Addis Ababa University
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Assessment Of Use Of Insecticide Treated Mosquito Nets And Factors Affecting It In Serbo Town

A thesis submitted to School of Graduate Studies in partial fulfillment of the requirements to a Masters Degree in Public Health

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April 2005

Acknowledgement

I am deeply grateful to my advisor, Dr Ahmed Ali, for assisting with devotion and concern, in each and every step of the thesis. I am appreciative of Dr Alemayehu Workus' pertinent advices. I am also thankful to Ato Waqgari Derressa and Ato Fekede Balcha for availing pertinent reference materials. I am indebted to the appreciable hospitality of Jimma University staff during the field work. The Ethiopian Public Health Association has facilitated financial issues, so deserves acknowledgement. Last but not least, I would like to express my gratitude to all those who volunteered to participate in the study and provided information. This study has been sponsored by UNICEF Ethiopia

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Abstract

Background: Among malaria control measures, use of mosquito nets is the one that is getting more acceptance and is being used in large scale worldwide. Despite on going distribution and use of nets in Ethiopia, the household level situation in utilizing them is by and large unknown.

Objective: Assess utilization of mosquito nets in Serbo Town and clarify socio demographic, organizational, economical, behavioral and other factors related.

Method: Qualitative and quantitative methods were used. In the Quantitative part, interviewer administered questionnaire with a checklist was used for a household. Qualitative section included focus group discussion of community members and in depth interview of important stake holders.

Result: Malaria was recognized as a major problem. Children were said to be more effected groups, but did not intentionally get protection. Half of the households possess at least one net. Nets however, were not always used for the intended purpose. Common malpractices were selling, use as curtain and leave the nets in package. Main reasons were economical and unfavorable health belief. Factors that were independently associated with use were: possession of a radio, being knowledgeable, getting health education, number of persons per room and number of beds. Predictors of purchasing were occupation, possession of a radio and being knowledgeable.

Discussion, conclusions and recommendations: Reasons for improper use were economical, housing condition, health belief, organizational effort and possibly biological. Selection of control measures, should take into consideration local situation. Once chosen as methods of prevention, mosquito net distribution should have proper guideline and local capacities for doing so should be strengthened. Education messages should focus on the need for prioritizing young children, possible use over sleeping floors and mending holes on nets using local material. Color and design of nets should take into consideration housing condition, and the trend of using for other purposes.

1. Introduction

1.1 Background

Each year, malaria, a parasitic disease spread by mosquito bite, results in 300 to 500 million clinical cases globally of which 90% occur in Sub Saharan Africa(1). Mostly it is under five children in Sub Saharan Africa who are affected, dying at a rate of nearly 3000 per day; contributing to 20% of the all child deaths(2). Some suffer from the acute lethal complications; others succumb to the severe anemia or consequences of low birth weight. Among survivors malaria hinders optimal growth and development(2).During pregnancy malaria poses substantial risk to the mother, fetus and the neonate as it can lead to severe clinical illness, anemia and low birth weight(3).

Beyond the individual ailments, the disease results in increased burden to health institutions, poor pregnancy outcome, poor growth of economy and others(2). It also causes significant impediment in the economic development. It costs the region between $3-12billion and inhibiting economic growth by as much as 1.3% each year(1).Ten percent of the continents disease burden is due to malaria(4). It accounts for about 40% of public health expenditures, up to 50% of inpatient admissions and out patient visits in areas of high transmission(2).

Coming to the Ethiopian situation, in a non epidemic year, 5-6 million clinical cases and over 600,000 confirmed cases are reported from health facilities(5). Malaria has been reported as the major cause of morbidity and mortality, accounting for 15.5% of outpatient consultations, 20.4%of admissions and 27% of inpatient deaths(6). In Oromia alone more than 6 million cases were diagnosed and treated at different health institutions between 1995-2000(7). In the same

region and during the same time interval, malaria accounted for 11.2% of all admissions and 14.26% of all deaths in hospitals and health centers(8).

