ADDIS ABABA UNIVERSITY

COLLEGE OF HEALTH SCIENCES

SCHOOL OF PUBLIC HEALTH

Insecticide Treated bed Net Utilization among Under Five Children and Household bed Net Ownership in Adami Tulu District, Oromia Regional State, Ethiopia

By

Bikila Lencha (BSc)

Advisor: Wakgari Deressa (PhD)

A THESIS SUBMITTED TO THE SCHOOL OF GRADUATE STUDIES OF ADDIS ABABA UNIVERSITY IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF PUBLIC HEALTH (MPH) IN EPIDEMIOLOGY

Addis Ababa, Ethiopia

June 2014

ADDIS ABABA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

INSECTICIDE TREATED BED NET UTILIZATION AMONG UNDER FIVE CHILDREN AND HOUSEHOLD BED NET OWNERSHIP IN ADAMI TULU DISTRICT, OROMIA REGIONAL STATE, ETHIOPIA

By

Bikila Lencha (BSc)

Approved by examining board

_____

1. Chairman, Graduate Committee Signature

   Dr Wakgari Deressa _____

2. Advisor Signature

   Dr Wakgari Deressa _____

3. Internal Examiner Signature

   Mr. Alemayew Desalegn _____

4. External Examiner Signature

   Dr Adugna Woyessa _____

Addis Ababa, Ethiopia

June 2014

Acknowledgements

First of all, my thanks to my Advisor, **Dr. Wakgari Deressa,** for his constructive and valuable scientific guidance, suggestions and comments throughout the thesis work.

Prof Bernt Lindtjørn has also special thanks because of his advice.

My deep appreciation also goes to Mal Trial project (funded by Norwegian Research Council).

I would like to thank all the study participants who have committed their time to participate.

Data collectors and supervisor also got deep gratitude because of their full commitment to the field work.

My special thanks for the Addis Ababa University, School of Public Health Librarians for providing me reading materials and Arat kilo campus digital librarians for their internet service.

Last but not the least; I would like to thank Adami Tulu Woreda Health Office especially malaria focal person because of his continuous support.

Table of contents

List of Tables

List of Figures

List of Acronyms and Abbreviations

AL	Artemetrine Lumefantrine
AOR	Adjusted Odds Ratio
CI	Confidence Interval
COR	Crude Odds Ratio
DHS	Demographic and Health Survey
EHNRI	Ethiopian Health and Nutrition Research Institute
FMOH	Federal Ministry of Health
FGD	Focus Group Discussion
IEC	Information, Education and Communication
IRS	Indoor Residual Spraying
ITN	Insecticide Treated Nets
KAP	Knowledge, Attitude and Practice
LLINs	Long Lasting Insecticidal Nets
MALTRIAL	Malaria Intervention Trial
MDGs	Millennium Development Goals
MIS	Malaria Indicator Survey
MOP	Malaria Operational Plan
PMI	President‘s Malaria Initiative
RBM	Roll Back Malaria
SNNP	Southern Nations Nationalities and Peoples
SP	Sulphadoxine-Pyrimethamine
UNICEF	United Nations Children‘s Fund
WHO	World Health Organization

Abstract

Background: In Ethiopia, despite the increasing availability of Insecticidal Treated Nets (ITNs); its use among net owning households has not been satisfactory. Hence, in addition to scaling up ITNs distribution, periodic assessment of the utilization and associated factors among high risk population is highly recommended.

Objective: The objective was to assess level of Insecticide Treated Net utilization and associated factors among under-five children and household net ownership in Adami Tullu District, Oromia Region, Ethiopia.

Methods: A community based cross sectional study was conducted in Adami Tullu district from February 10-20, 2014. Data was collected using structured questionnaire and observation checklist. Focus Group Discussions were conducted. Cluster random sampling technique was used to select the study units. Bivariate logistic regression was applied for the analysis of each of the independent variables against ITN utilization among under five children and household net ownership. Those significant variables were entered into model to determine independent predictors of both outcome variables.

Results: Household ownership of at least one ITN was 25.3%. The indoor residual spray (IRS) coverage was 97.0%. ITN utilization among under-five children was 63.9% for those owning at least one ITN. Awareness of sleeping under net every night prevents malaria [AOR (95%CI) =4.7 (1.1-9.6)], spouse education [AOR (95%CI) =1.74 (1.2-2.6)], and kebeles (i.e. Boccessa [AOR (95%CI) =2.2 (1.2-4.1)], Elka Chellemo [AOR (95%CI) =2.3(1.2-4.4)]) were the independent predictors of the ITNs ownership. While, ITN utilization among under-five children was affected by knowledge of ITN kills malaria mosquitoes [AOR (95%CI) =3.8 (1.15-12.4), knowing fever as a symptom of malaria [AOR (95%CI) =3.2(1.05-9.6)] and gender of the child [AOR (95%CI) =6.0 (2.5-12.8). Qualitative result found lack of understanding, fear of side effect and misuse of the nets as the main barriers of ITN use.

Conclusion and Recommendation: Even though the indoor residual spray coverage reached the national target (90%), the ownership of ITNs and the utilization among high risk population remained far from 2015 target of universal coverage and 80% utilization. Information, Education and Communication (IEC) on the ITN utilization need to address misconception regarding durability of ITNs and focus on avoiding gender discrimination among under-five child

1. Introduction

1.1. Background

Malaria remains a major public health and development challenge. It caused 216 million cases and 655,000 deaths worldwide in 2010, of which 81% of the cases and 91% of the deaths were from the sub-Saharan Africa (1). Children under the age five years are most likely to suffer from the severe effects of malaria because they have not developed sufficient naturally acquired immunity to the parasite. A severe infection can kill a child within hours (2).

Three-quarters of the landmass of the Ethiopia is defined as malarious (i.e. altitude <2000 m) and about 68% (>52 million people) of the population reside in these areas (1). Significant differences occur in distribution of both malaria cases and vectors within endemic areas of the same classification and the proportion of *P.vivax* is increasing in the hot and drier months from January to May (3). This seasonal increase may be due to *P.vivax* relapse and continued transmission when conditions for falciparum transmission are unfavorable.

The Presidents Malaria Initiative (PMI) was launched in June 2005 to rapidly scale up malaria prevention and treatment interventions and reduce malaria-related mortality by 50% in 15 high-burden countries in sub-Saharan Africa (4). PMI estimated national Long Lasting Insecticidal Net (LLIN) gap of about 6.75 million in 2012, including an estimated gap of 2.4 million for Oromia Regional State.

Huge progress has been made in scaling up key malaria interventions, Ethiopia falls short of reaching either Roll Back Malaria (RBM)‘s target goal of 80% coverage for key interventions or Ethiopia‘s even more ambitious goal of 100% household Insecticide Treated Net (ITN) ownership (5). A wide gap exists between coverage and utilization of ITNs (6). This shows that, mosquito net ownership in itself is not synonymous with utilization.

Hence, in addition to scaling up ITNs distribution, periodic assessment of the utilization and associated factors among high risk population is highly recommended (7). Thus, this study aimed at identifying potential factors associated with utilization of ITNs in the previous night among under-five children and household ITN ownership in a malaria-prone district of Eastern Shewa.

1.2. Statement of the problem

World Health Organization (WHO),estimates that 207 million cases of malaria occurred globally in 2012 (uncertainty range 135–287 million) and 627 000 deaths (uncertainty range 473 000–789 000) (8). *Plasmodium falciparum* causes most of the deaths in sub-Saharan Africa. An estimated 90% of all malaria deaths occur in Africa of which the majorities are children under five (91%) (7).

The use of ITNs is one of the main malaria control strategies in Ethiopia to reach the national targets to achieve malaria elimination within specific geographical areas with historically low malaria transmission and achieve near zero malaria death in the remaining malarious areas of the country (9).

In Ethiopia, the Federal Ministry of Health (FMOH) conducted continuously mass distribution of LLINs between 2005 and 2007, targeting to distribute two LLINs per household in malaria endemic areas and further 15 million were distributed in 2010 and 2011 to replace LLINs distributed previously (10). Despite this rapid scale up of each kebele since 2005, it is unlikely that all LLINs are still in use after six years (11). Identification of awareness gaps, monitoring of behavioral changes on malaria disease recognition and use of preventive and control measures such as the use of ITNs are a priority area for the Government of Ethiopia with a special emphasis on increasing coverage and use of ITNs as per the national malaria guidelines (11).

Increase in ITN access (i.e. household ownership) does not necessarily translate to equal increase in utilization (12). Because, the success of ITN utilization depends on several factors: such as, willingness of people to use nets, inconvenience to hang the nets, educational background, place of residence, age and gender differences, and colour of nets (11-12).

Oromia Regional state showed a decrease in net use by children under-five from 56.4% in 2007, decreasing to 55% in 2011 (13). In order to complete the Millennium Development Goals (MDGs) target, we are left with a time of less than a year. Thus, it is important to determine the actual levels of use and to take timely corrective actions. Therefore, the main purpose of this study was to assess Household ownership of ITNs and utilization as well as associated factors among children younger than five years.

1.3. Significance of the study

The finding from this study is considered to generate information that helps malaria control program to improve ITN policies and design interventions to prevent malaria. The result of this study helps to identify gaps in ITN utilization and to design appropriate information, education and communication (IEC) interventions towards improving its utilization among under- five children. The result will also be useful to evaluate the progress of the woreda towards achieving the regional and national target and to take immediate actions in planning and implementation of prevention and control strategies. It will be used as a base line for the District Health Office to develop appropriate strategies to increase ITN utilization among under-five children. Information generated in this regard also helps as a baseline for further intervention study of MalTrial project.

2. Literature Review

2.1. Malaria in Ethiopia

Two of the four *plasmodium* species are of epidemiological importance in Ethiopia. *P. falciparum* accounts for 60% and *P. vivax* for the remainder (3, 10-11). The four malaria vectors (*An. arabiensis, An. pharoencis, An. funestus and An. nili*) are widely distributed (3). However, *Anopheles arabiensis* is the most important vector and responsible for most epidemics in the country.

In Ethiopia, malaria is seasonal and unstable, causing frequent epidemics and it usually occurs at altitudes < 2,000 m above sea level (14). Occasionally, transmission of malaria occurs in areas previously free of malaria, including areas > 2,000 m above sea level. Most of the malaria transmission occurs between September and December, after the main rainy season from June to August (14). The trend analysis study in Jimma found that for transmission of malaria parasite, climatic factors are important determinants as well as non-climatic factors that can counteract climatic influences (15). Due to this, an increase in malaria cases occurrence from 2003-2005 with peak cases occurring in 2005 and malaria cases were reduced the following three consecutive years (2006-2008) but a remarkable increase in 2009 was observed in the study area.

Recent study on prevalence of malaria infection in Butajira area reported that, more children had malaria in the low altitude than in the high altitude, which suggest that the highland population has lower immunity to malaria, as a result it may end up in devastating outbreak, resulting in a substantial increase in morbidity and mortality among both children and adults (16). Similarly, Significant differences occur in Ethiopia in distribution of both malaria cases and vectors within endemic areas of the same classification (3). Household factors have been shown to contribute to differences in malaria between households in the same village. In a study of children residing in six highland villages near dams in Tigray, malaria incidence varied significantly by presence of seven household risk factors; including use of irrigated land, earth roof, animals sleeping in the house, no separate kitchen, windows, and open eaves. The proportion of infection among children exposed increased from 2.1% with one or no risk factor to 29.4% with five or more factors (3). This shows how much they could contribute to the malaria infection.

In addition to important contributions of increasing insecticide resistance, drug resistance, and climate change other key factors contributing to the persistent malaria burden include population dynamics, war and social upheavals, poverty, water resources and agricultural development (3). For instance, Ethiopia‘s 3% yearly population growth rate could alone account for a 30% increase in the number of malaria patients over a 10 year period. Despite the low parasite prevalence, malaria is still the leading communicable disease in Ethiopia (17).

2.2. Malaria prevention

The number of nets delivered to countries in sub-Saharan Africa dropped from 145 million in 2010 to 66 million in 2012 (18). Research shows that high ownership and use of ITNs reduce all-causes of mortality in children under five by about 20 % and malarial infections among children under five and pregnant women by up to 50 % (19).

In Ethiopia one of the prevailing challenges to the successful implementation of LLINs to protect people from malaria is increasing the consistent use of LLINs (11). There were also wide geographical differences in LLIN use, ranging from 25% in Oromia to 75% use in Gambella.

Ethiopia is one of the few African countries with a history of malaria control strategies for more than 40 years (3). With the change to a control program IRS was used more selectively to prevent or control outbreaks and epidemics. The basic principle is that female mosquito resting after biting on the sprayed surfaces of the house picks up a lethal dose and dies before from transmitting the parasite.

Recently, Ethiopia has set the goals, with respect to malaria control, to achieve malaria elimination within specific geographical areas with historically low malaria transmission and achieve zero deaths due to malaria in the remaining areas with malaria transmission, by 2015 (9). In relation to ITNs and IRS, the specific objectives related to the above goals are: to achieve 100% of households in malarious areas own, on average, two LLINs, at least 80% of people at risk of malaria use LLINs and to increase and maintain IRS coverage to 90% of households in IRS-targeted areas.

2.3. Historical overview of ITN in Ethiopia

The cornerstone for malaria disease prevention in Ethiopia is the use of LLINs (3). The effectiveness of this intervention depends on high coverage and effective utilization. Previously,

no nationally compiled data are available about number of nets distributed, household coverage, and net re-impregnation rates. However, commonly reported problems include lack of acceptance in communities without a tradition of net use, poor community participation because of required payment, improper use of nets, frequent net damage without repair, and poor participation in re-impregnation. In order to address this problems, the key strategy used by the country is a rolling periodic (every three years) free distribution of LLINs to all population groups living in endemic, high and moderate malaria risk areas of Ethiopia (14).

The first largest ever distribution campaign in Ethiopia was conducted from September to December 2005, in which more than 3 million ITNs were distributed (20). Sixty percent of these nets were LLINs. ITNs are generally distributed in areas where malaria transmission occurs for more than 3 months of the year. The ITN distribution system through the public sector gives priority for free distribution to pregnant mothers and children under five years of age in targeted high priority areas.

