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Assessment of Insecticide Treated Nets (ITNs) Utilization among Children under five years of age and Pregnant women of Adama Woreda, Oromia Regional State, Ethiopia.

By

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Lists of abbreviations

AOR- Adjust Odds Ratio

CI- Confidence Interval

COR- Crude odds Ratio

DHS – Demographic and Health Survey

FMOHE- Federal Ministry of Health of Ethiopia

ITNs- Insecticide Treated Nets

NGO's – Non-Governmental Organizations

OR- Odds Ratio

RBM- Roll Back Malaria

Abstract

Background: East Shoa Zone is one of the 14 Zones in Oromia Regional States accounting more than half of malaria burden annually. Among 12 Woreda in the Zone Adama Woreda is highly malarious, almost 95% of the land malarious and 91% of population at risk. Over 20,000 bed ITNs were distributed in the area. Additionally, the role of Social marketing is not negligible. Despite the efforts to achieve the goal, locally there is critical lack of information about ITNs ownership by households, utilization among under 5 children and pregnant women and factors affecting utilization.

Objective: The study is aimed to assess the proportion of Insecticide Treated Nets ownership by households, utilization among under 5 children and pregnant women and factors affecting ownership and utilization of Adama Woreda.

Method: Community based cross- sectional survey was conducted during September 2006. Primarily, the malarious villages were stratified as rural, suburban kebeles and factory camps. The existing households were identified using registration list available at Woreda health office. Study units were identified by multistage random sampling technique. A total sample of 845 households was proportionally selected. Both self-reported information and direct observations were used to collect data. Data was entered to the computer using EpiinfoVersion6 and analyzed in SPSS 11.0 version statistical software. Tables and figures were used to present the data. Frequency distribution, percentages and Odds Ratio with 95% level of confidence were calculated and interpreted accordingly.

Result: A total of 826 households were assessed, among which 494 and 116 households were assessed with children under 5 years of age and pregnant women, respectively. Four hundred and ninety seven (59.7%) households were observed owning at least one ITN. Three hundred and four (61.5%) children and 73 (62.9%) pregnant women were living in the household owning at least one mosquito net. Direct observation of household has confirmed that only 20.2% and 14.7% of children and pregnant women respectively, were utilizing properly mounted ITNs. Self-reported utilization was over reported compared to direct observation. Regarding a factor for non-owning of ITNs, high price and Locating for free distribution were among the major once. Among major factors for none utilizing, absence of mosquito in the house (53.8%), and forget to mount net (34.6%). In general, knowledge and practice of ITNs were significantly associated with place of residences, educational status and health information of the respondents.

Conclusion and Recommendation

The coverage of ITNs in the area is highly encouraging, although the significant proportion of households was not covered. Not all mosquito nets owned by households were being properly utilized used by young children and pregnant women. Significant proportions of vulnerable groups were not covered. Hence, prioritizing vulnerable groups during distribution, household education on careful and consistent utilization of bed net with great emphasis to high risk and priority groups and district level educational monitoring and regularly ongoing survey were recommended.

Introduction

Background

Globally, Malaria remains to be a major problem causing an unacceptable toll on the health and economic welfare of world's poorest communities. There are some evidences that shows malaria and poverty are intimately connected and currently given as a cause of poverty in poor malarious countries. World Health Organization report has shown that the disease is estimated to be responsible for an estimated average annual reduction of 1.3% in economic growth for those countries with the highest burden (1, 2).

Africa has the greatest burden of malaria cases and deaths in the world. In 2000, malaria was the principal cause of (around 18%) deaths among children under 5 years of age in sub Saharan Africa. Malaria is also a significant indirect cause of death; malaria related maternal anemia in pregnancy, low birth weight and premature delivery are estimated to cause 75,000-200,000 infant deaths per year in Africa South of the Sahara (1, 2).

Despite the highest magnitude of this devastating disease, most countries did not start implementing program to provide access to the tools and strategies recommended by Roll Back Malaria until 2000. In many countries in Africa where the burden of malaria is greatest, scaling up access to treatment and prevention began even more recently. Globally, it is agreed to reduce the burden of malaria by half by the year 2010 and again by half by 2015 (1).

To achieve the millennium development goal, the core technical strategies identified were improved and prompt access to effective treatment, increased use of ITNs, early detection and response to malaria epidemics and improved prevention and treatment of malaria in pregnant women and young children in endemic areas. Similarly, at the African summit on RBM in Abuja, Nigeria in 2000, African heads of state committed themselves to halving the burden of malaria by 2010, by achieving 60% coverage of all at risk population with suitable curative and preventive measures by 2005 (1,2,3,4).

Ethiopia, as one of the signatories of the Abuja convention, has included the above global strategies in its national malaria prevention and control approach. Although the indoor residual house spray with DDT had been going on for the last 4-5 decades, Insecticide Treated Nets experience for prevention of, the effort to achieve the goal is not negligible. Within the last half a decade, this new technology became an option for malaria prevention in the country. Thus, currently the country has got different source for ITNs (WHO, UNICEF, etc.) and distributing for the Regional States. The data from Federal Ministry of Health of Ethiopia has showed that nearly 10 million bed nets were distributed from the center to the regions with in years 2004/2005 (5,6).

Different studies had shown that majority of the distributed bed nets were not in use and their recent status, utilization proportion, demand in the area etc are not well identified in this country or Africa as the whole (1,2). Hence, in addition to scaling up ITNs distribution, periodic assessment of the efforts and moreover the utilization among high risk and priority groups were highly recommended (1).

Statements of the problem

Ethiopia, realizing the effectiveness of ITNs for prevention of malaria transmission, scaling up distribution and utilization of ITN to cover 60% of children fewer than 5 years of age and pregnant women living at high risk area of malaria transmission is undergoing (7). In order to support this part of malaria prevention aspect there was much effort and resources allocated from donors. On the other hand the proper utilization coverage of ITNs among priority and high risk groups were found to be very low, where as the 1st phase of the commitment has ended by 2005(1).

Assessment of attaining of Abuja target of 60% ITNs coverage by African countries indicated that Eritrea is the only one that reached this target during 2003 (WHO,2005). Thirty four surveys conducted in the median year of 2001 have shown that the population weighted coverage of ITN usage in African less than five years of age was 3% (1). Similarly, survey done in Ethiopia have showed that under 5 years of age children and pregnant women who had slept under ITN the previous night of survey were 1.3% and 1.2% for both groups respectively. In the year 2005, only about 3.3% of the households own at least one ITN (8).

Since three-fourth of the land mass in Ethiopia is malarious and Oromia is the 1st largest Region, It shares majority of the health and economic burden of malaria in this country. Similarly high proportion of resources to prevent and control malaria is expended in the region, especially in Woreda with intensive transmission (7). Among these, Adama Woreda (95% of the land malarious and 90% of population at risk) stands among the top. Therefore, in addition to the governmental effort, Non-governmental organizations and others (sugar factory) in the Woreda were distributing bed nets in their respective catchments (9,10). The share of social marketing is also not negligible (11). Despite different preventive measures taken, the magnitude of the disease has remained the leading cause of morbidity and mortality, always raising the question why?

Locally, there is a serious lack of information and knowledge about current level of ITN coverage by household. Specially, data about ITNs utilization rate among under 5 children and pregnant women, factors affecting utilization and demand of the households were

remained un assessed in the study area. In addition, these were identified as a knowledge gap at all levels including, Regional, Zonal, Woreda Health Office and Federal Minster of Health of Ethiopia to be filled by researchers (1, 5, 7).

In the light of this background, the present study examined the situations and tries to fill the gap. The data generated is opted to assist the local authority and Regional Health Bureau to prepare implementation plan and evaluation of their activities. Similarly, it could contribute to national information.

Literature review

Impact of malaria on health and economy

In 2004, globally 107 countries and territories have reported that they own areas at risk of malaria transmission and 3.2 billion people were living at risk (1). It is also estimated that around 350-500 million clinical disease episodes occur annually. Most of these are caused by Plasmodium falciparum which is accountable for more than one million deaths each year. Malaria contributes synergistically with HIV/AIDS to morbidity and mortality in areas where both infections are highly prevalent and evidences continues to accumulate to support the view that adult infected with HIV, in addition to children <5 years of age and pregnant women (1).

Recent studies had shown some evidences that malaria and poverty are intimately connected. Currently malaria is given as a cause of poverty in poor and malarious countries with intensive transmission. Not only malarial countries are poor, but their economic growth is reducing. WHO report has showed that the disease is estimated to be responsible for an estimated average annual reduction of 1.3% in economic growth for those countries with the highest burden (1, 2).

Africa remains the region that has the greatest burden of malaria cases and deaths in the world. Plasmodium falciparum accounts for 93% of parasitological species of malaria cases, which is predominantly transmitted by Anopheles gambiae and Anopheles funestus vectors. Two-third (66%) of African population is at risk of malaria. The estimated contribution of Africa to the global burden of clinical falciparum malaria cases and malarial mortality burden were 74% and 89% respectively (1). Each year approximately 25 million African women become pregnant in malaria endemic areas and at risk of Plasmodium falciparum infection during pregnancy (1, 8).

Malaria in Ethiopia

Malaria is one of the top ranking causes of morbidity and mortality in Ethiopia. The highest score for out patient visit goes for malaria. It is also one of the main causes of hospitalization and death in all corners of the country. More than two-thirds of population lives in malarious areas (12, 13). In 2000-2003, the disease was the primary cause of reported morbidity and mortality accounting for 16% of out patient visit, 20% of hospital admission, and 27% of hospital deaths. During a non epidemic years, 5-6 million clinical malaria cases and over half a million confirmed cases were reported from health facilities (14). Oromia Regional State, in 2004, the Regional annual malaria report showed that 701,539 out patients were clinically diagnosed as malaria. Among 335,799 patients whose blood films were examined microscopically, 31.5 % were positive for malaria. Among blood film positives 17.3% were children under 5 years of age (7).

Epidemiology of Malaria

Transmission of malaria depends greatly on local environmental factors:- Temperature, relative humidity, rain fall pattern, availability of breeding sources and man-made environment. The others are parasite; host and vector factors. Altitude and climatic factors are the main determinants of malaria epidemiology in the country. Areas below 2000 meter altitude are classified as malarious (12, 15). On the other hand, recently done studies has shown that shown that malaria occurs in highland fringe areas including urban sites, the main factor being climate change (16).

Malaria transmission in Ethiopia is mostly seasonal and unstable in characteristics, thus, predisposing majority of the population to frequent and often large scale epidemics (17).

Parasite species

Of all the four Plasmodium species occurring in the country, the two epidemiologically important species are Plasmodium falciparum and P.vivax, 60% and 40%, respectively.

Anopheles arabiensis is the principal vector adapted to different ecological locations in Ethiopia (17).

Malaria Prevention and control Strategies

In the absence of any vaccine, and with the problems associated with drug resistance, prevention of malaria has to return to basic principles such as anti-mosquito measures and the use of Mosquito nets over beds for protection. Globally, malaria control policies and strategies vary with local malaria endemicity. The national control policies of malarious countries generally conform to the key strategies advocated by Roll Back Malaria. This new global initiative against malaria has key elements: - Effective management of malaria, rapid diagnosis and treatment, multiple and cost effective means of preventing infection and well co-coordinated movement etc (1, 18, 19).

Utilization of Insecticide Treated mosquito Net is the principal strategy for malaria prevention in areas where sustained vector control is required. All countries in Africa south of the Sahara, majority of Asian malaria endemic countries and some American countries have adopted ITNs as a key malaria control strategy (1, 2, 20).

Mosquito net utilization had shown impacts on malaria control in parts of India, China, and Africa. Moreover, the wearing of protective clothing and the use of insect repellents and bed nets continue to afford the best protection (13, 21).

In Africa, where the burden of malaria is greatest, scaling up access to treatment and prevention began even more recently. With respect to progress on prevention, the number of ITNs distributed has increased 10 fold during past 3 years in more than 14 African countries (1, 14).

However, the current public health challenge is to increase household demand for and access to ITN on a scale (1, 14, 15). In order to achieve the Abuja target, it would be

necessary for Africans to purchase and utilize appropriately 32 million new nets annually for the next 10 years (1, 3).

Efforts made to prevent and control malaria in Ethiopia

Coordinated action against malaria (as malaria eradication) was launched between 1955 and 1969, Ethiopia being one of the 3 countries in Africa to implement the program. Although the program had remarkable result in industrialized countries and lager areas of sub-tropical Asia and Latin America, the problem of malaria has remained serious in Ethiopia and same for the continent. Hence, the program was reorganized in to malaria control program (1,12).