About three-quarters of the total area of Ethiopia is malarious with an estimated 48million(68%) of the population being at risk(5).Generally highlands or highland fringe areas between 1000 and 2000 meters of altitude can be considered as highly epidemic prone; however, as a result of ecological degradation and increase in temperature, malaria transmission has also been detected at altitudes as high as 2300m(6). Only few areas in the western lowlands of the country have relatively stable transmission(6). The other areas have unstable transmission i.e. are epidemic prone. Unlike stable transmission the unstable one renders no or little protective immunity against malaria (9).Of the parasite species *P. falciparum* contributes for 60% and *P. vivax* for the rest of the burden(5). The major vector is *Anopheles arabiensis*, followed by *Anopheles pharoensis, Anopheles funestus* and *Anopheles nini*(9).

Selection of control measures should consider the magnitude of the problem, behavior of vector species involved, vector breeding site, availability of resources, level of transmission, and sustainability of the selected intervention(10,6). Use of chemical insecticide has been the principal method of vector control since early 1960s. Later, insecticide resistance, high cost and high replastering rate of houses necessitated the utilization of all appropriate technologies in an integrated approach(11).The national prevention and control approach employs early diagnosis and prompt treatment, selective vector control including use of ITNs, early detection and control of epidemics and prevention of malaria during pregnancy(6).

Mosquito nets have been among the means of prevention for long. Nevertheless, they were given limited consideration as control intervention until an overwhelming interest arose in the treated ones(12,10). If used properly, nets provide physical barrier and with treatment generate a chemical halo that extends beyond the mosquito net itself(13). Protection within a community may also extend to non-users due to the mass killing effects of ITNs on vectors(10). Nets significantly decrease death of under five children and during pregnancy provide significant protection against maternal anemia and low birth weight(2).

Taking into account the disease burden and its consequences, the Roll Back Malaria partnership was launched in 1998 by the WHO, UNDP, UNICEF and the World Bank to enhance global support, mobilize resources and build partnership to half the malaria burden by 2010(2). Accordingly, among the targets for 2005 of the Abuja Malaria Summit is that at least 60% of those at risk of malaria, especially young children and pregnant women, should benefit from the best use of ITNs(1). Although there are prospects to such a goal, like the global fund, what had been achieved in years was disappointing(13,9,4,2). Fewer than 5% of children in sub Saharan Africa were sleeping under ITNs by 2002(2). A data reviewed by WHO from a series of nationally representative surveys form 29 countries(conducted between 1991 and 2001) gave an over all average of 2% for under five children sleeping under ITNs(14).

1.2 Literature review

Nets have been in use since very early times to protect people against different insects, including mosquitoes(10). Nets are now made of cotton, nylon, polyester, polyethylene and synthetic with cotton mixtures(11). They can have rectangular, circular wedge or other shapes and are produced in different colors(10). Nets are preferably treated with insecticides If not possible, they can be used untreated. Insecticide treated ones either kill or irritate the mosquitoes beyond being physical barriers(10). They serve as human baited traps when somebody is sleeping inside by attracting and killing mosquitoes and other biting insects(15). Insecticide treated nets(ITNs) have to be treated regularly for maximal benefit. The commonest chemicals used are second and third generation synthetic pyrethroids(10,16).

Impact on mortality and morbidity

Large scale trials of ITNs conducted over two years period in various epidemiologic settings across Africa reported a 15-33% reduction in all causes of child mortality(17). Properly used ITNs can cut malaria transmission by at least 50%(2,1). During pregnancy ITN use provides significant protection against maternal anemia and low birth weight, major contributors of neonatal morbidity(2).The above mentioned mortality reduction in many trials appeared to be associated with malaria transmission pressure, with a lower efficiency detected at sites with higher transmission(18). Yet, in a study conducted to assess the efficacy of ITNs in the prevention of mortality in young children in an area of high perennial malaria transmission in western Kenya, it was found that the overall reduction in all causes of child mortality was 16% (18).

