ENSIGN COLLEGE OF PUBLIC HEALTH

KPONG-EASTERN REGION, GHANA

USE OF INSECTICIDE- TREATED NETS AT THE HOUSEHOLD LEVEL IN THE YILO KROBO MUNICIPALITY OF THE EASTERN REGION OF GHANA

By

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DECLARATION AND CERTIFICATION

I hereby certify that except for reference to other people work, which I have duly cited, this Project submitted to the Department of Community Health, Ensign College of Public Health, Kpong is the result of my own investigation, and has not been presented for any other degree elsewhere.

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ABSTRACT

Introduction: Despite evidence that the use of ITNs decreases malaria-related morbidity and mortality, the use of ITNs in sub-Saharan Africa remains relatively low. The aim of this study is to find out the factors that influence the use of ITNs in the Yilo Krobo Municipality of the Eastern Region of Ghana.

Methods: A cross-sectional study with the household as the unit of the study, was conducted in January 2017 in the Yilo Krobo Municipality of the Eastern region of Ghana. The study used a quantitative approach. A structured questionnaire was used to establish the demographic characteristics of households' heads and factors affecting ITN use. Descriptive statistics were used to define household ITN use and logistic regression analysis used to identify factors associated with use and non- use of ITNs.

Results: ITN ownership among household heads was 58%(231). The results showed a significant association between sex of respondents and ITN ownership (X^2=10.75 p-value= 0.001). Majority (42.25%) of the respondents had not used ITN the previous night while 31.75% indicated they sleep under an ITN.

The findings showed a strong association between decision making authority and ITN use with a p-value of 0.015 (X^2=8.36). Again, the employment status of household heads and ITN use were found to be significantly associated (X^2= 9.36, p-value=0.009). ITNs use was found to be high (63.4%) among Household whose heads were informal workers compared to those with formal employment (22.8%) and the unemployed (13.73%). There was a significant association between income of household heads and ITN use (p-value<0.001).

Married household heads were twice as likely to use an ITN as compared to household heads who were single (OR:2.00, 95%CI: 1.20 -3.07). Household heads who were formal workers were 2.7 times more likely to use an ITN as compared to household heads who were not employed.

CONCLUSION: The study found that, ITN use in the Yilo Krobo Municipality was low with factors such as; demographic, and Household factors contributing to this low utilization of the ITNs.

Table of Contents

LIST OF TABLES

Table **Page**

LIST OF FIGURES

Figure Page

LIST OF ABBREVIATIONS

CDC	Centers for Disease Control
CI	Confidence Interval
OR	Odds Ratio
DHMT	District Health Management Team
DHS	Demographic and Health Survey
GHS	Ghana Health Service
IPT	Intermittent Preventive Treatment
ITN	Insecticide- Treated Net
LLIN	Long-Lasting Insecticide-Treated Net
MCP	Malaria Control Programme
MICS	Multiple Indicator Cluster Survey
NGO	Non-Governmental Organization
OPD	Outpatient Department
RBM	Roll Back Malaria
SP	Sulfadoxine- Pyrimethamine
UNICEF	United Nations International Children's Emergency Fund
USAID	United States Agency for International Development
WHO	World Health Organization

DEDICATION

This work is dedicated to my lovely grandmother, Esther Fatima Coffie

And

My Parents Seidu Amadu and Lariba Seidu

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LIST OF APPENDICES

CHAPTER ONE

INTRODUCTION

1.0 Background

Malaria is an infectious disease which infects millions of people globally. People who get malaria are typically very sick with high fevers, chills, and flu-like illness. There are four kinds of malaria parasites that infect humans. These are Plasmodium falciparum, *Plasmodium vivax*, *Plasmodium ovale, and Plasmodium malaria.* *Plasmodium falciparum* is the type of malaria parasite that is most likely to result in severe infections and if not treated promptly, may lead to death.

Globally, the World Health Organization estimates that in 2015, 214 million clinical cases of malaria occurred. Because malaria causes so much illness and death, the disease is a great drain on many national economies. Since many countries with malaria are already among the poorer nations, the disease maintains a vicious cycle of disease and poverty.

Between 2010 and 2015, malaria incidence among populations at risk (the rate of new cases) decreased globally by 21%. In that same period, malaria mortality rates among populations at risk declined by 29% globally among all age groups, and by 35% among children under 5. (RBM 2016)

Also, malaria is known to be the world's most important parasitic infection, leading the major health and development problems in poor African countries. There are 300 to 500 million clinical cases every year, and between one and three million deaths, are attributable to this disease. (Breman, Egan, Keusch, & Breman, 2001)

Sub-Saharan Africa carries a disproportionately high share of the global malaria burden. In 2015, the region was home to 90% of malaria cases and 92% of malaria deaths. Malaria continues to be

the leading cause of death among children in sub Saharan Africa, accounting for about 20 percent of childhood death (RBM 2010). In the face of this dire situation, experts, nonetheless, remain divided on whether emphasis should be placed on more daring policies aimed at a complete eradication or on a gradual control approach. (Greenwood 2009)

In 2015, 438,000 people died of malaria in Africa. (WHO 2015)

Malaria transmission occurs all year around with slight seasonal variation (Roll Back Malaria in Ghana, 2010). In 2010, there were almost 4,000 deaths due to malaria as reported by Roll Back Malaria Ghana, (2012). In 2015, 10.1 million cases of OPD malaria cases of malaria were recorded accounting for 38.1 % of OPD attendance. Malaria deaths recorded in that same year in all ages was 2,133 which is 7.0% of all deaths recorded at the health facilities.

The total malaria cases (OPD) in the Yilo Krobo Municipality in 2015 was 40,326 representing 31.49% and 38,658 in 2016 representing 41.70%.

Malaria control is crucial in achieving the Sustainable Development Goal 3 (SDG3), which seeks to end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable disease by 2030.

Malaria is preventable and curable, and increased efforts are dramatically reducing the malaria burden in many places. The currently recommended interventions are; Vector control through the use of Insecticide- Treated Nets (ITNs), Indoor residual spraying (IRS) and larval control, chemoprevention for pregnant women, confirmation of malaria diagnosis via microscopy or rapid diagnostic tests (RDTs) and timely treatment with appropriate antimalarial.

Vector control is the main way to prevent and reduce malaria transmission. If coverage of vector control interventions within a specific area is high enough, then a measure of protection will be conferred across the community. (WHO 2016)

WHO recommends protection for all people at risk of malaria with effective malaria vector control. Two forms of vector control – insecticide-treated mosquito nets and indoor residual spraying – are effective in a wide range of circumstances.

Indoor residual spraying (IRS) is a way of preventing malaria. It is a powerful way to rapidly reduce malaria transmission. Its full potential is realized when at least 80% of houses in targeted areas are sprayed. Indoor spraying is effective for 3–6 months, depending on the insecticide formulation used and the type of surface on which it is sprayed. In some settings, multiple spray rounds are needed to protect the population for the entire malaria season. Antimalarial medicines can also be used to prevent malaria. For pregnant women living in moderate-to-high transmission areas, WHO recommends intermittent preventive treatment with sulfadoxine-pyrimethamine, at each scheduled antenatal visit after the first trimester. Similarly, for infants living in high-transmission areas of Africa, three (3) doses of intermittent preventive treatment with sulfadoxine-pyrimethamine are recommended, delivered alongside routine vaccinations. In 2012, WHO recommended Seasonal Malaria Chemoprevention as an additional malaria prevention strategy for areas of the Sahel sub-Region of Africa. The strategy involves the administration of monthly courses of amodiaquine plus sulfadoxine-pyrimethamine to all children under 5 years of age during the high transmission season.

Insecticide-treated Nets(ITNs) have shown to significantly reduce malaria-related morbidity and all-cause mortality across a range of transmission settings in Africa. (Stephen Obeng

Gyimah,2012). The use of ITNs on a large scale reduces clinical malaria episodes by 48%. Despite the evidence that the use of ITNs decreases malaria-related morbidity and mortality, the use of ITNs in sub-Saharan Africa remains relatively low. With increased funding from international donors, efforts have been made to distribute ITNs to vulnerable populations at risk of malaria across sub-Saharan Africa (SSA). The Roll Back Malaria Partnership (RBM) set up target of protecting 80% of children and pregnant women at risk for malaria with ITNs by 2015. (Roll Back Malaria, 2005. Global Strategic Plan 2005 –2015. Geneva: Roll Back Malaria.). However, the impact on preventing malaria morbidity and malaria-related mortality may not be minimized if ITNs are not properly and consistently used by vulnerable populations. The Anopheles mosquito, which transmits the malaria parasite usually bites in the night mainly between 10.00 p.m. and 4.00 a.m. Therefore, if people are made aware of the feeding habits of the Anopheles mosquito and the appropriate use of insecticide treated nets (ITN), the rate of malaria infection may be reduced to an appreciable level.

According to GHS/MIC, nationwide survey results, 70% of households in the country has at least one ITN. The GDHS 2014 results show that, not all those who have the nets are using them.

The use of ITN has been associated with lower prevalence of malaria infection, and a resultant fewer premature births and significant reductions in all causes of maternal anemia.

However, only 4.1% of the total population of Ghanaians sleep in insecticide treated bed nets.

It is also clear that ITN re-treatment rate among Ghanaians is very low. Beyond governmental, state and institutional challenges, there could be lack of inadequate education, poverty, environmental, cultural and even religious hindering beliefs. As part of mitigating some of these

challenges, some free distribution of bed nets had been promulgated, and in the later part of 2012, the Ministry of Health and the Ghana Health Services, in partnership with donor countries had decided to go from house to house to hang bed nets for people in the communities (WHO and GHS, 2003).

1.1 Problem statement

Even though, there has been a continuous education on malaria and the importance of using ITNs in the prevention of the disease, yet malaria continues to be the number one cause of morbidity in the Yilo Krobo Municipality. According to the 2016 Annual Report of the Ghana Health Service, the disease accounted for 31.49% of all OPD morbidity in 2015, and 41.70% in 2016. (Yilo Krobo Municipal Annual report.2016)

Insecticide-treated Nets (ITNs) have shown to significantly reduce malaria-related morbidity and all-cause mortality across a range of transmission settings in Africa. (Stephen Obeng Gyimah,2012).

Yet, utilization is 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 mortality and morbidity in spite of government, NGOs and the private sectors interventions to ensure that individuals especially most vulnerable group access, own and sleep under ITNs.

According to the Ghana DHS/MIC 2014 report, households owning at least one mosquito net (ITN) constitute 70% of the population. Mosquito net use however is low, 28% in children under

five and 20% in pregnant women (Smith Paintain et al., 2014). Children and women, particularly pregnant women are the most vulnerable in terms of the burden of the disease.

Studies have been done to prove that ITNs are highly effective in reducing malaria morbidity and mortality if correctly and consistently used (Lengeler, 1996), yet utilization is below the target level of 75% (World Health Organization, 2013). In 2016, 7,224 insecticides nets were distributed to M/2 (Measles 2), Pregnant women and ANC registrants in the Yilo Krobo Municipality (Yilo Krobo Annual report 2016) yet utilization is low and malaria continue to top all OPD cases.