The country has adopted a new strategy of malaria control that integrates the program in to primary health care system along with the ongoing decentralization and health sector reform. An enabling environment that recognizes malaria as a serious development problem has been created. Malaria control is no longer seen as a largely top-down vertical intervention. Instead, effective malaria actions are being included in local health development efforts. Furthermore, Ethiopia has adopted the WHO's Global Roll Back Malaria (RBM) strategy which mainly relies on early diagnosis and treatment by community health workers, vector control with insecticides and use of insecticide treated nets (13,22,23).

Currently, progress in malaria control activities is seen. Among the major recent achievements:- Change in anti-malarial drug policy, development of new malarial treatment guidelines, development of a national strategic plan for scaling up the distribution and use of ITNs (1, 3, 14,24).

The Situation of Insecticide Treated Nets distribution

ITN was identified as a weapon in the fight against malaria, but there are evidences that relatively few people in high-risk regions use of them. World Health Organization

estimate that only less than 10% of at risk children and women in Africa regularly sleep under ITNs (3). Survey conducted from 1999 to 2004 across 34 countries, have shown that the median proportion of children under 5 years of age using ITNs was only 3% (ranging from 0.1%-63%). Other Surveys conducted in 2002-2004 showed remarkable increase in Eritrea (63%) and Malawi (36%). In selected areas of Senegal, household owner ship of ITNs increased from 11% in 2000 to 41% by 2004. Urban and relatively wealthy households are far more likely to own ITN than rural poor, in which people are at higher risk of malaria (1, 25).

The impact of ITNs on morbidity and mortality

The huge growth in the transmission of multi-drug resistant malaria in recent years has meant that great importance is now placed on non-specific methods of malaria avoidance, such as the wearing of appropriate clothing, use of mosquito repellents on exposed areas of skin, sleeping under mosquito nets impregnated with safe, long-lasting, and acceptable insecticides such as permethrin or deltamethrin, and mosquito-proofing of houses when financially possible (26).

Insecticide treated nets (ITNs) are effective in reducing malaria mortality and over all child mortality (26). The lives of 400,000 – 500,000 children could be saved if every child under 5 years of age in Africa properly slept under a treated net. The study done in high risk area of Malaysia has shown that ITNs distribution and improved diagnosis and treatment services reduced malaria incidence 28 fold between 1995 and 2003 (3). WHO in 2005, reported that ITN utilization has demonstrated a reduction in all causes under 5 years of age children mortality by up to 25% (1). Similarly, other study has identified that proper use of ITNs can reduce all cause mortality in children by an average of 17% and incidence of severe and mild malaria episodes by 45- 48% (1).

Insecticide treated nets contribute significantly to anemia in pregnant women, adverse birth out comes such as spontaneous abortion, still birth, premature delivery and low birth weight (1, 9, 14). The study done in Kenya, had shown that women who were protected by ITNs every night in their first four pregnancies delivered about 25% fewer babies who

were either small for gestational age or borne prematurely than who were not protected by ITNs (9).

The effectiveness of ITNs assessment in Aleta Wondo Woreda, Southern Ethiopia had shown that ITN has an overall protective efficacy of 18% against all causes of child mortality and 50% of malaria disease episodes (9). Large studies of ITNs in the Gambia, Ghana and Kenya have indicated that the use of this simple technology can reduce over all child mortality by 17%- 63% .The same study in Kenya, had shown that ITNs reduced death from life threatening malaria by 44%, lowered the hospitalization of children with malaria by 41% and child hood death from all causes by 33% (27).

The proven efficacy of insecticide-treated nets, most recently in operational settings has rejuvenated confidence in vector control as a viable means to tackle malaria and high coverage with ITNs will do more for public health in Africa (28, 29).

The Utilization of ITNs among vulnerable groups

The survey done in Ghana on ITN use among under 5 years children showed that the proportion of children and pregnant women who slept under ITN the previous night of survey was 34.8% and 34%, respectively (30). Similar study done in the areas of rural Burkina Faso, self-reported compliance was 66% and 98% during dry and rainy season, respectively. These were further confirmed by direct observation and found to be only 34% and 79%, respectively (32).

Almost all studies conducted in Africa showed that ITNs utilization by high risk groups are very low and have identified various social, behavioral and economic barriers to ITNs use. These include a lack of information about the benefit of ITNs, poor access to market for ITNs, cultural preferences and low income (3). The study done in Uganda on knowledge, Attitude and Practice related to malaria and insecticide treated nets had shown that majority (71.5%) of the respondents know that children five years or under are at greater risk of malaria, but only 9.9% reported that pregnant women are also at risk. Only 24.6% of respondents cited the use of mosquito nets as best prevention method and 17% did not know how to prevent malaria at all. Although nets were viewed positively, nearly

half (42.8%) nets found in the households during the survey were not in use. The common reasons for failure to use the ITN were: - it is perceived to be expensive, not hanged, no bed room, too small, a cause of heat and lack of enough air when slept under it (32, 33, 34).

The assessment on the proper hanging of ITNs was found to be very low. The study done in rural Burkina Faso had shown that the proportion of ITN found to be tacked correctly under mat/mattress during direct observation was 10% and 34% during the dry and rainy season surveys, respectively (32).

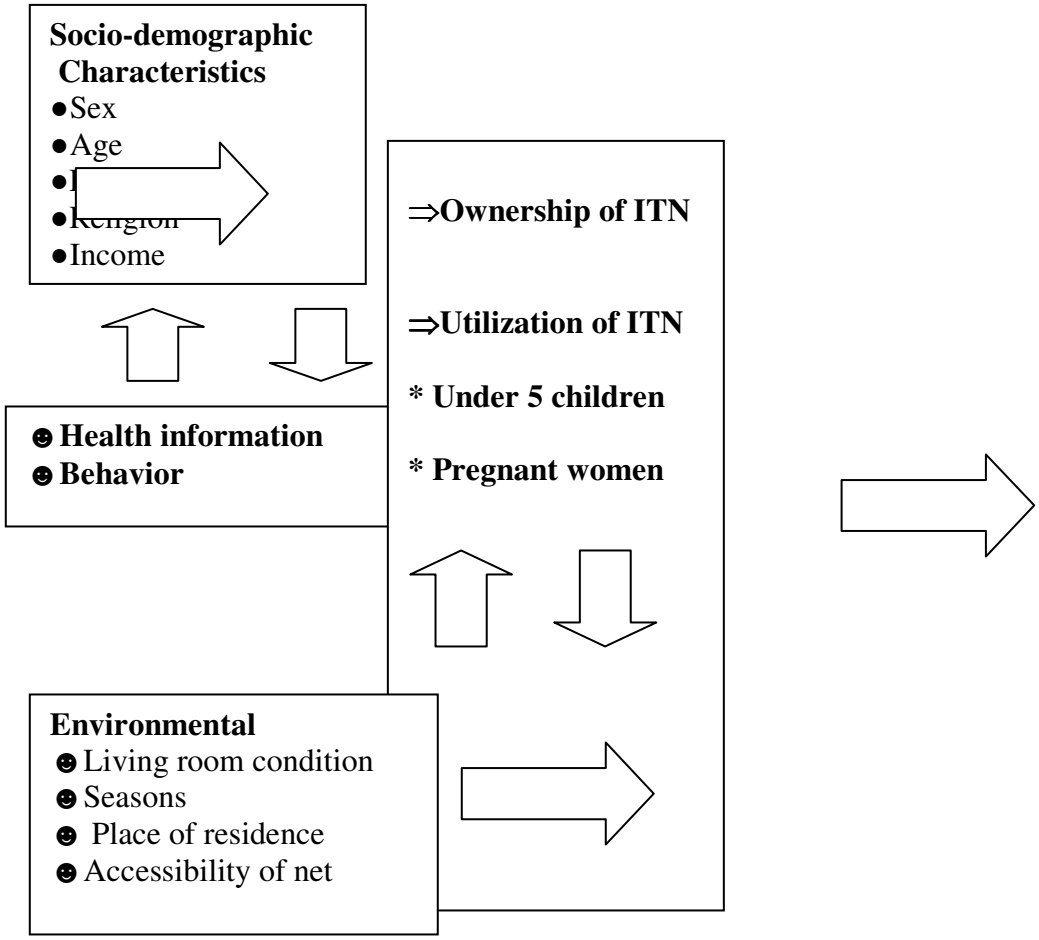
In Ethiopia, DHS in 2005 preliminary report showed that only 10% of people living at high risk of malaria (altitude at 1500m) own ITN, just 4% of children under 5 years of age and 1% of pregnant women slept under ITN the night before the survey (8). The other study done in Ethiopia had shown that only 6% of vulnerable groups (children under 5 years of age and pregnant women) had slept under net prior night (34). Furthermore, the utilization rate differed by place of residence, in which urban areas are higher than the rural ones (25, 35).

Although the distribution of ITNs is improving through time, it was seen that nearly half of bed nets were not in use. It was further seen that self report utilization of ITNs tends to be over reported compared to direct observation. The study done in Rural Burkina Faso has shown that among self-reported compliance of 66%, only 34% of under five children were confirmed sleeping under bed net by direct observation (32).

Clearly, just increasing coverage will not be enough unless people use treated nets correctly and consistently, rates of malaria death and illness will not be reduced (32).

Insecticide treated nets scaling up have shown progress, but the situation of utilization among children under five and pregnant women in Africa are not well known. Hence, the periodic assessment of the progress (with coverage and utilization among vulnerable groups) towards achievement of the targets was highly recommended in the National strategic plan and World Health Organization Malaria report (1, 6, 37)

Figure 1: Study frame work for assessment of ITN possession and utilization among Children under 5 years of age and pregnant women, Adama Woreda, Sept. 2006.



OBJECTIVES

GENERAL OBJECTIVE

To assess Utilization of Insecticide Treated Nets among households and describe factors affecting its use in Adama Woreda.

SPECIFIC OBJECTIVES

1. To identify the proportion of households with Insecticide Treated Nets.
2. To identify the proportion of under five Children and Pregnant women utilizing Insecticide Treated Nets.
3. To identify knowledge of respondents and other factors affecting utilization of ITN.

Methodology

Study Design

Community based cross-sectional study was conducted in Adama Woreda during the second two weeks of September 2006.

Study Area and population

Adama Woreda is one of the 12 woredas in East Shoa Zone of Oromia regional State, around 100 km east of Addis Ababa along the railway and high way to Djibouti. Adama Woreda has 40 rural villages, 5 Suburban kebeles and 15 Sugar factory camps. It has a total population of 163,104 (38). More than two-thirds (68%) of the population inhabiting in the rural villages, where as the rest in suburban and Wonji sugar factory camps accounting 18.6% and 13.4%, respectively. Concerning the health care services, there is one factory Hospital, one governmental health center, one missionary health center and 15 health posts and 5 private health facilities. Geographically, 95% of the villages in the woreda are located in the low land and 90% of population at risk of malaria transmission. Morbidity report from health facilities showed that, malaria stands the 1st among the ten top diseases (38). This is mainly because of that the woreda is located in Rift valley; majority of the area is low land (Altitude below 2000 meter) and large scale irrigation by Wonji Sugar Factory and Koka hydroelectric dam on the Awash River creating man-made environment for vector breading source. Similarly the annual rain fall, mean temperature, Parasite(P.falciparum and p. vivax) and vector species in the area has highly in fevered the transmission of the infection (7,15).

As there is intense transmission of malaria in the woreda, curative and preventive actions are under going. Among these, Insecticide spray (each village 2 times a year), early diagnosis and treatment, ITNs utilization scale up and distribution are being tried by the government, non governmental organization and Wonji Sugar Factory in their respective catchments. Woreda health office annual repot in 2005 showed that approximately 23,787 bed nets were distributed. Among these majority (71%) were distributed by organizations other than Ministry of health (7, 10, 38).

Source Population

The source population was all households which are found in rural villages, Suburban and Factory camps with high risk malaria transmission in Adama woreda.

Study subjects

The study subjects were households and under five years of age children and pregnant women of Adama woreda who were chosen randomly from villages that were at risk of malaria transmission. It was assumed that one under five child and pregnant women sleep under the mosquito net, but if more than one existed in the household, one under five child and pregnant women in the household were selected from each by lottery method. Observation of bed net for all households that own net was done. If more than one net existed in the household that does not have under five years of age child and pregnant women, one net was chosen by lottery method for observation. If more than one mosquito net owned by a household where child or pregnant woman existed, the one that household uses for child under five years of age and pregnant women were selected by lottery method and observed.

