 (100%)
Student	0	1 (100%)	0	1 (100%)
Total	18 (20.5%)	56 (63.6%)	14 (15.9%)	88 (100%)

 Table 5: A cross tabulation of household structure and occupation

P-value = 0.36 (Pearson chi-square at 0.05 degrees of freedom)

As shown in the table above, the majority of the respondents stayed in semi-permanent structures roofed with iron sheets accounting for 63.6 percent. While 20.5 percent stayed in grass thatched houses made of mad and wattle and few 15.9 percent were in permanent structures. None of the respondents was staying in the small huts that make it difficult to hang the net. This would mean that in this study population, the household structures can support hanging of mosquito nets. However, as shall been seen in the coming sections, some caregivers were found not to be using nets simply because the houses they stayed in were too small to allow hanging of mosquito nets. They had kept the nets waiting to use them when they construct a bigger house.

The researcher further analysed the relationship between occupation and the type of household structure and came up with the results indicated in the same table above. In terms of ownership of permanent structures, farmers had the lowest percentage (11.3 percent) of the total number of respondents whose occupation was farming. Unemployed and students were found not to be living in permanent structures. The reason for such trend is that the unemployed and students do not have any source of income to enable them put up permanent structures. Also since most of the farmers were engaged in peasant farming/subsistence farming, they can not raise enough money to construct permanent structures 4 (44.4

percent). To explore the effect of occupation on the type of household structure, an inferential statistic measure was conducted using the Pearson chi square test. The results indicated a P value of 0.36, more than the 0.05 value at two tail level of significance, tested at a 95 percent confidence interval. This means that the effect was weak. This means that the relationship observed in the cross tabulation is therefore weak to influence the outcome.

Respondents were asked about the number of rooms each house has and 31.8 percent of the respondents had houses with 2 rooms, 30.7 percent with 3 rooms, 22.7 percent with 4 rooms and only 2.3 percent had their houses with six rooms. The number of rooms ranged from 1 room to 6 rooms. The number of rooms and people staying in each household determine the number of people sleeping in one net or not even sleeping under the net. If the household has one room, it is difficult for household members to sleep under the net due to lack of space as some household members sleep on the floor as shall be seen in the coming sections of this study. As talked about earlier some key informants revealed that they were not using the net which was given to them because of lack of enough space in the house. They hoped to use the net when they build a bigger house. They complained that, when the house is too small, it does not permit use of a net.

4.2.2 Number of people sleeping in a household

Under this section, respondents were asked about the number of people in the household, number of children under five years staying in the household and their relationship with the respondents. The number of people sleeping in one household ranged from 2 people to 11 people. The majority of the households had 2 to 5 people sleeping in one household accounting for 51 percent and only 3.5 percent of the study participants slept 10 or more people in each household. But still, on average in this community, a big number of people sleep in the same household. The 45.5 percent of the study participants sleeping 6-9 people in the same household should not be ignored. This implies that congestion is at its peak and this affects proper use due to heat and ability to provide ITNs to all household members. That's why as shall be seen later in this study, some of the caregivers complained of a lot of heat as one of the hindrances to ITN use. These findings are different from the study that was done in western Kenya where number of household occupants had do effect on ITN

use (Alaii et al 2003). In terms of the children under five years, 43.2 percent of the interviewed respondents had one child in the household, 34.1 percent 2 children, 30.5 percent 3 children and 2.3 percent 4 children in the household who are below the age of five. The number of children under five also overstretches the capacity of the household in as far as provision of ITNs is concerned. And given the low level of household income, the households find themselves incapacitated to afford ITNs for all their children under five. It was also found out that, 94.3 percent of the respondents had children in their households who are below five years as their own biological children, 3.4 percent were siblings and 1.1 percent, niece/nephew and grand children respectively.

4.2.3 Number of beds in the household

It was found out that the majority of the respondents interviewed did not have enough beds for all household members. This has implications to net use especially among the children under five years who are not given priority when it comes to sharing of beds. Seniority in African tradition plays an important role in households when it comes to sharing of resources. The elders are given first priority especially in regard to limited resources. The majority of the respondents had less than three beds per household in the study community. The majority 59.1 percent of the study participants had between 1 - 2 beds and only 6.9 percent had five and above beds within the household. In instances where the household had one bed, it was for the parents sometimes sharing it with the child who is still on breastfeeding. This implies that the rest of the children sleep on the floor which does not permit mosquito net hanging putting in mind the fact that the houses themselves are too small.

These findings are further confirmed with the findings from key informants that reveal the same. The community development officer in this community mentioned that some children in the village do not have beds, so there is no way a mosquito net can be fitted on the floor. Therefore after receiving the net, the conditions within the household do not favour net hanging due to insufficient beds. These findings are also in agreement with the study done in Iganga District on factors influencing access to and compliance with ant malarial measures in children under five where many children in the community slept on the floor,

and could not use the ITNs even if they were given to them (Kagaha 2008). Seniority in the household further precipitates this inability of under fives to properly and consistently use ITNs that initially are meant for them.

4.2.4 Sleeping arrangements in the household

Sleeping groups within the household determine whether or not children under five are able to sleep under Insecticide Treated Nets. In the study carried out in Ethiopia, Ghana, Mali, Nigeria, Senegal and Zambia on Intra-household mosquito net use by Baume at al 2008, it was found out that most common sleeping groups in both countries was a woman of reproductive age and a child under five under 1 net, often along with another child or spouse. The findings of this study are not very much different although the most common grouping is parents sleeping alone. However, the difference between the groupings is not so much significant as shall be seen later. Respondents were asked about the sleeping arrangements within their households and these were responses as indicated in the table.

Group	Frequency	Percentage
Children under 5 sleep alone	45	27.1
Children under 5 with parents	37	22.3
Parents sleep alone	47	28.3
Children under 5 with siblings	37	22.3
Total	166	100

Table 6: Sleeping groups in the household

As presented in the table above, more than one response was possible and 28.3 percent of the respondents said that parents sleep alone, 22.3 percent sleep with parents and older siblings and 27.1 percent of the respondents agreed that children under five sleep alone. This makes it difficult for such children who do not sleep alone to sleep under the net since parents end up using it or even elder siblings.

Findings from Key Informant interviews (KIs) reveal the same information on sleeping arrangements. An interview with the Community Development Officer Muhorro Subcounty revealed that parents sleep with their children in the same bed. He however said that other parents put a provision for a small bed for a child still under breast feeding next to the parents' bed. This means that in case a child under five gets a net, it should be able to cover both the child and the parents. This may inhibit proper use since most of the ITNs meant for children are of a small size. This leaves loopholes that are exploited by mosquitoes to penetrate and cause harm to children. Children above 3 years sleep alone while others sleep with their elder brothers and sisters. When the parent buys a bed, priority is given to older children leaving the under fives sleeping on the floor. This is due to the culture in Africa as indicated earlier where seniority and the benefits that go along with seniority is in most cases based on age. Such a culture leaves out children when it comes to use of certain resources that are limited within the household.

4.2.5 Disruption of sleeping arrangements

In most of the cultures in Africa, relatives and family friends pay constant visits and spend nights or even a few days in another household. Due to poverty, most households do not have capacity to have separate bed rooms for visitors. As a result, they disrupt the existing sleeping arrangements within the household. Respondents were asked whether they had received visitors spending a night in the last six months. The majority 67 percent acknowledged to have received visitors in the last six months. When asked where visitors slept when they came, the responses were as indicated in the table below.

Place	Frequency	Percentage
In the sitting room	22	25.0
Slept with children	27	30.7
In the children's bed room	13	14.8
Not Applicable	26	29.5
Total	88	100.0

Table 7: Showing where visitors sleep

As indicated in the table above, 25 percent slept in the sitting room, 30.7 percent slept with children and 14.8 percent slept in the children's bed room. This means that when visitors sleep in the children's room, children are displaced. Respondents were further asked where children sleep when visitors sleep in the children's bed room and 12 percent mentioned that children sleep on the floor in the sitting room and 1.1 percent mentioned that children sleep with their older siblings. This implies that visitors within the household are given first priority compared to children. This leaves children vulnerable to mosquito bites since they can not hang the nets in the sitting room where there are no supportive mechanisms for net

hanging. This practice affects ITN utilization in households with children the under five. These findings are similar to the findings of a study done in Western Kenya by Alaii et al 2003, where sleeping arrangements were being disrupted by visitors. As visitors come and go, ITNs may not be moved to ensure coverage of children as sleeping arrangements change and the relative status of house occupants varies (a child may be allowed to use his or her ITN only when no adult is visiting). This exposes the child to mosquito bites that consequently causes malaria hence accounting for persistent high death rates due to malaria among the under fives despite the wide spread campaign on ITN usage.

It should be noted that there are social cultural factors that were found in this community to be disrupting sleeping arrangements and thus expose the children under five years to mosquito bites despite the fact that some of them may already be having ITNs. When a family member dies, close relatives and neighbours spend four days morning by spending the night at the burial home. This exposes children under five to mosquito bites since some of them do spend the night with their mothers at the burial home for four days without any protection against mosquito bites. That's why the child mortality rate in Kibaale is so high accounting for 90/1000 live births.

4.2.6 Supervision of children

Children under five require constant supervision to ensure that they have covered themselves well at night to avoid mosquito bites. It is the responsibility of parents to ensure that children sleep well by covering them and if possible check on them during the night. Respondents were asked whether they supervise children to ensure they cover themselves well. The majority 87.5 percent supervise their children while 12.5 percent do not supervise their children. In order to capture a bigger picture of supervision of children, a cross tabulation was done between marital status and supervision of the under fives as indicated in the table below.