Malaria over the years has been the major health problem affecting the Yilo Krobo Municipality. Malaria tops all OPDs recorded cases despite the distribution of ITNs. This study is therefore set out to find out the factors that influence the use of ITNS in the Yilo Krobo Municipality.

1.2 Justification of The Study

Studies have been done in Ghana on the factors associated with the use and nonuse of ITNS but none has been done in Yilo Krobo municipality of the Eastern Region.

Ghana especially after several years made efforts at improving on ownership (possession of a net or ITN), it is of essence to distinguish between ITN ownership and ITN use (actual use of net owned). The focus going forward for the National Malaria Control program in the country is to get people to use the ITNs. Information from such a study will inform any efforts at increasing utilization of ITNs especially in the Yilo Krobo Municipality and its environs. The data obtained is also expected to be of immense help to policy planners in the Ministry of Health, especially in the division of malaria control and will contribute to the body of literature, provide appropriate guide to strategies for the promotion of ITNs and basis for further research in malaria control. This study seeks to unravel those factors that may be contributing to the gap between ITN possession

and use, and to address problems associated with actual use of nets within the households, rather than net ownership.

1.3 Research Hypothesis

- More than 50% of the population of Yilo Krobo Municipal own ITNs.
- Individuals with a basic level of education or higher, are more likely to use ITNs than those who have no education
- Female household heads are more likely to use ITNs than male household heads.

1.4 Conceptual Framework

Figure 1; Presents the conceptual frame work for analysis of association between sleeping under ITN and various explanatory factors.

The use of ITNs is influenced by socio demographic factors such as; age, sex, educational 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, number of ITNs that a household possess, and decision making which may involve the household head. Utilization is also influenced by perceptions towards ITNs, beliefs, attitudes, knowledge on proper use in terms of consistence in usage.

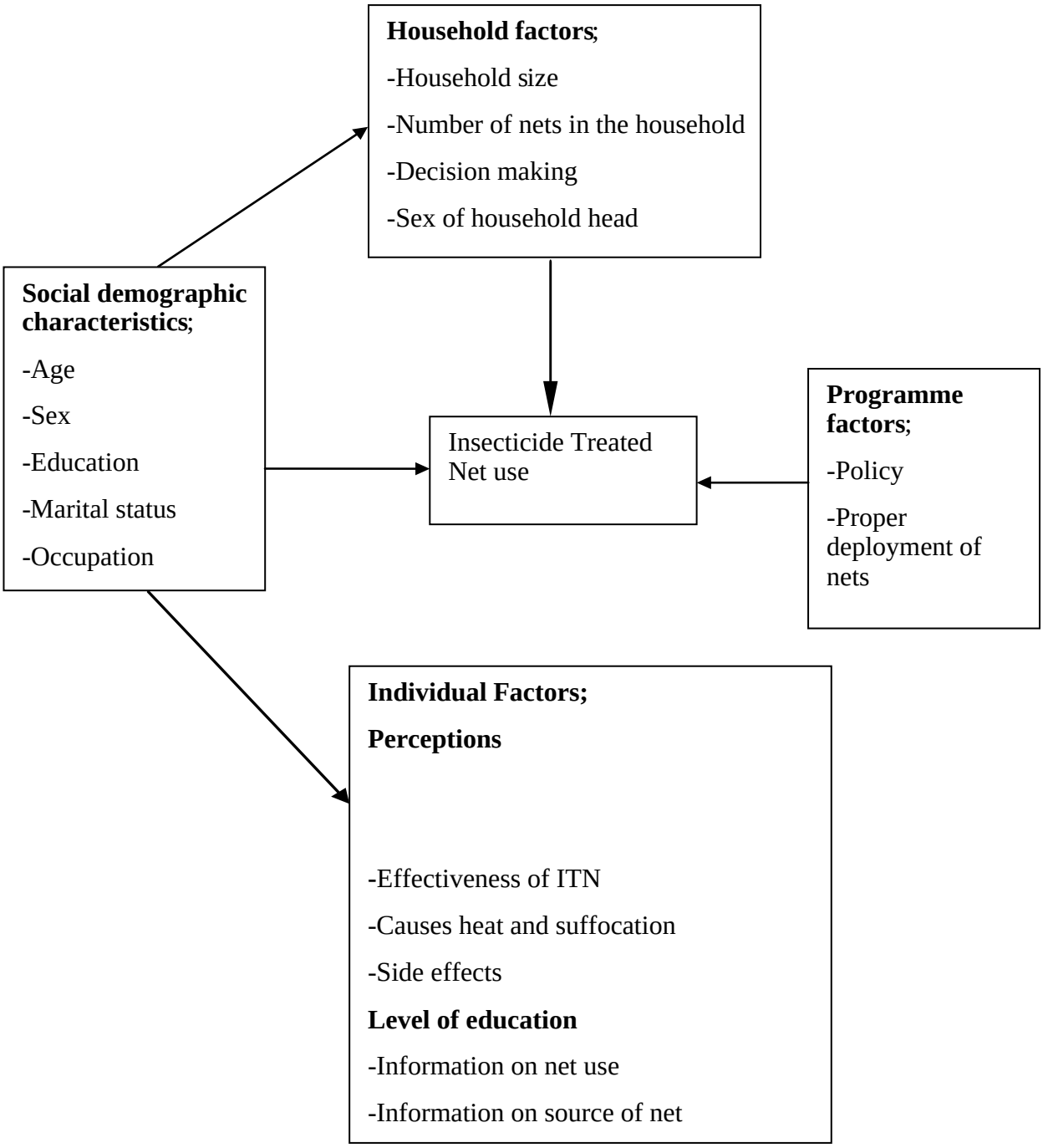


Figure 1.0: Conceptual Framework

Therefore, with the good intra-household practices, perceptions and attitudes towards ITNs, utilization is possibly manifested through proper deployment of ITNs, consistence on usage. This leads to increased utilization of ITNs within households.

1.5 Research Questions

The research will help to answer the following questions:

1.What proportion of the population own ITNs in the Yilo Krobo Municipality of the Eastern region of Ghana?

2. To what extent does educational level influence the use of ITNs?

3. How do the knowledge, attitudes, perceptions and beliefs of the people influence the usage of ITNs?

1.6 Objectives of The Study

General objective:

To assess the factors influencing the use of ITNS in the Yilo Krobo Municipality of the Eastern region of Ghana.

Specific objectives:

1. To estimate the prevalence of household ownership of ITNs in the Yilo Krobo Municipality.

2. To assess the socio-cultural and socio economic factors that influence the ownership and utilization of ITNs in Yilo Krobo Municipality

3. To explore perceptions related to the non-use of ITNs.

4 To assess household and individual factors influencing ITN use in the Yilo Krobo Municipality

1.7 Rationale of The Study

Despite the effectiveness of ITNS in reducing the incidence of malaria infections, the use of ITNs in Ghana is low. The findings from this study will complement knowledge and awareness about this important public health problem. Identifying knowledge gaps will also help in improving educational programs targeted at influencing people to use ITNs.

1.8 Organization of the Study

The research work is divided into five (5) chapters. Chapter one captures the introduction grouped under the following headings: Background of the study, study problem, rationale of the study, research questions, and justification of the study.

Chapter two reviews relevant literature on the subject under the study.

Chapter three includes methods used for collecting data for the study. These methods include administration of questionnaires, interviews, observation and data analysis methods.

Chapter four presents results, discussions and analysis of the data for the study.

Lastly, the fifth chapter will capture conclusions and recommendations based on the findings of the study.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 INTRODUCTION

This review takes a comprehensive look at ITN utilization globally and explores studies conducted in different countries. The review will also explore Socio-cultural beliefs and knowledge of malaria, household ownership and demographic factors that influence the use of ITN.

2.2 ITN OWNERSHIP AND USE

Although ITNs are increasingly accessible in many SSA countries, getting people to correctly and consistently use ITNs has proven difficult. (Binka FN, Adongo P, 1997). A previous multi-country assessment in SSA using national and sub-national household surveys between 1991 and 2001 found a considerable gap between use and possession among children. (Korenromp EL, et al., 2003). The analysis showed that household possession of ITNs ranged from 0.1% to 29%, whereas use by children younger than 5 years old ranged from 0% to 16%. Within households possessing at least one ITN, only 55% of children were found to have slept under an ITN the previous night. In another study using data from sub-national NetMark surveys conducted between 2000 and 2004, the result showed that bed net use among children younger than 5, within households with at least one bed net, ranged from 48% to 73%, while use among pregnant women ranged from 18% to 69%. (Baume CA, Marin MC, 2007).

In a survey in rural Burkina Faso it was reported that, 49% (103/210) of the respondents reported at least one mosquito net in their household. Twenty-one percent (21%) owned one, 13% two and 15% more than two mosquito nets. Muller et al, (2002)

A study conducted in three regional states in Ethiopia suggested that overall, net use of all ages in all households went up between baseline 2006 and MIS 2007 from 27.7% to 36.7% for any type of net. (Shargie et al., 2010).

Also, a study conducted in Mali showed a high rate of ownership of nets with more than 91.0 % of households having at least one net of any type. There were regional differences, with the lowest rate in Bamako (87.2%) and the highest in Gao (95.1%). Nationwide, 82% of households have at least one impregnated insecticide net. (Cervinskas, Berti, Desrochers, Mandy, & Kulkarni, 2008)

In Ghana, ownership and use of Insecticide-Treated Nets are promoted by the Ghana Health Service as one of the primary interventions for reducing malaria transmission and morbidity in the country.

A study conducted in the Northern region of Ghana by Bukari (2015) indicated that, ITNs ownership was 70.3%. With 70.3% of ITNs ownership among the respondents only 34.4% consistently used their ITNs. The study further showed that, 62(21.4%) of the respondents had at least one net and majority of them 227(78.6%) had more than one net. Long lasting insecticide nets (LLINs) were the majority of the nets owned by the respondents 268(92.7%), with treated nets recording 13(4.5%) and other types of nets with 8(2.8%).

Several studies have shown that using an insecticide treated net (ITN) is effective in reducing the man-vector contact and prevent malaria. The use of ITNs on a large scale reduces clinical malaria episodes by 48%. Despite the evidence that the use of ITNs decreases malaria-related morbidity and mortality, the use of ITNs in sub-Saharan Africa remains relatively low.

However, only 4.1% of the total population of Ghanaians sleep in Insecticide- Treated Nets. Again, only 12.2% of households in Ghana, 9.1% of children under five years of age and 7.8% of pregnant women sleep under Insecticide Treated Nets (Ter Kuile et al., 2003).

According to a study conducted in the Agona East District of the central region of Ghana, ITN possession in households was 76.2% and utilization in households was 38.2%; Significantly households with heads who have discussed net use with their household or friends are more likely to have slept under a net. (aOR= 3.50). Kobla (2015) The most common reason for non-use of ITN identified were the hot weather conditions, not having a net and the cost. Those who use the ITN also did so because they believed it protected them from mosquito bites.

2.3 FACTORS INFLUENCING ITN UTILIZATION

Demographic factors have shown to influence the use of ITNs. These include; age, gender, occupation, level of education and marital status. ITN utilization is influenced by certain socio demographic characteristics, (Ng‟ang'a et al., 2009) household factors and level of awareness, knowledge and perceptions of the households (Hightower et al., 2010). Studies have shown that children under five and women in reproductive age are more likely to sleep under ITNS (Baume & Marin, 2007); Tsuang, Lines, & Hanson, 2010).