Sample Size Determination

The study sample size was determined by statistical calculation. The estimation of population proportion, p, where p is the proportion of households that uses ITNs for children under 5 years of age and pregnant women, assuming that one child or pregnant women sleep under a net. Because of the approximation of households properly utilizing ITNs in the area was unknown, p = 0.5 was used, as this value gives sample size sufficiently large to guarantee an accurate prediction, at 95% confidence interval and 5% error of estimate.

The following formula was used.

$$n = \frac{(z_{\alpha/2})^2 * p\,(1-p)}{d^2}$$

Where as:-

n= sample size

p= 0.5 (proportion of HH using ITNs)

Zx/2=1.96 (Z=score corresponds to 95% confidence interval.

d= 0.05 (Margin of error)

$n = \frac{(0.5)(0.5\ (1.96)^2}{(0.05)^2} =$ 384 HH

The study group was stratified twice (multistage) and the design effect was taken to be 2; the total sample was 2x384= 768

10% contingency was considered =77 households, which gives a total of 845 households.

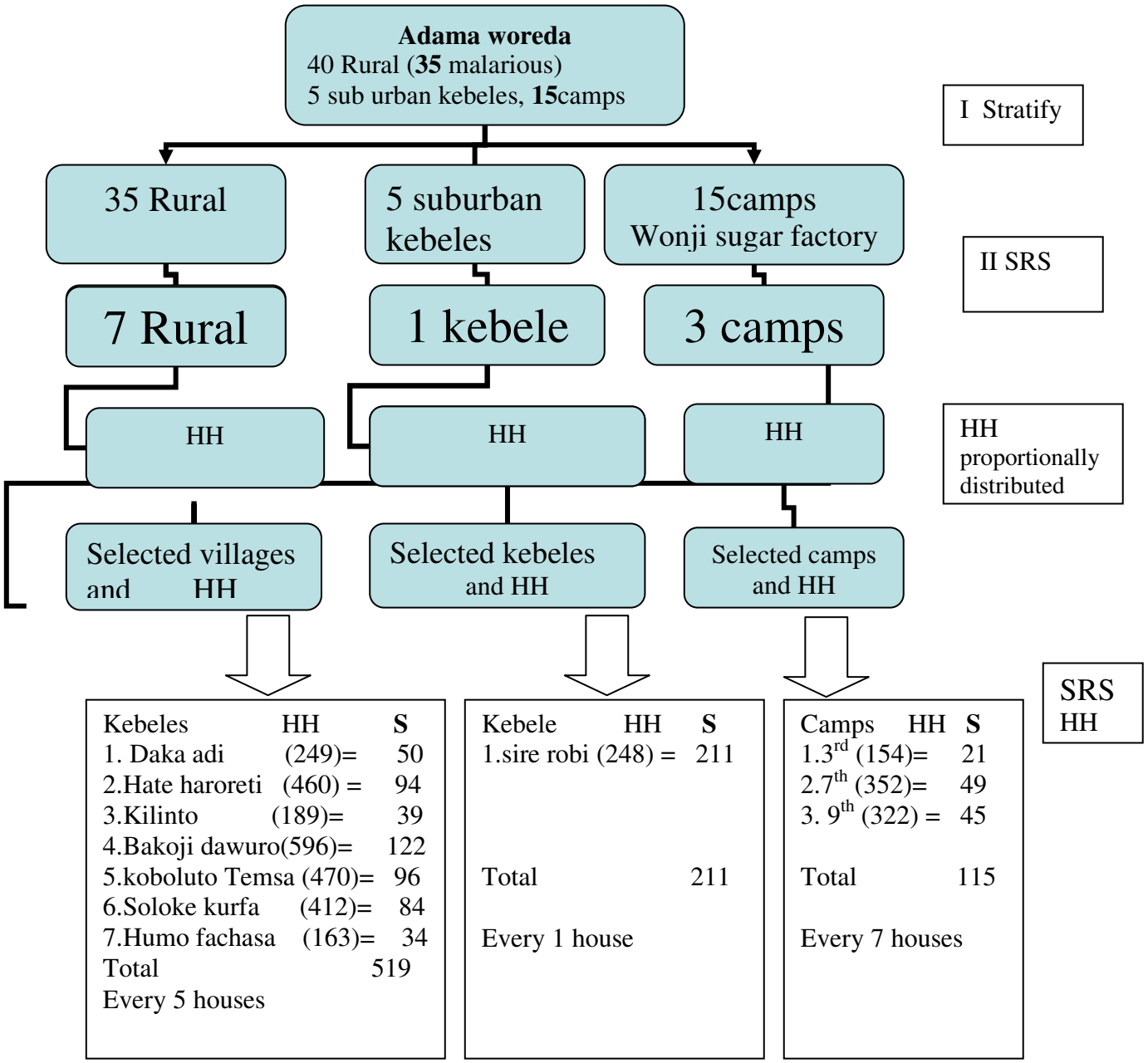
Sampling procedures

The study units were identified by stratified multistage random sampling technique. Primarily, the source population was stratified in to Rural (35 kebeles), Town (5 kebeles) and factory camp (15 camps), with a population proportion of 61.4%, 25%, and 13.6% respectively. This was believed to increase representatives of the subjects as there might be differences by type of residence, information, economic status and efforts from external bodies which causes variations.

The villages, kebeles and camps were selected by simple random sampling using the list of each stratum as sampling frame. Hence, 7 rural villages, 1 Suburban kebele and 3 Factory camps were selected by simple random sampling method.

The number of households which were selected from each randomly selected kebeles was determined by the households (population) proportion of respective kebeles. Furthermore, the study units (households) were selected by simple random sampling using the recent registration list which was prepared for DDT spray in June 2006 by Woreda Health Office (Figure 2).

Figure 2: Schematic presentation of sampling procedures, Adama Woreda, Sept. 200**6.**



Data Collection Method

The data was collected by interviewer using standardized (partially adapted from the previous works) questionnaire which was pre- tested in Lume woreda (which is similar to the study area and adjacent to the study woreda, in Adada Danbala village) by principal investigator and one MPH student who was assigned as supervisor, for appropriateness before the actual data collections. The questionnaire was translated to Oromo language. Nine data collectors (2 Diploma Nurses, 1 Sanitarian and 6 Malaria experts), twelve assistants (community health agents from respective villages, kebele and camp) and three supervisors (2 BSC and 1 MPH student) were recruited on the basis of educational, ability to speak the regional working language (oromifa) and Amharic. The team was divided into six groups with 1 supervisor for two teams.

The information was collected from household heads, mothers, care givers or member of household whose age is 18years old and above and less than 80 years. Observations was done on the type of bed net, condition of the net/ any thorn /burn etc parts/ and proper utilization of bed nets by children under 5 years of age and pregnant women for those who own bed nets and utilizing and for those who gave "forget" as a reason for non-utilizing the previous night. Direct observation of children and pregnant women who had slept under bed net was done by experts from Woreda health office early in the morning (from 5.30am- 7.00am) before the members of the households go out of their beds.

Data Quality Assurance

To maintain the quality of the data structured and pre-tested questionnaires and check lists were used to collect information. Two days training was given to all data collectors, assistants and supervisors. The whole process of data collection was done under close supervision of the senior supervisors from Zonal health office. The collected information was frequently checked at the field by the supervisors. The overall supervision was done by the principal investigator. Questionnaires were checked for completeness every night at the time of data collection and incomplete ones were sent back to the data collector for check up under supervision. Feedbacks on previous day activities were given for both data collectors and supervisors.

Data cleaning was done and 5% of data was reentered and compared with the already entered data to maintain its quality.

Data Management and Analysis

Data was checked for completeness and any incomplete information was excluded from the entry. Coded data was entered in to Epiinfo version 6.04 computer software package. Cleaned data was exported to SPSS 11.0 version computer software package. The program was used to produce frequency distribution, calculate percentages, Odds Ratio with 95% CI, to ascertain the association between dependent and independent variable as appropriate. Additionally, Tables and Figures were used to present findings.

Variables

Dependent variables:

- Availability of ITN in the household (possession)
- Practice on ITN utilization: children under 5 years of age sleep under the net and pregnant Women sleep under the net.
- Knowledge of respondent:-

Independent variables

- **Socio-economic characteristics**:

Sex, Age

Educational status,

Religion,

Source of Income

- **Health information**
- **Environmental**

-Type of living room

- Place of residence

-Season of the year

Operational definition

●**Bed Net-** is a material made of nylon, polyester, polyethylene and synthetic with cotton mixture with different shape, size and used to protect people against insect bites.

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

●**Target group**-groups which are nationally identified as high risk and given priority for ITN utilization, these include pregnant women and children under 5 years of age, community affected by emergency and all others living in malarious area.

● **ITN utilization-** The use of standardized properly hanged (mounted) over the bed or the sleeping area and less than 5 years of age child and pregnant women sleeping under the mosquito net during the early morning of observation day.

Ethical Consideration

Primarily, ethical clearance was obtained from Medical Faculty Research and Publication Committee, Addis Ababa University. Formal letter was written to Oromia Regional State Health Bureau from of Department of Community Health. The principal investigator communicated Regional Health Bureau, East Shoa Zone health office and Adama Woreda Health Offices. All respondents were asked for their willingness to be involved in the study. Data collectors put their signature for they had informed verbal consent for the interview and the observation done.

Confidentiality was guaranteed and the information other than the study objectives was kept secret. Problems identified during data collection: children and pregnant women who were febrile were referred to health post or village community health agent. Malpractices related to ITNs and non utilization of ITNs was communicated through health education given after interview and direct observation.

Dissemination of findings

The final report will be presented as partial fulfillment of the degree of Master of public health to Department of Community Health, Faculty of Medicine, Addis Ababa University and copies will be offered to Federal Ministry of Health Malaria Control Department, Oromia Regional Health Bureau. Further more, half a day seminar will be conducted for Zonal and Wored Health Office workers at Adama Town. Also it will be disseminated through Publication of the findings in local and international journals and presentation on scientific conferences.

Results

Socio-demographic characteristics of households

A total of 845(100%) study subjects have participated in the study. Among these, very few 19 (2.3%) households were omitted from the analysis due to incomplete information. Hence, 826(97.7%) households with complete information were included in the analysis of the study study. Among these Rural villages, suburban and Sugar factory camps were 511(61.9%), 210(25.4%) and 105(12.7%), respectively (Table 1).

Majority (52.3%) of the respondents were females. The median age of the respondents was 32.5 and the mean age was 30.5 with SD± 1.246. More than three-fourth (84.9%) of respondents were Christian by their religion.

Farming is the major source of income for majority (58.5%) of the respondents, where as monthly enumeration was for 24.6% of the respondents. Concerning the educational status of the respondents, nearly half (42.9%) of the respondents were illiterate, where 57.1%of the respondents were able to read and write and above.

The assessment on the bed room condition has shown that 50.7% of the respondents had bed room/place of sleep separated from other activities by certain materials, whereas nearly half (49.3%) of the households bed room were shared with other activities (Table 1)**.**

Table1: Socio-demographic characteristics of respondents, Adama Woreda, Sept. 2006. (n=826)

Characteristics	Number (%)	Remark
Sex of respondent		
Male	394 (47.7)	
Female	432 (52.3)	
Age in years		
18-24	226 (27.4)	Mean= 30.5
25-34	248 (30)	SD± 1.246
35-44	187 (22.6)	
45-54	91 (11)	
55-80	74 (9)	
Educational status of respondents		
Illiterate	354 (42.9)	
Read and write	103 (12.5)	
Grade 1-6	182 (22)	
Grade 7-12	159 (19.2)	
12 and above	28 (3.4)	
Religion		
Christian	701(84.9)	
Moslem	122 (14.8)	
Others	3 (0.3)	
Source of income		
Farm	483 (58.5)	
Trade	62 (7.5)	
Salary	203 (24.6)	
Others	78 (9.4)	
Bed room condition		
Separate	419 (50.7)	
Shared with other	407 (49.3)	

Prevalence of ITN owning and conditions related to Household's net

A total of 500(60.5%) of the respondents self-reported that they own at least one bed net. Among these, 7(1.4%) households couldn't show any bed net during observation of household's bed nets. Hence, a total of 493 (59.7%) households were observed owning at least one bed net. The assessment done on the number of bed net owned by a household, nearly half (41.2%) of the households own one bed net. The mean number of bed net owned was 1.83 with SD ± 0.791.

The assessment done on the reasons for non-owning net has showed that, among non-owners of bed net, high price of bed net was given as a reason for none owning by 109(46.2%) respondents and 34% were expecting bed net to be distributed free by government through village authority and did not try any other alternatives to obtain mosquito net. Similarly, lack of information was given by 27% of respondent as a reason for none owning bed net.