	Supervision of children		
Marital status	Yes	No	Total
Single	3 (3.4%)	0	3 (3.4%)
Married	59 (67.0%)	6 (6.8%)	65 (73.9%)
Widowed	1 (1.1%)	1 (1.1%)	2 (2.3%)
Divorced/separated	7 (8.0%)	2 (2.3%)	9 (10.2%)
Living together/cohabiting	7 (8.0%)	2 (2.3%)	9 (10.2%)
Total	77 (87.5%)	11 (12.5%)	88 (100%)

Table 8: Influence of marital status on supervision of children

P-value = 0.014 (Pearson chi-square at 0.05 degrees of freedom)

As indicated in the table above, the majority of the respondents who did the supervision of children were those who were married accounting for 67 percent of the total number of respondents. The cross tabulation gives a P-value of 0.014 Pearson chi-square at 0.05 degrees of freedom that shows a significant relationship between marital status and supervision of children. Having the majority of respondents who supervise children while sleeping being the married people rises out of the social fact that the institution of marriage is the main socially sanctioned relationship through which children are expected to be raised into and supervision and care of children being the core roles supposed to be played by parents therein. That's why for instance 1 out 2 (50 percent) of the widowed were not supervising their children. This means that in such households where supervision of children at night is lacking, proper utilization of ITNs may not be realised hence exposing the under fives to mosquito bites.

The researcher further asked the respondents to mention who specifically in the household supervises children. This was because shared responsibility between parents ensures proper care of the under fives. It also makes the plight of children known well to those involved and thereby meeting their need. The findings are presented in the table below.

Person responsible	Frequency	Percentage
Father	6	6.8
Mother	66	75.0
Elder siblings	5	5.7
Grand Father	2	2.3
Not Applicable	9	10.2
Total	88	100

Table 9: Showing who supervises the under fives

As presented in the table above, 75 percent of the respondents mentioned that it is mothers who supervise children, 6.8 percent fathers, and 5.7 percent elder siblings. This leaves the role of supervision of children mostly in the hands of mothers who are already burdened by other household chores. Because of the busy schedule of mothers in the household, they end up forgetting to cover children under the net. This affects the effectiveness of ITNs in the household as consistence is compromised with since the responsibility is not shared equally. Findings from the key informants are not so much different from the above. Some key informants insisted that monitoring and supervision of children is practically done by their mothers and sometimes not done at all. The Local Council Three Chairperson (LCIII) of the area had this to say on supervision of children.

"Both parents assist the children in ensuring that they have slept well. But mostly mothers and sometimes it is the older siblings who supervise their younger siblings" For those key informants who said that children under five are solely supervised by their mothers based on the fact that men come back home very late in the night when children are already asleep. Some of the men come when they are very drunk and instead become a source of disruption at night by waking up the children. This actually disrupts the well organised beddings of children hence exposing them to mosquito bites.

4.3 Utilization of Mosquito Nets

ITNs are currently the recommended approach to preventing malarial episodes in under fives. They are very effective because of they prevent under fives from mosquito bites and also kill mosquitoes on contact if used consistently and correctly. This study recognized the fact that not all mosquito nets used in the community were ITNs and therefore made attempts to establish general usage of mosquito nets prior to critical analysis of ITNs. In this sub-section, focus is put on possession of any kind of mosquito net, number of nets per household, ownership of nets, utilization of nets among the under fives, consistency in net usage, reasons for not using mosquito nets and decision making in regard to who should use the net within the household.

4.3.1 Possession of mosquito nets

In terms of possession, respondents were asked if they had any kind of mosquito net whether treated or not. About 56.8 percent of the study participants had any kind of mosquito net in their household while 43.2 percent did not have any mosquito net. It was further found out whether there is a relationship between education level and net possession. The critical analysis of possession of mosquito nets and education level in the study community is presented in the table below.

	Net possession		
Education level	Yes	No	Total
No education	8 (9.1%)	11 (12.5%)	19 (21.6%)
Primary	28 (31.8%)	19 (21.6%)	47 (53.4%)
Secondary	19 (11.4%)	5 (5.7%)	15 (17.0%)
Post secondary	3 (3.4%)	2 (2.3%)	5 (5.7%)
Vocational	1 (1.1%)	1 (1.1%)	2 (2.3%)
Total	50 (56.8%)	38 (43.2%)	88 (100%)

 Table 10: Influence of education on mosquito net possession

P-Value = 0.89 (Pearson chi-square test at 0.05 degrees of freedom)

As presented in the table above, the majority of the respondents 31.8 percent who had any kind of nets in their households had finished primary education. This is due to the obvious reason that the majority of the study participants had gone up to primary level. When the results presented in the table above are analysed critically, you find that respondents who had no education were least likely to possess the nets compared to those who had some level of education. Out of 19 respondents who had no education, 11 (57.9 percent) had no nets. Whereas at least more than half of the respondents who had attained some level of education had nets in their households. For Instance, 10 (66.7 percent) out of 15 respondents who had finished secondary education had any kind of net. This suggests that education influences possession of nets in this study population. However, the level of significance is weak as revealed by the Pearson chi-square test at 0.05 degrees of freedom where the P value is 0.89 meaning that there are also other factors that influence possession.

Possession of mosquito nets was further cross tabulated with occupation to find out whether a relationship exists between occupation of respondents within the household and possession of any kind of net within the household. This is because the type of occupation determines how much income one is likely to have and consequently the ability to afford and meet different needs in the household. The results are indicated in the table below.

	Net posse		
Occupation	Yes	No	Total
Farmer	34 (38.6%)	28 (31.8%)	62 (70.5%)
Salaried	6 (6.8%)	3 (3.4%)	9 (10.2%)
Casual worker	3 (3.4%)	3 (3.4%)	6 (6.8%)
Trader	5 (5.7%)	1 (1.1%)	6 (6.8%)
Unemployed	3 (3.4%)	1 (1.1%)	4 (4.5%)
Student	0	1 (1.1%)	1 (1.1%)
Total	51 (58%)	37 (42%)	88 (100%)

Table 11: Influence of occupation on net possession

P-Value = 0.78 (Pearson chi-square test at 0.05 degrees of freedom)

A critical analysis of the table above reveals a relationship between possession of nets and occupation of respondents exists. Although respondents engaged in farming form the majority of study participants and therefore majority of those who possessed nets (38.6 percent), they are also the majority of those who did not possess any kind of net. It should be noted that traders are more likely to possess any kind of net. Out of 6 respondents who were traders, 5 (83.9 percent) had nets in their households. This is due to the exposure traders get when they move outside their community as they do they work. In the process, they are able to purchase them since their incomes are relatives high compared to farmers who have to wait till end of the harvest to earn income. However, those who were unemployed were also more likely to possess any kind of net within the household. These are respondents who were once employed but lost their jobs when they already had nets. Actually one of the unemployed was an ex-soldier from Uganda People's Defence Forces. Students were found not to have nets. This was only one student in the study population who was even an orphan looking after his siblings. Casual workers are another category that is least likely not to possess nets. It was also found that 3 out of six casual workers in the study population had no nets. This therefore shows that occupation has a positive effect on net possession. It should be noted that the number of nets within each household also determines whether or not the under fives will use it correctly and consistently. This study further sought to find out the number of nets per household in the study community. The table below summarises the responses from the caregivers who participated in this study on number of nets.

 sie 12. Tumber of nets per nousenoid				
Number of nets	Frequency	Percentage		
More than 3	9	10.2		
3 Nets	2	2.3		
2 Nets	5	5.7		
1 Net	34	38.6		
Not applicable	38	43.2		
Total	88	100		

Table 12: Number of nets per household

As seen from the table above, only 10.2 percent had more than 3 nets in their households, 2.3 percent had 3 nets, 5.7 percent had 2 nets and the majority 38.6 percent had only 1 net in the household. This means that the majority of the household members do not have nets as one net can not be shared among all of them. Number of people under one net was found to range from 1 to 6 people as 22.7 percent slept 2 people in one net, 14.8 percent 3 people and 9.1 percent 4 people in one net. This does not provide for effective usage of the mosquito net due to overcrowding of the net yet most of the net possessed were found to be single as shall be seen in the subsequent sections. Respondents were further asked to mention who in the household sleeps under the net. Here, the researcher wanted to know who specifically in the household sleeps in the net to get a clear picture. More than one response was possible as presented in the table below.

	Count	Percentage of
Category of who sleeps in the net		responses
0 - Year olds ($0 - 11$ Months)	12	12.6
1- Year olds (12 – 23 Months)	16	16.8
2 - Year olds ($24 - 35$ Months)	12	12.6
3 - Year olds ($36 - 47$ Months)	2	2.1
4 – Years olds (48 – 59 Months)	7	7.4
Children 5 – 14 Years	3	3.2
Pregnant Women of reproductive age (15 – 49 Years)	2	2.1
Parents	41	43.2
Total	95	100

Table 13: Showing who sleeps in the net within the household

As presented in the table above, parents form the major group of people in the household who sleep under the net. Parents account for 43.2 percent of people in the household who sleep under the net. It should be noted however that generally children under five sleep under the nets since if grouped together account for 12.6 percent for those between 0-11 months, 16.8 percent (12-23 months), 12.6 percent (24-35 Months), 2.1 percent (36-47 months) and 7.4 percent (48-59months). The higher percentage of parents sleeping in nets is due to the fact that most of the parents sleep with the children still breast feeding and in most cases are covered under the same net.