A cross sectional survey conducted in the highlands of Kenya showed that, despite ITN ownership reaching more than 71%, compliance was low at 56.3%. The compliance rate was significantly higher during the rainy season compared with the dry season (62% vs. 49.6%). The overall percentage of participants who owned at least one ITN was 73.8% in the dry season and 71.4% in the rainy season. There was an inter-site difference in ITN ownership. The seasonal ITN usage during the dry season was significantly lower than that in the rainy season (49.5% vs. 61.8%, OR

= 0.6, c 2 = 37.8, d.f. = 1, P < 0.0001). In both regions, participants' ITN usage was significantly higher in the rainy season than the dry season. Atieli et al (2011)

Low level of education of household head (Pettifor et al., 2008), low homestead wealth (Githinji et al., 2010) are less likely to sleep under ITNS. Household factors such as decision making, sleeping space (Lam et al., 2014), fewer nets in the households (Baume & Franca-Koh, 2011), large household size or family size (Oresanya, Hoshen, & Sofola, 2008) affect the use of ITN. Level of awareness, perception and beliefs (Bennett et al., 2012) on effectiveness of ITN (Nuwaha, 2001) as a preventive measure have been shown to be associated with net use or non-use (Nankinga et al., 2012) (Baume & Franca-Koh, 2011) (Negash, Haileselassie, Tasew, Ahmed, & Getachew, 2012). According to a study in India, West Bengel population, factors independently associated with ITN use in multivariate analysis included age < 35 years (P<0.001) (Biswas et al, 2010). In a study conducted in Ethiopia by Graves et al., (2006), it was found that, an increase net use was associated with age 25-49 years (OR=1.4 CI 1.21.7) as compared to children under 5 years, but reduced net use was associated with age 5-24years (OR=0.2, CI 0.2-0.3) compared to the under-fives. Another study done in Ethiopia in Afar region of the country, examining ownership and utilization of nets, found that among the potential determinants explored regarding utilization of LLINs, age to be significantly associated with LLIN utilization and the under-fives were more likely to sleep under bed nets, similarly a cross sectional survey conducted in central Kenya revealed a similar finding with bed net use with age ($\chi 2$ = 74.483 P = 0.000), (Ng‟ang‟a et al.,2009) (Negash et al., 2012). A cross sectional study done by Graves et al (2011) in assessing factors associated with mosquito net use by individuals in households owning nets in Ethiopia also showed increased net use associated with age (OR=1.4,

95% CI 1.21.7) compared to children under five. Gender has been found to be very much associated with net use (Ng‟ang'a et al., 2009) in some households Gender norms and values that influence the division of labour, leisure patterns, and sleeping arrangements may influence net use for men and women., a female gender (OR=1.4 CI 1.2-1.5) was associated with net use, according to Graves et al (2006). A cross sectional study done in Central Kenya also revealed significant variation in bed net use with gender (Chi2= 4.25 P- 0.039). Gqrley et al, (2013) found that females used ITNs compared to males (57.2% vs 48.8%). After controlling for several covariates, females remained more likely to use ITNs compared to males (OR: 1.5, 95% CI: 1.3-1.7) in a post campaign survey in Kano State in Nigeria. According to a study done in Afar in northeast Ethiopia regarding utilization of nets, occupation of household head was significantly associated with net use (Negash et al, 2012) (Ng‟ang'a et al., 2009). Also, is a study done in Central Kenya in a rice farming community, a cross sectional study where the predominant job was farming found occupation (Chi2-7.955 P-0.047) to be associated with net use. Households whose heads were engaged as a farmer (adjusted OR 0.137; 95% CI: 0.04-0.50) and housewife (OR 0.26; 95% CI: 0.08-0.82) were less likely to use ITN than those of other occupations (Biadgilign, Reda, & Kedir, 2012) According to this study done in Uganda involving care givers, a hospital based cross sectional study, ITN utilization was significantly associated with formal employment of head of household (OR = 6.00, 95% CI = 1.9518.48)(Nankinga et al., 2012) Level of education of heads of households is crucially associated with net use(Ng‟ang'a et al., 2009)(Noor et al). Positive predictors for LLINs utilization are increasing educational levels (Jombo,et a 2011)(Rhee et al., 2005), being able to read instructions on leaflets attached to nets is good enough to enhance the correct use of it. Women who had secondary school or higher education were 3.4 times more likely to own a net and 2.8 times more likely to have used a net compared to women with less than

secondary school education (Pettifor et al., 2008) A cohort study done in Kinshasa in the Democratic Republic of Congo among pregnant women on attending the clinic and given nets free of charge and followed up for use. In multivariable analyses examining factors associated

with net ownership and use, level of education remained strongly associated with both. To re enforce this observation a hospital-based descriptive study done in Imo State, South University

Again, only 12.2% of households in Ghana, 9.1% of children under five years of age and 7.8% of pregnant women sleep under insecticide treated bed nets (Ter Kuile et al., 2003).

Also, a study conducted on the ownership and utilization of Insecticide Treated Nets (ITNs) among pregnant women and children under five years in the prevention of malaria in the Nanumba south district of the northern region of Ghana showed that, there were not significant relationships between current marital status and ITN use and education level of the male head of the household and ITN use. ITN use by the respondent during the previous night was greater in households headed by a male (73.7%) than those headed by a female (61.8%) and greater among households headed by a currently married person (73.0%) than a person who is not currently married (67.2%). ITN use was highest among female heads of household with a 9th grade education or less (71.7%) and male heads of household with a 9th grade education or less (74.1%). The result also showed that, respondents living in a household headed by a female were 0.612 times as likely (P = 0.010) to have slept under an ITN during the previous night than in a household headed by a male. Education level of the female head of the household did not significantly contribute to the model. Bukari (2015)

2.4 KNOWLEDGE ON MALARIA AND ITN USE

According to a study conducted in Southeast Iran, a quarter of illiterate respondents

stated that drinking dirty water and contaminated food could cause malaria. This revealed a gap of their knowledge on malaria transmission.

Baume and Marin stated some cases of non-use of nets during the rainy season and explained it in part by the desire to use new nets rather than old nets. This poses a problem for net usage in the long term. Whether the net is free or for sale, it is the perception of the individual that determines its consistent use. If the individuals are not sufficiently motivated to use ITNs in their daily life, their widespread use on a long-term basis will not be successful (Baume & Marin, 2007).

A preliminary study conducted in a rural area in Burkina Faso revealed that the population used ITNs at high rates for the first few months and then gave it up for non-objective reasons, such as the reduction in the number of mosquitoes, difficulty in fixing the nets etc (Toé et al., 2009). beliefs like eating maize stalks, contact with malaria patients, exposure to rains and cold

weather, bad smell and dirty water were frequently suggested (Jima et al., 2005).

According to a study conducted in Uganda, it was realized that over half of the participants in all Focus group discussions (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. In the same study, it was stated that, the main reason given by participants as to why pregnant women and children are vulnerable to malaria was that their bodies are weak, a reference to low immunity against disease. In this community, adolescents, primigravidae and men were not perceived to be at risk of malaria (Mbonye, Neema, &

Magnussen, 2006). Some respondents in another study in Burkina Faso identified various types of food as a cause of malaria.

Socio-cultural beliefs

A qualitative study conducted in Tanzania shows that, the following beliefs were associated with malaria:

Mosquito bites are traditionally symbolic of a woman's suffering when in mourning. It also states that, sleeping under a net at a funeral or a son building his own brick house before he builds a home for his father results in punishment by witchcraft.

Keeping a woman under a net at funerals is one of many ways in which men use symbols of modernity to discipline women's behavior (Darkwah & Nyarko, 2011).

A baseline survey for the implementation of insecticide treated mosquito nets in Malaria

control in Ethiopia indicated that although the association of malaria with mosquitoes is widespread in these communities, other causal factors of malaria such as traditional beliefs like eating maize stalks, contact with malaria patients, exposure to rains and cold weather, bad smell and dirty water were frequently suggested (Jima et al., 2005). In a study conducted in Uganda, it was realized that over half of the participants in all Focus group discussions (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. In the same study, it was also noted that the main reason given by participants as to why pregnant women and children are vulnerable to malaria was that their bodies are weak, a reference to low immunity against disease. In this community, adolescents, primigravidae and men were not perceived to be at risk of malaria (Mbonye, Neema, & Magnussen, 2006).

2.5 PERCEPTION OF ITN USE

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

Attitude towards the use of ITNs and other malaria preventive measures are factors that influence the use of ITNs. 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 nonuse (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 focused on

perceptions, attitudes, knowledge, and beliefs of using ITNs in households with children under five making a difference from the previous studies. In a study conducted to assess the distribution, knowledge and utilization of ITNs in selected malaria prone areas of Ethiopia, Animut et al (2008) indicated that 60.1% of the respondents had knowledge about nets. The most important source of

information was health workers (59.1%), followed by radio, which contributed to 34.3% of the source of ITN information. Most of the respondents (91.1%) in the study agreed on general use of ITNs, 60% to prevent mosquito bite and 39% to prevent malaria. Most of the respondents also perceived the frequency of malaria infection for those sleeping under ITNs as much less as those sleeping without nets. However, about 22% of the respondents believed that they could still be infected with malaria while using ITNs. More than 97% of the households found no problems while sleeping under ITN. Problems mentioned by the remaining small percentage of respondents included nets are too hot to sleep under, time taking to tuck net every night, difficult to get up at night, mosquitoes can still bite through the net and net do not allow enough air through.

The findings from a study conducted among boarding students in Zaria, Northern Nigeria is not significantly different. The study revealed that knowledge and awareness of ITN among secondary school students was high (87.3%). The respondents were also aware of the vulnerable group that is being targeted for ITN use (Aliyu & Alti-Mu‟azu, 2009). A study conducted by Kudom & Mensah (2010) among secondary schools and tertiary institutions in Ghana revealed that 93.9% of respondents in the senior high school and 86.7% in the tertiary institutions stated that ITNs are either used to protect oneself from mosquito bites or to prevent malaria. Accordingly, 79.8% of the respondents in senior high schools and 86.9% in tertiary institutions mentioned ITN as an effective strategy for protection against mosquito bites. The findings of Kudom & Mensah suggest that highest school and tertiary students in Ghana have adequate knowledge about ITNs and its usage in the prevention of malaria. A recent study conducted in Southern Ethiopia to assess knowledge and utilization of ITNs among freely supplied households however, showed that 62.6% of the 650 respondents indicated ITNs as the main preventive measure of malaria, followed by taking tablets (14.0%), proper disposal of waste (10.7%), use of traditional remedies (3.4%), fumigation (3.4%), use of aerosol spray (3.1%) and drainage of breeding sites (1.7%). Most (97.5%) of the respondents believed that sleeping under ITN has a benefit and only a little above five percent (5.2%) of the respondents reported problems associated with sleeping under ITN (Gashaw & Wakgari, 2008). From this finding, it is clear that not all people will use ITNs in the prevention of malaria. Some people prefer other methods of protection. Similarly, Adindu et al (2010) indicated in their study on the perception on the use of ITNs that in all the FGDs and the KIIs conducted, participants and key informants knew that mosquito nets were useful preventive measure against malaria and that pregnant women and children less than five (5) years are supposed to sleep under nets since they are the most vulnerable groups. However, Doumbo et al

(2005, p. 5) stated that knowledge on the prevention of the disease was more limited. Only 35.0% of the individuals in their study knew that mosquitoes transmitted malaria and less than 40% of the people knew that one could prevent malaria. In addition, 17.0% of the respondents stated that using ITNs is an important method of malaria prevention. Information on ITNs is obtained from various sources in a community. For instance, Adindu et al (2010) asserted that the common source of information on malaria prevention is radio, followed by health workers, newspapers, pastors, meeting in the local communities and friends especially among adolescents. A few participants

mentioned television as a source of information. Over three-quarters of participant's in all FGDs mentioned that they trusted information from health workers because health workers are knowledgeable and can reach the people and provide face-to-face explanation.