Another area of concern and fierce debate was the hypothesis that reducing malaria transmission levels might slow the development of clinical immunity leading to shift in child mortality to older ages, i.e. delayed mortality, with little or no long term survival gains(17). One study in Burkina Faso was conducted to assess the impact of insecticide treated curtains over a six year period. Over the period of the study, no evidence of a shift over time in the mortality from younger to older children was found(17).

Nevertheless, it is worth noticing that what nets provide is far from absolute protection for adults who go to sleep late and might leave their bed any time during the night. Some who used the nets did develop malaria as infection might occur before going to bed(19). It was found that 10.5% of bites were not prevented and those were mostly before down. Potential exposure occurring when people leave the bed to check on noise or urinate. People might not tuck in the net properly when returning(20).

Role of treated nets

The practical scenario in different parts Africa is that after mosquito net trials, when the responsibility of retreating is left for individual households, retreatement rates rapidly fall(16,21). Nets without insecticide treatment are said to have limited use because insects use small holes to enter, easily attack a neighboring unprotected individual or persist until the individual comes out(10,16). A trial in Kenya concluded that efficacy of nets is reduced if retreatment with permethrin is delayed beyond six months(18). But other studies in Kenya showed that if untreated nets are used in a relatively good condition, they can still protect against malaria(16,21). In one of these studies, as criteria to label a net as being in good condition, being

long enough to be tucked in under the mattress and having no more than five small holes sized 2cm or less were used(16).

Diversion of mosquitoes to those not protected had been a point of worry(16). In the same study, parasitemia among children sleeping unprotected in villages where many children slept under untreated net in good condition was similar to or lower than in villages where good nets were uncommon. Diversion may be important for people sleeping unprotected in the same house as net users(16). In another study in a Kenyan coast with a similar objective, nets were labeled as intact when having no visible holes, satisfactory when having less or equal to five small hole and worn out if otherwise(21).The proportion of children who were *P.falciparum* positive was similar among those that did not sleep under a net and those that slept under an untreated net that was worn. Yet it was lower for those that slept under an untreated net that was in good condition when compared with those that did not sleep under a net(21).

Possession and use of ITNs

All the mentioned benefits of ITNs can be obtained through proper practice(11). Households are supposed to hang the nets and sleep under them even during seasons when their use is uncomfortably hot and there may not be enough biting by nuisance insects to make net use seem worthwhile(15). Users should tuck them in under the mattress before sleeping, follow treatment schedules when possible, mend any holes, and give priority to children and pregnant women(15,22). Community members must also make sure that people, especially children, go to bed before vectors start biting and do not get up before they stop(15). Therefore, better

understanding of people's perception of malaria and its perceived cause, preventive action and values attached to ITNs are needed for planning mosquito net program (10).

Household possession data indicate the extent to which distribution channels are enabling high coverage and may be particularly valuable at the early stage of program development and implementation. But use is what ensures protection and therefore a more useful predictor of epidemiological impact (22).

Studies on the other hand have repeatedly indicated existence of improper practice in using the nets. In a study conducted in western Kenya to assess factors affecting ITNs use during a trial approximately 30% of the nets already in the households were unused(23). Among the variables that had significant effect on mosquito net use was age, for which a 14.5% reduction in the probability of adherence was observed in children under five years of age compared to individuals' greater than five years of age(23). Adherence in this study meant that corners of a rectangular ITN are attached to the eaves and walls of the room, users lower the ITNs before sleeping and tuck them in under the bed or mat (23).

In a study conducted in Kenya to assess the impact of untreated mosquito nets 21 % of the nets were worn(21). In another study conducted in Uganda, among non users of ITNs 18% had used in the past but not at the time of the study. cost, reduced risk of exposure to malaria and inconvenience were their main reasons(24).

In studies in Latin America, use of nets was higher for infants and young children than for other children and adults(25,26).But this does not appear to be the situation in Africa, where traditionally, adults by virtue of their age and position as family income earners get priority coverage(23,28,29,27,24). In one study it was sated that child protection was simply a co-incidence when the child happens to share a bed with parents(29).