4.3.2 Ownership of ITNs

Mosquito net ownership is rising in sub-saharan Africa but will substantially reduce malaria only if nets are used and the most vulnerable household members sleep under them. Views were sought on ownership of ITNs in the household which revealed that ownership of ITNs in the household is slightly lower than any kind of nets. It was found out that 46.6 percent of the respondents had at least an ITN within the household and 34.1 percent did not have. Whereas knowledge about ITNs was high in this community (61.4 percent) as shall be seen in the coming section, ownership of ITNs is very low. More than half of the respondents did not have ITNs in their households. A cross examination of the actual nets used in the households reveal the following results in the table below.

Type of net	Frequency	Percentage
Ordinary net	18	20.5
Ever treated net	1	1.1
ITN/Currently treated net	31	35.2
Not applicable	38	43.2
Total	88	100

Table 14: Types of nets used in the household

In order to know the actual type of net used in the household, respondents were cross examined by asking the type of net currently being used in the household. As shown in the table above, only 35.2 percent were using ITNs/currently treated nets, 1.1 percent ever treated nets and 20.5 percent ordinary nets. Different reasons were given as to why some people were not using Insecticide treated nets. They include; not having money to buy the ITNs (36.4 percent) and stopped using it because mosquitoes had reduced. It was also interesting to find out that some people did not know where ITNs are and others had not

bothered to get nets. It should also be noted that ITNs being slightly expensive compared to non treated nets made some people to buy just ordinary nets and others did not know whether the net was treated or not. For those who knew treated nets mentioned that treated nets have a chemical which can be felt by smell.

Reason	Frequency	Percentage
I don't have money to buy the net	32	36.4
Mosquitoes had reduced	1	1.1
Have not bothered to get a net	4	4.5
I have never known where they are	3	3.4
That's what I could afford	2	2.3
Not enough for both of us	1	1.1
Don't know whether it is treated or not	2	2.3
Not applicable	43	48.9
Total	88	100

Table 15: Reasons for not using treated mosquito nets in the household

As seen from the table above, caregivers gave different reasons as to why they were not using mosquito nets. Key informants gave similar reasons as to why some households were not using nets. The community development officer had this to say;

"Some people drink a lot and forget to put on a net. The net can be there but because the husband and the wife come home when drunk, they forget to put it on"

Other reasons mentioned by key informants include; Misconceptions that ITNs make someone sweat.

"Sometimes I spend the whole night without covering myself, how can I start sleeping in a sack!"

One of the respondents commented.

"People have a feeling that mosquito nets cause a lot of heat and therefore make it uncomfortable for some one sleeping in it. Inadequate income to raise money to buy the nets is our major problem. The crops we grow can not raise money to pay for children's school fees at the same time buy nets. The house is small to allow net hanging. It needs a house with big rooms. Not readily available. I only saw them once being sold by a hawker who had come from Mubende district. Some people say that when you sleep under the net, you can be affected by the chemicals". Another key informant had this to say;

"Most of the nets given are used by the household heads/parents and leave the children out. It's like a cultural belief that anything good is given to elders. Children are not given priority in this regard"

Another respondent had this to say;

"Rats eat the nets and put holes in them. This easily lets in mosquitoes. There are no nsecticides and people in this community don't know where to get it"

It was further noted that sometimes maintenance is hard due to poor housing set up and using candles which produce a lot of smoke and dirtying the ITNs requiring them to be washed regularly. Some people fear that it can be caught by fire if a candle (Tadooba) gets near it. An interview with the chairperson LCIII Muhorro sub-county had this to say about ITNs and candles.

"Mosquito nets have their own problems. Sometimes the users burn them especially those who use candles. When other people hear that it burnt someone, they fear using these nets again"

Some of these findings are similar to findings of previous studies done in other parts of Uganda and in Africa. Most of the reasons largely are related to financial capability, attitude and perceived effectiveness. Perception is an important factor because it influences the decision for accessing ITNs but financial capability is the fundamental factor in enabling the person to fulfil his/her decision.

4.3.3 Under fives and net usage

In order to capture utilization of ITNs among the under fives, respondents were asked if their children under five years sleep under ITNs. It was found out that 39.8 percent of the respondents had their under fives sleeping under the net, while 28.4 percent had the nets in the household but children under five years were not sleeping under the ITNs, and 31.8 percent did not have the nets within the household. The percentage of children under five years sleeping under the net net in this study is higher than the percentage of children under five years in the study carried in Iganga district Eastern Uganda where 22 percent of the total respondents in the survey reported that their children slept under mosquito nets. In the same study, out of 29 respondents who reported using nets, only 11 respondents reported

that children were sleeping under ITNs (Kagaha 2008). This higher percentage of children under five sleeping under ITNs could be due to the fact that ITNs had been given free of charge in this study community to children under five and pregnant women the year before this research. This means that most of the under fives got a chance to own an ITN.

4.3.4 Consistency in net usage

According to malaria control programme, mosquito nets are supposed to be used every night. Respondents were asked how often children below 5 years sleep under the net during the night. The table below summarises the results;

Period	Frequency	Percentage
Throughout the night during the	6	6.8
season for mosquitoes		
All year round	10	11.4
Most part of the night	13	14.8
Some part of the night	8	9.1
Not applicable	51	58
Total	88	100

 Table 16: Consistence of under fives in sleeping under the nets

As seen from the table above, there are lots of inconsistencies in net usage. Only 11.4 percent of the respondents mentioned that their children sleep under the net all year round, 14.8 percent use the net most part of the night, 9.1 percent some part of the night and 6.8 percent through out the night during the season of mosquitoes. These results clearly indicate that consistency in using the mosquito nets among the under fives is still low. Yet for ITNs to be effective in preventing malaria, children under five years are supposed to consistently sleep under them. These findings are quite different from the findings of a study done in Iganga District Eastern Uganda where consistency of sleeping in ITNs was relatively high as majority 63 percent of respondents reported that their under fives slept under mosquito nets throughout the night at all times, while 20 percent reported that the under fives slept under the mosquito nets throughout the night at might but only during the seasons for mosquitoes (Kagaha 2008). This therefore accounts for high malaria incidents among children.

4.3.5 Decision making

Decision making within the household in regard to who should sleep under the mosquito net lies between the mother and father. It impacts on the availability and accessibility of ITNs within the household. In the study community, it was found out that largely, its men who decide who should sleep under the ITN as presented in the table below.

Who decides	Frequency	Percentage
Father	26	29.5
Mother	18	20.5
Both father and mother	4	4.5
Not applicable	40	45.5
Total	88	100

Table 17: Showing who decides who should sleep under the net

As indicated above, 29.5 percent of the study population mentioned that it is men who determine who should sleep under the net and 20.5 percent mothers. It is only 4.5 percent where both father and mother decide/agree together on who should sleep under the ITN. As seen from the previous section, it is mothers who are largely responsible for the supervision of children while sleeping yet participate less in decision making in regard to who should sleep under the ITN. Men come home late and know little about child care and the needs of children. When children are sick, it's mostly women who take a lead role in looking after sick children. Therefore, the intra-household gender relations shape the way ITNs are utilized by household members in terms of who should sleep under the net. While women were responsible for child care through ensuring that children sleep well, they do not have enough resources at their disposal to enable them buy the ITNs to their children. Men are expected to provide such financial support to the female caregivers which results into men dominating the decision making process on who should sleep under the net.

4.4 Conclusion

In conclusion, it should be recognised that the intra-household dynamics in ITNs use in households with children under five years is complex and influenced by various social, economic and cultural realities. The success of ITN utilization largely depends on how households are able to cope with these realities and how policy makers and implementing organs understand these realities. Otherwise, continuous distribution of nets without proper knowledge on the intra-household dynamics will continue to offer little success in prevention of malaria among the under fives.

CHAPTER FIVE

KNOWLEDGE, ATTITUDES, PERCEPTIONS AND BELIEFS ABOUT ITNs

5.0 Introduction

One of the objectives of the study was to examine knowledge, attitudes, perceptions and beliefs of caregivers towards the usage of ITNs among the under fives. Data was collected by an interview schedule and interview guide to get a deeper understanding. This section assesses the knowledge, attitudes, perceptions and beliefs about ITNs in the household. Whereas ITNs are the mainstay in malaria prevention, their effectiveness largely depends on the knowledge and perceptions of the people in the household who directly use them. The findings from this chapter were analysed using the Health Utilization Model. The study takes caregivers as rational actors in making choices and decisions about access to responsive and malarial preventive measures for the under fives. Their rationality is traced from socio-cultural and economic context within which they live.

5.1 Knowledge about mosquito nets

Knowledge about mosquito nets was high among the study participants. It was found out that 89.8 percent of the respondents had heard about mosquito nets and 10.2 percent had not heard about mosquito nets. However, knowledge of ITNs in particular was found to be relatively low compared to mosquito nets in general. In this study, I sought to understand whether the respondents really know what ITNs are. Knowledge of respondents was assessed against the demographic variables of the respondents in order to assess the influence of such demographic variables on knowledge base of the caregivers. However, among all the variables, only education showed a slight influence on the knowledge of ITNs. Literacy can act as a mechanism of social transformation especially in the field of child development and health care promotion by poor people. Education was categorized into ordinal classes along which the responses were classified in order to assess how variations in education ladder would impact on caregivers' knowledge of ITNs within the households. The table below summarizes the responses from caregivers.