2.6 AFFORDABILITY OF ITNs

A lot of evidence have shown that, ITN is strongly determined by socio-economic status. The cost of an ITN is a major barrier to ownership and usage for a proportion of Africans who

are among the poorest of the poor and also the most highly affected by malaria.

Malaria burden is highest in rural areas and among the poorest people.

ITN possession and utilization are between two-fold and eight-fold lower in the poorest households compared with the least poor households (World malaria report, 2005).

Because high coverage rates are needed to realize the full potential of either ITNs or IRS, WHO

GMP recommends "universal coverage" of all people at risk in areas targeted for malaria

prevention. In the case of ITNs, this means that all people at risk in areas targeted for malaria

prevention should be covered with ITNs. ITNs should be either free of charge or highly

subsidized. Cost should not be a barrier to making them available to all people at risk, especially young children and pregnant women (WHO malaria report, 2009)

Due to the fact that ITNs can be re-used, they are expected to be less expensive in the long-term than the combined cost of other prevention methods and treatment including anti-malaria drugs, insecticide sprays, coils and traditional control methods. 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 nonuse (Nuwaha 2002). This therefore accounted for low usage of ITNs.

According to a survey in Ghana when respondents were asked why they did not own bed net or ITN, majority of them cited lack of money and high cost as the main reasons (NetMark 2004). Guyatt and colleagues (2004) also say that the major reason given by most households throughout Africa for not owning a net is financial. A study into people's knowledge on malaria prevention in Burkina Faso showed that mosquito nets are rather expensive in Burkina Faso and this was the most important reason for households not owning mosquito nets (Okra et al 2002).

According to Muller et. tal (2003), 92% of women said the main reason for not using an ITN was lack of money.

Ownership of ITNs is important in the reduction of malaria cases and should be readily accessible by all. Making Insecticides- Treated Net available to the public at affordable prices is a key to achieving high ITN coverage (Malaria consortium, 1999)

CHAPTER THREE

3.0 METHODOLOGY

3. 1 INTRODUCTION

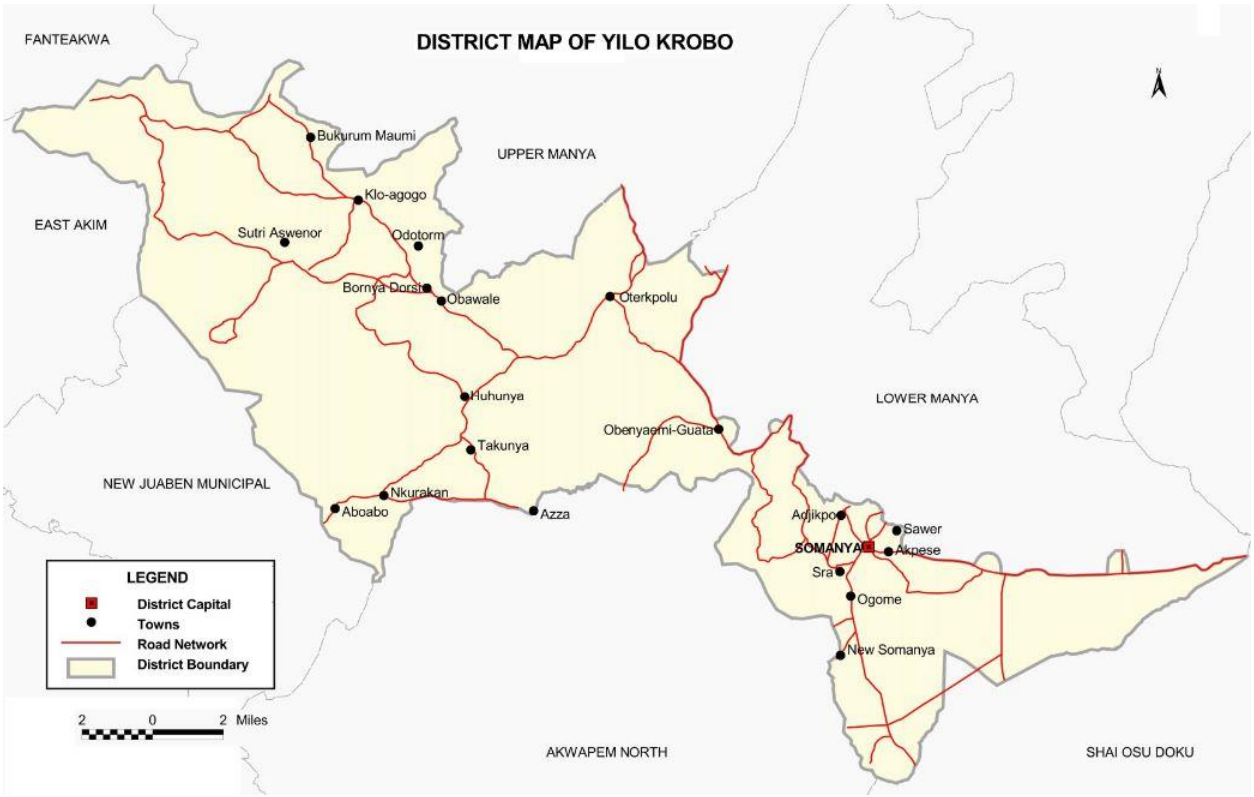
This chapter describes the study population procedures, methods and techniques used to collect and analyze data for this study. The instrument for data collection procedure is usually appraised based on the quality and accurateness of the analysis and information it provides at the end. As a result, this chapter will look at how data was gathered for the research. The methodology will describe the research design, study population sample size and sampling techniques, data sources, data collection instruments, and data analysis plan.

3.2 The Study Area

The study was conducted in the Yilo Krobo Municipality. It forms part of the twenty-six municipalities in the Eastern Region of Ghana.

The Yilo Krobo Municipality was established in 1988 with its capital at Somanya. The municipality is divided into six (6) Town/Area Councils namely, Somanya, Oterkpolu, Boti, Nkurakan, Nsutapong, and Klo-Agogo . It covers an estimated area of 805sq.km and shares boundaries with Upper and Lower Manya Krobo Districts to the north and east, Dangbe West and Akuapem North Districts to the south, New Juaben Municipal, East Akim and Fanteakwa Districts to the west. It has twenty-five centers, four private clinics and nine CHPS compounds. The total number of households in the Yilo Krobo Municipality is 86,567

The Yilo krobo municipaliy is chosen for the study because there are high cases of malaria despite the high distribution of mosquito nets in the area.



Map 1.10: Map of Yilo Krobo Municipality

3.3 Study Design

The research is a descriptive cross sectional study which used a structured questionnaire to obtain data from respondents on household possession and utilization of ITNs.

Data was collected from household heads or their representatives from a sampled population of the Yilo krobo Municipality.

Data on Insecticide -Treated Net ownership, usage and perception was obtained from the respondents. Background information such as age, sex, marital status, level of education, number of people in a household, occupation and religion was also captured by the structured questionnaire.

3.4 Population and Sampling Techniques.

The target population for the collection of data for this research was the household heads or their representatives in the Yilo Krobo Municipality.

Sample Size

Sample size was estimated as follows:

Determination of sample size is based on the estimated number of households in the Yilo Krobo Municipality (N = 86,567)

Estimated number of household in the Yilo Krobo Municipality is 86,567

The formula is stated

below:

n = [N⁄1+N (e) 2],

Where: n – The sample size

N – The estimated households 86,567

e – The desired level of precision or level of acceptable error = 0.05

Total sample size (n) = [86,567/ (1 + 86567 (0.05)2]

N = [86569/ (1 + 86567 x .0025)]

n = [86569/1 + 217.42]

n = [86569/217.42]

n=400

Therefore, the sample size was 400.

Sampling Techniques

A simple random sampling technique was used to select three sub-districts out of the six sub-districts in the Yilo Krobo Municipality. The capital towns of the three sub-districts were used for this study. In selecting participating households, a systematic random sampling was used. and another simple random sampling was done to select the participating households in the Municipality. The simple random sampling technique gives an equal chance for all households within the Districts to be selected for the study (Sarandakos, 2005).

3.5 Data Collection Procedure

The primary sources of data used for this study was obtained from the communities using a structured questionnaire.

Data Collection Instruments

This was a list of questions given to respondents to answer with the aim of getting data on the topic under study. The researcher chooses self-administered questionnaires as opposed to the postal questionnaires. The questions in the questionnaire was in two forms; open ended questions and close ended questions. The close ended questions offered a set of alternative answers from which the respondents were asked to choose the one that most closely represents their view. The open-ended questions on the other hand, did not follow any kind of choice. With this, the respondents' answers were recorded in full. The respondents again answered the questions the way he or she understood them.

3.6 Pilot-Testing of The Instruments

The questionnaire was pre- tested in the Lower Manya Krobo Municipality before the collection of data. The aim was to help reassess and restructure the questionnaire. It also helped in revealing the length of time appropriate for questioning the respondents. This tested the validity and reliability of the instruments. The pre-test was conducted on twenty household heads or their representatives.

3.7 Data Management and Analysis

The data was entered in excel and processed with the aid of STATA version 14, a statistical package for quantitative analysis and presented for analysis using bivariate, multivariate, and logistic regression analysis. The results of the analysis are presented in tables, bar graphs, frequencies, percentages, means, standard deviations and themes and discussed accordingly.

3.8 Ethical Considerations

Ethical clearance was sought from the Ensign College of Public Health Ethical Review Board. The study respondents were adult household heads or their representatives. Written informed consent was sought from all study subjects and the study was explained to all respondents.

The potential risks of the project were the respondents' time and privacy. The study will benefit the participants since information collected from them will help improve health promotion and intervention activities related to Malaria control and will also add up to existing knowledge. The data collected was used for analysis, soft copies were password protected and hard copies were stored in a locked place. The researcher alone had access to the data. The researcher funded the study and there is no issue of conflict of interest.

3.9 Limitations of The Study

The study was limited to only households or their representatives in the Yilo Krobo Municipality. As a result of time and financial constraints and the population of the Yilo Krobo Municipality, the study did not cover the entire Municipality as well as the population in the district. In view of that, conclusions are based on observations made at a point in time- cross sectional study; typically, the study aimed at understanding the factors that influence the use of ITNs.

3.10 Assumptions

It was assumed that, all responses and information provided by the respondents were accurate and true characteristics of the study population and study area.