Among 54.7% of the household's mosquito nets were re-treatable and the remaining were permanently treated bed nets. Among those who own re-treatable bed nets, only 41(15.2%) respondents had re-treated their nets. Further more, the assessment by place of residence shows that only 22(25.3%) of rural, 13(20.6%) of Factory camp and very few 6(4.5%) suburban dwellers had re-treated their bed nets.

The major reasons given for none re-treating bed nets were- absence of K-O tablet(re-treating kit)supply or availability in the area was given by 146(64%) respondents and 87(38.2%) were due to lack of information about the need of re- treatment (Table 2).

The direct observation of household's bed net for any defect through the net has showed that among household's bed nets which were observed, 138(28%) were inspected with varying degree of visible defect /thorn, burn etc/ through the nets (Table 2).

Table 2: Ownership of ITNs and conditions related to ITNs owned, Adama Woreda,

Sept. 2006.

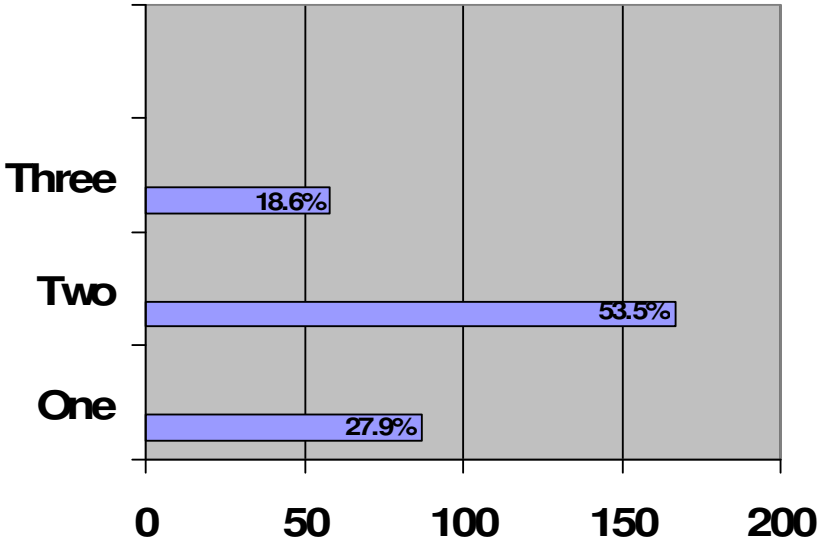
Characteristics	Number (%)	Remark
Ownership of ITN (self reported) (n=826)		
Yes	500(60.5)	
No	326(39.5)	
Ownership of ITN(confirmed by observation) (n=826)	493(59.7)	
Number of ITN/ HH (self reported) (n=500)	206(41.2)	Mean=1.83
One	173(34.6)	SD± 0.791
Two	121(24.2)	
Three +		
Type of Net observed in HH (n=493)		
Re-treatable	269(54.6)	
Permanent	224(45.4)	
Re treatment of non Permanent (n=269)		
Retreated	41(15.2)	
Bed Nets observed with defect (n=493)	138(28.0)	
Factors for non-owning bed net (n=326)		
Lack of information	88(27.0)	
High Price	109(46.2)	
Not available	82(34.7)	
Waiting for free distribution	82(34.7)	
Factors for non treated nets (n=228)		
No KO tab in the area	146(64)	
Lack of information	87(38.2)	
Forgotten	6(2.6)	
Others	6(2.6)	

NB. Percent might not add up to 100 due to multiple responses.

The number of bed /place of sleep in a household with young children and pregnant women

The assessment done on the scarcity of the net in the household has shown that among 312 (37.7%) of households with children under five years of age and pregnant, 167 (53.5%) of households own two beds/places of sleep and 87(27.9%) own one bed/place of sleep while the reaming (18.9%) were assessed having three beds/place of sleep. The mean number of bed/place of sleep was 1.91 with SD ± 0.676 (Figure 3).

Figure 3 : Children's and pregnant women's house with the Number of bed/place of sleep that were owned , Adama Woreda, Sept. 2006.



Prevalence of Insecticide Treated Nets utilization among <5 years of age children

A total of 494(59.8%) households were found with at least one less than five years of age children. Among these 342(69.2%), 103(20.9%) and 49 (9.9%) were from Rural, suburban and factory camp respectively.

Majority (61.5%) of under five years of children survived in the household which has at least one bed net whereas the remaining 38.5% of the children had no access to ITNs.
Only 176(35.6%) of under 5 years of age children had utilized bed net during the previous night of survey. Further more, detail assessment was done to confirm self-reported utilization and for those who gave "forgotten to utilize only for that day" as a reason for none utilizing during the previous night by direct observation while sleeping under bed net early in the morning of the next day of the interview and it has shown that 116 (23.5%) were confirmed by direct observation while sleeping under bed net.

Self-reported ITN utilization among <5 children was over reported when compared with direct observation (Figure 4).

Among children utilizing bed net, majority (86.2%) were observed sleeping under properly hanged(mounted) bed net, whereas the remaining(13.8%) were utilizing bed net in other forms (using under mattress, as a sheet and cover cloth over the blanket) rather than mounting it over the bed or place of sleep.

Thus, the proportion of under five children observed sleeping under mosquito nets which were properly mounted over the bed or place of sleep were 20.2% (Figure 5).

A total of 26(22.4%) children were utilizing bed nets with defect/varying degree of thorn, burn etc/. Similarly, 38.8 % of the children were observed sleeping under mosquito net which was not re-treated timely (Table 3).

Table 3: Insecticide Treated Net utilization among < 5 years of age children and conditions related to their bed net, Adama Woreda, Sept. 2006.

Characteristics	Number (%)
<5 child in the HH (n=826)	
Yes	494(59.8)
No	332(40.2)
Access to ITNs (n=494)	304(61.5)
Child utilized ITN previous night (n=494)	176(35.6)
Child sleeping under properly hanged net (n=116)	100(86.2)
Child sleeping under net with defect (n=116)	26(22.4)
Child sleeping under net which were not retreated (n=116)	45(38.8)

Figure 4: Relationship of self-reported ITN utilization among under 5 children with direct observation by place of residence, Adama Woreda, Sept. 2006.

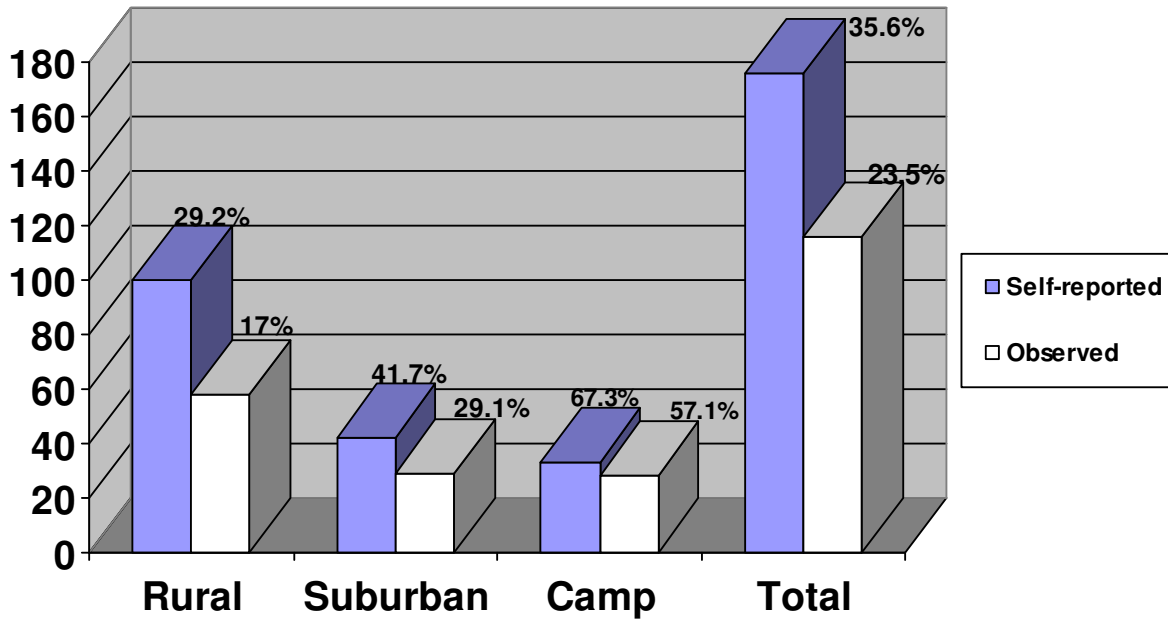
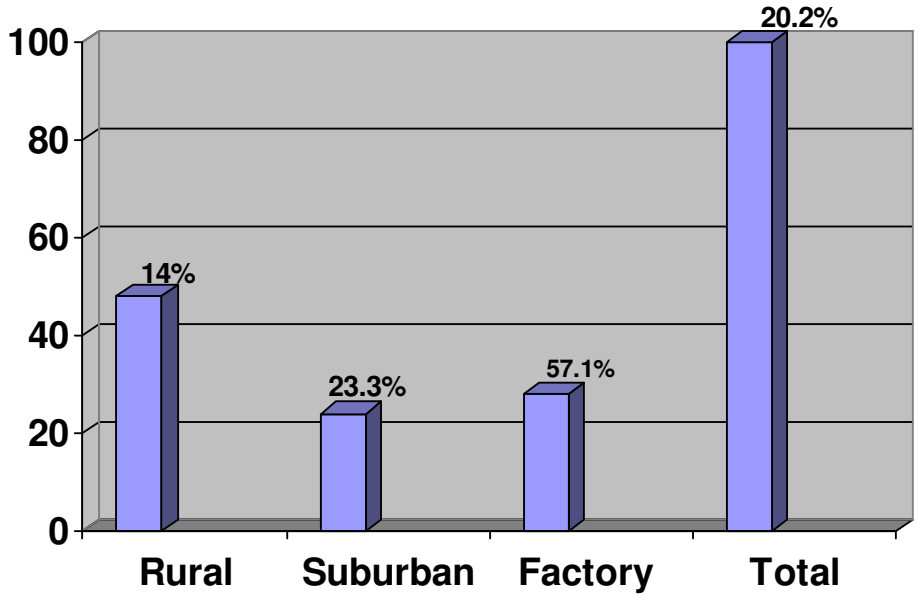


Figure 5: Properly mounted ITNs utilization among under 5 children with direct observation by place of residence, Adama Woreda, September, 2006.



Prevalence of Insecticide Treated Nets utilization among pregnant women

One hundred and sixteen (14%) of total households were assessed with at least one pregnant women. Among these, majority (75%) were from rural villages where as 17(16.7%) and 12(10.3%) were suburban and factory camp, respectively.

The assessment done on accessibility of ITNs for the pregnant women in the area has shown that 73 (62.9%) of the assessed pregnant women were living in the household which has at least one bed net and the reaming 37.1% of the pregnant women have no accesses to ITNs.

Only less than half 43(37.1%) of pregnant women had self-reported as utilizing bed net the previous night of survey. Further more, the assessment by place of residence showed that only 32(36.8%) of rural, 3(17.6%) of suburban and 8(66.7%) of camp had access to bed net at household level and were utilizing ITNs by history.

The direct observation done had shown that only 21 (18.1%) of pregnant women were directly observed while sleeping under bed net.

Again self reported utilization of ITNs among pregnant women was over reported over direct observation (Figure 6).

The observation of bed nets utilized by pregnant women showed that 17 (81%) of utilizes were observed sleeping under properly mounted mosquito net. Improperly hanged bed net utilization was higher (29.6%) among rural pregnant women when compared to other places of residence. Similarly, 4(19%) of pregnant women utilizing net were observed sleeping under bed net with defect and 28.6% of pregnant women were observed sleeping under bed net which were not treated for the last 12 months (Table 4).

The proportion of pregnant women observed utilizing properly mounted (over the bed/place of sleep) mosquito nets in the area were 14.7% (Figure 7).

Table 4: Insecticide Treated Net utilization among pregnant women and conditions related to their bed net, Adama Woreda, Sept. 2006.

Characteristics	Number (%)
Pregnant in the HH (n=826)	
Yes	116(14)
No	710(86)
Accesses to ITNs (n=116)	
	73(62.9)
Pregnant women utilized ITN previous night in the area (n=116)	43(37.1)
Pregnant women sleeping under properly hanged net (n=21)	17 (81)
Pregnant women sleep under net with defect (n=21)	4(19.0)
Pregnant women sleeping under net which were not retreated (n=21)	6(28.6)

Figure 6: Relationship of self-reported ITN utilization among pregnant Women with direct observation by place of residence, Adama Woreda, Sept. 2006.