	Knowledge of		
Education level	Yes	No	Total
No education	8 (9.1%)	11 (12.5%)	19 (21.6%)
Primary	31 (35.2%)	16 (18.2%)	47 (53.4%)
Secondary	11 (12.5%)	4 (4.5%)	15 (17.0%)
Post secondary	3 (3.4%)	2 (2.3%)	5 (5.7%)
Vocational	1 (1.1%)	1 (1.1%)	2 (2.3%)
Total	54 (61.4%)	34 (38.6%)	88 (100%)

Table 18: Influence of education on knowledge regarding ITNs

P-Value = 0.54 (Pearson chi-square test at 0.05 degrees of freedom)

It was found out that 61.4 percent of the respondents knew what ITNs are and 38.6 percent did not know. The results from the cross tabulations revealed that caregivers with primary education level had the highest knowledge on ITNs. This may be due to the fact that most of the caregivers in the survey were from this class of the primary education strata. However, the relationship between education and knowledge regarding ITNs is weak with the P-value 0.54 Pearson chi-square test at 0.05 degrees of freedom. In terms of specific educational classes, respondents who had no education showed low awareness of ITNs. Only 8 (42.1 percent) out of 19 respondents who had no education knew what ITNs are. Whereas those who had attained formal education knew what ITNs are, the highest level of knowledge being in the category of respondents who had finished secondary education. In this category, 11 (73.3 percent) out of 15 knew what ITNs are. Those respondents who knew what ITNs are mentioned that treated nets have a smell of a chemical (insecticide) that is used to treat them. This implies that literacy levels have some influence on knowledge regarding ITNs. When asked what they knew about ITNs, the following responses presented in the table below were given.

Knowledge	Frequency	Percentage
They are effective in prevention of malaria	21	23.9
Protects against mosquito bites	28	31.8
Kill mosquitoes that cause malaria	5	5.7
Not Applicable	34	38.6
Total	88	100

 Table 19: Knowledge about ITNs

As presented in the table above, 31.8 percent respondents mentioned that ITNs protect children against mosquito bites, 23.9 percent they are effective in prevention of malaria and

5.7 percent mentioned that ITNs kill mosquitoes that cause malaria. Respondents who knew what ITNs are were further asked if they knew the difference between ITNs and non treated nets. It was found out that 36.4 percent knew the difference while 44.3 percent did not know the difference between treated and non treated nets. Those respondents, who said yes, differentiated ITNs and non treated nets as presented in the table below.

Difference	Frequency	Percentage
ITNs kill mosquitoes on contact	30	34.1
Causes suffocation if still new	1	1.1
Not applicable	57	64.7
Total	88	100

 Table 20: Difference between ITNs and non treated nets

As seen from the table above, 34.1 percent mentioned that ITNs kill mosquitoes on contact while non treated nets do not, and 1.1 percent mentioned that insecticide treated nets cause suffocation to children if still new. This could be the reason as to why some people were found not to be using ITNs in their households. They complained that the ITNs have a chemical that smells. This study reveals slightly greater knowledge among the study population on ITNs. For instance, in the study carried out in Mbarara in Western Uganda, on the perceptions about malaria prevention, the study participants expressed ignorance of Insecticide Treated Nets and could not tell whether a bed net was treated or not (Nuwaha 2002). The findings from the key informants indicate that some caregivers do not know the difference between treated nets and non treated nets since they had not been exposed to both of them. It was found out that before the nets were given to pregnant mothers and children under five years in this community, some people had never seen what a mosquito net looks like. This therefore made it difficult for them to differentiate between a non treated net and ITNs.

However, it should be noted that, ITNs causing suffocation to children is mentioned in both studies. This could be due to the fact that the number of individuals staying in each household is high. This leaves little space and using the net increases on the heat within the house. Some respondents as shall be seen later were found not to be using the nets due to lack of space waiting to use the nets when they construct a bigger house.

The level of knowledge about ITNs though still low, it is relatively higher than that found in the previous studies. This could be due to the fact that ITNs in this community were given out by government and sensitized the community how to use them as mentioned by the community development officer of Muhorro Sub-county.

5.2 Knowledge on Treatment of Mosquito nets

For mosquito nets to be effective, they must be treated with insecticide at least once a year especially if the net is an ITN/Currently treated net. Respondents were asked whether they retreat their mosquito nets. Re-treatment means dipping or soaking the net in insecticide to kill or repel mosquitoes. As an indicator for 'awareness' respondents were asked if they had ever heard of mosquito nets that had been dipped or soaked in insecticide to kill or repel mosquitoes. The results of the cross tabulations between level of education and mosquito net re-treatment are presented in the table below.

Education level	mosquito net re-treatment			
	Yes	No	Not Applicable	Total
No education	0	8 (9.1%)	11 (12.5%)	19 (21.6%)
Primary	1 (1.1%)	31 (35.2%)	15 (17.0%)	47 (53.4%)
Secondary	2 (2.3%)	9 (10.2%)	4 (4.5%)	15 (17.0%)
Post secondary	1 (1.1%)	2 (2.3%)	2 (2.3%)	5 (5.7%)
vocational	0	1 (1.1%)	1 (1.1%)	2 (2.3%)
Total	4 (4.5%)	51 (58.0%)	33 (37.5%)	88(100%)

 Table 21: Influence of education on net re-treatment

P-Value = 0.29 (Pearson chi-square test at 0.05 degrees of freedom)

Only 4.5 percent had ever heard and re-treated their nets and the biggest percentage (58.0 percent) had never. The caregivers who had treated their nets came from those who had attained formal education, secondary education was the highest with 2.3 percent, primary and post primary education had 1.1 percent. Respondents who had no education and those who had attended vocational training had not heard about net re-treatment and were therefore not treating their nets. Although those respondents who treated their nets came from those respondents who had attained some formal education, education as a variable did not possess a significant influence on the knowledge of net re-treatment. This means that other factors could be responsible for the low knowledge of net re-treatment as shall be

seen in the proceeding chapters. It was further found out that re-treatment is done at least once a year. When asked why they treated their nets within the period of at least once a year, they responded that's the way they were told by health workers to treat their nets after 6 months and to keep them effective in killing mosquitoes. For ITNs to be effective, they must be retreated at least once a year using an insecticide.

It should be noted that awareness in regard to net re-treatment in this study population is extremely very low. In Uganda, according to Baume at al 2008, it was at 23 percent, Zambia 51 percent and in Senegal 70 percent during the period 2000 to 2004. Respondents who had never heard that mosquito nets are supposed to be retreated were asked why they did not know and 25 percent said that they were not told about net re-treatment and 3.4 percent had never bothered to ask. This further reveals low awareness in regard to net re-treatment within the household.

5.3 Source of Information about ITNs

In order to capture source of information about ITNs in this community, respondents were asked how they came to know about ITNs. More than one response was possible and the sources of information were given as presented in the table below.

Source of Information	Frequency	Percentage
Radios	39	39.8
Health workers	39	39.8
Counsellors/field workers	3	3.1
Home visits	5	5.1
Neighbour/friend	4	4.1
Brochure/poster	4	4.1
Newspaper	3	3.1
Others	1	1.0
Total	98	100

Table 22: Sources of information about ITNs

From the table above, it is clear that the major sources of information about ITNs in this community are Radios and Health workers which constitute 39.8 percent each. Respondents noted that Kagadi Kibaale Community Radio (KKCR) had played and important role in informing the population in this community about health related Issues. This is a community Radio managed by Uganda Rural Development and Training (URDT) a local

non governmental organisation. The media has played an important role in improving health status of the communities not only in Muhorro sub-county but also in other communities. In the study carried out in Western Kenya about factors affecting use of Permethrin-Treated bed nets, the media spread messages that would help the people appreciate the use of ITNs. The messages included; take ill children to health clinics promptly, sleep under ITNs all year round every night and tuck in ITNs to keep mosquitoes from entering, correct and consistent ITN use can reduce illness and death in young children, wash ITNs only just before insecticide treatment and keep ITNs in good condition by sewing up holes (Alaii, et al 2003). Other sources include; counsellors/field workers (3.1 percent), home visits (5.1 percent), neighbours (4.1 percent), brochures/posters (4.1 percent) and newspapers (3.1 percent). Posters and newspapers constituted the lowest percentage because of low literacy levels in the community and their unavailability.

5.4 Perceived effectiveness of ITNs in prevention of malaria

It is believed that ITNs provide a barrier against mosquito bites that causes malaria. ITNs if are used correctly and consistently, they reduce morbidity and prevent malaria among the under fives. This study assessed the perceptions of caregivers about the use of mosquito nets in controlling malaria. Responses of the feelings about use of ITNs were cross tabulated with ownership of mosquito nets in the household to find out the relationship between the two variables. The results are indicated in the table below.

and presence of mosquito nets in the household								
Feeling	about	use	of	ITNs	in	Presence of m	osquito nets	
prevention of malaria in the household		Total						
						Yes	No	
]	l presend Feeling preventio	<u>l presence of mo</u> Feeling about prevention of ma	<u>l presence of mosquito</u> Feeling about use prevention of malaria	<u>l presence of mosquito net</u> Feeling about use of prevention of malaria	<u>l presence of mosquito nets in the</u> Feeling about use of ITNs prevention of malaria	l presence of mosquito nets in the hou Feeling about use of ITNs in prevention of malaria	I presence of mosquito nets in the householdFeeling about use of ITNs in prevention of malariaPresence of m in the householdYes	I presence of mosquito nets in the householdFeeling about use of ITNs in prevention of malariaPresence of mosquito nets in the householdYesNo

Table 23: The relationship between feelings about use of ITNs in malaria prevention

prevention of malaria	in the ho	Total	
	Yes	No	
Very Effective	13(14.8%)	1 (1.1%)	14 (15.9%)
Effective	28 (31.8%)	2 (2.3%)	30 (34.1%)
Average	7 (8.0%)	2 (2.3%)	9 (10.2%)
Less effective	2 (2.3%)	1 (1.1%)	3 (3.4%)
Not effective at all	1 (1.1%)	2 (2.3%)	3 (3.4%)
Not applicable	0	29 (33.0%)	29 (33.0%)
Total	51 (58%)	37 (42%)	88 (100%)

P-Value = 0.37 (Pearson chi-square test at 0.05 degrees of freedom)

As presented in the table above, 34.1 percent believed that ITNs are effective in prevention of malaria, 15.9 percent very effective, 10.2 percent average and only 3.4 percent less effective. Therefore among the respondents who had used ITNs before, largely believe that ITNs are effective in the prevention of malaria. Only 3.4 percent who are the minority perceived ITNs as not effective at all. The cross tabulation between the perceptions of respondents and net possession in the household reveal a strong relationship between the two variables. The majority of the respondents who had the nets strongly believed that ITNs are effective in malaria prevention among the under five compared to those who did not have nets in their households. This is in line with Andersen 1968's model of the need factors. The moment individuals perceive the need for a service, their likelihood of using it is high. That's why those whose perception of ITNs as very effective were found to be possessing ITNs compared to those who perceived ITNs as less effective.