Children under five years of age are especially vulnerable to malaria and are targeted as high priority groups for ITNs (20). Therefore, households in targeted areas with children under five years of age have a greater chance of getting free ITNs through the public distribution system The distribution was continued and more than 20 million LLINs were distributed in Ethiopia between 2005 and 2007 and further 15 million were distributed in 2010 and 2011 to replace LLINs distributed previously and no more non- LLINS will be distributed in Ethiopia (11). Despite this rapid scale up of each kebele since 2005, it is unlikely that all LLINs are still in use after six years.

2.4. Utilization of insecticide treated nets in Ethiopia

Ethiopia‘s 2007 National Malaria Indicator Survey (2007 MIS) was a large, national representative survey of coverage of key malaria interventions (21). According to this survey, the coverage for ITN possession was relatively higher, about 66% of the sampled households owned at least one ITN and 65% of them possessed at least one LLIN. This is a great improvement compared to the finding of EDHS 2005 in which only about 6 percent of households in Ethiopia own a mosquito net whether treated or untreated (20). The poorest households (predominantly rural) ownership of at least one net is high compared to wealthiest households. This could be due to free distribution of nets in rural malarious areas. In malarious

areas, ITN use by children under age five years has increased to nearly 42% in those households that own at least one ITN. In Oromia, about one fourth (national average: 42%) of under five children slept under LLINs the night preceding the survey.

The 2011 MIS finding was challenging, with declines in the percentage of households that had at least one net (13). For households living <2,000m (i.e. in malaria-endemic areas), Amhara Region reported the highest LLIN coverage, with 73.6% of surveyed households having at least one LLIN, while Oromia had the lowest coverage at 44.3%. Net-use rates in households that owned a mosquito net or LLIN demonstrates favorable trends of behavioral change toward net utilization.

Nationally, the percentage of children under-five who had slept under a mosquito net the night preceding the survey increased approximately by 4% from 2007 to 2011 (13). Use of LLINs among children under-five in households <2,000m with nets was nearly the same, based on the gender of the child (girls (65.4%) and boys (64.1%)) and wealth quintile of the household (63.6% and 64.0%). The survey showed difference on the age of the child and children under age 12 months (71.4%) was modestly higher than among most other age groups. Oromia Regional state showed a decrease in net use by children under-five from 56.4% in 2007, decreasing to 55% in 2011. This might affected the national coverage since Oromia is the largest region with the majority of the land conducive for malaria transmission. Further research is needed to identify factors associated with the decline in bed net ownership and utilization between 2007 and 2011 in children less than five years in Oromia Regional State in order to achieve the national and regional targets.

A study carried out in 2011 in the highlands of western Kenya showed that despite current high net ownership (>71%) within the highlands, actual usage remains low, with only approximately slightly more than half of the residents who own nets reporting net use (22). Low education level of the head of the household and seasonality are the main factors which affected the ITN utilization. The vast majority of the population was not willing to use the net during dry season because of hotness, discomfort, low mosquito density and other reasons. The age specific ITN usage across the age groups was significantly higher for children under 5 years (percent usage of 78.4%) than other age groups. But, this is not the case in Oromia; where the under-five children access to utilize ITN is lower than other members of the household (13).

A comparative intervention study among less than five children in Nigeria found that ownership increased from 58% at baseline to full coverage and utilization of less than five children increased from 57% at base line to 83 % among the intervention group (23). There was around 13% increase in the control group, but this was not statistically significant and it is only half of increase in the intervention group. This study showed 93% decrease in the prevalence of malaria among the intervention group. However, this much decrease might be confounded by other factors.

Deressa et al; study in Amhara and Oromia Regions revealed that out of 2874 surveyed households about half (49.1%) of them reported at least one ITNs (24). According to this study, only 22.9 % (47.9% in Amhara) of children under-five had slept under an ITN the night preceding the survey in Oromia. This study further reported that among ITN-owning households, 63.0% of all children under the age of 5 years had slept under an ITN the night before the survey. Oromia Regional State owned and used relatively lower than other large regions like Amhara Regional State. In addition, this study revealed that coverage of ITNs varies at times and from one area to another, depending on the timing and completeness of the local distribution of ITNs. Therefore, regular, area specific rapid assessments of household possession, use of nets and respondent‘s knowledge is crucial to complement ongoing free distribution.

Another similar cross sectional study in Oromia and Amhara Regional States reported a wide gap between ownership and utilization (91% and 35%) respectively (25). The possible reason for ownership might be free distribution of ITNs prior to the time of the study. The perception that the ITN was no longer effective if not re-treated was the single most important reason explored by qualitative finding of this study.

A cross sectional study in 2011 in SNNP revealed that around two third (60.5%) of all net-owning households (67.5%) reported that they had used a net the previous night (26). The household utilization is high according to this study. But, only 9.4% were used by children alone and the highest proportion of all mosquito nets were used the previous night by the households‘ mother, father and youngest child or mother and youngest child together. This indicates that priority is not given to children of under five years old as a vulnerable group. Additionally, this study identified possible reasons for not using ITNs among households like too old or torn, too

dirty and unavailability of nets. Around one third of the nets were thrown away before 12 months old.

2.5. Knowledge, attitude and perceptions of care givers

Study on knowledge of malaria and its association with malaria related behaviors in Ethiopia reported a wide gap between awareness of the study subjects to associate mode of malaria prevention by ITNs via protection from mosquito bites and knowledge of the symptoms of malaria (27). For instance, majority of women had heard of malaria in this survey and about one third of them (31.5%) reported that nets or ITNs could prevent malaria. According to this study, the proportion of women who answered correctly to the knowledge of the prevention of malaria is almost similar among the overall women and women with under-five children

Similarly, analysis of malaria indicator survey 2007 revealed that of 4,438 surveyed women, more than three fourth (79.5%) had heard of malaria (28). However, only half of them recognized fever as a sign of malaria, 1,763 (41.2%) mentioned mosquito bites as the cause of malaria, and 1,792 (38.2%) cited mosquito nets as a prevention method for malaria. In addition, this study shows that even though there is awareness in the community, the knowledge towards malaria prevention using insecticide treated nets remained low, which needs further study. Since ITN is an effective mechanism of malaria prevention in Ethiopia, it is important to assess knowledge and perception of mothers towards ITN utilization.

A study about ITNs usage against malaria in Tigray Region found that three fourth of the respondents claimed that children under-five years of age should be given priority to sleep under ITN in the household (29). Even though the attitude of the respondents is high concerning priority group who have to use ITN most, the actual utilization is questionable because, out of 260 nets observed, only 12.3% of the nets observed were found to be hanging and ready for use. Furthermore, slightly less than two third (63.04%) of the interviewees had positive attitude towards buying ITNs if supplied by some body or organization with an affordable price while the rest of the respondents, about one third preferred free distribution by the government.

The Nigerian study of Aluko and Oluwatosin revealed that women showed different kinds of attitudes towards utilization of ITNs in their responses: while majority were uncertain, quarter of them showed negative attitude which did not favour the utilization of ITNs (30), which is

opposite to the above study in Tigray Region of Ethiopia (29). Only 21% of women showed positive attitude towards ITN utilization.

A cross sectional study of the relationship between care-givers‘ misconceptions and non-use of ITNs by under-five Nigerian children found that the level of misconception about the cause of malaria, prevention of malaria and knowledge of ITN had a significant effect on ITN utilization among under five children (31). For example, caregivers with misconceptions about prevention of malaria were about 20 percent less likely to own and use a net. According to this study, caregivers with correct knowledge of prevention of malaria were about 18 percent more likely to own and use a net compared with their counterparts who did not own a net. Even though, the perception of the majority of caregivers about the cause of malaria is mosquito bite**,** majority of them had misconceptions. Similarly, cross sectional study on Bioko Island, of Equatorial Guinea found that knowledge of prevention and transmission of malaria were associated to household ITN ownership (32).

2.6. Factors associated with utilization of insecticide treated nets

A cross sectional study conducted in 2012 in Eastern Hararge (Gursum) showed that households who received or were told about ITN were three times more likely to have used it than those who were not (33). According to this study, mass media was the first important source of information on malaria cited by respondents followed by health workers, local village leaders, health extensions workers, and neighbors. This study further reported the presence of under-five year‘s old children in the household was strongly associated with ITN ownership than its utilization. The recent study in the Kersa demographic surveillance site didn‘t found an association between presence of under-five and ownership (34).

In Contrary to, Kersa study, another cross sectional study in south central Ethiopia reported the association between illiteracy and high LLIN ownership among households (35). According to this study, there was a difference in LLIN ownership in terms of geographic location i.e. low LLIN ownership in the high altitude area despite the increase in malaria prevalence in the high altitude fringe zone. Moreover, gender difference was also found in which male headed households were more likely to own LLINs

Another comparative cross sectional study based on 2006 baseline and 2007 MIS in three largest regions in Ethiopia identified several factors independently associated with increased net use (36). One of the factors is age in which those 25 to 49 years were more likely to use net compared to under-five year old children. In addition to age difference, female gender increasing, proportion of good nets (without holes) in household; and increasing net density were associated with ITN utilization in both surveys with the addition of women‘s malaria knowledge and urban clusters in MIS 2007. This study showed that ITNs are available within the household, but, under-five children‘s are still not using it. This raises the interest to study factors associated with ITN utilization among under-five children in malarious areas.

The prospective cohort study that was undertaken in Channo Mille District reported that the ITN use fraction reached to a maximum only two third despite near universal coverage (37). The study further reported low ITN utilization among children below five years and pregnant women compared to that of other adults. Similarly, study in Kenya found the non use of ITN even after mass distribution due to lack of convenient space to hang more than one ITN (38). Before mass ITN distribution, the most frequent reason for not using ITN was having worn out bed nets. Being male, younger age (mainly 15–24 years) and living away from the vector-breeding site were less likely associated to ITN use.

A comparative cross sectional study in southwest Ethiopia reported ITNs ownership of 56.6 % (39). Although the ownership of at least one ITN is higher in Gilgel Gibe, the control population was twice likely to have slept under a bed net the previous night compared to respondents from Gilgel Gibe. Different sociodemographic factors like age, marital status, wealth index and distance to nearest health service, accessibility to transport, residence and household size were responsible for higher utilization of LLINS among the controls. Important variables such as gender, educational status and occupational status of household heads did not show a significant association with ownership of LLIN.

According to the study done in Ghana, the use of ITN as a preventive measure not only prevents malaria but could also help improve other health indicators (40). However, not all under-five years old children are using the net because of age based discrimination. This means, as the children advance in age, the probability of sleeping under ITN falls. However, this finding was in contrary to the study in Nigeria, which didn‘t found an association between age and under-five

use (41). Both of the studies found positive association between areas of residence and low-income households with utilization of ITNs among children aged-under five. The Nigerian study also found negative association between education and household ownership which was similar to study in south central Ethiopia (37).

2.7. Barriers towards Insecticide treated net utilization

According to the study in Kersa District, only one fourth of household members, including less than half (46.6%, n=767) of children under five slept under LLIN (34). The study identified the main barriers to utilization of LLIN like low educational level of women, low awareness on malaria prevention, unavailability of separate sleeping room, LLIN colour preference, and unavailability of enough LLINs to household members. Similarly, the Kenyan study found Low education level of the head of the household and seasonality as a main barrier which affected the ITN utilization (22).

In addition, recent cross sectional study which was undertaken in Kenya found affordability as the main barrier (38). The qualitative data suggested other barriers like size, colour and shape of ITNs as majority of the participants preferred nonwhite and round nets. According to this study, in addition to affordability, the other non-financial barriers are important to ITN access. Similarly, the study in Oromia and Amhara Regional State found ITN characteristics like age, shape, and free vs. purchased and whether the household had been sprayed with IRS had a significant impact on whether an ITN was used or not (25). Another study reported the age, lack of cleanness and unavailability of nets as a main barrier (26).

Generally, there is a wide gap between ownership and utilization of insecticide treated nets. Even though there was much progress from DHS 2005 to MIS 20O7, the improvement was not satisfactory between the MIS 2007 and MIS 2011. Rather, it showed decrease in net utilization especially among children of less than five years. It remained unacceptably low in Oromia Regional State where the majority of the land is malarious. Even though there is continues distribution of ITNs with in the country, there is scarcity of studies to identify ITN coverage of households and possible factors associated with ITN utilization for children of less than five years separately. Therefore, further research was needed to identify factors associated with the decline in bed net ownership and utilization between 2007 and 2011 in children less than five years.

Most of the studies tried to identify factors associated with ITN ownership and utilization. This might vary from place to place. Even though a number of studies have been done in the past, majority of them are on a wide scale comparing the different regions of the country and the factors associated with ITN is not well studied specifically for under-five children. In addition, most of the studies focus on the analysis of already available data. Most of the Woredas in the Oromia are malarious and Adami Tulu is one of them. Therefore, it is of paramount importance to study factors associated with ITN utilization on small scale in one of the malarious area of the region which is Adami Tulu District.

2.8. Conceptual framework

The utilization of ITNs is influenced by the socio demographic factors like age, sex, education level, occupation, and marital status that work through the intra-household factors like number of household occupants, sleeping room and sleeping arrangement. Utilization is also influenced by perceptions towards ITNs, knowledge on cause and prevention of malaria and proper use of ITNs in terms of consistence in usage. Different studies showed that ITN use by children under-five was associated with their mother‘s malaria Knowledge , living in a household sprayed with insecticide in the past 12 months, increasing number of household ITNs and decreasing household size, education of the head of the household and household ownership of at least one ITN.