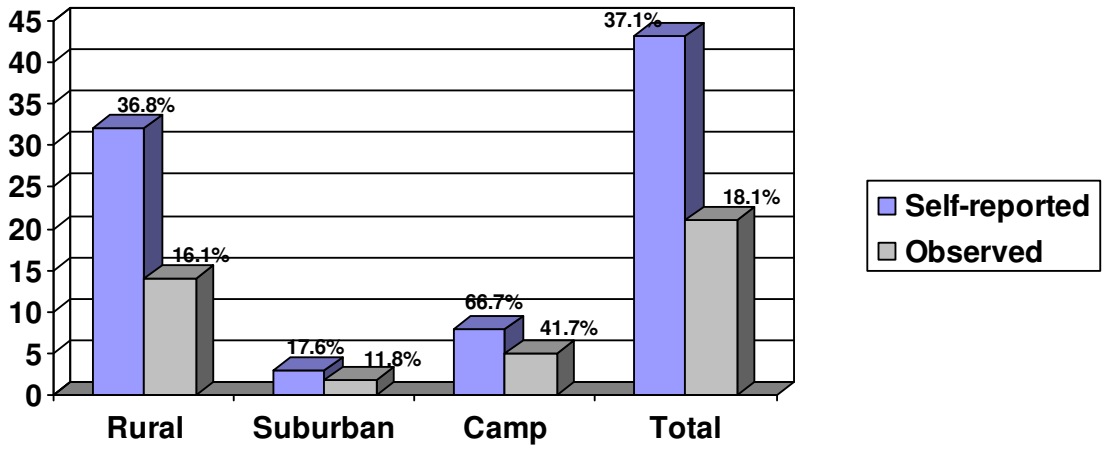
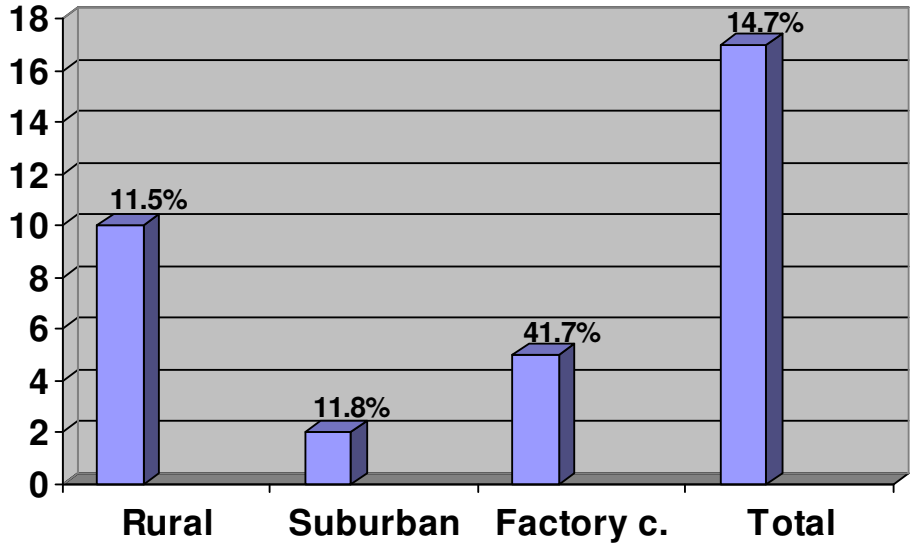


Figure 7: Properly mounted ITNs utilization among pregnant women, with direct observation done by place of residence, Adama Woreda, September, 2006.



Reasons for not-utilizing of ITNs among high risk groups

The assessment done on the reasons for not utilizing bed net by under 5 years of age child among households who own bed nets has showed that, nearly half (40.6%) of the

respondents reason was the absence of mosquito in the house and they believe that bed net is used only when mosquito is seen in the house. A total of 38(29.7%) of the respondents reason was forgotten to mount bed net during the night. Similarly, 38(29.7%) of the respondents had no reason to give for their non compliance and others were not utilizing as bed nets were old and not killing mosquito were given as reasons for none utilizing bed nets.

Similarly, among the reasons for non-utilization by pregnant women living in the households owning bed net showed that, More than half (53.8%) of the pregnant women who had access to bed nets were not utilized bed net during the survey morning. Among the reasons given, the absence of mosquito in the house was the major reason, where as 34.6% respondents gave "forgotten" to mount the net as a reason for none utilization (Table 5).

Table 5:- Reasons for non-utilization of ITN among owners of ITNs, Adama Woreda, Sept. 2006.

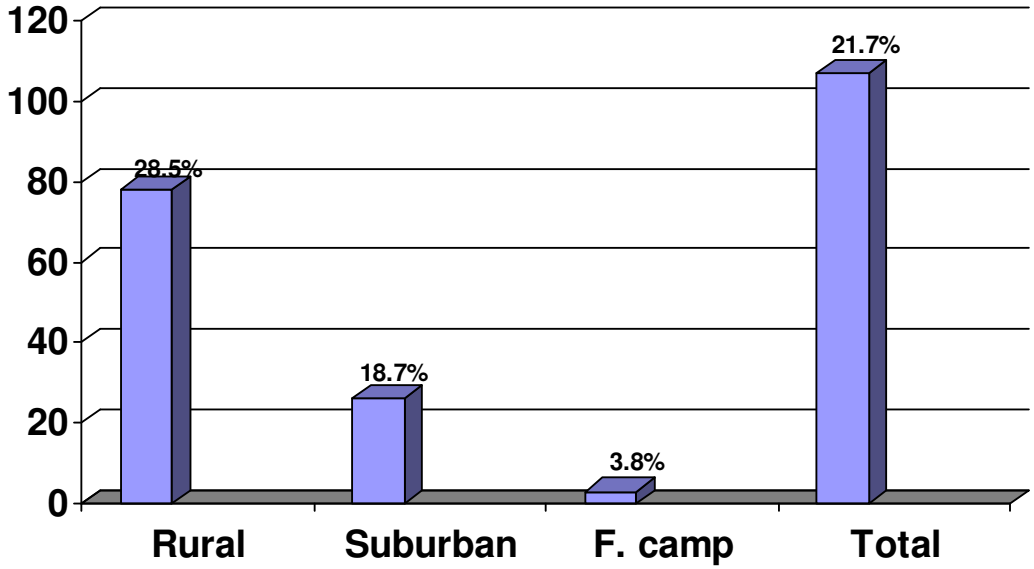
Characteristics	Number (%)
Reason for child not Utilizing (among ITN owners) (n=128)	
Forgotten	38 (29.7)
No Mosquito in HH	52 (40.6)
Other	38 (29.7)
Reasons for pregnant women not Utilizing (among ITN owners) (n=26)	
Forgotten	9 (34.6)
No Mosquito in HH	14 (53.8)
Other	3 (11.5)

None Compliance of ITN utilization

The assessment done has showed that majority (53.6%) of children's and 71.2% of pregnant women's bed nets were not in use in the area. Furthermore, the direct observation of the households bed net has showed that, 107(21.7%) of household's bed

nets were inspected totally unutilized (none compliance) with the evidence that no any attempt to use as bed nets were kept as they were packed by the manufacturer, (Figure 8).

Figure 8- None compliance of ITNs utilization among owners of bed net by place of residence, Adama Woreda, Sept.2006.



Knowledge related to malaria transmission and prevention

A majority (80.5%) of the respondents have identified that malaria transmission is caused by Mosquito bite. On the other hand 15.5% of the respondents believe that malaria transmission is due to shortage of food in the area.

Concerning the identification of malaria prevention methods at household level, 463 (56.1%) of the respondents cited Insecticide Treated Nets utilization as one of the priority measure for malaria prevention at household level.

Further more, 70(8.5%) of the respondents response was traditional measures (drinking locally made alcohol and eating Garlic) as Malaria prevention method. Only 2.8% of the respondents totally didn't know how to prevent transmission of malaria.

High risk group identification by the respondents was assessed and had shown that majority (84.7%) of the respondents were able to identify children under 5years of age as high risk group. Similar assessment has also shown that only less than half (38.7%) of the respondents were able to identify pregnant woman as one of high risk group for malaria infection.

Six hundred and eighty five (82.9%) of the respondents were able to identify children under 5 years of age as priority group, where as less than half (40.6%) of the respondents identified pregnant women as high priority group in malaria prevention strategy (Table 6).

Table 6: Knowledge of the respondents in relation to malaria transmission, prevention and priority and high risk group identification , Adama Woreda Sept. 2006.
n=826

Characteristics	Number (%)
Transmission of malaria	
Mosquito bite	665(80.5)
Bad season	145(17.6)
Hanger	128(15.5)
Priority for prevention at HH level	
DDT spray	109(13.2)
Source reduction	282(34.1)
Drug prophylaxis	239(28.9)
ITNs	463(56.1)
Not known	23(2.8)
Traditional Source	70(8.5)
High risk group identification	
<5 children	701(84.7)
Pregnant women	320(38.7)
Adult	11(1.3)
Old age	76(9.2)
Not known	19(2.3)
Priority setting in malaria prevention	
<5children	685(82.9)
Pregnant women	335(40.6)
Adult	8(1)
Old age	52(6.3)
Not known	17(2.1)

Note- percent did not add up to 100 as there were multiple responses.

Knowledge related to ITNs mechanism of action and utilization

Knowledge of the respondents about ITN prevention mechanism has shown that majority (66.2%) of the respondents were able to identify bed nets prevent mosquito bite (as a physical barrier), whereas it was only about half (52.1%) of the respondents have

information that properly treated nets also act by killing mosquito. Only few (4.6%) responded that they do not know about mechanism of action of ITN.

Six hundred twenty six (75.8%) of respondents have identified that bed net should be used every night. A total of 145(17.6%) respondents believe that bed net should be used seasonally and few (3.6%) replied that bed net should be used when mosquito seen in the houses.

A total of 730(88.4%) respondents believe that utilization of ITN does not have any problem. Only 80(9.7%) of the respondents complain that ITN utilization has a problem. Among these, 44(58.7%) said that sleeping under ITN cause increased hotness on children and they sweat much, 15(20%) replied that sleeping under net causes discomfort and 12(16%) believe that sleeping under nets cause lack of air inside the net (Table 7).

Table 7: Knowledge related to ITNs mechanism of action and utilization, Adama Woreda, Sept. 2006.

Characteristics	**Number (%)**
Mechanisms of action of ITNs (n=826)	

Physical barrier	547(66.2)
Kills mosquito	430(52.1)
Irritate mosquito	67(8.1)
Not known	38(4.6)
Others	9(1.1)
When to utilize ITNs (n=826)	
Every night	626(75.8)
Seasonally	145(17.6)
When Mosquito Seen in HH	30(3.6)
Not known	44(5.3)
Any problem if ITN Utilized (n=826)	
Yes	80(9.7)
No	730(88.4)
Not known	16(1.9)
Lists of the problems (n=80)	
Prevent comfort	18(22.5)
Cause heat	45(56.3)
Lack of enough air	13(16.3)
Not known	4(5)

Factors affecting ownership of bed net and its utilization

The analysis done why certain group own ITN and others don't own has showed that ownership of bed net varied between places of residence. It was seen that rural residences were less likely own bed net when compared to camp dwellers [AOR=95%CI, 0.28(0.14, 0.56)]**.** Similarly, it was found that the respondents with health information (identification

ITNs as priority for malaria prevention) were about 2 times more owned net than those who had no information, [AOR=95% CI, 2.16(1.56,3.00)].

The ownership of ITNs was significantly associated with the health information of risk group identification f the respondents. Households who had knowledge of identifying high risk groups were about 2 times owned bed net than those who don't had these information, [COR=95%CI,1.78(1.32,2.38)]. However, there was no significant association that can be demonstrated form the data between educational status and source of income of the respondents after adjusting for confounding factors (Table 8).

Table 8: Ownership of ITNs by selected characteristics of households and health Information, Adama Woreda, Sept. 2006.