The researcher went ahead to find out why the respondents felt that way about ITNs. Different reasons were given as to why some respondents felt that ITNs are very effective, effective and not effective in prevention of malaria. The reasons given are summarised in the table below.

Perceived feelings	Frequency	Percentage
Protect children against malaria	25	28.4
Sometimes I suffer from malaria	11	12.5
Spent a long time without falling sick	10	11.4
Mosquitoes can bite you when still outside	2	2.3
No applicable	30	34.1
None response	10	11.4
Total	88	100

Table 24: Reasons for perceived feelings about ITNs

Those respondents who felt that ITNs are effective in prevention of malaria were basing on the fact that they had spent a long time like 2 years without falling sick and that mosquito nets protect children against malaria. These are lived experiences of respondents who had used the ITNs for some time. However, those respondents who felt that ITNs are not effective in prevention of malaria based on the fact that mosquitoes can bite you when still outside the net; and that sometimes they suffer from malaria despite sleeping under the net. Suffering from malaria despite sleeping under the net could be due to the fact that some ITNs were not retreated or not even ITNs, others have holes in them caused by rats as mentioned by some key informants which allow mosquitoes to penetrate through.

Respondents were further asked what other people say about mosquito nets in order to obtain wider views on ITNs in this study community. The views of other people in the community can allow or even hinder usage of ITNs depending on how they influence someone's perceptions. The results are indicated in the table below.

Variable mentioned	Count	Percentage of
		responses
They are good if availed to every one	57	44.5
Cause a lot of heat	14	10.9
Cause suffocation	7	5.5
Affect the eyes if still new	2	1.6
Don't know how to hang them	47	36.7
Non response	1	0.8
Total	128	100

Table 25: Showing what people say about ITNs

More than one response was possible. As presented in the table above, 44.5 percent who are the majority mentioned that other people think that ITNs are good if availed to them, 36.7 percent say that they do not know how to hang the ITNs and some people think that ITNs cause a lot of heat, suffocation and affect the eyes if still new. The findings of this study about the feelings and perceptions of ITNs within the household have some similarity with findings found in the previous studies done on ITNs. The occurrence of negative side effects is not a new phenomenon in the use of ITNs within the households. Winch et al 1997 reported that most common side-effects of exposure to the insecticides such as runny nose and nosal irritation lead to non re-treatment of the nets. However, the number of people who perceived ITNs to have side effects is small compared to those who perceived ITNs are good and effective in prevention of malaria. Such negative perceptions negate proper use of ITNs in households with children under five years.

5.5 ITNs and Malaria Prevention among the under fives

ITNs if properly used and maintained can provide a physical barrier to hungry mosquitoes and provide 46 percent protection against malaria (RBM 2001). In this study, respondents were asked if ITNs are necessary in preventing malaria among the under fives. The majority 64.8 percent agreed that ITNs are necessary in malaria prevention among the under fives. The reasons why ITNs are necessary in preventing malaria are presented in the table below.

Reason	Frequency	Percentage
Protect against malaria	53	85.5
Does not allow mosquitoes to go through	3	4.8
If you sleep in it consistently	6	9.7
Total	62	100

Table 26: Reasons why ITNs are necessary

More than one response was possible. As presented above, the majority agreed that ITNs protect against malaria. As shown in the table above, 85.5 percent said that ITNs protect against malaria by providing a physical barrier. 4.8 percent ITNs do not allow mosquitoes to go through and 9.7 percent said that ITNs are necessary if you sleep in them consistently.

However, 12.5 percent mentioned that ITNs are not necessary in preventing malaria among the under fives. The reasons advanced to support their thinking were that even ordinary nets that are not treated with insecticide can prevent mosquitoes and that they have traditional herbs that they can rely on to prevent malaria. This further reveals lack of awareness that was seen in the previous section.

5.6 Conclusion

In conclusion, the utilization of ITNs at the time of this study was very low due to the perceptions, beliefs and attitudes towards ITNs. However, acceptability and willingness of the community to use ITNs for malaria prevention was high. It is expected that the expansion of ITN implementation and increasing coverage to all households with children under five may lead to success of malaria control among children. Communities should be sensitized on the importance of ITNs for malaria prevention. In addition, massive sensitization should be able to erase poor perceptions caregivers have on ITNs.

CHAPTER SIX

ACCESSIBILITY AND AFFORDABILITY OF ITNs

6.0 Introduction

Use of ITNs has remained appallingly low compared to the RBM target of 80 percent coverage. Although there are a number of initiatives to promote ITN sales, involving both sales through public health facilities and a number of social marketing initiatives, coverage remains low. According to the policy and strategy for ITNs, over 80 percent of people living in malaria endemic areas of Uganda are supposed to sleep under ITNs. The majority of these people purchase their ITNs from the unsubsidized commercial market and prices are kept low in both urban and rural areas. However, vulnerable group including children under five can obtain subsidized ITNs (MOH 2003.) Under this section, the researcher assesses accessibility and affordability of ITNs to households with children under five.

6.1 Accessibility

Accessibility is a major factor that affects use of ITNs in the households. For ITNs to be effectively utilized within the household, they must be readily available within the community. Respondents were asked if they had any where they could obtain nets. The majority 56.8 percent mentioned that they knew where they could obtain the nets and 40.9 percent did not know. The enabling factors within the community determine whether ITNs are used by households or not. When asked where they had obtained the nets they were currently using in their households, different sources were mentioned as indicated in the table below.

Source	Frequency	Percentage
Government	31	35.2
Supermarket	3	3.4
Retail shop	12	13.6
Pharmacy	1	1.1
Drug shop	2	2.3
Not applicable	39	44.3
Total	88	100

Table	27:	Sources	of	ITNs
Lanc		Durus	UL 1	

As presented in the table above, most of the households with nets got them from the government (35.2 percent) through net distribution programme that targeted the under fives and pregnant women. Other sources include; supermarkets 3.4 percent, retail shops 13.6 percent, pharmacy 1.1 percent and drug shops 2.3 percent.

Although more than half of the respondents knew where they could obtain the mosquito nets, key informants reported that before the programme where nets were given to children under five and pregnant mothers, most of them had never had about ITNs and never seen them. "Before we got ITNs from the government, we had never used or even seen mosquito nets" said Chairperson LCI Kabuga. LCI chairpersons mentioned that the demand for ITNs is high in this community yet they are not readily available. Some Key Informants expressed doubt about the availability of ITNs in the open market. "I don't know where I can obtain a net in case I needed it". This implies that accessibility to ITNs in this community is the biggest challenge. Some people expressed interest in owning these nets but availability is the main problem. All they knew was that it's the responsibility of the government to provide ITNs to children under five. The nets brought by the government were not enough as only 27 households with under fives per village received one net.

In the study carried out in Nigeria by Onwejekwe et al, it was found out that accessibility was found appallingly low with 10 - 12 percent of households owning at least one untreated net in Nigeria and negligible coverage of treated nets. The low coverage was due to affordability problems as households' economic status has been related to net ownership in a number of studies. Secondly, people may not value the nets enough to buy them and thirdly, it is possible that either nets are not physically available or that people do not know where they can buy one. This is similar to what some key informants and respondents mentioned that they did not know where to buy them in case they needed them. Actually, some respondents confessed having never seen ITNs until they got a chance to see them being supplied by the government. Otherwise, if it was not because of the government initiative to provide free nets, some people in this community looking at a net physically would have remained a dream as one of the leaders quoted saying:

'I am not very sure whether mosquito nets are readily available in Muhorro subcounty' LCI chairperson - Kabuga

In general, the net outlets in this community are not widespread. There are few drug shops, pharmacies, general stores, retail shops and vendors if at all they exist in Muhorro subcounty where people can access ITNs.

6.2 Affordability of ITNs by Caregivers

There is mounting evidence that poor households are more vulnerable to the consequences of malaria infection, such as severe or complicated malaria or risk of mortality. As seen in the socio demographic characteristics of participants in this study, the majority of respondents (70.5 percent) were engaged in peasant farming which does not generate enough income to meet the daily requirements of households including purchase of ITNs.

Under this sub-section, affordability is measured in terms of the cost of purchasing the net and insecticide that is used in re-treating the nets. In terms of the cost of a net, it was found out that any net in this community ranges from 2,000= Uganda Shillings to 15,000= Uganda shillings depending on the type of a net. But still, there was a segment of the respondents who did not know the cost of a net constituting of about 34.1 percent. This means that although the cost may appear high to some people, others are just reluctant and have not bothered to find out how affordable a mosquito net is and due to priorities of individual's preferences for goods and services.