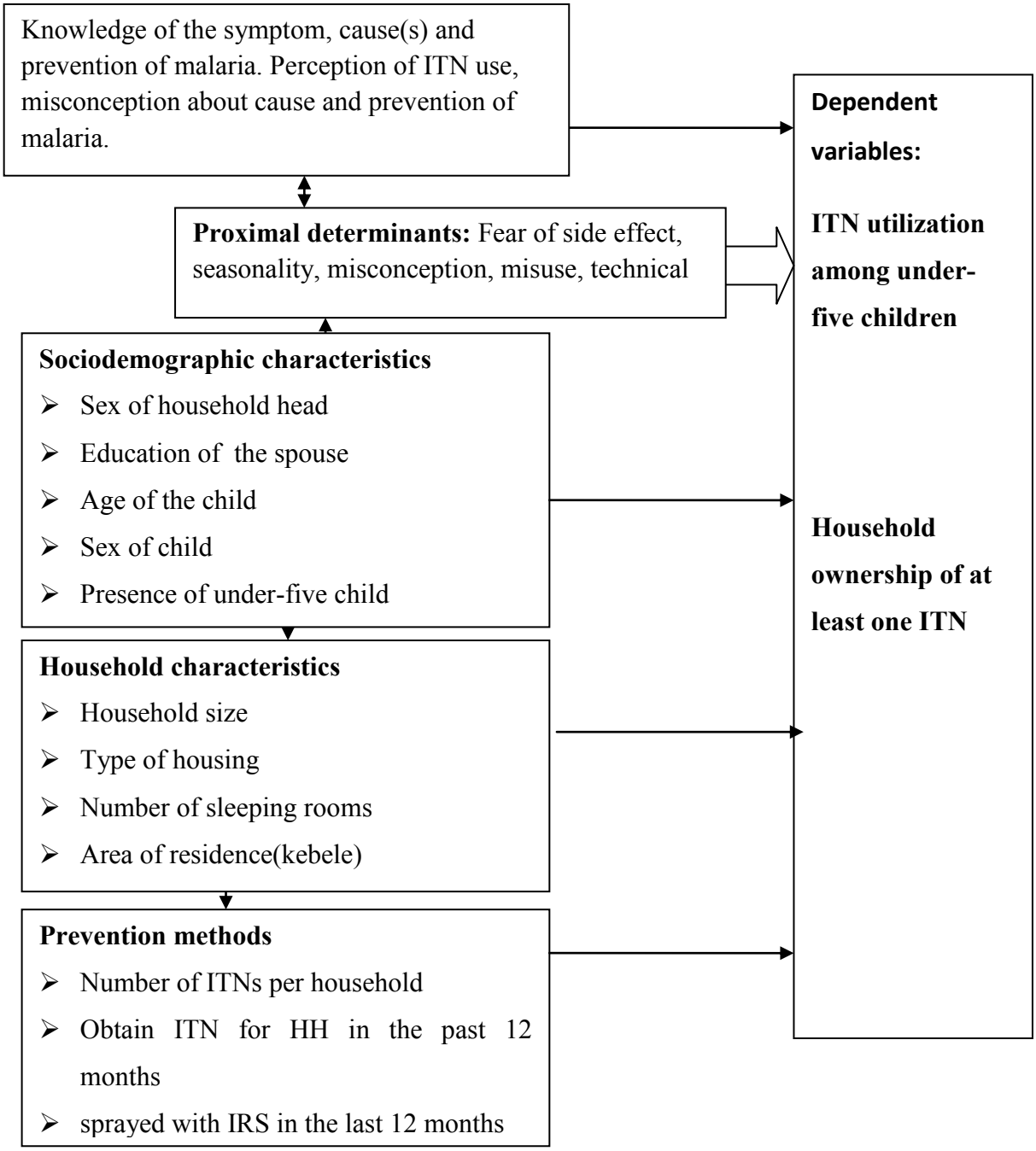

Figure 1: Study framework for the assessment of ITN utilization among children of less than five years and Household net ownership in Adami Tulu District, February, 2014

3. Objectives

3.1. General objective: The overall objective of this study was to assess insecticide treated nets utilization among under-five children, household net ownership and associated factors in Adami Tulu District, Oromia Regional state, Ethiopia.

3.2. Specific objectives

- To identify household ownership of insecticide treated net(s)
- To describe level of utilization of insecticide treated net among under five children
- To determine factors associated with ITNs utilization among under five children

4. Methodology

4.1. Study area and study period

This study was conducted in Adami Tulu District of east Shewa Zone in February 2014. East Shewa Zone is divided in to 12 woredas. Adami Tulu District with an area of 1403.3 km^2 is bordered by SNNP's Regional State in the west, Dugda-Bora in the north, Arsi Zone in the east and Arsi Negele in the south (42). Geographically, the area is located between 38°20' and 38.5°5' and 7°35'and 8°05. The District lies at an altitude between 1500m and 1600m above sea level .The people are predominantly subsistence farmers belonging to the Oromo Ethnic Group and are primarily Muslims. The District is administratively organized into 62 rural and four urban kebeles (the lowest administrative units in the country). Ecologically, Adami Tulu is found in the Central Rift Valley of Ethiopia, and it is located at 160 km away from Addis Ababa (43).

People in the area live in circular tukuls with thatched conical roofs and mud or thatch walls. There are a few rectangular houses with roofs of corrugated metal sheets. Malaria transmission in the District is seasonal and epidemic type, peaking from September to December. Severe malaria epidemics occurred in the area in 1991, 1998 and 2003. Two species of Plasmodia are present in the area; *Plasmodium falciparum* (about 70%) and *P. vivax* (about 30%) (42).

4.2. Study design

A community based cross-sectional study complemented with qualitative study was conducted in randomly selected rural kebeles for MalTrial project in Adami Tulu District.

4.3. Source population

The source population was all under five-children and their mothers/ care takers in randomly selected rural kebeles of Adami Tulu District.

4.4. Study population

All randomly selected households and under five-children eligible for the study were included. Eligible children were defined as those who were under-five and stayed in the household the night before the interviewer's visit. Mothers/care taker or other adult above 18 years of age were included and if there was more than one woman/care taker in the household, one with under-five children was selected for the study. If there were both male and female care takers, the female one was selected for interview.

4.5. Sample size determination

Quantitative: The required sample was calculated using Epi Info version 3.5.3 software package based on the following assumptions: It was determined based on the single proportion for cross-sectional survey assuming 55% of the proportion of children had slept under ITN among ITN owning households during the previous night and 44.3% of households with one ITN in Oromia (13). Assuming 5% margin of error at 95% percent confidence level and assuming 1.5 children per household from DHS 2011(20) of the 15.4% proportion of under-five, sample size was calculated for both outcome variables and largest sample size was taken in order to address the objectives

Table 1 Sample size calculation for household ownership of ITN and utilization among under-five, Adami Tulu district, February 2014

Dependent variables	p	q(1-p)	Margin of error, 5%	Zα/2, 95% CI	Base sample size	Child/ HH	Design Effect	Non-response	Final sample size
ITN utilization among U5	0.55	0.45	0.05	1.96	**380**	1.5	1.25	5%	748HHs
Household ownership of one ITN	O.44	0.557	0.05	1.96	379	_	1.25	5%	498HHs

The following formula was used to calculate the sample size:

$$N = \frac{(Z\alpha/2)^2 P(1-P)}{D^2}$$

Where n= sample size P =55 % (Proportion of <5 children using ITN) and 44.3 % (proportion of Households with at least one ITN).

Z α/2=1.96 (Z=score corresponds to 95% confidence interval), d= 0.05 (Margin of error)

The sample size was calculated for both outcome variables, considering design effect of 1.25 %

(44) and 5% non-response rate. Finally, 748 households were taken as final sample size because it was the largest one and helped to address our objectives of household net ownership coverage in addition to utilization among under-five.

Qualitative: Four groups of FGD participants were selected by the investigator purposively in consultation with the Kebele (small administrative units) leaders and health development army. All groups contain at least 7-8 women who had at least one child aged less than five years old. This is helpful to handle the discussion easily and to avoid side conversation. Total of 30 mothers with under-five children were recruited for discussion and saturation was reached at the last FGD.

4.6. Sampling procedures

The district was purposely selected to represent malarious areas of East Shewa zone. Study units were identified by Cluster random sampling technique. Out of 62 rural kebeles, four of them were selected (Anano Shisho, Boccessa, Elka Chelemo and Gallo Heraphe and) for MalTrial and all of them were included in our study.

There were 30 Gares (used as clusters in our study) that were selected from kebeles of the MalTrial project. The number of households in each cluster varies from 15 to 72. Since our sample size is 748 we used all Gares by selecting at least 25 households from each Gare using table of random numbers by Excel Computer program. Those clusters with less than 25 households were combined together as one cluster while those clusters with above 50 households were divided into two based on their proximity of geographical location. Therefore, (Jawe (17) + Madda Galli (15), Warashmana Barkota (22) +Warashmana Hacara (21)) were combined together while two Gares with more than 50 households were divided into two (Qoboo Imano (72) and Bomba (57). Finally 30 clusters and 25 households were used for data collection and 748 households involved in the study.

For the qualitative part, purposive sampling was employed to get mothers with under-five children in all randomly selected kebeles.

4.7. Inclusion criteria

All households who were permanent residents and under five years old children of the randomly selected rural kebeles were included.

4.8. Exclusion criteria

A child who didn‘t belong to the household member and respondent who had not slept in the household in the previous night prior to survey were also excluded from the study.

4.9. Data collection and questionnaires

Quantitative: Data collection was undertaken from Feruary10-20 2014. Using interviewer administered structured questionnaire which was adopted from Ethiopia MIS 2O11 (13).It was adjusted to the objective of the study and includes questions about the respondent‘s socio-demographic characteristics, knowledge and perception about malaria and ITNs, and household possession and utilization of each individual child in the household during the night preceding the survey. The questionnaire also contains observational check list containing variables such as number of ITN and number of beds available in the household, number of ITN already hanged for use and the condition of the net that was used for observation (see Annex II). In households where ITNs were reported to be present, interviewers observed and confirmed the presence of the net using the checklist. Moreover, when the mosquito nets were reported to be in use at that time, the interviewer checked if the net had been hanged at the place where people sleep during the interview in the day time.

The questionnaire was prepared in English and then translated to Afaan Oromo (see Annex V) by investigator and translated back to English to check the consistency. Data was collected from households where there were married couples, the husband or the wife (wife preferred if both available at the same time) responded to the questionnaire. In case (when there were no married couples), the head of the household or other adult person responded to the questionnaire. If the appropriate respondent was not available in the house during initial visit, revisits were done on the next day to contact the appropriate person.

Qualitative: During FGDs, participants were informed about the purpose of discussion to obtain verbal consent from each of them. Semi-structured discussion guide was developed and held with mothers of under-five children from each of the four kebeles to explore and understand perceptions and barriers towards use and non use of ITNs among under-five children (see Annex III). Based on the objectives of the study the main themes were perception about cause and prevention of malaria, perception about vulnerability of children, benefit and side effects of ITNS and barriers towards ITN utilization. The discussion was facilitated by Principal investigator using a check-list and all the discussions were tape recorded. The note taker was assigned by the investigator. The recorded data was transcribed in Afaan Oromo and then translated into English word- for- word. It was supplemented with field note in any case there is a difficult of identifying

the audiotape record to clarify the ambiguity. Translation into Afaan Oromo was verified by investigator.

4.10. Data quality assurance

To maintain the quality of the data structured and pre-tested questionnaire was used to collect information. Pretest was done in a village which is similar to and out of study Gares/clusters/ and appropriate corrections have been made to the questionnaire. Training was given to data collectors for one day on how to conduct the interview, content of the questionnaire, and ways to approach respondents. Pretest was done on the second day on 30 households. Data collectors were recruited with the help of supervisor.

Data was collected by eight peoples with at least diploma level in Nursing and Medical laboratory technology for 10 days. Six of the data collectors were from Malaria Intervention Trial field team who had the experience of data collection. They knew all the Gares and respective households in each of them because they have already participated during base line survey of the project. One supervisor from malaria intervention trial field team and principal investigator supervised the overall data collection process. Questionnaires were checked for completeness every night during data collection and incomplete ones were sent back to the data collectors for checkup under supervision. The supervisor and principal investigator checked the filled questionnaire during the field work. Five percent of the data have been entered to check the consistency of the data before actual data entry.

FGDs were conducted in Afaan Oromo (see Annex V).Correctness of transcription was checked for 5% of all the audio tapes. Minor corrections, such as incomplete responses to the questions, were checked in comparison with note and corrected on subsequent transcriptions. Principal investigator entered each transcript into Microsoft WORD. Participants gave their ideas freely throughout the discussion until the idea was saturated.

4.11. Study variables

Dependent variables: ITN utilization by under-five children for each child the night prior to interview and Household net ownership of at least one ITN.

Independent variables:

- Socio-demographic: sex, education, kebele, age, sex and number of U5 child.
- Household: family size, roof of house, number of sleeping room, house sprayed, get ITN in the past 12 mths, number of ITN in the household.
- Knowledge and perception: knowledge of cause, symptom and prevention. Perception and misconception about cause and prevention of malaria

4.12. Data analysis

Data was checked for completeness and entered in to Epi info version 3.5.3 computer software packages. Data was exported to SPSS (statistical package for social sciences) version 21.0 computer software package. Then cleaned, labeled and recoded in SPSS. All categorical variables were dummy- coded. Ownership of ITNs was assessed at a household level, while ITN usage focused on children under-five years in households with at least one ITN.

The knowledge section included one question each assessing the cause, symptoms, prevention of malaria and knowledge ITN kills malaria mosquito and ITN protects against malaria. For the purpose of analysis, these questions were converted into five dummy variables: ―perceived benefit of sleeping under net every night prevents malaria, mosquito bite causes malaria? ―Is fever a symptom of malaria?" ―Knew ITN kill malaria mosquitoes", ―Knew ITN prevents malaria" four of them with a Yes or No value and one True, False and Not sure option. Frequency distribution tables and figures were used to quantify them. Most of the questions had a different number of potential correct answers and respondents were allowed to give more than one answer.

Misconception of the respondents was calculated for both knowledge of cause and prevention of malaria. For example, for cause of malaria there were 7 different options including the correct answer. They are Mosquito bite, eating immature sugarcane, eating maize stalk, hunger (empty stomach), exposure to cold or changing weather, witchcraft and exposure to dirty swampy areas. Those six variables were first recorded in SPSS to give large number for those who didn't have

misconception and added up in EXCEL program. The mean was calculated in SPSS and those below the mean were identified as with misconception. The same calculation was done to calculate the misconception of prevention of malaria.

Bivariate logistic regression was used for the analysis of each of the independent variables against the dependent variables separately. Those significant variables at 0.2 were entered into multivariate model to determine independent predictors of net utilization among under-five children and household net ownership. The level of significance was set at 95% ($p < 0.05$) for statistical significance in the model.

–Open code" was used for the analysis of qualitative data by sorting information, looking for similarities, differences or contradictions. English transcripts were read and re-read to develop codes that identify important and common concepts related to the main themes of the study. The data was coded, categorized and appropriate themes developed. Field notes and original transcripts were looked upon when more information/ clarity were needed during coding, analysis and write up. Finally, the qualitative data was summarized and presented along the main themes to complement the quantitative data.

4.13 Operational definitions

Household: - A household is defined as a group of people living in the same area and who share a common source of food and/or income. Houses with only one person were also considered as household.