Characteristics	Ownership of ITNs		Crude OR=95%CI	AOR=95%CI (enter method logistic model)
	Yes	No		

Place of residence				
Rural	278	233	0.37(0.23,0.60)*	0.28(0.14,0.56)**
Suburban	142	68	0.65(0.38,1.12)	0.695(0.40,1.22
F. camp	80	25	1.0	)
				1.0
Education				
Illiterate	206	148	0.84(0.64,1.12)	1.06(0.77,1.04)
Literate	294	178	1.0	1.0
Source of Income				
Farming	297	204	0.63(0.47,0.86)*	1.68(1.00,2.83)
Trade	29	33	0.41(0.23,0.71)	0.75(0.40,1.41)
Salary	192	89	1.0	1.0
Health information				
ITNs as priority				
Yes	323	140	2.42(1.82,3.22) *	2.16(1.56,3.00)**
No	177	186	1.0	1.0
Children high risk				
Yes	406	295	0.45(0.29,0.70)*	0.34(0.21,0.56)**
No	94	31	1.0	1.0
Pregnant women high risk				
Yes	220	100	1.78(1.32,2.38)*	1.06(0.75,1.51)
No	280	226	1.0	1.0

The knowledge of citing Insecticide Treated Nets utilization as priority tool for pregnant women and childhood malaria prevention was found to vary between selected socio-demographic characteristics. The assessment done by age of the respondents has showed that age grouped 18-24 years were about 3 times more knowledgeable than old age group(55 -80),[AOR=95%CI, 3.14(1.58, 6.23)]. The knowledge was also about 2 times higher among bed net owners than none owners of bed net, [AOR=95% CI, 2.14 (1.54, 2.97)].

Similar assessment with place of residence has showed that rural dwellers were found to be less knowledgeable than factory camp respondents, [AOR=95%CI, 0.18(0.09, 0.35)], where as an association between sex and ITNs knowledge can not be demonstrated from the data (Table 9).

Table 9: ITNs preference as priority tool for pregnant women and childhood malaria prevention by selected Socio-demographic characteristics, Adama Woreda, Sept. 2006.

Characteristics	Priority for ITN utilization		Crude	Adjusted OR=95%CI (enter method logistic model)
	Yes	No	OR=95%CI	
Sex				

Male	213	181	0.86(0.65,1.13)	1.18(.83,1.67)
Female	250	182	1.0	1.0
Age in years				
18-24	150	76	5.71(3.17,10.31)*	3.14(1.58,6.23)**
25-34	155	93	4.83(2.70,8.63)*	3.68(1.91,7.08)**
35-44	92	95	2.80(1.55,5.08)*	2.52(1.30,4.87)**
45-54	47	44	3.09(1.59,6.01)*	2.59(1.26,5.33)**
55-80	19	55	1.0	1.0
Educational status				
Illiterate	153	201	0.09(0.03,.31)*	0.27(0.08,0.94)**
Read &write	43	60	0.09(0.03,.30)*	0.29(0.08,1.11)
Grade 1-6	105	77	0.16(0.05,0.56)*	0.44(0.12,1.61)
Grade 7-12	137	22	0.75(0.21,2.70)	1.26(0.33,4.74)
12 +	25	3	1.0	1.0
Place of residence				
Rural	215	296	0.09(0.05,0.18)*	0.18 (.09,0.35)**
Suburban	155	55	0.36(0.19,0.72)*	0.63(0.30,1.31)
F.camp	93	12	1.0	1.0
Ownership of ITN				
Yes	323	177	2.42(1.82,3.23)	2.14(1.54,2.97)**
No	140	186	1.0	1.0

* Significant COR

** Significant AOR

The analysis done on ITNs utilization among under 5 years of age children varies between socio-demographic characteristics of the respondents. The assessment done with educational status has showed that children from illiterate parents were less likely utilized bed net than under five years of age children from literate parents, [COR=95%CI, 0.51(0.31,0.86)]. Similarly, children from parents who have positive health information about importance of ITNs have utilized ITNs about 2 times more than who lack the information, [COR=95%CI, 1.73(1.04, 2.89)].

The assessment has also shown that the utilization of ITNs is strongly associated with parent's identification of high risk and priority groups. It was seen that children from

parents who identified that under five years of age children as high risk and priority groups have about 3 times more utilized ITNs than children from Parents who lack the information, [COR=95%CI, 2.61(1.30,5.25)]. Although adjustment done for confounding factors has not demonstrated significant association between sex, age, source of income and health information of the respondents and child bed net utilization, it has showed that utilization bed net among children has associated with the place of residence. It was found that rural dweller's children were less likely utilize bed net than children in factory camp residence, [AOR=95%CI, 0.09(0.02, 0.32)] (Table10).

The analysis done between education and pregnant women ITN utilization has showed that significant association could not be demonstrated from the data, [OR=95%CI,0.52 (0.71,1.58)]. After adjusting for confounding factors it was also seen that pregnant women resided in the rural villages were less likely utilized net than those who were living in the factory camp,[AOR=95%CI,0.09(0.02, 0.32)], but no significant association was demonstrated from the data between other factors and pregnant women utilization of bed net, (Table 11).

Table10: Utilization of ITNs among under 5 years of age children by selected socio-demographic and health information of the respondents, Adama Woreda, Sept. 2006.

Characteristics		Child utilized ITNs		Crude OR=95% CI	Adjusted OR=95% CI
		Yes	No		
Sex	Male	55	80	0.95(0.59,1.53)	1.01(0.57,1.78)
	Female	60	83	1.0	1.0
Age of parents					
	18-24	32	54	0.89(0.23,3.39)	0.42(0.10,1.78)
	25-34	43	54	1.19(0.32,4.50)	0.68(0.17,2.80)

35-44	26	33	1.18(0.30,4.63)	0.75(0.18,3.12)
45-54	10	16	0.94,(0.21,4.17)	0.75(0.16,3.50
55-80	4	6	1.0	1.0
Education				
Illiterate	34	73	0.51(0.31,0.86)*	0.67(0.37,1.18)
Literate	82	90	1.0	1.0
Place of residence				
Rural	58	125	0.12(0.05,0.28)*	0.09(0.02,0.32)**
Suburban	30	31	0.23(0.09,0.62)*	0.22(0.08,0.60)**
F. camp	28	7	1.0	1.0
Source of Income				
Farming	62	117	0.45(0.27,0.74)*	1.79(0.69,4.68)
Trade	3	4	0.63(0.13,2.98)	1.08(0.21,5.62)
Salary	50	42	1.0	1.0
Health information				
ITNs as priority				
Yes	82	96	1.73(1.04,2.89)*	1.18(0.65,2.15)
No	33	67	1.0	1.0
Identification of<5 as priority				
Yes	103	125	2.61(1.3.00,5.20)*	1.86(0.86,4.04)
No	12	38	1.0	1.0

Table11: Utilization of ITNs among pregnant women by selected socio-demographic and health information of the respondents, Adama Woreda, Sept. 2006.

Characteristics	**Pregnant women utilized ITNs**			
	Yes	No	Crude OR=95% CI	Adjusted OR OR=95% CI
Education				
Illiterate	6	20	0.52(0.71,1.58)	0.64(0.18,2.28)
Literate	15	26	1.0	1.0
Place of residence				
Rural	14	41	0.07(0.01,0 .64)*	0.01(0.00,0.41)**

Suburban	2	4	0.10(0.01,1.51)	0.27(0.00,0.79)**
F. camp	5	1	1.0	1.0
Source of Income				
Farming	15	39	0.45(0.13,1.55)	8.01(0.38,167.13)
Others	6	7	1.0	1.0
Health information				
ITNs as priority	15	22	2.73(0.90,8.27)	2.40(0.65,8.81)
Yes	6	24	1.0	1.0
No				
Identification of <5 as priority				
Yes	8	24	0.56(0.20,1.62)	0.26(0.06,1.10)
No	13	22	1.0	

Discussion

Insecticide treated net utilization among under 5 years of age children and pregnant women living at risk area is recommended method in malaria control program. Currently scaling up the coverage is undergoing at a large. Clearly, just increasing coverage will not be enough unless people use treated nets correctly and consistently. The current situations should be assessed with the best method for utilization. Hence, this study relied on the combined collection of self-reported information and direct observation methods.

The 59.7% households with bed net in the area was quite an encouraging out come. It was better than the 10%, less than 10% and 11% reported in the previous studies done in Ethiopia, (1, 25, 26). The finding of this study is similar to different studies done in Eritrea, Burkina Faso and Ghana (1, 32, 34). On the other hand, 40.3% of households with out a single Insecticide Treated Net were a concern which needs to be addressed. Among

500 households which had self-reported as owning bed net, only 7(1.4%) were missed during direct observation of household's bed net. This was another encouraging finding compared to study done in Burundi, which had shown that 28% of free distributed bed nets were resold to the neighboring country (32).

The result from this study suggests that possession of bed net with mean number of 1.83,SD±.719 per household was almost similar to the information (mean 1.8 /household) gained from the other study done in Ghana (34). The assessment has shown scarcity of bed net by comparing the number of bed/place of sleep that household own (which has a mean of 1.91 with SD±0.676) with the mean possession of bed net in the area. This should be a point of concern during scaling up ITN coverage, as scarcity of bed net in the household is believed to affect the utilization of ITNs by vulnerable groups.

Concerning the factors for non-owning of bed net by a household, the findings from this study has shown that 109(46.2%) of the respondents complained that social market price was high to afford. This was found to be higher than 34.7% gained from the study done in Ghana, where respondents claimed that the subsidized sale price was expensive (34). High proportion (34.7%) was waiting for free distribution through village authority without any attempt to purchase from social market. Lack of information was given as a reason by 88 respondents, among whom 73.9% were rural respondents. The poor rural communities tend to suffer the effect of malaria than others, ones due to increased transmission intensity and existing poor access to preventive and curative health services. Hence, priority in ITN distribution and household health education should be given great emphasis. Similarly, people who can afford the price at social marketing should be motivated to make use of the social marketing as an alternative means of owning ITNs.

Concerning the re-treatment of bed nets, very high proportion (84.5%) of re-treatable bed nets were reported as none re-treated for last 12 months. This is similar to 85% for different African countries (1). More over, 45(38.9%) of children under 5 years of age and 6(28.6%) of pregnant women were observed sleeping under bed nets which were not retreated timely. This condition is believed to minimize the efficacy of net and increase

risk of encountering malaria infection (1, 9, 14, 28, 35). Therefore, periodic supply of re-treatment kit by woreda health office should be a point of concern.

Another feature emerging from the study is high (80.5%) of the respondents reporting that malaria transmission is due to mosquito bite. This is higher than about 60% gained from the study done in Butajira district, Ethiopia (39). More than half of the respondents preferred ITN utilization as priority means for malaria prevention at household level. Such high awareness could be potentially used in the effort to scale up ITN utilization and coverage among vulnerable group (32).

The assessment done on the knowledge of identification of high risk group has shown that majority of respondents consider under 5 years of age children as high risk and priority group respectively. On the other hand, only 38.9% and 40.6% of the respondents identified that pregnant women are high risk and priority group, respectively. Again this is much higher than 9.9% gained from the study done in Uganda (33). These showed that pregnant women got less attention and it seems to be a serious problem in the national effort to improve maternal mortality ratio, (1, 2, 3, 27, 36). Hence, identification of pregnant women as high risk and priority group in malaria prevention program should be considered in Information Education Communication and Behavioral change communication plan at Woreda level.

Concerning the information about the major mechanism of action of ITN, majority (66.2%) of the respondents known that it act as a physical barrier and properly treated bed nets kill mosquito. On the other hand, among 280 household's re-treatable bed nets, only 41(14.5%) respondents had re-treated their mosquito net timely. This was found to be lower than the information gained (41%) from other study done in Ethiopia (36). This is believed to be minimized through intensive house hold education and periodic supply of re-treating kit.

Although two-thirds of the respondents have information that ITN should be used every night, about 30% of respondents preferred to use ITN seasonally and when mosquito density is higher in the house. This again confirmed the information gained (34%) from

the study done in Ghana, but people can be motivated to utilize ITN through the seasons as contracting malaria may persist throughout the year (32, 34, 36).

More than three-fourth (85%) of the respondents believe that ITN utilization has no problem. The assessment done by place of residence has shown that 14.5% of rural respondents complain that ITN has disadvantage. Among these, 58.7% of these respondents major complain were increased heat inside the net. This was found to be similar to other studies (22, 24). In general the knowledge of ITN, was found to be better in urban dweller than rural, $P<0.05$. Additionally, this study has shown that factory camp dwellers were found to be much more knowledgeable than rural and suburban residences, $p<0.05$. Again this suggests that much emphasis should be given to the rural dwellers.

More than half of the children and pregnant women in the area were living in the household which own at least one bed net. This was found to be much higher and encouraging compared to 3.3% gained in Ethiopian DHS preliminary report 2005. On the other hand, the remaining children and pregnant women who survived in the households with out a single bed net are the major concern to be addressed.