CHAPTER FOUR

4.0 RESULTS

4.1 Introduction

In this chapter, the results of the study are described and the analysis of the data are presented. The results of the study are presented according to the study objectives and key variables.

4.2 The Socio-Demographic Characteristics of the Respondents

In all, 400 households' heads were included in the study of which 51% were females and 49%, male respondents. The average age of the household head or their representative was 37 years; ranging from 25 to 81 years $\pm$11.8. With regards to marital status, little over half (50.50 %) were married, 34% were single and the remaining 15.5% were divorced/widowed.

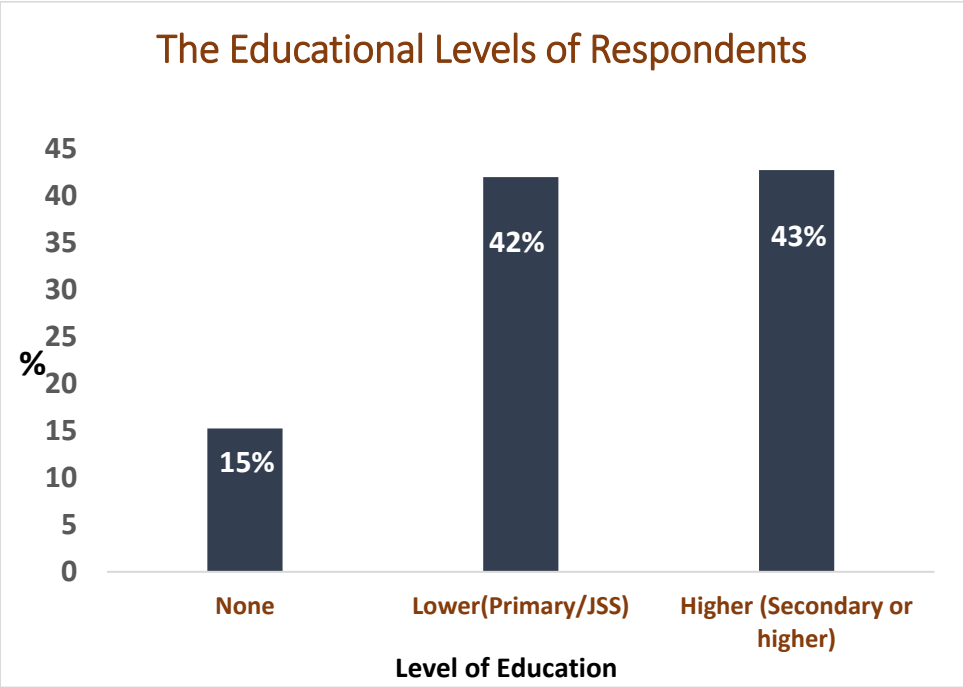
Majority of the respondents 57.25% had attained lower educational level (primary/JSS), 42.25% had attained higher level of education (secondary or higher). Those who had no formal education constitute 15.25%. On employment status, informal workers were the majority (67%) whiles 16% were formal workers with the remaining 17% of the respondents not employed. In terms of religion affiliations, Christians formed the majority (72.75%) with Moslems and traditionalist representing 13.23 and 14% respectively. The majority of the respondents (75%) were low-to-middle income earners with 13% earning a high income. The remaining 11.25% do not earn any monthly any income. Household characteristics were also determined, the average number of people living in a household was 7 people $\pm$ 4. More than half (5.75%) of the households had a household size of 6 or above. Majority (51.75%) with 28% of households having 4 – 6 people.

The least size of households (1-3 members) constituted 20.25%. With regards to building structure, 39% of the respondents lived in houses built with blocks and mud or wood houses formed 21%. The remaining 39.25% lived in houses made other materials suitable for house structure.

TABLE 4.1: Demographic Characteristics of Household Heads

Demographic characteristics	Frequency (N=400)	Percent (%)
Age (years)		
25-35	209	52.5
35-50	136	34.0
Above 50	55	13.75
Gender		
Female	204	51.00
Male	196	49.00
Marital Status		
Single	136	34.00
Married	202	50.00
Divorced/Separated	62	15.50
Religion		
Christian	291	72.75
Muslim	53	13.25
Traditionalist	56	14
Occupation		
Formal worker	64	16
Informal	268	67
Unemployed	68	17
Monthly Income		
Lower and middle income	300	75
High Income	55	13.75
No income	45	11.25
Household structure		
Mud/wood	84	21
Block	159	40
Others	157	39
Household size		
1-3	81	20.25
4-6	112	28.00
Above 6	207	51.75

Figure 4.1: The Distribution of Educational levels of Respondents



4.3 ITN Ownership in The Yilo Krobo Municipality

Of the 400 households studied, 58% were in possession of at least one type net either an ITNT or LLNs. A quite significant number (42.25%) did not own any type of net. Among those who own any type of net, 56.71% own up to 3 nets while the remaining 43.29% had 4 to 8 nets.

Those who did not have any ITNs gave the following reasons; The major reason was the none availability of the ITN (54.44%) followed by those who think the ITNS give side effects (27.22%). Others also think the net was costly (5.33%) and they do not feel comfortable sleeping under it (4.14%). The 2.3% had no reason(s) for not having the any type of net.

With regards to means of obtaining ITNs, 32% of the respondents revealed they obtained it for free whiles 9% purchased their ITNs from health facilities and 2.25% obtained their ITNs from chemical shops at a price. On the type of nets owned by households who owned nets, ITNs

formed the majority (43%) followed by long lasting nets (6.50%). Ordinary nets and ever treated nets constituted 5.6% and 3.00% respectively.

4.4 Sociodemographic factors associated with ITNs ownership at the Household level

Sociodemographic factors of respondents were examined to determine their association with the ownership of ITNs at the household level. Among the factors examine, it was found that educational level of respondents was significantly associated with ITNs ownership (X^2=4.14, p-value=0.042). There was 87% of ITNs ownership among households whose heads were educated as compared to 28% ownership with those households whose heads had no formal education.

Majority (50.55%) of household heads within the age group 25 – 35 years owned ITNs, whiles ownership among those in age group 36- 55 years was 39.82%. Heads who were 56 years or above represented the least (9.52%) to own an ITNs. Again, the age of respondents was significantly associated with ITNs ownership at p-value=0.42. at $\alpha<0.05$.

Furthermore, the results showed a significant association between sex of respondents and ITN ownership (X^2=10.75 p-value= 0.001). Also, households with female heads owned majority (58%) of ITNs as compared to males (41.9%) household heads. There was no association between residence of respondents and ITN ownership (p-value= 0.59). However, 58.9% of respondents who live in rural areas owned ITNs.

The study also revealed a significant association between the type of household structure and ITN ownership. (X^2=17.88, p-value=0.001). ITNs ownership among respondents living in block houses was high (49%) whiles there was only 16.9% ownership among those who lived in mud/wooden houses. See table 4.2 below

TABLE 4.2 Individual and Household factors associated with ITNs ownership.

Variables	ITN Ownership		P-vale
	Yes N (%)	No N (%)	
Educational level			
Educated	203 (87.88)	136 (80.47)	0.042*
Not educated	28 (12.12)	33 (19.53)	
Age of household heads			
25 – 30years	117 (50.65	92 (54.44)	
36 – 55years	92 (39.83)	57 (33.73)	0.419
Above 56years	22 (9.52)	20 (11.83)	
Sex			
Female	134 (58)	70 (41.42)	
Male	97 (42)	99 (58.58)	0.001*
Marital status	68 (29.44)	68 (40.24)	
Single	127 (54.98)	75 (44.38)	
Married	36 (15.58)	26 (15.38)	0.063*
Divorced/widowed	10 (4.33)	11 (6.51)	
Knowledge of where to obtain ITN			
No	53 (23)	135 (80)	<0.001*
Yes	178 (77)	34 (20)	
Household structure			
Mud/Wood	39 (16.88)	45 (26.63)	
Block	112 (48.88)	47 (27.81)	<0.001*
Others	80 (34.63)	77 (45.56)	
Number of people who sleep in a room			
<=2	156 (67.5)	115 (68.1)	0.913
3-4	75 (32.47)	54 (31.95)	
Monthly Income			
Lower and middle income	172 (74.46)	128 (75.74)	
High income	43 (18.61)	12 (7.10)	<0.001*
No income	16 (6.93)	29 (17.16)	

**The measure of association is significant at $\alpha<0.05$*

4.5 Attitudes Towards ITNs Use Among Households.

Households' attitudes on the frequency of ITNs use was determined. The majority (39.75%) of the respondents said that, everyone in the household mostly sleep under an ITN, 7.50% responded that pregnant women mostly sleep under an ITN and 5% represented indicated that adult men mostly sleep under an ITN. The remaining 1.25% also responded that adult and children under five years sleep under ITNs most often (1.25% and 4.3% respectively).

With regards to sleeping under ITNs the night before the study, it was found that, the majority (42.25%) of the respondents had not used ITN the previous night while those who slept under an ITN constituted 38.50%. When respondents were asked how often they sleep under ITNs, 42.25% said they had never slept under an ITN whiles 31.75% indicated they sleep under an ITN every night and those who use ITN once in a week formed 8.18. In addition, those who use ITN every two weeks and once a while constituted 5.75% and 3.5% respectively. The remaining 8% did not remember the last time they slept under an ITN.

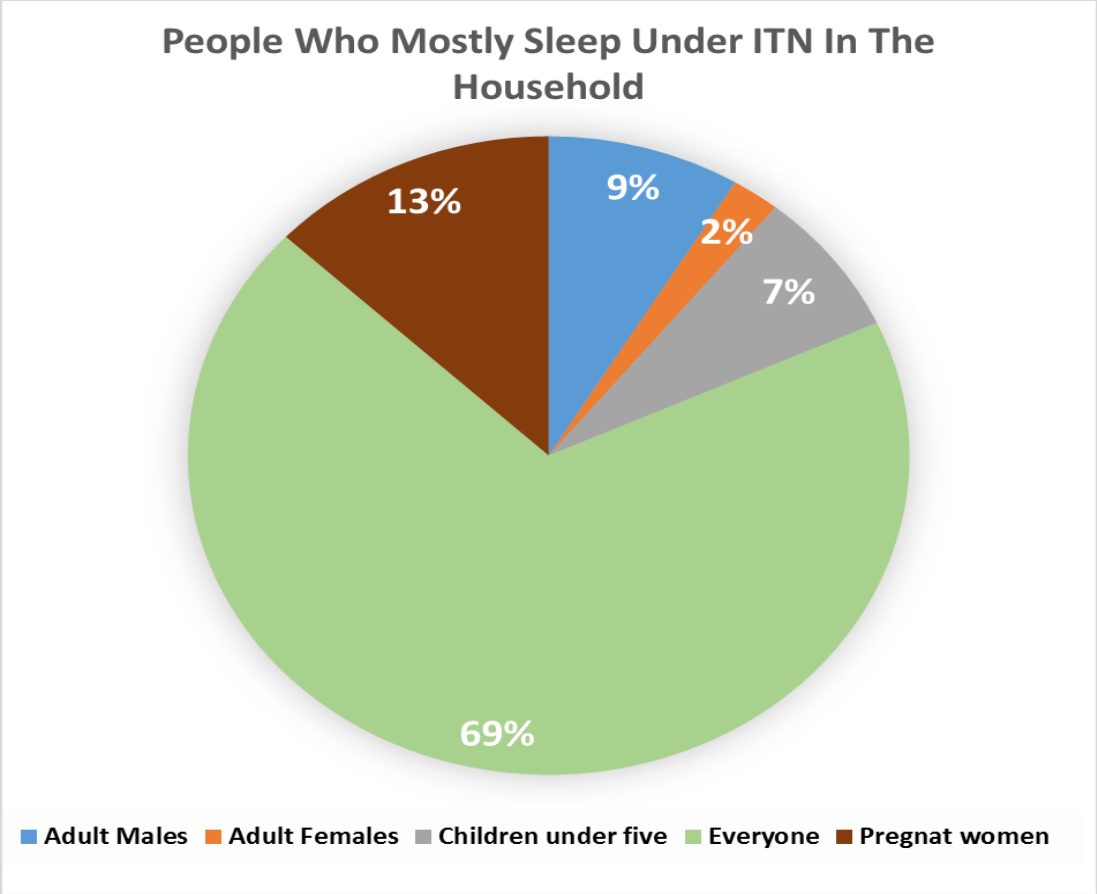


FIGURE 4.2: People who mostly use ITNs in a household

Reasons for Not Sleeping under an ITN

The table 4.4 below provides the summary of respondents' reasons for not sleeping under their ITNs. A higher proportion (37%) said they did not use an ITN because they do not own any whiles 20% of the respondents indicated they do not feel comfortable sleeping under ITNs. Other reasons given were that, there was no mosquitoes (17.20%), the weather was worm (10.80%) and fear of side effects also formed 7.60%. The remaining 4.8% said the ITN was torn.