Household ownership of ITNs: - Households were considered as ITN owners if they had at least one LLIN at the time of the interview. All nets were considered as ITNs in our study.

Insecticide Treated Mosquito Nets:- Nets treated with insecticide to kill or irritate mosquitoes and used as physical barriers.

LLIN utilization: -A Child that was reported to have slept under ITNs during the night prior to the survey interview was considered as user.

Long Lasting Insecticide Nets: - is a net treated with insecticide by the manufacturer and does not need to be retreated until after 20 washes or four years of use. That was considered as ITNs in our study.

Hole: - A net was classified as having holes if it had any finger-sized hole or larger

4.14. Ethical consideration

Ethical clearance was obtained from Ethical review committee of School of Public Health, Addis Ababa University. Formal letter have been written for Adami Tullu health office. The letter was written for each of respective kebeles from Woreda Health bureau and informed before going for data collection. Households of study kebeles were told about the objectives and aims of the study in detail. Participants were informed that their participation is purely voluntary and assured of the confidentiality of all information.

4.15. Dissemination of findings

The final report will be presented to College of Health Sciences, School of Public Health, Addis Ababa University. Copies will be provided to Oromia Regional Health Bureau, Zonal and Woreda Health Office of Adami Tullu woreda. It will be disseminated through publication of the findings, in peer-reviewed reputable journals and presentations on scientific conferences.

5. Results

5.1. Socio-demographic Characteristics of the respondents

Seven hundred forty three households are included in the study with a response rate of 99.3%. About half (50.5%, 375 of 743) of households have at least one under-five child in the household. The total population of the studied households was 3,900 with an average (±SD) household size of 5.25 (±2.4) and range of 1-14. The proportion of under-five children from the total population was 14.1%.

More than two third (68.5 %, 509 of 743) of the respondents were females and the relationship of the respondents to the head of household was husband/wife for 55.5% and head of household for 37.3%. Concerning religion, majority of the respondents were Muslims (65.3%). In the area of ethnicity, majority of the respondents were Oromo (86.3 %) (Data not shown)

The mean age (±SD) of the respondents was 34.4 ±12.2 years, with majority of the participants in the age range of 18-30. Around 549 (73.9 %) of the respondents were married and about 467(62.9%) had no formal education. Most of the households were headed by males 584(78.6%). Two hundred seventy six (37.1%) of the respondents and one third (33%) of the spouses of the respondents had formal education and majority of them were in junior secondary school in both cases. The main occupation of the respondents was farming 382(51.4%) followed by housewife 265(35.7%). The mean age of under- five children in the study was 29.05±15 months. The majority of roof of house was corrugated iron sheet 426(57.3%).The average number of rooms observed per household were 1.54 (±SD 0.54).(data not shown)

The mean number of individuals per household who slept under ITNs last night was 2.72 (±SD 0.88). The mean number of ITNs among households with at least one ITN was 1.16(±SD .37). On average, 1.63(SD ±.549) separate beds/places of sleep were observed in the household. But, only .68(±.555) of them were with ITN hanged (data not shown).

Table 2 Selected socio-demographic Characteristics of the respondents, Adami Tulu district, February 2014.

Variables	Frequency (n=743)	Percent
Sex of HH head		
Male	584	78.6
Female	159	21.4
Sex of respondent		
Male	234	31.5
Female	509	68.5
Age (739)		
18-30	344	46.5
31-44	221	29.9
≥45	174	23.6
Education of spouse		
No education	498	67
Yes	245	33
Household size		
<4	297	40
>=4	466	60
Under-five child in household		
Yes	375	50.5
No	368	49.5
Roof of house		
Corrugated Iron Sheet	426	57.3
Thatched and others	317	42.7
Total no of sleeping room		
One	362	48.7
To and above	381	51.3

Others occupation*- Fishery, Student, others ethnicity-Zay, Others roof-dobba, no education includes those with no spouse

In FGDs, the mean age of the participants was 28.3(±4.4) and ranges from 20-38 years. Half of the participants were literate (had formal education) and around three fourth of them were Muslims in religion. On average each mother had 1.5 children and 17(56.7%) of the participants were housewife in occupation followed by farming (40%). The result of FGD is summarized in the following paragraph.

Majority of the participants knew the cause of malaria. All of the participants agree with vulnerability of children and pregnant women. For most of the participants washing clothes of the children and praying to Rabbi were prevention methods in addition to cleaning environment and hanging the nets. The participants said that ITN has no side effect as far as it is used appropriately. Rather, it protects against malaria and other insects like housefly and fleas. Lack of understanding, fear of side effect and using the net for other purposes like carrying harvest materials, covering the toilet were among the barriers mostly discussed. Majority of participants had misconception concerning ITN utilization throughout the year. Finally, education was explained as the best way to increase utilization among under-five children.

5.2. Knowledge and misconception of malaria and ITN(s)

Majority of the respondents, 694 (93.4%) considered malaria as a major health problem in the community and about 647(87.1%) stated fever as a symptom of malaria. Feeling cold and chills were also reported by 638(85.9%) and 598(80.5%) respectively. Even though six hundred seventy (90.2%) reported mosquito bites, 43.7% reported eating maize stalk as a cause of malaria. Exposure to dirty swampy area (36.6%), exposure to cold weather (26.6%) and hunger/ empty stomach (25.7%) were also reported causes of malaria.

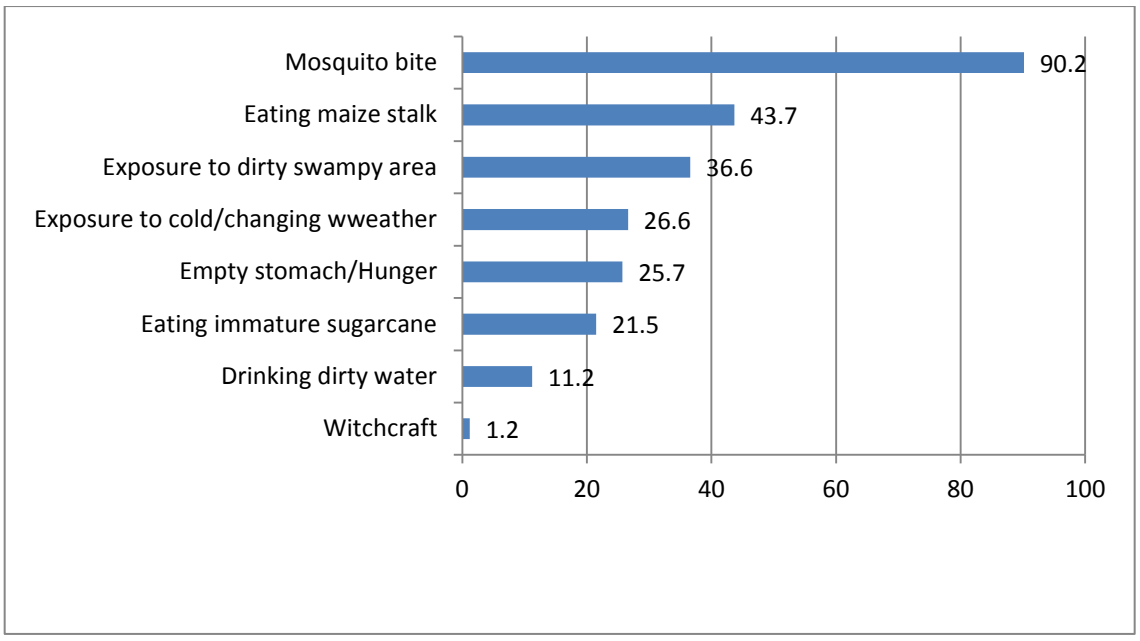

Figure 2 Respondents perception of the cause(s) of malaria in Adami Tullu District, February 2014

Almost all of the FGD participants mentioned mosquito bite as a cause of malaria though they explained it in different ways. One of participants said *~~if~~ there is stagnant water on the ground around the bed; mosquito will rise and bite peoples during night time." (25 years, Grade 2, Muslim mother of 2 children, Elka chellemo kebele)*

Sleeping under mosquito net every night prevents malaria was true for 690(92.9%) of the respondents. Spraying the house and draining mosquito breeding site were among the main prevention methods for 718(96.6%) and 438(59%) of the respondents, respectively (Fig. 3).

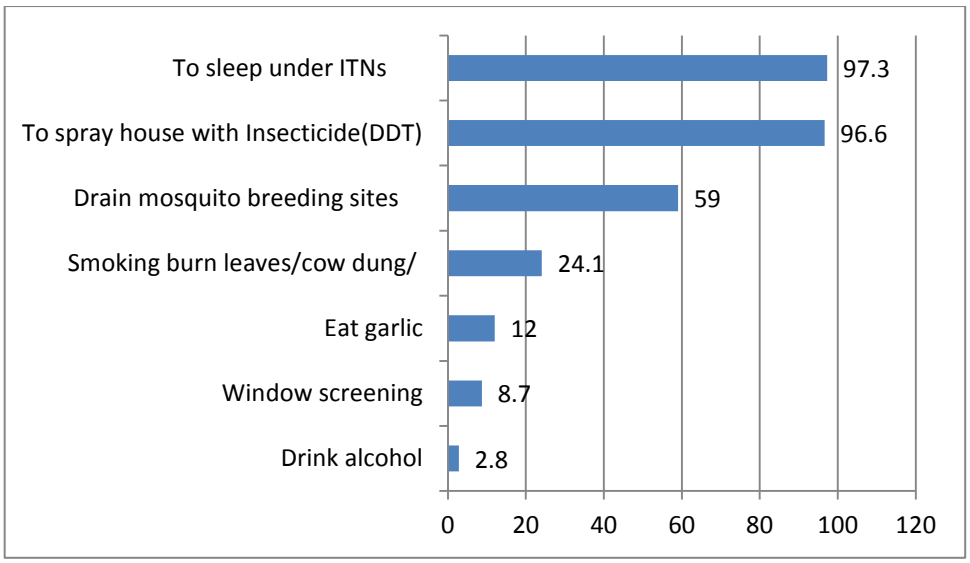

Figure 3 Respondents‘ knowledge of how to prevent malaria, Adami Tullu District, February 2014

Majority of the respondents knew how to prevent malaria. On the other hand, some of them (32.2%, n=239) still had misconception about it (Table 3).

Table 3 Respondents‘ misconception about cause and prevention of malaria, Adami Tulu District, February 2014.

Misconception of malaria	N(743)	Percent
Misconception of cause of malaria		
with misconception	355	47.8%
w/o misconception	388	52.2%
Misconception of prevention of malaria		
with misconception	239	32.2%
w/o misconception	504	67.8%

Majority of the FGD Participants discussed role of ITNs in prevention of malaria even though they add their own perception like washing the clothes of children, cleaning eating materials and digging toilet at distance from the home.

"By draining water in front of the home, using net hanging correctly, cleaning one own house, washing clothes of the children and cleaning eating materials."(38years, Orthodox mother of one child in Boccessa kebele)

All of the respondents had awareness about ITN. Out of this, 653(87.9%) of the respondents mentioned that ITNs are used to kill malaria mosquitoes and three fourth (75.8%) of them said that it protects against malaria. More than half (53.8%) of the respondents mentioned that it protect against the bite of nuisance insects.

Table 4 Respondents awareness and knowledge of the use of ITNs, Adami Tullu District February 2014.

Number(%) of respondents who ever heard about ITNs	**743 (100%)**
Benefits of ITNs	n(%)
To kill mosquitoes	653(87.9%)
To protect from malaria	563(75.8%)
To protect from the bite of nuisance insects	400(53.8%)
Used as a mattress	76(10.2%)
Used as a curtain	67(9.0%)

*Multiple responses possible ITNs-Insecticide treated nets

FGD participants discussed that ITNs could prevent malaria if used in appropriate manner and most of the side effect occur due to technical problems. One of participant said *"specially, it needs great care for the children. If it burns you during the night time, you will feel it throughout the day. Specially, when the net is new, it should be hanged correctly since it has the chemical at the beginning. We can take care of U5 Children by correctly hanging the net and inserting under the bed or mat in all directions."(35 years Muslim mother of 2 children in Gallo Heraphe kebele)*

"We have seen peoples who use close to their body and affected most. Otherwise, it is good if hanged away from contact of the body."(30 years, Muslim mother of 1 U5 child in Anano Shisho kebele)

About half (49.1%) and 448(60.3%) of the respondents reported that malaria is more serious for under five children and pregnant women respectively. However, 67(9.0%) of the respondents said that it is equally serious for all household members. One of the mother said, *"Under-five children and pregnant women are mostly affected because they have no force." (25years, Grade 5, Muslim mother of one child in Anano Shisho kebele)*

5.4. Household ownership and utilization of ITNs among households in Adami Tulu District, February 2014

ITNs were reported in 188 households which makes the ownership of ITNs 25.3%. The household coverage of IRS was almost universal (97%, n=721). ITNs were observed in (90%, n=169) of those households reported to have ITN. Only (28.8%, 108 of 375) of households with under five children own at least one ITN. One hundred three (47%) of the total observed ITNs were in a good condition, without holes. Among ITN owning households, the coverage for one and two mosquito nets was (83.5%) and (16.5%) respectively. Only 31(4.6%) households of the total population got ITN within the past 12months from any source.

In all FGDs, it was explained that there was no recent distribution, and some of them were using ITN that they got from the town. One of participant said *"the previous one was already expired and during my delivery, the extension brought for me from Batu town."(35years, Muslim mother of 2 children in Anano Shisho kebele)*

The total number of mosquito nets owned by households (used and unused) in the sample were 219. Around two third (65.8%) of them reported to be hanged over bed/mat/platform during interview and about 113 of the nets were confirmed hanging during observation. Average number

of ITN per household for all surveyed households and households with at least one ITN were 0.37 and 1.16 respectively.

Table 5 Distribution of household ownership of ITN and average number of ITN per household, Adami Tulu District, February 2014

No. (%) of HHs with at least one ITNs	188(25.3)
No.(%) of HHs with at least two ITNs	31(4.2)
Average number of ITN per household for households with at least one ITN	1.16
Average number of ITN per household for all surveyed households	0.3
N	743

Majority of FGD participants mentioned scarcity of ITNs and damage of the available ITN in the household due to smoke and repeated wash. One of the participants strengthened this idea *–we used to sleep under the net with my husband and under five children .but; I removed it since it was expired after two washes" (25years-Grade 8-protestant mother of 1 child in Gallo Heraphe kebele)*

"I have taken two nets two years ago; I removed and washed it since it gets dirty due to smoke .then after, I hadn't used it again since there is no chemical to retreat it."(30years Muslim mother of 1 child Elka chellemo kebele)

Among ITN owning households, (60.6%) of any household member had slept under it during the previous night prior to interview.ITN was not clean (39%), not hanged (30%) and absence of mosquito during this time of the year (15.1%) were the main reasons claimed by those households who own but, didn't used it. Few of the respondents mentioned that they removed the net because of funeral and marriage ceremony. Among those households who had used net last night, 105(92.1%) had slept under ITN.