Although the distribution of the net in the area has shown remarkable progress in the area, the proportion of ITNs utilization among <5 years of age children and pregnant women, conformation by direct observation has showed that only 23.5% of the children and 18.1% of pregnant women were utilizing ITNs in the area, although self-report information was found to be over reported on direct observation. How ever this finding is encouraging compared to fewer than 10% reported from previous studies done nationally, but this was again lower than 34.8% and 34% gained from similar studies done in Ghana and Burkina Faso, respectively (31, 32, 34).

The proper utilization of net has shown that majority of child's and pregnant woman's bed nets were mounted over the bed but about 15% of children and nearly 20% of pregnant women were observed utilizing bed net in other forms (cover cloth, sheet and under mattress).

The direct observation done for proper utilization of mosquito net (proper mounting) among children less than 5 years of age and pregnant women shows that only 20.2% and 14.7%, respectively. Furthermore, the nets were observed for any defect through and it was seen that 22.4% and 21% of the children and pregnant women's respectively had slept under net that has varying degree of thorn through. These conditions are believed to significantly affect efficacy of the net and increase the probability of malaria infection among pregnant women (9).

Another area of concern was the factors given for children not utilizing bed net the previous night of survey. Similarly to other study done in Ghana, the absence of Mosquito (lower mosquito density) in the house was among the major (40.6%) reasons given. This was followed by 28.1% forgot to mount the bed net during the night. The remaining (29.1%) complain about disadvantages of bed net, bed net was old, thorn etc. The utilization of bed nets only during certain seasons and with load of mosquito, might expose vulnerable group for infection as malaria infection persist through out the year in the area. Hence, motivation of people for consistent utilization through regular health education is suggested.

Generally, under utilization of ITN among children under 5 years of age children and pregnant women was strongly associated with the place of address, educational status and health information of the care givers, $P<0.05$ and much emphasis has to be given to motivate people on utilization of ITN in the area as distribution of bed net is scaling up.

Strength and Limitation of the study

Strength of the study

-This study relied on the combined collection of self-reported information and direct observation.

-It has included population at different address of residences.

-It addresses the needs of the current information by governmental bodies at different levels.

Limitation of the study

- This study didn't include proper tacking of child's and pregnant women mosquito net under the mattress or materials used similarly, as mothers go out of bed unpacking the net to open the door for the observers and it may affect proper utilization.

- As the data was collected by experts working in the area, the utilization report might be biased.

Conclusion and Recommendation

The coverage of ITNs in the area is encouraging compared to most findings in this country, although the set goal was not achieved. Not all mosquito nets owned by households in the area were being used by young children and pregnant women. Significant proportions of vulnerable groups were not covered. Appreciable number of household's bed nets was not re-treated within a period of recommendation. Hence, the following recommendations were given.

☺ The free distribution should prioritize vulnerable groups using good opportunity of Antenatal care clinic and under five immunization program, household education and regular district level on going survey with great emphasis to Rural and Suburban by Adama Woreda health office.

☺ East Shoa Zone and Adama woreda health offices can potentially use the existing awareness about cause of malaria and ITNs protection in malaria control program to improve the observed utilization (none compliance) problem .

☺ Supply of re-treating kit should be secured by Oromia Regional Health Bureau.

☺ Households which can afford the price at social market should be motivated to Purchase ITNs by Adama woreda health office, Health extension workers, Community health agents and local authorities at grass root level etc.

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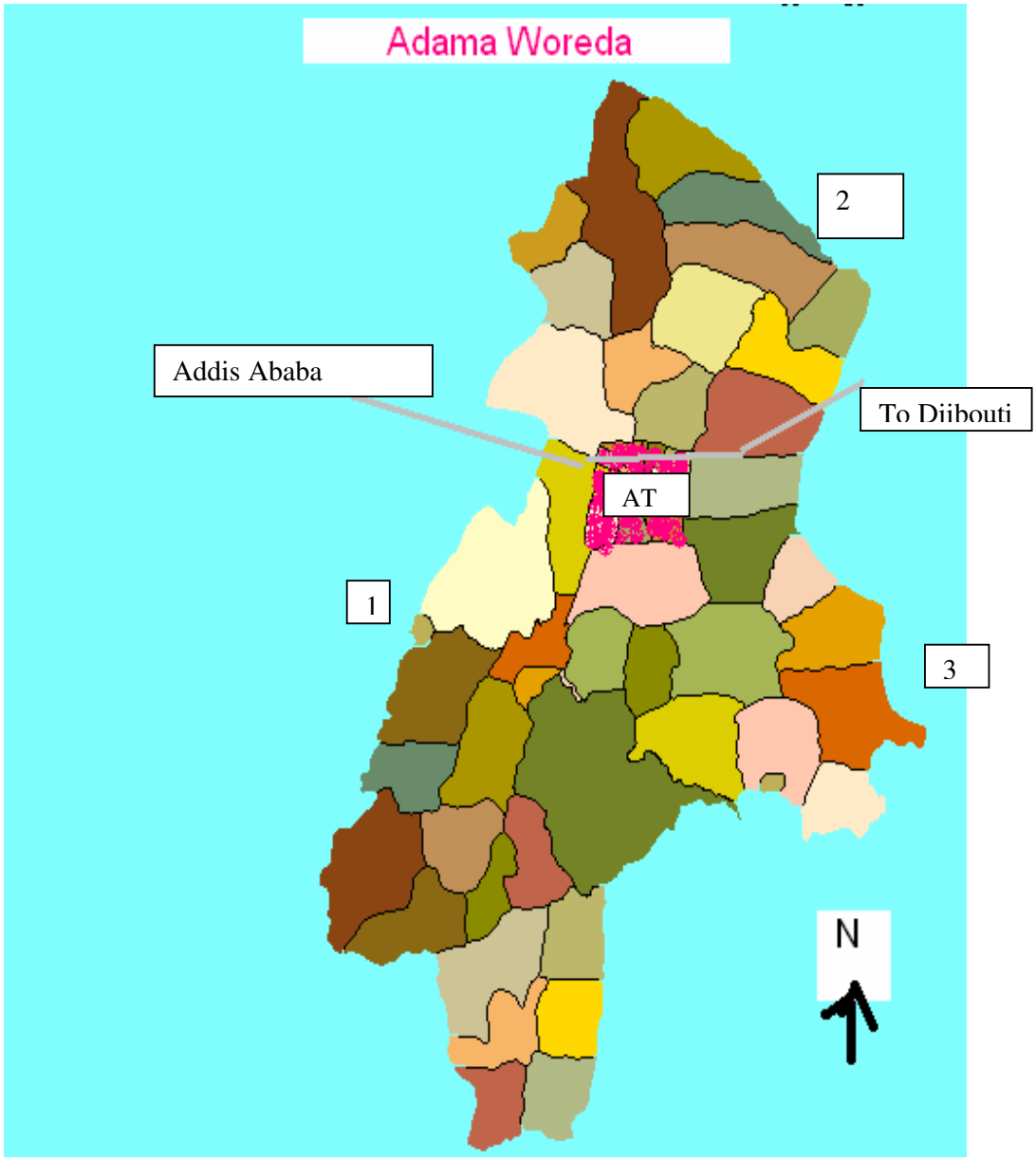
Annex I. Map of the study area



- AT = Adama town (Not included in the study)
- Adama Woreda
- Boundaries
  1. Lume Woreda
  2. Bosat Woreda
  3. Arsi Zone

SER.NUMBER_____

Rural/KEBELE/Camp_____

Annex II- Consent form

Addis Ababa University, Faculty of Medicine, Department of Community Health

Questionnaire prepared to Assess Insecticide Treated Nets possession of the Household and Utilization among under 5years of age Children and Pregnant Women of Adama woreda.

Guideline for interviewer:

I. **Greeting:-**

Hello, I am _____. I am working in the research team of AAU of medical faculty, Department of community health. Also Introduce your self that, you came from woreda /Zonal health office .Then explain the purpose of the study for the respondent by saying that "the reason why I came here is to ask you some questions related to malaria .The purpose of this interview is to have your opinion on the bed nets. This in turn will help to design the intervention to tackle the transmission of malaria." After the explanation, identify the presence of any household member whose age is greater than 18 years old and select the proper respondent.

II. Informed consent

Read the following paragraph for the selected person. "To conduct our study, I would like to ask you some questions. I kindly request you to give me your sincere and truthful answer. All the information that you are going to give me will remain confidential and you don't need to mention your name."

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_____

S. Number_____

PA/ Kebele/Camp_____

QUESTIONNARIES

Addis Ababa University, Faculty of Medicine, Department of Community Health

A Questionnaire to Assess Insecticide Treated Nets Utilization among Children Under 5 years of Age and Pregnant Women Adama woreda.

Instruction:-

1. All data collectors and supervisors should keep the permission letter from woreda ready at all the time
2. Introduce his/her name, and the purpose of the visit to the household
3. Request the willingness of the respondent for interview and observation of bed nets. (Based on the consent form)
4. Please write the number of the response in the coding boxes provided on the right edge
5. Data collector must fill his/her name, put signature properly.

A. Socio-demographic Characteristics

No	Question	Response	Code
A1	Sex of the respondent	A1.1 male A1.2 Female	
A2	Age of the respondent (In years)	A2.1 18-25 A2.2 26-35 A2.3 36-45 A2.4 46-55 A2.5 56 and above	
A3	Educational status	A3.1 Illiterate A3.2 Read and write A3.3 Grade 1-6 A3.4 Grade 7-12 A3.5 12 and above	
A4	Religion	A4.1 Christian A4.2 Moslem A4.5 Others	
A5	Source of income	A5.1 Farming A5.2 Trade A5.3 Monthly salary A5.4 If other, specify	
A6	Bed room condition	A6.1 Separate bed room A6.2 Shared with other	
A7	Place of residence	A7.1 Rural A7.2 Sub urban A7.3 Factory camp	

B. Knowledge and practice of the respondent

No	Question	Response	Code

B1	How do we acquire malaria?	B1.1 Mosquito bite B1.2 Bad season B1.3 If other, specify	
B2	How can we prevent malaria infection smission)	B2.1 DDT spray B2.2 Source reduction B2.3 Drugs(prophylaxis) B2.4 ITN s utilization B2.5 Not known B2.6 If other, specify	
B3	Who are at high risk of malaria in the ehold?	B3.1 Under five children B3.2 Pregnant women B3.3 Adults B3.4 Old age B3.5 If other, specify	
B4	Who should be given priority in malaria ention in the household?	B4.1 Under five children B4.2 Pregnant women B4.3 Adults B4.4 Old age B4.5 If other, specify	
B5	How does ITNs prevent malaria smission?	B5.1 Physical barriers B5.2 Kills mosquito B5.3 irritate mosquito B5.4 Not known B5.5 If other, specify	
B6	How frequent and when should one use s	B6.1 Every night B6.1 Seasonally B6.3 When Mosquito seen in the house B6.4 If other, specify	
B7	Dose the household own ITNs?	B7.1 Yes B7.2 No	
B8	If **YES ,** to B7 above, how many?	B8.1 One B8.2 Two B8.3 Three and above	
B9	If **YES,** toB7 above and it is not permanent, used for more than a year, have you retreated	B9.1 Yes B9.2 No	
B10	If **NO**, to B9 above, what is the major n?	B10.1. No K-O tab B10.2. Lack of information B10.3. Forgotten B10.4. Other	
B11	If **NO** to B7 above, what is the major reason?	B11.1 Lack of information B11.2 Price is expensive B11.3 Not available in the area B11.4 Did not want	

		B11.5 If other ,specify	
B12	Is there <5 child in the household?	B12.1 Yes B12.2 No	
B13	If **YES**, did he/she slept under bed net previous night?(For those who own)	B13.1 Yes B13.2 No	
B14	If **NO**, to B13 above, Why? (For those who own ITNs)	B14.1 No mosquito seen in the house B14.2 Forgotten B14.3 Did not want B14.4 If others, specify	
B15	Is there a pregnant woman in the house hold?	B15.1 Yes B15.2 No	
B16	If **YES** to B15 above, did she slept under bed net the previous night ?(For those who own bed net)	B16.1 Yes B16.2 No	
B17	If **NO** to B16 above, why?	B17.1 No mosquito seen in the house B17.2 Forgotten B17.3 Did not want B17.4 If others, specify	
B18	Dose sleeping under bed net cause any problem?	B18.1 Yes B18.2 No	
B19	If **YES**, to B18 above, what are the major problems?	B19.1. No comfort B19.2 Cause heat B19.3. Air hanger B19.4. If other, specify	

Serial Number_____

Rural/ Kebele/Camp_____

CHECKLIST

THIS CHECK LIST IS USED FOR THE OBSERVATION OF THE HOUSEHOLD'S BED NETS: CONDITIONS:- ANY THORN,BURN,EXISTANCE OF NET IN HH AND PROPER UTILIZATION BY UNDER 5

CHILD,PREGNANT WOMN FOR THOSE WHO OWN ITNs AND THOSE WHO RESPONDED TO BE UTILIZING AND THOSE WHO HAD GIVEN "FORGOTTEN" AS REASON FOR NON UTILIZING PREVIOUS NIGHT. THE OBSERVATION WILL BE DONE **EARLY IN THE MORNING** BEFORE THE MEMEBERS OF THE HOUSEHOLD GO OUT OF THE BED.