TABLE 4.3 Distribution of reasons for not sleeping under ITNs

Reason for not sleeping under a net	Frequency (n)	Percentage (%)
Don't have	93	37
Don't feel comfortable in it	50	20
No mosquitoes	43	17.20
Weather is worm	27	10.80
Side effects	19	7.60
Torn	12	4.8
Others	6	2.40

Sources from which respondents acquired ITNs

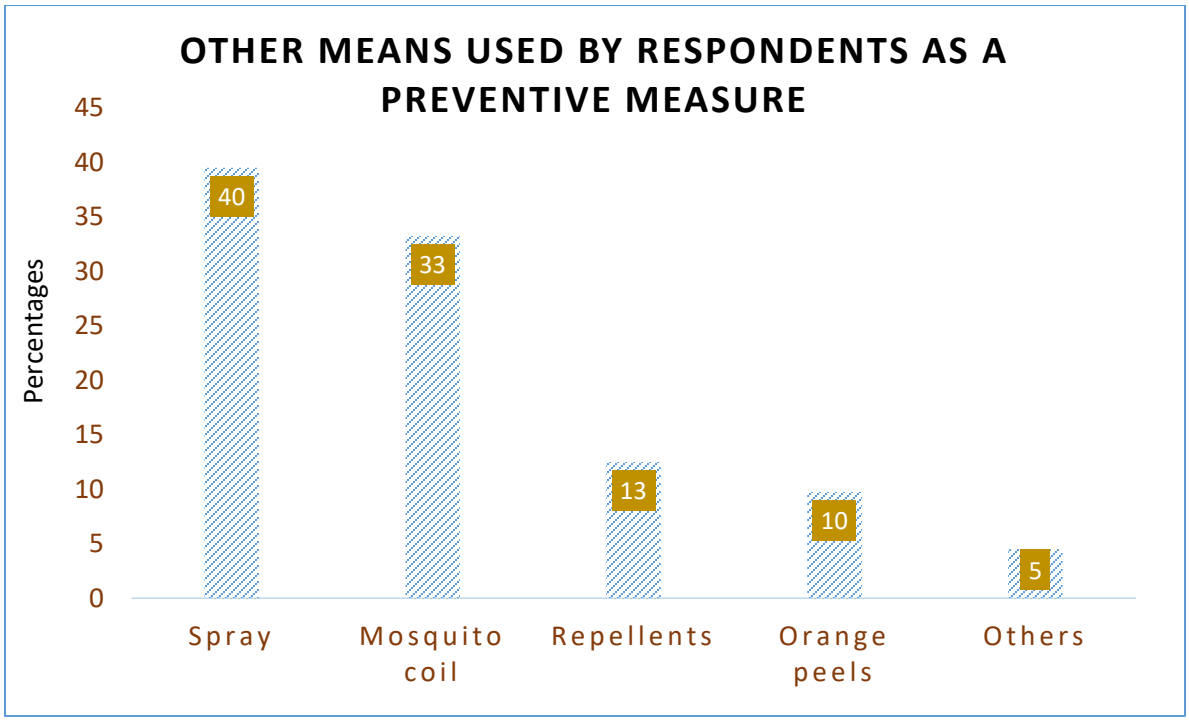
The table below represents sources from which respondents acquired their ITNs. 32% were provided freely by health workers, 9% purchased from health facilities whiles the remaining 2.25% purchased them from chemical shops.

TABLE:4.4 Sources of ITNS Among Respondents

Variable	Frequency N (%)
Provided freely by health workers	128(32)
Purchased from health facility	36(9)
Purchased from chemical shop	9(2.25)
Obtained from friends	3(0.25)

Other Preventive Measures Used by Respondents

FIGURE 4.3 Distribution of Other Preventive Measures by Households



Majority of respondents (39.60%) used mosquito spray as a preventive measure for malaria control. Interestingly, 9.75% used orange peels. The use of mosquito coil and repellent constituted 33% and 13% respectively. See table 4.3 above

Reasons for using ITNs by respondents

A high proportion of the respondents (83.25%) stated that, they use ITNs to prevent mosquito bite whiles 7.6% said it helps them sleep comfortably and 3.75% use ITNs because it prevents mosquito nuisance. Any other reasons formed 4%.

4.6 Perception of respondents on ITNs use

Majority (46.5%) of respondents said they strongly agree to the statement that, ITNs were effective in the prevention of malaria, while a few (12%) of the respondents disagreed with the statement. More than half (52.8) of respondents agreed that, mass media was effective in the promotion of ITN use, 28.3% said they agreed strongly and 2.5% said they strongly disagree that mass media was effective in the promotion of ITN use. Also, 35.3% of the respondents disagreed to the statement that, ITNs causes discomfort while 28.5% agreed. Again, when respondents were asked if ITNs were effective in the prevention of malaria among pregnant women, 42% said they agreed while 39% strongly agree, and the remaining 3.5% strongly disagreed to that. Interestingly, 29.5% of respondent's s agreed to the statement that, adult men do not need to sleep under an ITN while 24.7% strongly agreed. In addition, 36% of the respondents said they disagreed to the perception that, the colour of the ITN influence it's use, and 21% of the respondents said they strongly disagree. Table 4.5 below represents respondent's perception on the use of ITNs.

TABLE 4.5: PERCEPTION OF ITNS USE

Variable	AGREE (%)	Strongly agree (%)	Neither (%)	Disagree (%)	Strongly disagree (%)
ITN effectiveness	38.8(155)	46.5 (186)	6.25 (25)	5.5 (22)	3(12)
Mass media is effective in	52.8 (211)	28.3 (113)	9.8 (39)	6.5 (26)	2.5(10)
ITNs causes discomfort	28.5 (114)	16.3 (65)	14.5 (58)	35.3 (141)	5.5 (22)
ITN is effective in the prevention of malaria among pregnant women	42 (168)	39 (156)	7 (28)	8.5 (34)	3.5 (14)
Adult men do not need to sleep under ITNs	29.5 (118)	24.7 (99)	11 (44)	26.8 (107)	8 (32)
Colour of ITN affects its usage	9.8 (39)	7 (28)	27.3 (109)	35.5 (142)	20.5 (82)

4.7 Factors Associated with ITN Use

TABLE 4.6 Distribution of selected demographic factors and ITN use

Variables	ITN Usage		P-value
	Yes (%)	No (%)	
Age(Years)			
25 – 35	72 (47.06)	137 (55.47)	0.049*
36-50	57 (37.25)	79(31.98)	
Above 50	24 (15.69)	31 (12.55)	
Sex			
Female	87 (56.86)	117 (47.37)	0.65
Male	66 (43.14)	130 (52.63)	
ITN Ownership			
Yes	153 (100)	78 (31.6)	<0.001*
No	0 (0.00)	169 (68.4)	
Marital Status			
Single	39 (25.49)	97 (39.27)	0.018
Married	88 (57.52)	114(46.15)	
Widowed/Divorced	26 (16,99)	36 (14.57)	
Educational level			
Educated	133 (86.93)	206 (83.40)	0.340*
Not educated	20 (13.07)	41 (16.60)	
Religion			
Christians	99 (64.71)	192 (77.73)	
Moslems	27 (17.65)	26 (10.53)	0.017
Traditionalists	27 (17.65)	29 (11.74)	
Monthly income			
No Income	7(4.58)	38(15.38)	
Lower and Middle	115(75.16)	185(74.90)	<0.001
High Income	31(20.26)	24(9.24)	
Occupation			
Formal	35 (22.88)	29 (11.74)	
Informal	97 (63.40)	171 (69.23)	0.009
Unemployed	21 (13.73)	47 (19.03)	

*Data are presented in frequency **(N)** and proportions* **(%)**; **The measure of association is significant at α=0.05*

ITNs use was determine by whether any member of the household had sleep under ITN the night before the study. ITNs use was found to be high (47%) among households whose heads were within twenty-five to thirty-five years old (25-35years), and majority (55.47%) of those who did not also sleep under an ITN were from households with heads in the age group twenty- five to thirty-five years (25-35years). There was no significant association between age of household head and ITN use. (X^2=2.73, p-value= 0.25).

The ownership of ITN was found to have a strong association with ITNs use and this association was statistically significate (X^2=181.27, p- value=0.001). There was also no significant association between household size and use of ITN at p-value=0.197. Again, the employment status of household heads and ITN use were found to be significantly associated (X^2= 9.36, p-value=0.009). ITNs use was found to be high (63.4%) among Household whose heads were informal workers compared to those of formal employment (22.8%) and the unemployed (13.73%). Also, high ITN use 975.16%) was found among those from low and middle income status and 4.58% and 20.26% for no income earners and higher income earners respectively. There was a significant association between income of household heads and ITN use (p-value<0.001).

TABLE 4.7 Distribution of selected household factors and ITN use

Variables	ITN Usage Yes (%)	No (%)	P-value
Number of ITNs owned			
1 - 3	76 (49.67)	55 (70.51)	0.003
4 and above	77 (50.33)	23 (29.49)	
Average number of people who sleep in a room			
<= 2	102 (66.7)	169 (68.4)	0.715
3 – 4	51 (33.33)	78 (31.58)	
Decision making on ITN use			
Individual	93 (60.78)	50 (64.10)	0.015
Caregiver	37 (24.18)	8 (10.26)	
Head of family	23 (15.03)	20 (25.64)	
Household structure			
Mud/wood	27 (17.65)	57 (23.08)	0.037
Block	73(47.71)	86 (34.82)	
Others	53 (34.64)	104 (42.11)	
Household Size			
1-3	25 (16.34)	56 (22.67)	0.197
4-6	41 (26.80)	71 (28.74)	
Above 6	87 (56.86)	120 (48.58)	

*Data are presented in frequency **(N)** and proportions* **(%)**; **The measure of association is significant at α=0.05*

From Table4.7 above, ITN use was found to be high among those living in block houses (47.7%) whiles ITNs use was only 17.65% of household living in a wooden/mud houses. There was a significant association between house structure and ITN use. ITN. (X^2=6.62 p-value=0.037).