The most common reasons for non use of ITN raised by FGD participants were dirty due to smoke, lack of understanding; misperception of repeated wash decreases the chemical, misuse and fear of side effect especially for children. Concerning lack of understanding *". There is a say "Dooqni ofiis hin nyaatu, namafis hin laatu" peoples have nets in the house. But, they neither use for themselves nor give for others." (35years, Muslim mother of 2 children in Anano Shisho*

kebele.) One of the mothers from Anano Shisho said the following about fear of side effect "peoples fear that their children's might be affected due to hotness under the net."(25years, Grade 5, Muslim mother of 1 child in Anano Shisho kebele)

5.5. Factors associated with household ownership of at least one ITN, Adami Tulu District, February 2014.

Bivariate analysis of the specific variables showed that, perceived benefit of sleeping under mosquito nets every night prevents malaria (OR=2.8 [95%CI, 1.2-6.7]) and knowledge of mosquito bite as a cause of malaria were associated with ownership (OR =0.5 [95 %CI, 0.3-0.8]. Feeling that malaria is a major health problem was not significantly associated with ITNs ownership (OR=1.7 [95%CI = 0.83-3.8]). Spouse education [OR (95% CI) =1.7(1.2-2.4), presence of under-five child in the household [OR (95 % CI) =1.5(1.O4-2.03)], the total number of sleeping room [OR (95% CI) =1.6(1.1-2.2), kebeles (boccessa (OR=2.1[95%CI 1.24-3.44]) and Elka Chelemo (OR=2.7[95%CI 1.55-4.6]) and sex of HH head [OR (95% CI) =1.9(1.2-2.9) and misconception about the prevention of malaria were associated with household ownership in bivariate analysis [OR (95% CI) =1.6(1.1-2.31].

Table 6 Bivariate and multivariate analysis of household net ownership among households, Adami Tulu District, February 2014

Variable	Total	HH ownership		Crude OR	Adjusted OR
		Yes	No	COR(95%CI), P value	AOR(95%CI),P value
kebele					
G/heraphe	150	26(17.3)	124(82.7)	1	
Anano Shisho	223	42(18.8)	181(81.2)	1.1(.645-1.9), .71	1.01(.54-1.98), .907
Boccessa	222	67(30.2)	155(69.8)	2.1(1.24-3.44), .005*	2.2(1.2-4.1), .011**
E/Chellemo	148	53(35.8)	95(64.2)	2.7(1.55-4.6), <.0001*	2.3(1.2-4.4), .017**
Sex of HH head					
Female	159	27(17.0)	132(83.0)	1	
Male	584	161(27.6)	423(72.4)	1.9(1.2-2.9) .007*	1.4(.83-2.3), .220
Education of spouse					
No education	498	109(21.9)	389(78.1)	1	
Yes	245	79(32.2)	166(67.8)	1.7(1.2-2.4), .002*	1.74(1.2-2.6) .008**
Total sleep room					
One	362	76(21.0)	286(79.0)	1	
Two & above	381	112(29.4)	269(70.6)	1.6(1.12-2.2), .009	1.55(.99-2.44) .058
Perceived benefit of sleeping under net every night prevents malaria					
False & N/s	53	6(11.3)	47(88.7)	1	1
True	690	182(26.4)	508(73.6)	2.8(1.2-6.7) .020*	4.7(1.8-12.0) .001**
Is there U5 child in the household					
No	368	80(21.7)	288(78.3)	1	
Yes	375	108(28.8)	267(71.2)	1.5(1.04-2.03) .027*	1.4(.93-2.5) .110
Misconception on prevention of malaria					
yes	239	47(19.7)	197(80.3)	1	
No	504	141(28.0)	363(72.0)	1.6(1.1-2.31) .015*	1.54(.97-2.4) .067

*-significance in bivariate **-significance in multivariate N/s-not sure, O-others, no education with no spouse, variables like occupation, family size and knew mosquito bite is a cause of malaria were included.(data not shown).

In the multivariate analysis**,** Kebele is one of the independent predictor of household net ownership i.e. those households in Boccessa and Elka chellemo were 2.2 and 2.3 times more likely to own ITNs respectively compared to Gallo Heraphe kebele. Those who perceive the benefit of sleeping under net every night prevents malaria were 4.7 times more likely to own ITNs compared to those who had not perceive this way. Those households with educated spouses were 74% more likely to own nets compared to their counterpart.

Variables like total number of sleeping room, knowledge of mosquito bite causes malaria, presence of under-five children in the household and misconception about prevention of malaria became insignificant in the logistic model.

5.6. ITN utilization among under five children in Adami Tulu District, February 2014

About 375(50.5%) percent of the 743 households surveyed had an under-five child. There were 549 under-five children living within these 375 households, giving 1.5 children per household. The ownership among households with at least one under-five was 28.8%.while, the utilization was 18.4%. The number (%) of under-five children who slept under ITN the previous night was 101(11%), and (63.9 %,) for all surveyed households and households with at least one ITN respectively. All FGD participants raised lack of knowledge and misuse of the net as the main reason for not using among under five children. One of the participants said *"due to lack of knowledge, even there are peoples who sell instead of protecting himself and his children from Malaria."(30years, Grade 5, Orthodox mother of 2 children in Boccessa kebele)*

5.7 Factors associated with ITN utilization among under-five children the night prior to the survey, Adami Tulu District, February 2014.

A total of 158(28.8%) children lived in households that owned at least one ITN and were included in the analysis of ITN use. In bivariate analysis, those who knew fever as a symptom of malaria were more than 3 times more likely to use ITN than those who had no knowledge. Similarly, knowledge of ITNs kills malaria mosquitoes [COR =4.0, 95%CI=1.4-10.6] and gender of the child [COR=7.15, 95%CI= (3.5-14.8) were associated with ITN use among under-five children during the night preceding the survey.

Variables like age of the child, number of U5 child, misconception about cause and prevention of malaria were not associated to ITNs utilization.

In multivariate analysis, both knowledge of fever is a symptom of malaria [AOR=3.2, 95%CI=1.1-9.6] and ITN kills malaria mosquitoes [AOR=3.8, 95%CI=1.15-12.4) were remained associated with ITN use among under five years old children. In addition, male children were 6 times more likely to use ITN during the night prior to the survey than girls [AOR=6, 95%CI=2.5-12.8].

Table 7 Bivariate and multivariable analysis of determinants of ITN utilization among under-five children, Adami Tullu District, February 2014

Variable	**Total (158)**	**U5 ITN use(n=101)**		**COR(95% CI),P-value**	**AOR(95%CI), P-value**
		Yes	**No**		
Knew fever is a symptom of malaria					
Yes	135	92(68.1)	43(31.9)	3.33(1.34-8.3), .010*	3.2(1.05-9.6) .041**
No	23	9(39.1)	14(60.9)		1
Knew ITN kills malaria mosquitoes					
Yes	138	94(68.1)	44(31.9)	4.0(1.5-10.6) .006*	3.8(1.15-12.4) ,.028**
No	20	7(35.0)	13(65)	1	1
Gender of the child					
Male	93	76(81.7)	17(18.3)	7.15(3.5-14.8) .000*	6(2.5-12.8) .000**
Female	65	25(38.5)	40(61.5)	1	

No-number, N/s-not sure, Variables like spouse education, family size, house sprayed in the past 12months,perception of re-plastering wall makes IRS effective, get ITN in the past 12months,no of ITN currently used while sleeping, misconception of cause of malaria were included in addition to the variables in the table 7

5.8. Misconception about durability of ITNs and seasonality of ITN use

Almost all of the FGD participants had misconception about the longevity of ITNs though it protects mosquito bite up to a minimum of 20 wash and at least 3 years ." *peoples are saying that the net is not protecting us from Insect bite after one or two wash because they thought that chemical decreases during wash and become useless. Therefore, it is better if given with insecticide for the future."(26years, Orthodox mother of 1 child in Boccessa kebele)*

The FGD participants expressed different ideas concerning the relation between seasonality and ITN use based on their living village. *For example, mother near Lake Dambal said "since we are living around the Lake, mosquito is always there even though it increases during rainy season. Thus, it is good to use throughout the year by washing."(32years, Muslim mother of 1 child in Boccessa kebele)*

Another mother said" Mostly we use when Malaria starts; during the rainy season when mosquito comes back. You will not find many mosquitoes during winter unless we hang the net to protect other insects."(27 years, Grade 2, protestant mother of 2 children in Gallo Heraphe kebele)

Finally, the participants put education as the best solution to solve all the raised problems concerning ITNs utilization among under-five children. Utilization needs to be increased through educating each other "Malaria is decreasing by now. We can be saved more than this in the future if we used ITNs appropriately."(25 years, Grade 5 Protestant, mother of 2 children Gallo Heraphe kebele)

6. Discussion

Our study assessed the ownership of ITNs among households, the utilization of ITNs among children below five years and their determinants in the rural setting. ITN ownership of at least one ITN was 25.3% and the utilization among under-five in households with at least one ITN was 63.9%. Perceived benefit of sleeping under net every night prevents malaria, spouse educational background, and living in Boccessa and Elka chellemo kebeles were associated with ITN ownership. ITN utilization among under-five was positively associated with having the knowledge of fever is a symptom of malaria and as ITN kills malaria mosquitoes. In addition, gender of the child was strongly associated to ITN use.

According to MIS 2011, for households living in malaria-endemic areas (i.e.<2,000m), more than half owned at least one LLIN (13). Similarly, in a study carried out by Deressa et al. about half of households,49.1% owned at least one ITN in Oromia and Amhara region of Ethiopia (24). However, in the present study only one fourth of total households owned at least one ITN. Similarly, the study in South Central Ethiopia reported less than a quarter (23.1%) of ITN ownership among households (35). The much variation between the present study and the former couple of studies could be due to time gap between the ITN distribution and the survey (13, 24). In our qualitative finding, people thought that the net is no more useful after two washes because the chemical content decreases and similar to study in Equatorial Guinea, nobody told them for how long to use once the distribution was undertaken until mass replacement (32). Additional justification could be that, the coverage of ITNs varies at times and from one area to another, depending on the timing and completeness of the local distribution of ITNs (24).

In order to ensure consistent and efficient use of prevention tools, knowing that malaria is transmitted by mosquito bites is essential (13). In the present study, 90% of the respondents knew that malaria is transmitted by mosquito bite which was higher than the MIS 2011 (72.1%).The possible reason for this difference could be increased awareness of the community members from time to time through media or health information dissemination. This was also supported by our qualitative study. Moreover, more than one quarter of the respondents who didn‘t have any misconception about causes (27.1%) and prevention of malaria (28%) owned ITNs in the household. This finding was similar to Nigerian study in terms of ITNs ownership that reported almost one quarter of the respondents who did not have any misconception (either about causes or prevention of malaria) owned and used a net (31).

Majority of the respondents had knowledge about the benefits of ITNs in killing malaria mosquitoes (87.9%) and three fourth (75.8%) of them reported that it protects against malaria. This finding has shown an improvement compared to previous study that reported 73.6% and 49.4% respectively (24). However, the qualitative study explored the misperception that ITN couldn‘t kill malaria mosquitoes after two washes unless re-treated. Instead, it protects their entrance. Similar finding reported that the ITN was no longer effective had to do with not seeing dead insects or the idea that the ITN needed re-treatment (25).

In our study, majority of the respondents (97.3%) agree that sleeping under ITNs prevents malaria, which was similar to the study in Tigray in which 97.5% of the respondents agree with it (29). In the present study, those who had the perceived benefit of sleeping under net every night prevents malaria were five times more likely to own ITNs. This result was similar to analysis of Malaria indicator survey 2007 in which any malaria knowledge including ITNs prevents malaria was strongly associated to ITN ownership (28). In addition, this finding was in agreement with the study in Equatorial Guinea in which the knowledge of prevention of malaria was associated with household ITN ownership (32).

Similarly, spouse education was significantly associated to household ownership of at least one ITN. Similar findings were reported in Nigeria (22, 30). However, it was in contrary to couple of studies in Ethiopia and Nigeria in which those illiterate household heads owned ITN than those who had an education (35, 41). Both arguments might be possible because the time of distribution matters in addition to literacy status. If the distribution was undertaken recently, the possibility of ownership would be high for all households. Otherwise, those households with educated spouses might have used it wisely and kept for a long period of time without damage.

There was significant difference between Kebeles (small administrative unit of the study area) in terms of ITNs ownership i.e. Boccessa and Elka chellemo kebeles were more than two times to own ITNs compared to Gallo Heraphe. This had probable justification since the ITNs were distributed recently (i.e. 2004EC) in Boccessa and Elka Chellemo kebele relative to the other two kebeles in which the nets were distributed before four years and already expired (Hussein, malaria focal person).

ITN ownership was not different between households that had children under- five years and those who did not have. This was similar to study done in the Kersa District of Eastern part of Ethiopia (34). This may be due to the universal target of the government to cover all high risk populations (altitude <2000m) whether there is under-five children in the household or not.

In our study, around two third (63.9%) of under-five children among ITN owning households used to sleep under net the night prior to survey. Similarly, Couple of studies undertaken in Ethiopia (24, 28) found that around two third of under-five children used to sleep under net the night prior to survey. One of the Nigerian study was also in agreement with our finding (41).

From more than one third (39.4%) of households with at least one ITN, no one slept under ITN in the night prior to interview. This was in agreement with the study in SNNPR, in which less than two third of households (60.5%) reported using their nets during previous night, while the remainder were not doing so (26).According to this study, the most common reasons reported for not using ITN were too old, too dirty and unavailability due to wash. Similarly, in our study more than one third of the nets (39%) were not used because of dirtiness. This finding was strongly supported by the qualitative result.