Lack of financial resources was frequently mentioned by key informants as a key barrier to obtaining nets. Key informants observed that because of low incomes, households tended to give greater priority to very immediate needs such as food, clothing compared to nets. One local council chairperson commented that:

'You can not go to buy a net or Insecticide when you do not have something to eat, to cloth children and no kerosene. If you have 10,000= and you want to buy uniform for the children, you have to buy the uniform and let the mosquitoes bite you'

Similarly, other key informants mentioned lack of money as the reason for not treating nets even though the insecticide may not be considered expensive. If there was no money at hand when nets were washed, people were likely to defer treating the net until the next washing. This reflects the tight budget constraint faced by many households. These results are similar to a study carried out in Mukono district were the cost was found to be the major challenge to use of ITNs (Mbonyi et al 2005). In the current study respondents mentioned that affordability was a particular challenge due to households depending on income from low value crops like maize, beans, Ground nuts, cassava, Irish and bananas. Unlike treatment costs, prevention expenditures were not considered as emergency expenses, so the household had to wait until there was money either from farm produce or other household income source.

6.3 Affordability VS Treatment status of ITNs

Among the policy and strategy for insecticide treated nets in Uganda (MOH 2003), is affordable net re-treatment. This is supposed to be done through improved access to retreatment kits using parish and village development committees, agricultural extension workers and health workers. The public sector is supposed to establish community based subsidised net re-treatment services like at schools and meeting points where it fits appropriate. Respondents were asked whether their nets have ever been treated. The table below indicates the results that were cross tabulated with occupation of respondents.

	Net re-treatment					
Occupation	Yes	No	Not Applicable	Total		
Farmer	1 (1.1%)	35 (39.8%)	26 (29.5%)	62 (70.5%)		
Salaried	2 (2.3%)	4 (4.5%)	3 (3.4%)	9 (10.2%)		
Casual worker	1 (1.1%)	4 (4.5%)	1 (1.1%)	6 (6.8%)		
Trader	0	5 (5.7%)	1 (1.1%)	6 (6.8%)		
Unemployed	0	3 (3.4%)	1 (1.1%)	4 (4.5%)		
Student	0	0	1 (1.1%)	1 (1.1%)		
Total	4 (4.5%)	51 (58%)	33 (37.5%)	88 (100%)		

Table 28: Influence of occupation on net re-treatment in the household

P-Value = 0.84 (Pearson chi-square test at 0.05 degrees of freedom)

It is important to note that only 4.5 percent had ever re-treated their nets and the majority 51 percent had never treated their nets. It should be observed that respondents who had treated their nets had their occupation as salaried (2.3 percent); casual workers and farmers had 1.1 percent. It is important to note that although traders had a higher percentage in net

possession as seen earlier, none of their nets was being re-treated. However, occupation has insignificant influence on net re-treatment in this community. There are other factors that hinder net re-treatment as shall be seen in the coming sections. Since the majority of the respondents were not re-treating their nets, this means that the nets the under fives were using are not effective in prevention of mosquito bites. That's why there are reports of high episodes of malaria among the under fives in this community. Where as a small percentage of respondents indicated that their nets were being re-treated, findings from the Key Informants indicate that net re-treatment is not done at all. Respondents were asked why they never treat their nets. The responses are summarised in the table below.

Reasons	Frequency	Percentage
I don't know where to get the insecticide	36	40.9
I was not told about the re-treatment	2	2.3
I don't have money to buy the insecticide	2	2.3
I cover my children well	1	1.1
Not applicable	47	53.4
Total	88	100

 Table 29: Reasons why nets are not re-treated

As presented in the table above, different reasons were given for not treating the nets. 40.9 percent did not know where to get the insecticide used in treating the nets, 2.3 percent were not told about the re-treatment of nets, 2.3 percent did not have money to buy the insecticide, and 1.1 percent claimed that they do cover their children very well and therefore no need of treating their nets. This is partly because of the ignorance about the importance of using the ITNs. The reasons given are quite similar to the study that was carried out in Piron, Mali, where people did not impregnate their bed nets due to not knowing anything about ITNs, cost and not having net impregnation services readily available in the village (Ree at al 2003). These factors militate against effective utilization of ITNs in households with children under five.

Respondents who had treated their nets had done it after six months (4.5 percent) and after 3 months (2.3 percent). This implies that they had enough knowledge on when ITNs should be re-treated. It was also found out that re-treatment was done by individuals within the households (3.4 percent) and others take them to the hospital in Kagadi (4.5 percent). This

is quite tiresome since this hospital is in more than 10 kilometres from the village where the interviews took place. This is evidenced when respondents were asked to mention how long it takes them to walk to the nearest re-treatment point. For those who had done it 4.5 percent mentioned that it takes more than 30 minutes. In any case, the treatment centres are not available in the community. The only place they could go to is Kagadi hospital.

In terms of the cost of re-treatment, for those who had treated their nets from the hospital, it was free of charge and those who had treated by themselves it costs around 2,000= Uganda shillings to 5,000= Uganda shillings to buy insecticide.

6.4 Conclusion

In conclusion ITNs affordability remains a big challenge to households with children under five. Though, the government policy on mosquito nets places much emphasis on children under five and pregnant women, ITNs remain inaccessible to majority of the children under five. Significant resources have been directed towards addressing affordability barriers through providing free ITNs to vulnerable groups, but the success of these interventions depends largely on the degree to which other barriers to access are addressed. Key barriers on the supply side included: distance from ITN outlets where they are sold; limited acceptability of ITNs provided through interventions; unavailability in the commercial sector and the price. Infrastructure, information and communication played a central role in hindering access affordability.

CHAPTER SEVEN

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

7.0 Introduction

This chapter presents a summary of findings upon which the inferences and recommendations for effective use of ITNs among the under fives within the household is made. It specifically assesses the influence of demographic variables on ITN use within the household among the under fives. Secondly, assessing the influence of intra-household practices on the use of ITNs among the under fives. Thirdly; assessing the influence of knowledge, attitudes, perceptions and beliefs on the usage of ITNs within the household. Lastly, access and affordability of ITNs within the household. The recommendations made in this chapter are intended to capture the attention of caregivers, NGOs and private enterprises involved in the promotion of ITNs, policy makers specifically Ministry of Health and to the body of knowledge of researchers and students in the field of malaria control in particular and the health field in general.

7.1 Summary of findings

This study revealed the following findings; the first objective of the study was to identify the intra-household practices that affect the use of ITNs among the under fives. Data pertaining to this objective was mainly collected from caregivers in the households with children under five years using an interview schedule and interview guide for key informants. The factors identified include: type of household structure, number of people sleeping in the household, sleeping arrangements in place and disruption of sleeping patterns due to visitors and cultural rituals and functions.

In terms of type of household structure which was classified into small huts, grass thatched, semi permanent and permanent structures, their influence on the use of ITNs was found to be week. Although some caregivers revealed that the size of the household compared to the number of people sleeping in the household affected the use of ITNs. Some people had the nets but were not using them due to lack of enough space within the household.

Secondly, the sleeping arrangements were found to influence the use of ITNs among the under fives. Respondents did not have enough beds for household members and the most affected were children who are not given priority. Most of the children were found to be sleeping on the floor which makes it difficult to deploy the net. The plight of children is made worse by visitors who are given first priority to use the beds available and children are made to sleep on the floor. Therefore, the disruption of sleeping arrangements was found to have an influence on the proper and consistent usage of ITNs in the households.

In terms of supervision of children while sleeping, to a greater extent it was found to be done, but mainly under households that have couples that are married and was found to be done by mothers. However, there are instances where supervision is not done at all especially in households that are divorced and widowed. This exposes the under fives to mosquito bites in instances where the net is not deployed well or not installed at all. The duty of supervision was found to be mainly of mothers and some times elder siblings in instances where the under fives slept with their elder siblings in the same bed.

The second objective of this study was to examine knowledge, attitudes, perceptions and beliefs of caregivers towards the usage of ITNs. In this study, general knowledge of mosquito nets was found to be high with most of the people ever heard and seen a mosquito net. However, most of the caregivers could not tell the difference between treated nets and non treated nets. Therefore knowledge on treatment was found to be extremely low and very few people were found to have ever treated their nets. In regard to the perceptions, ITNs are perceived to have side effects and thus felt they were dangerous to the health of children since they cause a lot of heat and suffocation. It should be noted that caregivers who had nets strongly believed that ITNs are effective in malaria prevention among the under fives compared to those who did not have nets in their households. The reasons for perceived effectiveness of ITNs were; protection of children against malaria and caregivers confessed that their children had spent a long time without falling sick since they started using mosquito nets. For those who thought that ITNs are not effective argued that, they do

sometimes suffer from malaria in spite of sleeping under ITNs; and that mosquitoes can bite you when still outside.

The third objective of the study was to determine the affordability of ITNs by households with children under five years. In terms of affordability of ITNs in households with children under five years, the study revealed that ITNs are not affordable. This was mainly due to the following factors; the ITNs were not easily available within the study community. This makes the cost of a net very high as one has to send for it or buy it far away from Muhorro Sub-county. This means that an extra cost of transport is added to the initial cost of the ITN.

Secondly, given the fact that most of the respondents were peasant farmers, their level of income is low. This makes the ITNs expensive for them to purchase as there are more pressing needs that require immediate attention like buying clothes for the children and school fees. That's why the majority of children under five years who were using ITNs had gotten them free of charge from the government. However, even those who had got free nets from the government had never treated the nets because of the high cost of insecticide and its unavailability. Therefore, the level of poverty in the community may explain why ITNs are not affordable to many households with children under five, as despite their heavily subsidise price they were no doubt still out of reach for many households.