Additionally, results from the table shows that, the number of ITNs owned by a household is strongly associated with use (X^2 9.14, p-value= 0.003).

The decision to use an ITN is mainly taken by the individual (60.78%) whiles 15% of the respondents stated that the head of the family was responsible in taking decision on ITN use in the household. The findings show a strong association between the decision making and ITN use with a p-value of 0.015 (X^2=8.36).

4.8 Bivariate Logistic regression of demographic Factors associated with ITN Use

Married household heads were 2.00 times likely to use an ITN as compared to household heads who were single (OR:2.00, 95%CI: 1.20 -3.07). Household heads who were formal workers are 2.701 times more likely to use an ITN as compared to household heads who were not employed. Household heads with higher income were 7.12 times more likely to use an ITN as compared to household heads who did not earn any income. Again, households owning four and more ITNs were more likely to use a ITN as compared to those who own one to three ITNs (OR 2.42, 95% CI: 1.338-4.388). Individuals in household who made decision by themselves to use ITNs were 0.40 less likely to sleep under an ITN as compared to decision made by care givers (OR:0.40, 95%CI: 0.1717-0.942). See Table 4.8 below

Table 4.8: Logistic Regression of demographic factors associated with ITN use

Variable	OR	P-Value	95% CI
Marital Status			
Single	Ref	1	
Married	2.00	0.0057	1.1996 – 3.0725
Widowed/Divorced	1.796	0.0661	0.9532 – 3.3848
Sex			
Female	Ref	1	
Male	0.682	00652	0.4539 – 1.0268
Number of ITN Owned			
1 - 3	Ref	1	
4 and more	2.423	0.0026	1.338 – 4.388
Occupation			
Unemployed	Ref	1	
Formal	2.701	0.0059	1.2935 – 5.641
Informal	1.269	0.413	0.7158 – 2.252
Income			
No income	Ref	1	
Lower income	3.375	0.0029	1.440 – 7.906
High Income	7.012	0.0001	2.4069 – 20.427
Decision making			
Caregiver	Ref	1	
Head of family	0.2486	0.004	0.089 – 0.694
Individual	0.4022	0.029	0.1717 – 0.942

Note: OR-Unadjusted odds ratio, CI-Confidence Interval, 95% significant level

4.9 Multivariate logistic Regression of sociodemographic Factors associated with ITN use among the Households

Table 4.8: Multivariate logistic Regression of individual and household Factors associated with ITN usage.

VARIABLE	ADJUSTED OR	P-VALUE	95% CI
Marital Status			
Single	Ref	1	
Married	1.480	0.306	0.698 – 3.139
Widowed/Divorced	1.685	0.293	0.637 – 4.461
Sex			
Female	Ref	1	
Male	1.338	0.352	0.724 – 2.474
Number of ITNs owned			
1- 3	Ref	1	
4 and above	2.222	0.010	1.207 – 4.088
Employment status			
Unemployed	Ref	**1**	0.365- 3.667
Formal worker	1.157	0.804	
Informal worker	1.557	0.379	0.581 – 4.172
Income			
No income	Ref	1	0.423 – 5.834
Lower and middle	1.572	0.499	
High income	2.093	0.369	0.417 – 10.501
Household structure			
Mud/wood	Ref	1	
Block	0.714	0.46	0.287 – 1.777
Others	0.9798	0.96	0.399 – 2.406
Decision making			
Care giver	Ref	1	
Head of family	0.278	0.015*	0.992 – 0.779
Individual	0.413	0.052	0.169 – 1.007

Note: AOR-Adjusted odds ratio, CI-Confidence Interval, 95% significant level

From table 4.9 above, household members whose head of family made the decision on ITN use, were 0.248 times likely to use ITNs as compared to households where individuals made the

decision by themselves to use ITNs (AOR: 0.28, 95%CI: 0.992-0.779). Households with four and more ITNs were twice as likely to use an ITN as compared to households that own one to three ITNs (AOR:2.22, 95%CI:1.207-4.088).

CHAPTER FIVE

5.0 DISCUSSION

5.1 INTRODUCTION

This study was a cross sectional household survey which aims to find out the factors that influence the use of ITNS in the Yilo Krobo Municipality. The study looked at ITNs coverage and utilization in the district, to find out whether there is an association between ITNs ownership and utilization, marital status, educational level of household heads, and sex of household heads in Yilo Krobo Municipality of the Eastern region of Ghana. Four hundred households were selected randomly from the selected sub district in the Yilo Krobo Municipality for the study. The study participants were household heads or their representatives. The findings are discussed following the order of the research questions outlined in chapter one.

5.2 Demographic Characteristics

Out of the 400 household heads included in the study, 51% (204) were females and 49% (196) were males. The average age of the household head or their representative was 38 years $\pm$ 11.8 ranging from 25 years to 81 years. With regards to marital status 50.50 %(202) were married, 34% were single and 15.5% were divorced/widowed.

Majority of the respondents (household heads)57.25% had attained lower educational level (primary/JSS), 42.25% had attained higher level of education (secondary or higher) and 15.25% of the respondents had no formal education. This means that, most of the respondents were educated.

Majority (67%) of the respondents were informal workers while 16% were formal workers and 17% were not employed. Also, 72.75% (291) of the respondents were Christians, 13.23% were

Moslems and 14% were traditionalists. This indicates that, majority of the respondents were Christians. Seventy-five percent (75%) of respondents were low and middle income earners, 13% were high income earners and 11.25% of the respondents were not earning any income.

5.3 ITN Ownership

Of the 400 households interviewed, 58% (231) were in possession of ITNs or Long Lasting Insecticide- Treated Nets(LLNs), while 42.25% did not have any ITN. This observation is quite lower than a previous study conducted in the Agona East District of the central region of Ghana, where ITN possession in households was 76.2% Kobla (2015).

Respondents who had three and less ITNs in their household were 56.7% and 43.3% represented households who had four and above ITNs. This finding means that, households who own INS had more than one ITNs in their households. This is similar to a study conducted in Eastern Ehiopia where 55.5% households owning one and two ITNs a study conducted by Sibhatu Biadgilign et al.

Those who did not have any ITNs gave various reasons for not owning one. Those who responded they did not feel comfortable sleeping under the ITN represented 4.14% (7), 5.33% (9) said it was costly, 2.3% (5) said they had no reason for not owning an ITN, 54.44% (92) said the net were not available, while 27.22(46) said it was due to side effects and 5.92%(10) constituted others who said they did not like ITNS. Majority (54%) of the respondents who said the ITNs were not available could be attributed to the fact that, they have no access to the ITNs.

Out of the 231 who owned ITNs, 32% (128) of respondents obtained their ITNs for free, 9% bought their ITNs from health facilities and 2.25% bought their ITNs from chemical shops. This

shows that, majority of the respondents who obtained their ITNs for free was as a result of the free ITN distribution campaign.

There is a significant association between education and possession of an ITN. (chi2=4.14 p-value=0.042). Eighty-seven percent of educated household heads owned ITNs while, 80% of educated household heads did not own any ITN and 28% of uneducated household heads did not own any ITN.

Majority (50.55%) of household heads within the age group 25 – 35 years owned ITNs, 39.83% represented age group 36- 55 years who owned ITNs and a few (9.52%) represented age group above 56 years' who owned ITNs, majority (54.44%) of age group 25-35years did not own ITNs. There was an association between age group and owning an ITN however, it was not significant (X^2=1.74 p-value=0.42).

The results of the study showed that, there is a significant association between sex and ITN ownership. (X^2=10.75 p-value= 0.001). Also, households with female heads owned majority (58%) of ITNs as compared to male (41.9%) household heads. There was no association between living in a rural area, urban and ITN ownership (X^2=0.29, p-value= 0.59). However, 58.9% of respondents living in rural areas owned ITNs.

Married household heads formed the majority (54%) of those who owned ITNs. Majority of household heads (77%) knew where an ITN was sold and owned ITNs, and those who did not know where an ITN was sold and did not own any ITN was 23%. The study also revealed a significant association between type of household structure and ITN ownership. (X^2=17.88 p-value<0.001) There was high (49%) ownership of ITN among households whose houses were built with blocks and a lower (16.9%) ITN ownership among mud/wooden house type structure.

5.4 ITN Utilization

ITN utilization has been shown to be associated with certain factors. In this study, it was found that, age group influenced the use of ITNs. This implies that, there is a week association between age group and use of ITNs with p-value of 0.25. Majority (47%) of those who slept under an ITN the previous night prior to the study were from households whose heads were twenty-five to thirty-five years old (25-35years), and majority (55.47%) of those who did not also sleep under an ITN were from households with heads in the age group twenty- five to thirty-five years (25-35years). Educational level of household head was not significantly associated with ITN use with p-value of 0.34. This was in contrast with a study conducted in central Kenya by the Ng‟ang‟a et al where educational levels of the household head or spouse was significantly associated with ITN use.

Also, there was a strong association between owning an ITN and using an ITN. (chi2=181.27, p-value<0.001). There is a week association between household size and the use of ITNs with a p-value of 0. 197.This means that, household size does not influence the use of ITNs.

Majority (47.7%) of respondents who lived in block houses use ITNs, and 17.65% of respondents who live in a wooden/mud house structure use an ITN. The different kinds of household structures may influence or deter the use of ITNs particularly when it comes to hanging of the ITNs. There was an association between house structure and use of ITN. (X^2=6.62 p-value=0.037)

Findings from the study indicates that, the number of ITNs owned by a household is strongly associated with ITN use with p-value of 0.003. There was no big difference between those who own one to three ITNs and households who owned four and more ITNs and whether a member of the household slept under an ITN. Households who own one to three ITNs and a member of

their household slept under an ITN was 49.67% and 50.33% represented those who had four and more ITNs.

The average number of people who sleep in a room and ITN use was not significant and there was no association between the number of people who sleep in a room and ITN use. (chi2=0.13, p-value=0.72).

Decision making within the household as to who should sleep under an ITN has an impact on the utilization of ITNs within the household. 60.78% make the decision to use ITNs by themselves, 15% of the respondents stated that the head of the family was responsible in making decision as to who should sleep under an ITN. In this study, there was a strong association between the decision on ITN use and ITN utilization with a p-value of 0.015. Household factors such as decision making, sleeping space (Lam et al., 2014), fewer nets in the households (Baume & Franca-Koh, 2011) large household size or family size (Oresanya, Hoshen, & Sofola, 2008) affect the use of ITN as well as poor sleeping arrangements (Iwashita et al., 2010). There was a strong association between the number of ITNs a household owned and the use of ITNs with a p-value of 0.003.