After restricting the analysis to under-five child with at least one ITN in the household, knowing as ITN kills malaria mosquitoes and fever as symptom of malaria were independently associated with ITN use among under-five years old child. Similar finding was reported in Ethiopia in which any malaria knowledge was significantly associated with under-five ITN use (28). The former association (i.e. ITN kills malaria mosquitoes), was also reported by cross sectional study in Oromia and Amhara regions of Ethiopia though it was not for under-five rather for any household member (24). Our finding was also in agreement with the study that found an association of increased malaria knowledge and improved net use by individuals and/or members of the household (36).

There was notable finding between gender of child and ITN utilization. Male children‘s were more likely to sleep under ITNs than their female counterparts which was uncommon in other African countries (32, 40-41).The probable reason for this difference could be that, our culture prefers male to female child in the household starting from birth ceremony. Further investigation is needed in order to verify it and address through intensive health education.

7. Strengths and limitations of the study

Strengths

Mixed community based study method was used. Direct observation was done to verify the reported information. ITN use among under-five was calculated for each under-five child

Limitations

However, the utilization level was based on self report of the respondents. Therefore, Social desirability bias might affect the utilization coverage among under-five children. The study was undertaken during the dry season when the malaria transmission is low and it might underestimate ITN utilization. There is also possibility that some of the nets being used might not be ITNs. Recall bias is also the other limitation for the specific questions like did you get ITN in the past 12 months, did the household sprayed in the past 12 months and child ITN use during the night prior to interview.

8. Conclusion

The coverage for IRS was almost universal (97%) in the study area. However, only one fourth of the surveyed households owned at least one ITN. Knowing the symptom of malaria and benefits of ITNs were found to be independent predictors of household ITN ownership and under-five use. Education of the spouse and living kebeles were also found to be additional predictors of household ITN ownership. Utilization of ITN was not equal among under-five, since male children were more likely to use ITN. Qualitative result identified that peoples had misconception concerning the longevity of ITNs ones distributed. Moreover, lack of understanding, fear of side effect and misuse of the ITN for the other purpose were explained as main barriers to ITN use. Education was explained as the best solution to address the barriers and increase ITN use among under-five children.

9. Recommendation

Based on the above conclusion, I would like to forward the following recommendation:

Woreda health office should undertake rapid and uniform replacement of ITNs among rural kebeles

Health Extension Workers have to teach the community during the ITN distribution in order to alleviate the prevailing misconception and raise the overall knowledge of community about malaria and ITNs.

IEC on the effective and continuous ITN utilization of under-five should focus on avoiding gender discrimination on ITN use among under-five children.

Federal Ministry of Health is expected to strength the collaboration with PMI and other donors in order to increase ITN ownership and sustain the prevention program

10. References

1. WHO. World Malaria Report. World Health Organization, Geneva,2011.
2.UNICEF. Malaria and Children, Progress in Intervention Coverage. Geneva,2007.
3.Ghebreyesus TA, Derressa Witten K, Getachew A, Seboxa T. The epidemiology and ecology of health and disease in Ethiopia. Malaria (Edited by: Berehane Y, Haile Mariam D, Kloos H). 2006:556-76.
4.PMI. Malaria operational plan (MOP). Addis Ababa, Ethiopia,2012.
5.FMoH. National Strategic Plan for Malaria prevention, Control and Elimination in Ethiopia 2010–2015. Addis Ababa: Federal Democratic Republic of Ethiopia Ministry of Health2009.
6.Astatkie A, Feleke A. Utilization of insecticide treated nets in Arbaminch Town and the malarious villages of Arbaminch Zuria District, Southern Ethiopia. Ethiopian Journal of Health Development. 2010;24(1):15-24.
7.WHO. World malaria report: World Health Organization, Geneva, 2012.
8.WHO. World malaria report. World Health Organization, Geneva,2013.
9.FMoH. National Strategic Plan For Malaria Prevention Control and Elimination in Ethiopia 2011-2015. Addis Ababa, Ethiopia: Federal Ministry of Health 2010.
10.FMoH. National five year strategic plan for malaria prevention and control in Ethiopia 2006–2010. Addis Ababa, Ethiopia:: Federal Ministry of Health 2006.
11.FMoH. National Malaria Guidelines. Addis Ababa, Ethiopia: : Federal Ministry of Health 2012.
12.Teklehaimanot A, Sachs JD, Curtis C. Malaria control needs mass distribution of insecticidal bednets. The Lancet. 2007;369(9580):2143-6.
13.FMOH EHNRI, partners. Ethiopia National Malaria Indicator Survey 2011. Addis Ababa: Federal Ministry of Health,2012.
14.PMI. Ethiopia Malaria Operational Plan(MOP) Ethiopia,2013.
15.Alemu A, Abebe G, Tsegaye W, Golassa L. Climatic variables and malaria transmission dynamics in Jimma town, South West Ethiopia. Parasites & Vectors. 2011;4:30.
16.Woyessa A, Deressa W, Ali A, Lindtjorn B. Prevalence of malaria infection in Butajira area, south central Ethiopia. Malaria Journal 2012;11:84.
17.FMOH. Health and health related indicators ,Ethiopia fiscal year 2003. Addis Ababa, Ethiopia: Ministry of Health;2010/2011.
18.WHO. World malaria report ,Global malaria programme: 2012.
19.PMI. 6th annual report to congress. Washington, DC 20523: U.S.Agency for International Development2012.
20.CSA and ORC Macro Ethiopia Demographic and Health Survey. Addis Ababa,Ethiopia and Calverton, Maryland, USA,2005.: Central Statistical Agency and ORC Macro2006.
21.FMoH. Ethiopia National Malaria Indicator Survey 2007. Addis Ababa: Federal Ministry of Health2008.
22.Atieli HE, Zhou G, Afrane Y, Lee M-C, Mwanzo I, Githeko AK, et al. Insecticide-treated net (ITN) ownership, usage, and malaria transmission in the highlands of western Kenya. Parasit Vectors. 2011;4(1):113.
23.Ashikeni M, Envuladu EA, Zoakah A. Malaria and the Use of the Insecticide-Treated Net (ITN) among Under-Five Children in Kuje Area Council of the Federal Capital Teritory Abuja, Nigeria. Journal of Mosquito Research. 2013;3(1).
24.Deressa W, Fentie G, Girma S, Reithinger R. Ownership and use of insecticide-treated nets in Oromia and Amhara Regional States of Ethiopia two years after a nationwide campaign. Tropical Medicine & International Health. 2011;16(12):1552-61.
25.Baume CA, Reithinger R, Woldehanna S. Factors associated with use and non-use of mosquito nets owned in Oromia and Amhara regional states, Ethiopia. Malaria Journal. 2009;8(1):264.
26.Batisso E, Habte T, Tesfaye G, Getachew D, Tekalegne A, Kilian A, et al. A stitch in time: a cross-sectional survey looking at long lasting insecticide-treated bed net ownership, utilization and attrition in SNNPR. Ethiopia Malar J. 2012;11:183.

27.Hwang J, Graves PM, Jima D, Reithinger R, Kachur SP. Knowledge of malaria and its association with malaria-related behaviors—results from the Malaria Indicator Survey, Ethiopia, 2007. PLoS One. 2010;5(7):e11692.
28.Jima D, Getachew A, Bilak H, Steketee RW, Emerson PM, Graves PM, et al. Malaria indicator survey 2007, Ethiopia: coverage and use of major malaria prevention and control interventions. Malar J. 2010;9(58):10.1186.
29.Tomass Z, Dejene T, Kidane D. Knowledge, Attitude and Practice (KAP) about Insecticide Treated Net (ITN) usage against Malaria in Kolla Tembien district, Tigray, Ethiopia. Momona Ethiopian Journal of Science. 2011;3(2).
30.Aluko JO, Oluwatosin AO. Utilization of insecticide treated nets during pregnancy among postpartum women in Ibadan, Nigeria: a cross-sectional study. BMC pregnancy and childbirth. 2012;12(1):21.
31.Arogundade ED, Adebayo SB, Anyanti J, Nwokolo E, Ladipo O, Ankomah A, et al. Relationship between care-givers' misconceptions and non-use of ITNs by under-five Nigerian children. Malar J. 2011;10:170.
32.García-Basteiro AL, Schwabe C, Aragon C, Baltazar G, Rehman AM, Matias A, et al. Determinants of bed net use in children under five and household bed net ownership on Bioko Island, Equatorial Guinea. Malar J. 2011;10:179.
33.Biadgilign S, Reda A, Kedir H. Determinants of Ownership and Utilization of Insecticide-Treated Bed Nets for Malaria Control in Eastern Ethiopia. Journal of tropical medicine. 2012;2012.
34.Gobena T, Berhane Y, Worku A. Low long-lasting insecticide nets (LLINs) use among household members for protection against mosquito bite in kersa, Eastern Ethiopia. BMC Public Health. 2012;12(1):914.
35.Woyessa A, Deressa W, Ali A, Lindtjørn B. Ownership and use of long-lasting insecticidal nets for malaria prevention in Butajira area, south-central Ethiopia: complex samples data analysis. BMC Public Health. 2014;14(1):99.
36.Graves PM, Ngondi JM, Hwang J, Getachew A, Gebre T, Mosher AW, et al. Factors associated with mosquito net use by individuals in households owning nets in Ethiopia. Malar J. 2011;10:354.
37.Loha E, Tefera K, Lindtjørn B. Freely distributed bed-net use among Chano Mille residents, south Ethiopia: a longitudinal study. Malaria journal. 2013;12(1):23.
38.Chuma J, Okungu V, Ntwiga J, Molyneux C. Towards achieving Abuja targets: identifying and addressing barriers to access and use of insecticides treated nets among the poorest populations in Kenya. BMC Public Health. 2010;10(1):137.
39.Sena LD, Deressa WA, Ali AA. Predictors of long-lasting insecticide-treated bed net ownership and utilization: evidence from community-based cross-sectional comparative study, Southwest Ethiopia. Malaria journal. 2013;12(1):406.
40.Nketiah-Amponsah E. Mothers' Demand for Preventive Healthcare for Children Aged Under-Five Years: The Case of Utilization of Insecticide-Treated Bednets in Ghana. Journal of Sustainable Development. 2010;3(2).
41.Osuorah DC, Ezeudu CE, Onah SK, Anyabolu OT. Household bed net ownership and use among under-5 children in Nigeria. Research & Reports in Tropical Medicine. 2013;4.
42.Bekele D, Petros B, Deressa W, Belyhun Y. Decline of Malaria using Combined Long Lasting Insecticide Treated Nets and DDT House Spraying Strategies in Adami Tulu Jido Kombolcha District, Central Ethiopia:A Longitudinal Study from Parasitological and Entomological Indices Data.2. Open access scientific reports. 2013;2(2).
43.Deressa w, Ali A. Malaria-related perceptions and practices of women with children under the age of five years in rural Ethiopia,. ”BMC Public Health. [article 259]. 2009;9.
44.Oresanya OB, Hoshen M, Sofola OT. Utilization of insecticide-treated nets by under-five children in Nigeria: Assessing progress towards the Abuja targets. Malar J. 2008;7:145.

11. Annexes

Annex I. Informed Consent Form (English version)

Addis Ababa University, College of Health Sciences, School of Public Health

Information Sheet

I. Greeting: - Good morning/ afternoon

Hello, I am _____. I am from an institution called Addis Ababa University, College of health sciences, School of Public Health. Then explain the purpose of the study for the respondent by saying that ~~-th~~e reason why I came here is to ask you some questions related to malaria and its prevention methods. The purpose of this interview is to have your opinion on the insecticide treated nets utilization among your under five children. This in turn will help to design the intervention to tackle the transmission of malaria." You are selected randomly to be participant of this study if you are willing to participate after you understand the information sheet.

II. Informed consent

"To conduct our study, I am going to ask you some questions which takes 30 to 40 minutes. I kindly request you to give me your answer. All the information that you are going to give me will remain confidential and you don't need to mention your name." Participation is based on your willingness. Are you willing to participate in the interview?

Yes_____ (continue the interview). No_____ (Thank and stop)

Signature_____ Date_____

(Signature of the interviewer certifies that consent has been obtained verbally.)

Signature of the supervisor _____Date_____

Annex II. Questionnaire Form (English Version)

A Questionnaire of Insecticide Treated Net Utilization among under-five children and Household Net Ownership in Adami Tulu district, East Shewa zone, Oromia, Ethiopia.

Section 1.Household Identification Information

No.	Identification	Response
1	Name of kebele	_____
2	Name of Garee/Got	_____
3	Household number?	_____
4	Questionnaire number?	_____
5	Name of interviewer	_____
6	Date of interview (dd/mm/yyyy)	/_____/_____/2006 EC

Section 2 Socio-demographic characteristics of the respondents

No.	**Questions**	**Responses**	**Skip to**
1	Sex of the respondent:	Male 1 Female 2	
2	Relationship of the respondent to the head of household:	Head of household 1 Wife/husband 2 Son/daughter 3 Sister/brother 4 Other (specify)_____88	
3	What is the sex of head of the household?	Male 1 Female 2	
4	What is your age in full years?	Year [_____]	
5	What is your religion?	Muslim 1 Orthodox Christian 2 Protestant Christian 3 Other (specify)_____88	
6	What is your ethnic group?	Oromo 1 Amhara 2 Gurage 3	

		Other (specify)_____ 88	
7	What is your current marital status?	Married 1 Never married (single) 2 Divorced 3 Widowed 4 Separated 5	
8	Can you read and write?	Yes 1 No 2	→10
9	If "**Yes**" to **Q8**, what is the highest level of school or grade you attended or completed?	Can only read and write _____ 1 Elementary school (1-4) ____ __ 2 Junior secondary school (5-8) __ 3 Senior secondary school (9-12)__ 4 Other (specify)_____ 88	
10	Can your spouse currently read and write?	Yes 1 No 2 Currently has no spouse 3	→12
11	If "**Yes**" to **Q10**, what is the highest level of school or grade your spouse attended or completed?	Can only read and write_____ 1 Elementary school (1-4)_____ 2 Junior secondary school (5-8)___ 3 Senior secondary school (9-12) __ 4 Other (specify)_____ 88	
12	What is your current main work/occupation? • ***Circle only one main answer***	Housewife _____ 1 Farmer _____ 2 Daily labourer _____ 3 Government/NGO employee ____ 4 Trader _____ 5 Other (specify)_____ 88	
13	How many people currently live in this household, including you and	Total number of household members [____]	

	under-five children?		
14	How many children under-five currently live in this household?	Total number of under-five [____]	
15	What is the main material of the roof of house of the household?	Thatched 1 Corrugated iron 2 Other (Specify)_____88	
16	How many rooms in this household are currently used for sleeping?	Total number of rooms [____]	