S. No	Points to be observed	Observation	Code
C1	Number of beds or places of sleep	C1.1 One C1.2 Two C1.2 Three and above	
C2	The number of bed nets observed in the usehold	C2.1 One C2.2 Two C2.2 Three and above	
C3	Number of beds /places of sleep observed with bed nets	C3.1 One C3.2 Two C3.2 Three and above	
C4	The type of bed net that household owned	C4.1. Re treatable C4.2. Permanently treated	
C5	Is the bed net hanged(placed) properly over the bed or sleeping area	C5.1. Yes C5.2. No C5.3. Other Specify	
C6	Is there any hole(throne) in the bed net	C6.1. yes C6.2. No	
C7	Did the child found seeping under the net?	C7.1. yes C7.2. No	
C8	Did the pregnant woman slept under the net?	C8.1. yes C8.2. No	

Name of the interviewer /Observer Signature_____ Date_____
Name of the supervisor _____ Signature_____ Date _____

LAKKO._____
Ganda/Maagala/Kampii_____

Annex III- Foormmii heyyaama Ittin gafaatamu

Uniiverstii Fiinffiinnee, Faakiiltii yaalii,Qaajjeelcha faayyaa hawaasaa

Gaaffiiwwaan itti fayyaadamaa saphaana siirree cuuphaamee da'eemamn waaggaa shaanii gaddii fi dubartiiwwaan uulffaa Aanaa Adaammaa ittin qoorrachoofii kan qophaa'ee.

Qajjelfamma:

I. Nagaa:-

Hello, Ani _____jeedhama. Ani kooree qooranoo Uniiverstii Fiinffiinnee, Faakiiltii yaalii,Qaajjeelcha faayyaa hawaasaa wojjiin hojjachaa jira. Akkasuma kara wajjiira Ananaa/Godina irra dhufuu kee ofi beeksiis. Sannan boodee,fayyida qooraanoo kana nama deebii keenuf akkana jeechoodhan ibsiif "Want mana keessan dhufiineef dhukuba busaa illalchisee gafii issin gafchoodhaf. Fayyiidan gafii kanats busaa saphaana siire'e illalchiisee yaada keessan argachoodhaf. Kuns karaa bratin sagantaa fi karoora dhukuba busaa offira dhoowuufi godhaamu kessat bayee nugargara" Eerga kana ibsiiteen bode,mattii kessa nama umuurin isa wogaa 18 fi sana ol ta'e filladhu.

II. Heyyaamma hubanoo irrat hundahee

Qbxiilee asi gadiit xuqamee akkuma jiiruun nama fillatmeef dubsi. "Qooranoo Kenya gaggesudhaaf,ani gafii murta'ee sigafadhaa.Deebii kessan kan dhugaa fi ammanama ta'ee akka anaf keentan kabajjaa gudadhaan issn gafadhaa. Yaadnif deebiin isn anaf keentan hunduu iciitdhan eegamman. Maqa kessns ibsuu hinbarbachiisu."

Gafiif deebii kana keesat hirmachoodhaf qophiidha?

Eyyan_____(itti fuufi). Mitti_____ (Galata galchi dhabi)

Mallatoo(nama ragaa sasaabu)_____Guyyaa_____

(Malltoon nama ragaa sassabu, qooqan heeyyaama argaachoo agarsisaa .)

Mallatoo to'aataa _____ Guyyaa_____

Lakkoo_____

Ganda/magala/Kampii_____

Gaaffiiwwaan

Uniiverstii Fiinffiinnee, Faakiiltii yaalii,Qaajjeelcha faayyaa hawaasaa

Gaaffiiwwaan itti fayyaadamaa saphaana siirree cuuphaamee da'eemamn waaggaa shaanii gaddii fi dubartiiwwaan uulffaa Aanaa Adaammaa ittin qoorrachoofii kan qophaa'ee.

Qajjeelfama 1. Namoon raggaa sassaabaniif kan to'aatan hunduu woraaqaa heeyyaamaa Aanaa irraa kenamuufi qabatanii deemuu qaban.

2. Maqaa issaniif waa'ee deemmaaniffi namootaa ibssuu qaban.

3. Gaafiiwwaan dhiiyeesuun dura heeyyammaa fi feedhii namootaa gaffaachoo qaban.

4. Deebii keenamee halaan eedoo qophaa'ee keessati lakko.deebii qbatee bareesuudhan deebsi.

5. Namoon raggaa sassaabaniif kan to'aatan hunduu maqaa fi mallatoo issani sirriit mallateesuu qaban

A. Halla jiireenyaa fi uummaata (Socio-demographic condition)

Lak	Gaaffii	Deebii	koodii
A1	Salla nama deebii keenee	A1.1 Dhiira A1.2 Dubartii	
A2	Uummurii (woggaan)	A2.1 18-25 A2.2 26-35 A2.3 36-45 A2.4 46-55 A2.5 56 fi sana ol	
A3	Sadarika barnootaa	A3.1 kanhinbaraanee A3.2 Dubiisuu fi bareesu A3.3 kuta 1-6 A3.4 kuta 7-12 A3.5 12 fi sana ol	
A4	Ammantaa	A4.1 kiiriistaana A4.2 Isiilamaa A4.5 Kanbiiroo	
A5	Madaa galii	A5.1 qoonaa A5.2 daldaalaa A5.3 minda Ji'aa A5.4 kanbiroo ibsi	
A6	Halla kuta bultii	A6.1 kuta bulttii koopha A6.2 kuta hojjii wojjiin kan ta'ee	
A7	Iddoo Jiireenyaa	A7.1 Ganda qootee bulaa A7.2 Magaalaa A7.3 Kaampii Warshaa	

B.Beekumssaa fi goocha namma gaaffiiwaan fi deebii keennee

Lak	Gaafii	deebii	Koodii
B1	Busan akkamit namma qaba?	B1.1 Yoo bookeen nama iddiituu B1.2 Qleensaa hammaa irra B1.3 Kan birro ibsii	
B2	Busa akkamt offiira ittsuu dandeenya ?	B2.1 DDT facaasuudhaan B2.2Eedoo horrimata hirrisudhan B2.3 Qorrichaan B2.4 Saphaana siirreet fayydamu B2.5 Kan biro ibsi	
B3	Uumata keessat dhukuuba	B3.1 Da'eemman woggaa shanii	

	bussaatiif kan saxiilaman namoota akkamiti	gadii B3.2 Dubartoota uulfaa B3.3 Dargagoota B3.4 Mangudoota	
B4	Uumata keessat dhukuba bussaa offiira ittisu irrat dursii eenufi keenamuu qaba	B3.1 Da'eemman woggaa shanii gadii B3.2 Dubartoota uulfaa B3.3 Dargagoota B3.4 Mangudoota	
B5	Saphaani siiree busaa akkamt namma irra dhoowwaa?	B5.1 Akka bookeen nama argatee hin iddiinee dhoowuudhan B5.2 Bookee ajjeesudhaan B5.3 Bookee ariiuudhaan	
B6	Namni tookoo saphaana siiree yoom fayyaadamu qaba	B6.1 Galggalaa hunda B6.1 Ji'oota murtaa'ee B6.3 Bookeen nanoo keenyaat yoo argiinee	
B7	Saphaana siiree qabduu ?	B7.1 Qabna B7.2 Hin qabnu	
B8	Yoo qabaatan , meeqa?	B8.1 Tokkoo B8.2 Lamma B8.3 Sadii fi sana ol	
B9	Gaaffii B7 gubaa fi deebiin qabna yoo ta'ee fi dhabataan kan cuuphaamee yoo hin tanee fi woggaa tokoo ol itti kan fayyaadaman yoo ta'e cuuphaamee	B9.1 Cuuphamee B9.2 Hin cuuphammnee B9.3 Kan biro ibsi	
B10	Deebiin B9 gubaatifi hin cuuphamnee yoo ta'ee mal fii?	B10.1. K-O tab(chemical) hinjiiru B10.2. Hanqiina beekumsaa B10.3. Ni irrafatamee B10.4. Yoo kan bira ta'e ibisa	
B11	Deebiin B7 gubaatifi Yoo hinqabunu yoo ta'ee ,Rakkiinni ciimman mal?	B11.1. Hanqiina beekumsaa B11.2. Gatii isaa ol kaa'aa dha B11.3. Nanoo keenyaat hin arggaamu B11.4. Hin barbanee B11.5. Yoo kan bira ta'e ibsi	
B12	Ijjooleen woggaa shaanii gadii mana keessa jirratii?	B12.1 Ni jiiratii B12.2 Hin jirituu	
B13	Yoo jirratee ,halkkan darbee saphaana siiree jalaa rafee	B13.1. Itti fayyadamee jiira B13.2. Itti hin fayyaadamnee	

	?(Kan niqabna jeedhan qoofaafii)		
B14	Deebiin B13 gubaatifi Yoo ittin hin fayyaadamnee yoo ta'ee ,malifii)	B13.1. Ni irrafaanee B13.2. Bookkeen hin jiirtuu B13.3. Kan biro ibsi	
B15	Dubartoon uulfaa mana keessa jirratii??	B15.1. Ni jiiratii B15.2. Hin jirituu	
B16	Yoo jirratee ,halkkan darbee saphaana siiree jalaa rafee ?(Kan niqabna jeedhan qoofaafii)	B16.1. Itti fayyadamee jiira B16.2. Itti hin fayyaadamnee	
B17	Deebiin B16 gubaatifi Yoo ittin hin fayyaadamnee yoo ta'ee ,malifii ?)	B17.1. Ni irrafaanee B17.2. Bookkeen hin jiirtuu B17.3. Kan biro ibsi	
B18	Saphaan siiree jala yoo raffaan ,rkkin nama irra gahu jirra?	B18.1. Jirra B18.2. Hin jiirru	
B19	Kan jirru yoo ta'ee, mal?	B19.1. Mijjawaa mitti B19.2. Nama o'eesa B19.3. Qilleensa nama dhoowaa B19.4. Kan bira ibsi	

LAKKO_____

Ganda/Magaalaa/ Kaampii_____

CHEEKI LIISTII

CHEEK LIISTIIN KUN DAWAANA SAPHAANA SIIREE MATTIIF KAN TAJAAJIILU: KUNS HALAA FII SIIRIITII ITTI FAYAADAMA NAMOOTA SAPHAANA SIIREE QABANI FII KAN OLU. DAWWAANAAN HALLAAN ITTI FAYYADAMN MATII KAN RAWWAATAMU GANAMMA ODU MATIIN SIIREE KESSAA HINBAANEE TA'A.

lakk	Qabxiilee qooraanoo	Too'aana	Koodii
C1	Lakkofiissa siiree/eedoo bulmata	C1.1 tokkoo C1.2 lama C1.2 sadiifi sana ol	
C2	Lakkoffiisa saphaana siiree mana keessat ımee	C1.1 tokkoo C1.2 lama C1.2 sadiifi sana ol	

C3	Lakkoffisaa siiree/eedoo bulmmata aanaa siiree qaban wojjiin kan illalman	C1.1 tokkoo C1.2 lama C1.2 sadiifi sana ol	
C4	Saphaana siiree kan akkamiti	C4.1 kan yeroo yeroon hamu C4.2. Dhabatankan cuphaamee	
C5	Saphaan siiree siirriit faniifaamee jiiraa? e/eedoo bulmata gutuman guutuut cuufee	C5.1 siiriit faniifamee C5.2 sirriit hin fanfamnee C5.3 hala kan bira ibsa	
C6	Saphaan siiree tarssaa'eena qaba?	C6.1 niqaba C6.2 hin qabu	
C7	Ijoolleen waggaa shani gadii saphaana e jala raffttee arggamtee?	C7.1 raffani jiran C7.2 hin raffiinee	
C8	Dubarttiin uulfaa saphaana siiree jala atin arggamtee?	C8.1 raffani jiran C8.2 hin raffiinee	

Maqaa ragaa sasaabduu_____ Maqaa to'aataa _____

Mallatoo_____ Mallatoo _____

Guyyaa _____ Guyyaa _____