The occupation of respondents influences the use of ITNs. This means that, there is a strong association between occupation of household heads and use of ITNs with a p-value of 0.009)

Also, income of influence the use of ITNs. Income was found to be significantly associated with ITN utilization with a p-value of 0.001. ITN utilization is influenced by certain socio demographic characteristics, (Ng‟ang'a et al., 2009)

Household heads who were married were1.919 times more likely to use an ITN as compared to household heads who were single. Households with male heads were 0.68 times less likely to use

an ITN as compared to households with female heads. This finding confirmed the hypothesis that, female household heads were more likely to use ITNs as compared to male household heads. Even though there was an association, between sex and ITN use, the association was not significant with p-value of 0.065.

5.5 Perception of ITN Use

Regarding respondent's perception on the degree of effectiveness of ITNs in the prevention of malaria, majority (46.5%) of them said they strongly agree, while a few (12%) of the respondents disagreed that ITNs were effective in the prevention of malaria. Majority (52.8) of respondents agreed that, mass media was effective in the promotion of ITN use, 28.3% said they agreed strongly that mass media was effective and 2.5% said they strongly disagree that mass media was effective in the promotion of ITN use. Also, 35.3% of the respondents disagreed to the perception that ITNs causes discomfort, while 28.5% agreed to the perception that ITNs causes discomfort. Again, when respondents were asked if ITNs were effective in the prevention of malaria among pregnant women, 81% strongly agreed and agreed to this perception and 3.5% strongly disagreed. Interestingly, 54.2% of respondents strongly agreed and agreed to the perception that, adult men do not need to sleep under an ITN Also, 36% of the respondents said they disagreed to the perception that, the colour of the ITN influence the use ITN, and 21% of the respondents said they strongly disagree that, the colour of the ITN influence the use of ITNs.

CHAPTER SIX

6.0 CONCLUSIONS AND RECOMMENDATIONS

Introduction

Four hundred respondents from four hundred households selected randomly from three sub-districts were interviewed to generate information on the use of Insecticides Treated Nets at the household level in the Yilo Krobo Municipality of the Eastern Region of Ghana, in January 2017. The conclusions and recommendations based on the results of the study are presented in this chapter

Conclusions

The findings from the study showed that, ITN ownership was 58%. The study showed that, respondents who had three and less ITNs in their household were 56.7% and 43.3% represented households who had four and above ITNs. The level of education of respondents did not influence the use of ITNs with p-value of 0.34. household head was not significantly associated with ITN use. The findings also showed that, there was an association between house structure and use of ITN with p-value of 0.037. There was a strong association between the number of ITNs a household owned and the use of ITNs with a p-value of 0.003. Also, Income of household head was found to be significantly associated with ITN utilization with a p-value of 0.001. In conclusion, ITN use is influenced by various household factors which affects ITN utilization. Therefore, distribution of ITNs without putting into consideration these household factors will continue to yield lower results in the prevention of malaria.

Recommendations

National Malaria Control Programme (NMCP)

1.It is recommended that, the National Malaria Control Programme (NMCP) should continue to distribute ITNs for free to improve on household ownership and utilization.

2. National malaria control program should continue mass education through the media and health education or talks in the communities by health workers so as to improve on level of awareness on ITN use.

Yilo Krobo Municipal Health Directorate

1. Communities should be sensitized on the importance of ITN as a preventive measure for malaria prevention

2. Improved information and communication could be used to erase erroneous perceptions.

Yilo Krobo District Health Centers

1. Educate clients on the use of ITN as a preventive measure for malaria.

2. Educate clients on the consistent use of ITNs.

Government/ Non-Governmental Organizations

1. Continue sensitization and distribution of ITNS to community and find more effective ways to ensure the use of ITNS

2. Policy makers should consider the inclusion of a policy which utilizes a Community based approach to increase ITN usage. That is involving community leaders to spear head the monitoring of correct use of ITNs.

3.To strengthen the system and structural responses by integrated home based outreach programs, ITN distribution and Behavioural Change Communication messages on malaria prevention can be incorporated with other outreach programmes.

Further Studies

1.There is the need for a qualitative study to identify respective reasons for non-use of ITN among individuals who never or rarely use ITN and individuals who inconsistently use ITN. This is important as these respective groupings could confound informed and targeted interventions.

2.This study should be replicated in other areas of the country including most remote areas using the combinations of methods to determine the levels and trends of ITN utilization among the population.

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APPENDICES

SAMPLE INFORMED CONCERNED FORM

CONSENT FORM

Project Title: Use of Insecticides Treated Nets at the household level in the Yilo Krobo Municipality of the Eastern region of Ghana

Institutional Affiliation: Ensign College of Public Health, Kpong

Background

The Principal Investigator is Sadia Seidu currently a student of Ensign College of Public Health, which is in affiliation to the Kwame Nkrumah University of Science and Technology and the University of Utah. She is undertaking an assessment of the factors the influence the use of ITNS in the Yilo Krobo Municipality as a partial requirement for the award of Master of Public Health (MPH) degree.

Benefits and Risks

The aim is to investigate the factors influencing the use of ITNs in households in the Municipality and identify the perception of use of ITNS. There is no known human risk attached to this study protocol.

Right to Refuse

Though, there are no known risks associated with this research, nevertheless, should you feel at any point in time to withdraw your participation in this study, you will be at liberty to do. You are selected on accounts of your eligibility and your inclusion into this study is absolutely voluntary under no obligation.

Anonymity and Confidentiality

You are assured that the information collected will be handled with strict confidentiality and will be used purely for academic purposes. Be assured that all your information will not be shared with any third parties not directly involved in the research.

Before taking Consent

Do you have any questions that you wish to ask? If yes, please state

……..……

……

……

……

If you have questions you wish to ask later, or if there is anything you wish to seek clarification on regarding the research, please don't hesitate to contact the principal investigator

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QUESTIONNAIRE

Questionnaire Number……..... **Interviewer's Name……..**

Date of Interview....…/….. /…...

TOPIC: USE OF INSECTICIDE TREATED NETS AT THE HOUSEHOLD LEVEL IN THE YILO KROBO MUNICIPALITY OF THE EASTERN REGION OF GHANA

INSTRUCTIONS: Tick or circle your choice(s) from the options given. Also, supply the answer where options are not provided to choose from.

SECTION A: DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

1) Age …….
2) Sex A. Female [ ] B. Male [ ]
3) Marital status A. Single [ ] B. Married [ ] C. Divorced [ ] D. Widowed [ ]
4) Religious Affiliation A. Christian [ ] B. Moslem [ ] C. Traditionalist [ ]
   C. Others (specify)……
5) What is your highest level of education? A. Primary [ ] B. JSS/Middle/JHS[ ]
   C. SSS/SHS[ ] D. Tertiary education [ ] E. Vocational/Technical [ ]
   E. No Formal Education [ ]
6) What is your occupation? A. Farmer [ ] B. Trader [ ] C. Teacher [ ]
   D. Unemployed [ ] E. Others [ ]
7) What is your place of residence? A. Urban [ ] B. Rural [ ]

SECTION B: OWNERSHIP AND UTILIZATION OF ITNs

8) Do you have Insecticides Treated Net (ITNs) in this household? A. Yes [ ] B. No [ ]
9) If No, why don't you own an Insecticides Treated Net.? A. It is costly [ ]
   B. Not available [ ] C. Not effective [ ] D. Side effects [ ] E. Others
   (specify).....
10) Do you know of any place you can obtain an ITN? A. Yes [ ] B. No [ ]
11) How much is the cost of an ITN? .....

12) How much are you willing to pay for an ITN? .....

13) What type do you have? A. Ordinary nets [ ] B. Ever treated net [ ] C. Baby net [ ] D. Insecticide treated mosquito net [ ] E. Long lasting insecticide net [ ]

14) How many Insecticides Treated mosquito nets do you have in this household? .....

15) Which people mostly sleep under a mosquito net in your household? A. Children under five years [ ] b. Pregnant women [ ] C. Adult males [ ] D. Everyone [ ] Adult females [ ]

16) Did anyone sleep under ITNs last night? A. Yes [ ] B. No [ ]

17) How often do you sleep under ITNs? A. every night [ ] B. Once in a week [ ] C. Twice in a week [ ] D. Others specify.....

18) When was the last time you slept under? .....

19) Did you sleep under ITN last night? A. Yes [ ] B. No [ ]

20) If **No,** Why didn't you sleep under ITN last night? A .Don't fill comfortable in it [ ] B. Weather is warm [ ] C. Is torn [ ] D.Side effects [ ] E. No mosquitoes[ ] F. Other (specify).....

21) Where did you obtain the ITN you are currently using?

A. Bought from Health Facility [ ] B. Given free by Health Workers [ ]

C. Bought from Chemical Shop [ ] D. Given free by village volunteer [ ]

E. From a friend/relative F. Others (specify).....

22) What other methods do you use to prevent malaria? A. Mosquito spray [ ]

B. Mosquito coil [ ] C. Repellents [ ] D. Orange pills [ ]

E. Other (specify).....

23) What is the main reason for using ITN? A. Prevent mosquito bite [ ]

B. Prevent mosquito nuisance [ ] C. Sleep comfortably [ ] D. Prevent malaria [ ] E. Others (specify)…….....

24) Will you continue using ITN? A Yes [ ] B No [ ]

SECTION C: SOCIO-CULTURAL AND SOCIO ECONOMIC FACTORS

25) 17 What kind of house structure do you live in? A. Brick house [ ] B. Wood house [ ]

C. Mud house [ ] D. Others specify.....

26) What type of toilet facility do you have? A Pit latrine [ ] B. KVIP [ ] C. WC [ ] D. No toilet[ ]

27) How many households are in this house? .....

28) How many people are in this household? .....

29) What is the average number of people who sleep in a room?.....

30) Who decides who sleeps under the mosquito net? A. Individual [ ] B. Caregiver [ ] C. Head of family [ ] D. Others [ ]

31) What is your monthly income? A. Below 500ghc [ ] B. 500 to 1,000ghc[ ] C. 1,001-1,500ghc[ ] D. Above 1,500ghc [ ]

SECTION D: PERCEPTIONS RELATED TO ITN USE

32) ITNs are effective in the prevention of malaria

A. Strongly Agree [ ] B. Agree [ ] C. Neither [ ] D disagree [ ] E. Strongly Disagree [ ]

33) Mass media is effective in promoting the use of ITNs

A. Strongly Agree [ ] B. Agree [ ] C Neither [ ] D disagree [ ] E. Strongly Disagree [ ]

34) The use of ITN causes discomfort

A. Strongly Agree [ ] B. Agree [ ] C Neither [ ] D. disagree [ ] E. Strongly Disagree [ ]

35) ITNs is most effective in the prevention of malaria among pregnant women and children

A. Strongly Agree [ ] B. Agree [ ] C. Neither[ ] D. disagree [ ] E. Strongly Disagree [ ]

36) Adult/men do not need to sleep under ITNs

A. Strongly Agree [ ] B. Agree [ ] C. Neither [ ] D. Disagree [ ] E Strongly Disagree [ ]

37) ITNs is usually used during the raining season

A. Strongly Agree [ ] B. Agree [ ] C. Neither [ ] D. disagree [ ] 5 Strongly Disagree [ ]

38) The colour of the net influences my attitude towards its use.

A. Strongly Agree [ ] B. Agree [ ] C Neither [ ] D. Disagree [ ] E Strongly Disagree [ ]