No.	Questions	Responses			Skip to
17	Do you consider malaria a major health problem in your community?	Yes 1 No 2			
18	What are the main signs and symptoms of malaria? • ***Multiple responses possible and circle all responses that apply*** • ***Probe for possible answers (Anything else?)***		yes	**No**	
		Fever	1	**2**	
		Feeling cold	1	2	
		Chills or shivering	1	2	
		Sweating	1	2	
		Headache	1	2	
		Nausea	1	2	
		Vomiting	1	2	
		Loss of appetite	1	2	
		Bitterness in the mouth	1	2	
		Body weakness/tiredness	1	2	
		Body ache/joint pain	1	2	
		Thirsty	1	2	
		Diarrhea	1	2	
		Don't know	1	2	
		Other (specify)_____88			
19	In your opinion, what causes	Mosquito bite 1			

	malaria? • ***Multiple responses possible and circle all responses that apply*** • ***Probe for possible answers (Anything else?)***	Eating immature sugarcane 2 Eating maize stalk 3 Hunger (empty stomach) 4 Exposure to cold or changing weather 5 Drinking dirty water 6 Witchcraft 7 Exposure to dirty swampy areas 8 Don‘t know 10 Other (specify) _____ 88	
20	For which group of the population do you think malaria is more serious? • ***Multiple responses possible and circle all responses that apply*** • ***Probe for possible answers (Anything else?)***	Adults 1 Children under five years of age 2 Children 3 Pregnant women 4 Elderly 5 Equally serious for all 6 Don't know 7	
21	Malaria is a treatable disease	True 1 False 2 Don‘t know or not sure 3	**Skip**
22	What drugs are currently given by health workers for treating malaria? • ***Multiple responses possible and circle all responses that apply***	CoArtem 1 Chloroquine 2 Fansidar 3 Quinine 4 Don‘t know 5 Other (specify)_____ 88	
23	What is the drug of choice for treatment of falciparum malaria? • ***Multiple responses possible and circle all responses that apply***	CoArtem 1 Chloroquine 2 Fansidar 3 Quinine 4 Don‘t know 5 Other (specify)_____ 88	
	Waiting too long to get treatment increases ones chances	True 1	

24	of dying from malaria	False 2 Don‘t know or not sure 3	
25	Children under five are more likely to die than other household members if they are not taken to a health facility as soon as they experience fever	True 1 False 2 Don‘t know or not sure 3	
26	One can start sharing malaria drugs with other household members if she/he starts feeling better	True 1 False 2 Don‘t know or not sure 3	
27	Malaria is a preventable disease	True 1 False 2 Don‘t know or not sure 3	
28	How can someone protect themselves against malaria? • ***Multiple responses possible and circle all responses that apply*** • ***Probe for possible answers (Anything else?)***	To sleep under mosquito net/ITNs 1 To spray house with insecticide (DDT) 2 Smoking (burn leaves/cow dung) nearby the house 3 Drain mosquito breeding sites around the house 4 Window screening 5 Eat garlic 6 Drink alcohol 7 Other (specify)_____ 88 Don‘t know 9	
29	Sleeping under mosquito net (ITNs) every night prevents malaria	True 1 False 2 Don‘t know or not sure 3	
30	Indoor residual spray is a chemical that is sprayed on the walls to kill mosquitoes that cause malaria	True 1 False 2 Don‘t know or not sure 3	
31	At any time in the past 12 months, has anyone sprayed the interior walls of your dwelling against mosquitoes?	Yes 1 No 2 I don‘t know or not sure 3	

32	Re-plastering wall within three to six months can make indoor residual spraying very effective	True 1 False 2 Don‘t know or not sure 3	

Section 3. Mosquito net knowledge, possession and utilization by households

No.	Questions	Response	Skip to
33	Have you heard about ―***mosquito nets***”?	Yes 1 No 2	
34	What are the benefits of the mosquito net? • ***List as many options as possible***	To kill mosquitoes 1 To protect from the bite of nuisance insects 2 To protect from malaria 3 Used as a curtain 4 Used as a mattress 5 Other (specify) _____88	
35	At any time in the past 12 months, did you get any mosquito net for your household?	Yes 1 No 2	 → 37
36	If ―Yes” to Q**35**, how many mosquito nets did you get for your household?	[_____]	
37	Does your household currently have any mosquito net that can be used while sleeping?	Yes 1 No 2	 →Section 4
38	How many mosquito nets do you currently have [both used and unused]?	[_____]	
39	How many of the nets the household has are **currently used** by household members while sleeping?	[_____]	
40	How many of the nets the household have are **hanged** over the bed/mat/platform during the interview?	[_____]	
41	Did anyone from your household sleep under mosquito net last night?	Yes 1 No 2	**→43** **→42**
42	If any one of the household members did not sleep under an ITN the previous night, what is the main reason?	Sleeping under an ITN is not convenient 1	

	• **If this question is answered, please skip to Section 4**	ITN was not clean 2 ITN was not hanged 3 Forgotten to sleep under an ITN 4 No malaria during this time of the year 5 No mosquitoes during this time of the year 6 Other (specify) _____ 88 Don‘t know 8	
43	How many of the people who slept in this household in the previous night slept under a net, including you?	[_____]	
44	Did you sleep under a mosquito net during the previous night?	Yes 1 No 2	

Section 4. Mosquito net utilization by under-five children

Now I would like to ask you some questions about ITN utilization by children less than 5 years old in this household. Please list each under-five child (in descending age order) who usually lives with you or are staying with you now and we will talk about each one separately.

This section is only addressed for households with at least one under-five child (Refer to Q14).

Child no.	**Sex** M=1 F=2	**Age** (months)	Did the child sleep under ITN the previous night? Yes = 1 No = 2
Child1			
Child2			
Child3			
Child4			

Section 5. Observational checklist

Now I would like to observe the ITNS and sleeping beds to see the condition of nets whether hanged correctly or not and verify what we have been talking so far.

No	What to Observe	Observation	Code	
51	Number of separate beds or places of sleep	[_____]		
52	The number of ITN observed in the household	[_____]		
53	The observed ITN is_____ For the recent owned one	a)in package b)hanged c)other specify_____		
54	Number of beds /places of sleep observed with ITN hanged	[_____]		
55	Is there any hole(throne) in the ITN that is being hanged	A)yes b)No	2	

That is the end of our interview. Thank you very much for taking time to answer our questions.

	Name	Signature	Date
Data collector	_____	_____	_____

Annex III. Focus Group Discussion (English Version)

Consent Form

Hello my name is _____. I came from an organization named Addis Ababa University. We are here to collect information for the research being conducted on malaria prevention and control. As part of this research, we want to see the level of ITN utilization and factors which affect its utilization among under five children and household net ownership. We are interested in all of your ideas and suggestions and there are no wrong or write answers. Both positive and negative ideas are important for our discussion.

Participation is based on your willingness and you can withdraw from the study anytime. However, your active participation will contribute a lot for our study. In addition the confidentiality of the information you will give us will be kept. No personal identification will be written and we assure you that whatever information you are providing will only be used for the research purpose and the data will be handled only by the research team.

While we are collecting the data since it is difficult to write down everything we will tape record our discussion in addition to note taking.

Are you willing to participate in the study? Agreed _____ Not Agreed _____

General information about participants of FGD

kebeles	Code	Age	Education	Religion	Occupation	U5 Child
	P1					
	P2					
	P3					
	P4					
	P5					
	P6					
	P7					
	P8					

DiscussionGuide

No	Study objectives and questions
	Objective. Identify perception of community regarding Malaria and LLINs
	Q1. What do you know about Malaria and LLINs? Probe A). Who are the most affected groups of community by malaria? probe for Under-five children, Pregnant women's. B). How can someone protect themselves against malaria? Probe for ITNs, IRS, environmental, cultural, traditional beliefs. C) Benefits and side effects LLINs. Probe for hotness, discomfort, colour, shape, difficult of hanging the net,
	Objective. Identify key behavioral barriers for use of LLINs and promotion of net among under-five children Q2. Are there any practices which prevent or promote the use of LLINs among under-five children? A. Do you have ITN in your house? If not why? B. Does every member of your household sleep under the ITN? If not why? C. Who gets the priority to sleep under the ITN in your house? Probe for under-five children, pregnant mothers. Why? D. Do you use ITN regularly? Probe for consistent use: every night, throughout the year. If not, why? Probe for Colour, shape, household structure, availability, cost, cultural beliefs…… E. What are the sleeping arrangements in this community? Probe for: children under five, Whether they sleep on mat, bed or platform, with family, alone F. What do you think should be done to increase consistent use of mosquito nets among the under fives?

Annex IV. Consent Form of Afaan Oromo Version

Foormii Heeyaama (Afaan Oromo version)

Nagaa:-Akkam bultan/oltan?

Hello, Ani _____jeedhama. Ani kanaan dhufee yuuniivarsiitii Finfinnee, koolleejji saayinsii fayyarraatti. Saanan bodee,faayida qooranoo kana nama deebii kenuuf akkana jeechuudhan ibsiif –sabaabni mana keessan dhufneef dhukkuba busaa ilaalchisee gaaffiiwwaan tokko tokkoo isiin gaafachuudhaf. Faayidaan gaaffii kanaas itti fayyaddama saaphana siree daa'imaan umrii waggaa shanii gadii ilaalchiisee yaada keessan akkaa nuuf keenitaniifi. Kunis saaganta fi karoora dhukkuba busaa offira dhowuufi godhaamu kessatti baay'ee nugargaara"

II. Heeyaama hubannoo irratti hunda'ee

"Qooranoo Keenya geggeesudhaaf, ani gaafii murta'een isin gaafadha. Deebii kessan akka anaf keenitan kabajaa guddadhaan isiin gaafadha. Yaadnif deebii isiin anaf keenitan hunduu iciitidhaan eegamma. Maqaa keessan ibsuu hin baarbachiisu." Hirmaanan keessan feedhirratti kan hunda'ee dha, yeeroo feetanitti dhaabu ni daandeesuu.

Gaafiif deebii kana keesatti hirmachuudhaf fedhaa qabduu?

Eyyeen_____(itti fufi). Miti_____ (Galatoomaa, dhaabi)

Mallatoo (nama ragaa walitti qabu)_____Guyyaa_____

(Mallattoon nama ragaa walitti qabu, qooqan heeyyaama argaachuu agarsisaa.)

Mallatoo to'aataa _____ Guyyaa_____

Kutaa 1: Oddeeffannoo Eenyummaa Maneennii

TL	Gaaffii Eenyummaa	Deebii
1	Maqaa Gandaa	_____
2	Maqaa Garee/ Gooxii	_____
3	Lakkoofsa Manaa	_____
4	Lakkoofsa Waraqa Gaaffii	_____
5	Maqaa nama Gaaffii gaafatuu	_____
6	Guyyaa Gaaffiin itti Gaafatammee	_____

Kutaa 2: Haala hawaasumma fi ummaata namoota gaaffii deebisani

T.L	**Gaaffii**	**Deebii**	**Darbi**
1	Saala	dhiira 1 dhala 2	
2	Walitti dhuufeenyi kee fi nama bulchaa/ Ittigaafatamaa mana kana maalii?	bulchaa / Ittigaafatamaa manaatti 1 Haadha warraa/ Abbaa manaatti 2 Ijollee dhiira/dubara 3 obbooleesa/obbooleetii 4 kan biroo (caqasii)_____ 88	
3	Saali nama bulchaa/ itti gaafatamaa manaa kana maali?	dhiira 1 dhala 2	
4	Umriin kee waggaadhan meeqa?	waggaa [_____]	
5	Amaantiin kee maali?	Islaama 1 Kiristaana Ortodooksii 2 Kiristaana Pirootestaantii 3 Kan biroo(caqasii)_____ 88	
6	Lammummaan kee maali?	Oromoo 1 Amaara 2 Guraagee 3	

		Kan biroo(caqasii)_____ 88	
7	Haali Gaa‘elakee kan ammaa maal fakkatta?	Kan heerumte/fuudhe 1 Takaa kan hin heerumne/fuune (single) 2 Kan hiikte/hiikee 3 kan haatti mana/abbaan manaa jalaa dute / du‘e 4 kan adda jiratan 5	
8	Dubbisuu fi barreessuu ni dandeesaa?	Eyyee 1 Lakkii/miti 2	→10
9	Gaaffii Lakk. **8** eyyee yoo ta‘ee, sadaarka hagamii/kutaa meeqa xumurte?	Dubbisuu fi barreessuu qofa 1 Sadarkaa tokkoffaa marsaa duraa (1-4) 2 Sadarkaa tokkoffaa marsaa lammaffaa (5-8) 3 Sadarkaa lammaffaa (9-12) 4 Kan biroo(caqasii)_____ 88	
10	Abbaa/haatti warraa kee ammaa dubbisuu fi barreessuu ni danda‘aa/dandeesii?	Eyyee 1 Lakkii/miti 2 Ammaa Abbaa/Haadha warraa hin qabu 3	→12
11	Gaaffii Lakk. **10** eyyee yoo ta‘ee, Abbaa/haatti warraa kee sadaarka hagamii/kutaa meeqa xumuree/xumurtee?	Dubbisuu fi barreessuu 1 Sadarkaa tokkoffaa marsaa duraa (1-4) 2 Sadarkaa tokkoffaa marsaa lammaffaa (5-8) 3 Sadarkaa lammaffaa (9-12) 4 Kan biroo(caqasii)_____ 88	
12	Qoodi hojiikeetti kan amma maali? • ***Deebii tokko qofatti mari***	Haadha warraa 1 Qotee bula 2 Hojii guyyaa 3	

		Hojii mootummaa/ mit-mootummaa 4 daldaalaa 5 kan biroo(caqasii)_____ 88	
13	Siif ijoollee waggaa shanii gadii dabalatee, nama meeqatuu mana kana keessa jiraata jira?	Ida'aama lakk. Miseensotaa maatii dimshaashan [____]	
14	Ijoollee waggaa shanii gadii meeqatuu mana keessa jiraata jira? • ***Yoo Ijolleen waggaa shanii gadii hin jirtu ta'ee, bakka keenameetti "0" guutti***	Waliigala lakk. Ijollee waggaa shanii gadii [____]	
15	Meeshaan baaxiin mana ittin hojeetamee/ uwwifamee maali?	Citaa /Thatched/hay 1 Qoorqorro/ corrugated iron 2 Kan biroo(caqasii)_____88	
16	Mana keessan keessa kutaa meeqatuu cisichaaf tajaajila jira?	Waliigala Kutaa cisichaaf tajaajila jiru[____]	