7.2 Conclusions

Uganda's current primary health intervention to reduce child mortality and morbidity include the use of ITNs, indoor residual spraying, prevention of malaria in pregnancy and through intermittent preventive therapy and prompt effective treatment of fever with artemesinin combination therapy (UBOS, 2006). ITNs are the most powerful malaria control tool to be developed and as such they have been an important component of global and national malaria control policies since mid- 1990s. One of the objectives of this study was to identify the intra-household practices that affect the use of ITNs among the under five. This study therefore concludes that in this study community there are intra-household dynamics that affect utilization of ITNs within households with children under five. These factors include: household structure, number of people sleeping in the household, sleeping

arrangements, disruption of sleeping arrangements, decision making and supervision of children. These therefore impede on proper deployment and coverage of all household members. Thus, the presence of an ITN in the household may not necessarily guarantee utilization.

Secondly, in regard to knowledge, attitudes, perceptions and beliefs of caregivers, the findings of this study showed that perceptions about ITNs informed and influenced the decisions caregivers made in regard to the use of ITNs among the under five within the household. Negative perceptions and beliefs held by the caregivers lead to low usage of ITNs. The study takes caregivers as rational actors in making choices and decisions about access to responsive and malarial preventive measures for the under five. Their rationality is traced from social-cultural and economic context within which they live. Therefore, whereas ITNs are the mainstay in malaria prevention, their effectiveness largely depends on the knowledge and perceptions of the people in the households who directly use them.

Another question this study raises is how affordable ITNs were by households with children under five years in the study community. Most of the ITNs used in this community were given out freely and those who did not get remain without. Affordability of ITNs remains a big challenge to ITNs usage as most of the people in this community are impoverished and can not afford the initial cost of the net and re-treatment. Ultimately, ITN distribution strategy should provide a mix of public and private sectors working together to create a sustainable complementary system. The low coverage of ITNs in this study community is distressing due to poverty. While many respondents were aware of the use of ITNs in malaria prevention among the under five, they were constrained from taking any action due to a personal lack of resources. The findings point to the fact that ITNs are too expensive for or are unavailable to the most vulnerable: pregnant women, children under 5 years of age, and the poorest families and communities.

It should therefore be noted that some people are willing to buy ITNs, but only if such services are offered at reduced prices and in close proximity to households. Whereas there is high awareness of the benefits of ITNs, they are used by few people mainly due to their

high cost, a lack of interest in malaria prevention by male head of household, and by perceptions that the chemicals used to treat them may have dangerous effects on their foetus. Consequently, ITNs must be administered concurrently with adequate resources for education in order to achieve a change in community practices, with on going communication between program planners and a target population to maximise the effectiveness of messages and methods used. Education is vital with net distribution.

7.3 Recommendations for Practice and Future Research

Knowledge on ITNs to caregivers especially on constant deployment and re-treatment should be enhanced. This will enhance their knowledge on proper deployment and the period the net takes before the next re-treatment is done. At the same time, caregivers at the household level need to be constantly reminded and assessed about their knowledge and ability to properly deploy the ITNs by community health workers. Massive sensitization and training to caregivers is necessary before ITNs are distributed. This is because as admitted by respondents, to some households, it was their first time to see mosquito nets. This therefore calls for proper training on how to use the ITNs, treatment procedures and where insecticide can be obtained.

Whilst in this study community ITNs had been distributed freely to children under five years and pregnant women, in the future perhaps free ITNs should be expanded to all individuals within all households to avoid net grabbing. Such a strategy can successfully eliminate grabbing of nets that are meant for children under five years. Perhaps the most effective strategy to ensure effective utilization in all households with children under five years should provide a mix of public and private sectors working together to create a sustainable complementary system. Yet it is pointless to talk of how nets should be distributed to all household members with children under five years financially if the facilities to distribute them remain inadequate. Ultimately, extensive international funding and the implementation of significant in-country infrastructure enabling successful supplychains, as well as collaboration between multiple partners will be necessary for malaria prevention among the under five to succeed.
The study further found out that nets and insecticides were not easily available in the open market in Muhorro Sub-county despite the willingness of some caregivers to purchase them. This therefore calls for public-private partnership to ensure that ITNs are readily available up to the village level. In this study community for example, there was no arrangement for net re-treatment. Such arrangements to have the nets re-treated should be made by government at the village level. Although net re-treatment in some parts of Uganda has been organized at the village level, in this study community it was different. Yet any ITN intervention must fulfil four basic functions: to provide information, education and communication, ensure procurement, distribution and re-treatment of the ITNs, incorporated periodic monitoring; evaluation and possess adequate financing. ITN usage, then, should look at sleeping patterns within the household and at whether the target populations that are most at risk are sleeping under the nets.

The economic level of caregivers should be boosted. Utilization of ITNs among the households with children under five years still remains a big challenge because of the economic status of caregivers. That's why caregivers can not afford beds for all the children in their different age groups and separate beddings for visitors that lead to disruption of sleeping arrangements. If households are empowered economically, then they can afford such facilities in their homes. Although the government is trying to empower the people through plan for modernisation of agriculture, its fruits are still far to reach with the high level of corruption that is so chronic among the civil servants and politicians in Uganda. Therefore, policy makers should note that, health policy needs to take into account how sickness among the under five and the cost of care contribute to household impoverishment, the interrelationship between poverty, health care policy and its management is thus central to enhancing the level of ITNs utilization within households with children under five and consequently malaria prevention.

Like any other new health intervention or change, acceptance always takes long due to cultural lag. The study found out many perceptions, beliefs and attitudes labelled against ITNs. In order to improve effective utilization of ITNs within the households with children under five, the following interventions are recommended:

To positively transform the caregivers' perceptions, beliefs and attitudes about ITNs, it is very paramount to adapt a behaviour change strategy. Such a strategy should be based on the fact that caregivers are rational actors on their perceptions, and the approach should link individual beliefs, attitudes, intentions and behaviour within the context of the social-cultural realities at play. The intervention should address the behaviour practice and their evaluation of potential outcomes. At the same time it should address the normative beliefs in the community that influence caregivers' opinions and the evaluation of those opinions.

With a massive education of communities, such beliefs, perceptions and attitudes will be eliminated. However such strategies should recognise and appreciate the fact that changing perceptions, beliefs and attitudes is a gradual process. This should be able to address the perceived negative effects of sleeping under the ITNs at the individual level as well as the community level factors that reinforce and sustain such misconceptions about ITNs. Further still, the behaviour change strategy through behaviour change campaigns at the community level should be used to provide a platform for both the health care workers to learn about the perceptions of caregivers in order to get to know them better and also to use that opportunity to educate caregivers how to properly use ITNs and their importance in malaria prevention among the under fives.

It is almost impossible for someone to have a study without limitations. The major limitation was that the study was restricted only to one sub-county. The sample was quite small to use it to generalize on the district or country wide scale. It is thus recommended that future research in this area should be designed to have a wider coverage at least representing both regions of Uganda to enhance on representation of views. The scope of the study in future should be extended to include more sample districts from different parts of Uganda. This will allow comparison between different communities in Uganda and hence provide a clear picture of intra-household dynamics that affect utilization of ITNs within households with children under five.

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APPENDICES

Appendix 1: HOUSEHOLD QUESTIONNAIRE FOR CAREGIVERS ABOUT UTILIZATION OF INSECTIDE TREATED NETS IN HOUSEHOLDS WITH CHILDREN UNDER 5 YEARS

SECTION 1	IDENTIFICATION
Parish	
Village	
Date of interview	
Time of Interview	

CONSENT FORM.

Good morning/afternoon/evening? My name is Bashinyora John Bosco from Makerere University. I am here to conduct research on utilization of Insecticide treated nets. The purpose of this study is to help understand the intra-household dynamics in utilization of ITN's among the under fives. You have been selected at random (by chance) to participate in this study. The information gathered here will remain confidential and I will not write down your name or any information that can identify where you live or who you are. Your participation in the study is voluntary and you will not be affected in any way if you decide not to participate. You do not have to answer any questions that you do not want to. You can stop the interview at any time. The relevancy of this study will depend so much on your honest response to the questions asked. If you agree to participate, the interview will take about an hour. Do you agree to participate in the study? Do you have any questions or clarification you need before we begin?

Signature of respondent verifying that informed consent has been verbally given by the participant.

Date: ____/___/____

To ALL respondents: All your answers will be kept strictly confidential. They will be put together with over 123 other people we are talking to, to get an overall picture. It will be impossible to pick you out from what you say, so please feel free to speak to me honestly. (*Proceed with interview only if answer is positive*).