T.L	**Gaaffii**	**Deebii**			**Darbi**
17	Akka ilaalcha keetitti, busaan ummata kee keessatti rakkoo fayyaa isaa cimaa dha jette yaada?	Eyyee 1 Lakkii 2			
18	Mallattooleen dhukkuba busaa maal fa'ii?		Eyyee	**lakkii**	

	• ***Deebii baay'een ni danda'aama*** • ***Deebii deebi'uu itti mari*** • ***Deebii ta'uu kan danda'aan kaasiif (kan hafee yoo jiratee)?***	Ho'ina qaamaa/dhaqnaa gubaa Qorrisisuu hollachiisaa Dafqa Mataa bowwuu/cabsaa Gara keessa ol ol jeechu / nausea ol deebisuu /hooqqisuu fedhii nyaata dhabu Afaan hadheessuu daadhabbii qaamaa dhukkubii buusa qaamaa dheebochisuu gara baasa/kaasa hin beeku----------98 Kan biroo(caqasii)_____88	1 1 1 1 1 1 1 1 1 1 1 1 1 1	**2** 2 2 2 2 2 2 2 2 2 2 2 2	
19	Akka yaada keetitti, busaan akkamitti nama qabaa/maaltu fidaa? • ***Deebii baay'een ni danda'aama*** • ***Deebii deebi'uu itti mari*** • ***Deebii ta'uu kan danda'aan kaasiif (kan hafee yoo jiratee)?***	Yoo bookeen busaa nama hiddiite 1 Shonkooraa xobbee nyaachuun 2 Hundee boqolloo nyaachuun 3 Beela'uu/gara duwaa 4 Qilleensa qorraa or kan jijjiramuuf saaxilamuu 5 Bishaan booruu dhuguun 6 Xoonqolla/Witchcraft 7 Bakka koosiin itti gatamuutti saaxilamuu 8 hin beeku 9 Kan biroo(caqasii)_____88			
20	Busaan ummata keessa nama kamiin caalmatti midhaa jettee yaada? • ***Deebii baay'een ni danda'aama*** • ***Deebii deebi'uu itti mari*** • ***Deebii ta'uu kan danda'aan kaasiif (kan***	Ga'eesoota 1 Daa'iman waggaa shanii gadii 2 Daa'iman waggaa shanii olii 3 Dubartii ulfaa 4 Maanguddoota 5 Hunda walqixa midhaa 6			

	hafee yoo jiratee)?	hin beeku 7	
21	Busaan dhukkuba yaalamu dha.	dhugaa 1 sobaa 2 hin beeku or sirritti hin beeku 3	**Darbi**
22	Qoorichonni dhukkuba busaa yaaluf oggeesotaa fayyaan keenaama jiraan maal fa'i? • ***Deebii baay'een ni danda'aama*** • ***Deebii deebi'uu itti mari***	CoArtem-------- 1 Chloroquine--------2 Fansidar ------- 3 Quinine------- 4 hin beeku --- 5 Kan biroo(caqasii)_____88	
23	Qoorichii gosa dhukkuba busaa isaa ~~f~~aalsiparam" jeedhamuf filaannoo jalqabaa ta'ee kami? • ***Deebii baay'een ni danda'aama*** • ***Deebii deebi'uu itti mari***	CoArtem ----- -- 1 Chloroquine --- 2 Fansidar ------- 3 Quinine ---- --- 4 hin beeku --- 5 Kan biroo(caqasii)_____88	
24	Yaala argaachuf yeeroo dheera eeguun carraa dhukkuba busaan du'uu ni dabala.	dhugaa 1 sobaa 2 hin beeku or sirritti hin beeku 3	
25	Ijolleen waggaa shanii gadii batalummaa dhaqna gubaan irraatti baraameen mana yaalatti hin geefamaan yoo ta'ee carraan du'uusaanii kan miseensota maatii biroo ni caala	dhugaa 1 sobaa 2 hin beeku or sirritti hin beeku 3	
26	Dhukkubsataan busaa tokko yoo itti fooya'ee, qorichaasa miseensota maatiif hiruu ni danda'a	dhugaa 1 sobaa 2 hin beeku or sirritti hin beeku 3	
27	Busaan dhukkuba itisuun danda'aamu dha	dhugaa 1 sobaa 2 hin beeku or sirritti hin beeku 3	
28	Namni tokko busaarra	Saaphana siree jala rafuun 1	

	akkaamiin of eeguu danda‘a? • ***Deebii baay’een ni danda’aama*** • ***Deebii deebi’uu itti mari*** • ***Deebii ta’uu kan danda’aan kaasiif (kan hafee yoo jiratee)?***	Farra booke busaa biifuun (DDT) 2 Naannoo manaatti baala gubuun/dhoqee loonii haarsun 3 Bakka walhormaata bookee busaa yaasun/Gogsuun 4 Foddaatti uffisuun 5 Quullubbi adii nyachuun 6 Alcoolii dhuguun 7 Kan biroo(caqasii)_____ 88 Hin beeku 9	
29	Halkan hunda saaphana booke ittisuu jala rafuun dhukkuba busaa ni ittisaa	dhugaa 1 sobaa 2 hin beeku or sirritti hin beeku 3	
30	Farri booke busaa(IRS) keemikaala booke dhukkuba busaa fiduu ajjeesuuf dagalee manaatti bifamuu dha	dhugaa 1 sobaa 2 hin beeku or sirritti hin beeku 3	
31	Ji‘oota kudha lamaan darbaan keessatti, manni keessan farra bookee busaan biifamee turee	Eyyee 1 Lakkii 2 Hin beeku 3	
32	Dagalee mana ji‘a sadii hanga ja‘a giddutti waan biroo dibuun/noora dibuun/ dandeetii farra booke busaa (IRS) baay‘ee cimsaa /ni dabala	dhugaa 1 sobaa 2 hin beeku or sirritti hin beeku 3	

kutaa 3: Itti fayyadama, qabeenya fi beekumsaa saaphana booke

No.	Questions	Response	
33	Waa‘ee Saaphana booke dhageese beekta?	Eyyee 1 lakkii 2	35
34	Bu‘aan saaphana booke maal fa‘ii • ***Amma dandeesuu tarreessi***	Booke ajjeesuuf 1 Booken hidammu haambisuuf 2	

		Busaa ittisuuf 3 Waa ittin golguuf/curtain / 4 Akkaa affataatti fayyadamuuf 5 Kan biroo(caqasii)_____ 88	
35	Ji'oota kudha lamaan darban keessatti, mana keettif saaphana booke (gosa kaamiinuu) argaateeta?	Eyyee 1 lakkii 2	37
36	Yoo G, **35** eyyee jettee**,** saaphana booke meeqa argaatee?	[_____]	
37	Mana keessa amma kana saaphanni booke yeroo hirribaaf tajaajilu ni jira/ ni qabda?	Eyyee 1 lakkii 2	kutaa 4
38	Amma kana saaphana booke meeqa qabda (kan hojirra oleef hin oliin walitti)?	[_____]	
39	Saaphana manni qabu keessa kan **ammaa cisiichaaf faayada jiru** meeqa?	[_____]	
40	Saaphana manni qabu keessa yeroo oddeeffannoon funaanamee meeqatuu siree/qoodirroo irraatti **raarrafammee**/faanifamme jira?	[_____]	
41	Halkan darbee mana keessa namni saaphana siree jala rafe jira	Eyyee 1 lakkii 2	**43** **42**
42	Yoo namni tokkoyyuu halkan darbee saaphana siree (ITNs) jala hin rafnee ta'ee, sabaabnisa maalii? • **Yoo gaffiin kun deebi'ee, gara kutaa 4tti darbi**	Saaphana (ITNs) jala rafuun mijata miti 1 Saaphanni qulqulluu miti 2 Saaphanni hin rarrafaamnee 3 Saaphana jala rafuun ni iraanfatamee 4 Waggaa kessa Yeroo kana bokeen hin jirtu 5 Kan biroo(caqasii)_____ 88 Hin beeku 8	
43	Namoota halkan darbe mana kana bulan keessaa, sii dabalatee nama meeqatuu		

	saaphana jala rafee?	[_____]	
44	Halkan darbee saaphana siree jala rafteetta?	Eyyee 1 Lakkii 2	

Kutaa 4: Tajaajila saaphana booke daa'iman waggaa shanii gadii

Waa'ee tajaajila saaphana siree kan daa'iman waggaa shanii gadii mana kanan isiin gaafachuu fedhaa. Daa'iman waggaa shanii gadii mana kana keessa sii waliin jiraatan guddaara gara xiqqaatti naf tarreessitaa. Saanan booda, waa'eesaani adda adda baafnee tokko tokkoon dubbana.

Kutaan kun manneen daa'iman waggaa shanii gadii qaban qofan kan deebi'uu (G **14** Ilaali).

Lakk. Daa'imanii	**Maqaa**	**saala** Dhiira=1 durba=2	**umrii** (ji'aan)	Halkan darbee daa'imni saaphana jala rafee/tee Eyyee = 1 lakkii = 2
Daa'ima 1				
Daa'ima 2				
Daa'ima 3				
Daa'ima 4				

Kutaa 5: Cheeklistii daawanna saaphana siree:

Amma immoo haala siree fi saaphana siree mana kessaa itti fayadaamtan ilaala. Cheeklistiin kun daawanna saaphana siree maneen daa'imaan waggaa shaanii gadii qabaaniif kan tajaajilu dha.

Daawanna saaphana siree Ijollee umrii waggaa shaanii gadii Kan Adamii Tullu, 2013

No	**What to Observe**	**Observation**	**Code**	
51	Siree/iddoo bulmaata meeqa jira?	----		
52	Lakkofsa saaphana siree mana kessatti argaamee?	----		
53	Saaphanni siree argaamee maal fakkaata?	a) Akkumaa itti dhuufetti jira b) Faannifamee jira c) Kan biro caqasii--	1 2 88	

54	Siree meeqatti saaphanni faannifamee argaamee?	_____		
55	Saphaanni siree tarsaa‘a dha/uraa ni qaba?	a)niqaba b)hin qabu	1 2	

Kun xumuraa gaaffii keenyatti. Yeroo kessan fuudhataanii gaaffii keenya waan nu deebiftaniif galatoomaa

	Maqaa	Mallattoo	Guyyaa
Nama data fuunannee	_____	_____	_____

Annex V: Focus Group Discussion (Afaan Oromo version)

Heeyama: Akkam jirtu? Maqaan Kiyyaa, _____jeedhama. Dhaabbata _Yuuniivarsiitii Finfinnee jeedhaamuraan dhufee. As kanaan dhufeefis Qo‘annoo tamsa‘inna busaa ittisuu fi too‘achuu irratti hubannoo hawaasni keenya qabu, beekuu fi dhukkuba busaa of irraa ittisuu irratti gaheen hawaasaa maal akka fakkaatu hubachuufi. Bu‘aan qo‘annoo kanaas ittisaa fi to‘annaa dhukkuba busaa geggeefamuuf gahee ol‘aanaa taphata jedhame amanama. Kayyoon qo‘annoo kanaas itti faayadamma saaphana siree daa‘imaan waggaa shanii gadii irratti fi waantota isaan Waal qabataan addan baasuuf.

Qo‘anna kanati Kan hirmaattan fedhiidhaani. Hirmaannaan keessan qo‘annaa adeemsifamuuf milkaa‘ inna ol‘annaa akka qabu ibsuun barbada. Odeeffannoon isin nuuf kennitan kaayyoo qo‘annoo asiin olitti ibsameen alatti kan birootiif akka hin olle waadaa isiniif gala, dhimma waa‘ee nama tokkoo ifatti ibsuun ragaa hin galmeessinu.

Odeeffannoo funaanamu kana hunda haala barreeffamaatiin galmeeffachuun waan ulfaatuuf marii amma adeemsifnu teephiidhaan waraabana. Egaa qo‘annoo adeemsifamu kanatti hirmachuuf feedhii qabdan maaliin nuuf ibsitu__Eyyeen-------- Lakkii-------- Galatoomaa!

Gabatee 8.1: Oddeeffannoo waligalaa Hirmaattotaa

Gandaa	hirmaattota	umrii	barnoota	Amaanta	hojii	waggaa 5 gadii
	P1					
	P2					
	P3					
	P4					
	P5					
	P6					
	P7					
	P8					

Gaaffiilee mare

G1. Waa‘ee Busaa fi Agoobarii maal beektuu/taa?

A. Namoota kamtuu dhukkuba busaattif baay‘ee saaxilama? (Waa‘ee Ijollee waggaa shaanii gadii kaasii)

B. Namni tokko busaarra akkaamiin of eeguu danda‘a? Waa‘ee saaphana, naannoo qulqulleessu, qoricha aadaa fayadammuu kaasii mari‘aachiisi

C. Faayida agoobarii_____ Miidhaa _____

G2: Gochaaleen agoobara akka itti fayyadamanii fi hin fayyadamne nama dhorkan jiru? (Waa‘ee Ijollee waggaa shaanii gadii kaasii)

A. Mana keesanii agoobara qabdu? Yoo hin qabdan ta‘ee, maaliif?

B. Maatiin keessan hundinuu agoobaratti fayyadamanii rafuu?

C. Maatii keessa enyuutu carraa Agoobaratti fayadamuu argata? Ijolleen waggaa shaanii gadii carraa ni argatuu? yoo mitti ta‘ee maaliif? (Waa‘ee ijoollee waggaa shaanii gadii, duubaartii ulfaa, maangudo kaasii?

D. Agoobara walitti fuuftani ni fayadaamtu? (Probe for waggaa guutuu, waqtiidhaan), yoo walitti fuufinsaa hin qabu ta‘ee, maaliif?

E. Haali cisiichaa maatii naannoo kaana akkami? Garaagarummaa bakkaa cisiicha umrii, saala fi k.k.f irratti hundaa‘ee? (Waa‘ee ijoollee waggaa shaanii gadii qophaa, maatii waaliin, kaasii

F. Ittifayyadamiinsa agoobaraa akka ol guddatu yaadni qabdan jiraa? Waa‘ee ijoollee waggaa shanii gadii, duubaartii ulfaa kaasiif