1	Julu like to ask you some ques				Twond like to ask you some questions about people who usually live in your household					
	Usual resident	Age	Gender	Previous night	Use of net					
0	001 Please give the name of	002 please give	003. What is	004 Did name	005 Did name					
	the people who are usual	the age in	the sex.	sleep here last	sleep under a					
	residents in this household	years. (Less	1 Male	night?	mosquito net					
	starting from the head of	than 1 year	2 Female	1. Yes	last night?					
	the household/family	record 00)		2. No	1 Yes					
				0: DK	2 No					
					0 DK					
01										
02										
03										
0.4										
04										
05										
05										
06										
00										
07										
07										
08										
09										
10										
11										
12										
1										

HOUSEHOLD LISTING _TABLE 1 I would like to ask you some questions about people who usually live in your household

SOCIO- DEMOGRAPHIC CHARACTERISTICS OF CAREGIVER

001	Gender of respondent	Male	1	
		Female	2	
002	Age	Age in complete years		
003	What is your date of birth?			
004	What is your marital status?	Single	1	
		Married	2	
		Widowed	3	
		Divorced/separated	4	
		Living together/cohabiting	5	
		No response	6	
005	What is your highest level of	No education	1	
	education?	Primary education	2	
		Secondary education	3	
		Post secondary education	4	
		Vocational education	5	
006	What is your occupation?	Farmer	1	
	_	Salaried	2	

		Casual worker	3	
		Retired	4	
		Trade/self employed	5	
		Unemployed	6	
		Student	7	
		Othera	, ,	
		Outers	0	
Section	INTRA HOUSEHOLD			
Section	INTRA-HOUSEHULD			
2	DYNAMICS AND			
007	UTILIZATION OF NETS			
007	What kind of house structure do you	Grass thatched/made of mad		
	stay in?	Semi-permanent		
		Permanent		
008	How many rooms does your house			
	have?			
009	How many people sleep in this			
	household?			
010	How many children under five years			
	are in this household?			
011	How are they related to you?	Own children	1	
		Niece/Nenhew	2	
		Siblings	3	
		Storings	5	
012	What sleeping arrangements do you	Children under five clean alone	1	
012	what sleeping analgements do you	Children aleen with negative	1	
	nave in place?	Children sleep with parents	2	
		Parents sleep alone	3	
		Children under five years with	4	
		older siblings		
013	Do you have beds for all household	Yes		
	occupants?	No		
014	If yes, how many beds do you have?			
015	How are they shared among the			
	household members?			
016	Do children under five veere clear	Vaa		
010	alone?			
017	If no, whom do they share with 9	INO Deserver		
017	If no, whom do they sleep with?			
019	De mor engenies (hans to an en	Elder siblings		
018	Do you supervise them to ensure	Yes		
	unat they have covered themselves	No		
010	well?			
019	If yes, who supervises?	Father		
		Mother		
		Elder siblings		
		Any other		
020	Have you received visitors who	Yes	1	
	spent a night in your household in	No	2	
	the last six months?			
021	Where did the visitors sleep when	In the sitting room	1	
	they came?	Visitors room	2	
		In the children's room	3	
L			5	

		With children Others	4 5	
022	If visitors slept in the children's bedroom, where did children sleep?	· · · · · · · · · · · · · · · · · · ·		Probe
023	Do you know anything about	Yes	1	
	If yes what do you know		2	
024	What kind of mosquito nets do you know?	Long life net Insecticide Treated mosquito nets	1 2	
		Ordinary nets Both treated and untreated mosquito nets Others	3 4	
025	Do you have any mosquito nets in your house?	Yes No	1 2	
026	How many mosquito nets do you have in this household?	More than 3 3 nets 2 nets	1 2 3 4	
027	How many people sleep under a mosquito net in your household?			
028	Who in the household sleep under the mosquito net?	0-year olds (0-11 months) 1-year olds (12-23 months) 2-year olds (24-25 months) 3-year olds (36-47 months) 4-year olds (48-59 months) Children 5-14 years Nonpregnant women of reproductive age (15-49) Pregnant women of reproductive age (15-49) Adult males 15+	1 2 3 4 5 6 7 8 9 10	
029	Who decides who should sleep under the mosquito net?	Father Mother Others	1 2 3	
030	What mosquito net do you sleep under?	Insecticide treated mosquito net Ordinary nets Long life mosquito treated net	1 2 3	
031	How many months per year do your household members sleep under the nets?			

032	What sizes of nets are used in this	Single size	1	
	household?	double	2	
		Triple/King	3	
033	Do your children under five years	Yes	1	
	sleep under the net	No	2	
034	For how long have your children	Every night	1	
0.54	under five years been sleeping	Some times	2	
	under the measurite net?	Some times	2	
025	Llow consistent de children helow 5	Throughout the night during the	1	
055	How consistent do ciliaren below 5	Throughout the hight during the	1	
	sleep under the net during hight?	season for mosquitoes		
		All year round	2	
		Most part of the night	2	
		Some part of the night	3	
			4	
036	What is the feeling about the use of	Very effective	1	
	Insecticide treated nets in	Effective	2	
	prevention of malaria?	Average	3	
		Less effective	4	
		Not effective at all	5	
		Explain		
Section	KNOWLEDGE, ATTITUDES,			
3	PERCEPTIONS, AND BELIEFS			
037	Do you know what ITNs are?	Ves	1	If no skin
0.57		No	2	to atn 041
038	Do you have ITNs in this	Ves	1	10 411 0 11
0.50	household?	I CS No	2	
030	Do you know the difference	NO Voc	1	
037	between ITN and a non-tracted net?		1 2	
040	If some sample in the difference?	110	2	
040	if yes, explain the difference?	••••••		
		••••••		
		••••••		
		•••••		
0.41				
041	What type of net are you using in	Net	1	
	this household?	Ever treated net	2	
		ITN/currently Treated net	3	
		Baby net	4	
		Others	5	
042	If not using a treated mosquito net,			
	why?			

043	What do you know about ITNs?			
044	How did you come to know about	Radios	1	
	it?	Health workers	2	
		Counselors/field	3	
		Home visits	4	
		Drama	5	
		Neighbor/friend	6	
		Brochure/poster	7	
		TV/VIDEO	8	
		News paper	9	
0.45		Others	10	
045	Do you treat your mosquito nets in	Yes		If no, skip
046	this nousehold?	NO	<u> </u>	to qtn 049
046	If yes, now often do you normally	Within six months		
	treat your mosquito net?	Within 1 Voor	2	
		within 1 fear	5	
047	Why is it that you treat your not	1 year and above	4	
047	within the period mentioned above?	••••••		
	within the period mentioned above?			
		••••••		
		••••••		
048	Do you know how long the net is	Yes	1	
010	supposed to take to be re-treated?	No	2	
			_	
049	If no, why?			
050	Do you think ITNs are necessary in	Yes	1	If no, skip
	preventing malaria among the under	No	2	to qtn 052
	fives?			-
051	If yes, give reasons			
052	If no, Give reasons			
053	What is your feeling about ITNs in	Very effective	1	

	preventing malaria among the under fives?	Effective Average	2 3	
		Less effective	4	
		Fynlain	5	
		Explain		
054	What do other people say about			
	mosquito nets?			
	-			
055	What could be done in the			
	household to make sure that every			
	child under five years uses ITNs?			
Section 4	AFFORDABILITY			
056	Do you have any where you can obtain a net?	Yes No	1 2	If no, skip to 059
057	Where did you obtain the net you	Government	1	
	are currently using in this	NGO	2	
	household?	Supermarket	3	
		Retail shop	4	
		Kiosk	5	
		Pharmacy	6	
		Drug shop	/	
059	How we high a cost of a not?	Others (Specify)	8	
058	How much is the cost of a net?			
		•••••		
059	How did you acquire the net(s) you			
0.59	are currently using?			
	are currently using.	•••••		
060	Have these mosquito nets ever been	Yes		If yes, skip
	treated?	No		to 062
061	If no, why have you never treated			If no skip
	the mosquito net(s)			to 064
062	If yes, when was it last treated?	After a year	1	
		After 6 months	2	
		After 3 months	3	
		Every month	4	
0.67	-	Never treat	5	
063	Do you retreat the net yourself or	Myself	1	

	you take it to the treatment centre?	Treatment centre	2	
064	Do you know any where you can	Yes	1	
	retreat your net from?	No	2	
065	How long do you take to walk to the	Less than 10 minutes	1	
	nearest re-treatment point?	10-20 minutes	2	
		20-30 minutes	3	
		More than 30 minutes	4	
066	How much is the cost of re-			
	treatment			
067	How long ego was this net re-			
	treated			

THANK YOU VERY MUCH FOR YOUR TIME

Appendix 2: KEY INFORMANT GUIDE

UTILIZATION OF INSECTIDE TREATED NETS IN HOUSEHOLDS WITH CHILDREN UNDER 5 YEARS

Introduction

Interviewer introduces himself and explains the purpose of the meeting, the expected duration of the interview, and seeks verbal consent to participate before the beginning of the interview.

Background Information

Please record the following:

- Names and designation
- Gender (sex) female/male
- Location and parish (Urban, Rural)
- Date of interview
- 1. How common is use of mosquito nets in this community among the under fives?
- 2. Who provides mosquito nets in this community?
- 3. Do you know any linkage between malaria and use of mosquito nets among the under fives?
 - Knowledge about purpose of mosquito nets.
 - Different kinds of mosquito nets
 - Perception of the effectiveness of the different kinds of mosquito nets.
 - The types of mosquito nets and explanations for it.
 - Constraints in accessing Insecticide treated nets.
- **4.** What do you think should be done to increase use of mosquito nets in prevention of malaria? (**probe for**)
 - Avenues for increasing access to mosquito nets
 - Avenues for improving proper use of mosquito nets
- 5. What are the sleeping arrangements in this community? **Probe for:**
 - Elders, elder children under fives
 - Whether they sleep on floor or bed
 - The kind of mosquito nets used by different age groups and explanations for it.
 - Regularity of using mosquito nets and explanations for it
 - Perception of the effectiveness of mosquito nets in preventing malaria
 - Perceived constraints in accessing mosquito nets (cost and distance).
 - Knowledge of proper use of mosquito nets in terms of treatment procedure and frequency
 - Sources of insecticide chemicals for treating mosquito nets.
- 6. Who supervises whether children under five years are using nets when they are asleep? Probe for gender roles in:
 - Gender needs for health care seeking

- Which roles do men play in ensuring that children under five years sleep under ITNs
- Which roles do women play?
- Power relations in decision making and resource allocation to health care seeking.
- Decision making for health care seeking
- 7. What are the constraints to effective and consistent use of mosquito nets? (probe for)
 - Distance and costs
 - Cultural and traditional beliefs/practices
 - Life at night
- 8. What do you think should be done to increase on effective and consistent use of mosquito nets among the under fives? Probe for
 - Intra-household gender relations

THANK YOU VERY MUCH FOR YOUR TIME