In many parts of Africa, the proportion of children under five years of age who slept under a net during the night preceding the survey was considerably lower than the proportion of households that possess a net(22). The gap is of concern for malaria control program not only because young children are the most vulnerable to malaria (except in epidemic areas) but nets are also relatively effective for the group. Their long sleeping hours will more often include the dusk hours of greatest mosquito abundance than do the sleeping hours of adults(22).The discrepancy between possession and use by children was remarkably consistent across countries and sub regions.

In a trial in western Kenya, pretreated net, twine and nails were provided free of charge to those residing in intervention households. Following that each participant was given a demonstration on mosquito net mounting and its use. Despite that, one month after net distribution, approximately half of the ITNs were not being used(30). It was reported that parents sleep on a bed with a mattress and have priority access to the only mosquito net in the household, if one exists(30).

In 69 surveyed regions for 12 countries in Africa ITNs possession varied between 0.1-25.5%.The corresponding use during the preceding night by children under five years of age was 0-

16%.Children's use increased with possession. In a linear fit use was 0.55 as high as possession. Possession could predict child use within a 95% CI of 4-5% points for ITNs(22).

Cost of nets and their use

Possession of nets was seen as being markedly affected by their cost. In a study in Tanzania families with high income were almost three times more likely to have a mosquito net than those with low income(31). In a study pertaining to malaria related belief in Ghana, the main reason for the low mosquito net usage was cost (32). Perception of study participants in western Kenya was that nets were too expensive(27). In a study in highland Kenya, reason for not having a mosquito net was mainly financial. The same study suggested that purchasing ITN for households could be the cost of sending three children to primary school for the year(33). In Burkina Faso high cost of nets was the most frequently stated reason for not owning nets(28).

Seasonality and net use

Nets were not used all days in all seasons. Nets were used mainly in the cold rainy season and stopped when the mosquito population was perceived to be low(30). In three African countries net use was between 1.2 and 5 times higher in the rainy cooler months than in the dry and hotter months. The lower use in dry and hot months related to less mosquito nuisance and sometimes to the perceived greater discomfort of sleeping under a net in this season(22).

Even in the malaria season, not all existing nets are being used, as shown in a number of in depth surveys that compared net use reporting with visual inspection of sleeping places. Observation in a social marketing program in Burundi showed that 29% of identified ITNs had not been hung

for use during the malaria transmission season (22). In a rural area in Burkina Faso, where malaria transmission is holoendemic, but markedly seasonal, seventy three percent of respondent used their mosquito nets only during the rainy season(28). In Nicaragua in areas of high coverage, people slept under the net through out the year; lower coverage was associated with seasonal use (26).

Health beliefs and mosquito net use

Health belief pertaining to causation of malaria and role of nets is an important factor. In one municipality in Uganda people who used nets were more likely to believe that malaria is caused by mosquitoes and could be cured by modern medicine(24). In the same study it was seen that favorable beliefs were important in predicting use of mosquito nets. Users were more likely to believe that mosquito nets prevent malaria and are worth their cost(24). In a study in Southern Ghana mosquitoes were incriminated by most respondents as cause of malaria. But many of those who share this concept and others who do not, believe that malaria can be acquired by other ways as the heat from scorching sun and any other heat related work, poor eating habit, constipation and others(32). In a study conducted in Rural Burkina Faso although most people mentioned mosquito as transmitter of malaria, humidity exposure to rain and cold were also mentioned as causative factors(28).

Another observation is that nets are perceived by many as means of protection to mosquito bite rather than malaria prevention. In a study to monitor community responses to malaria control measures in Nigeria, the proportion of people who perceived that mosquito net prevent malaria (22%) was less than those who believe in its prevention against mosquito bite (96%)(20). In

Burkina Faso, all respondents were interested in future use of treated nets, since it provides protection against mosquito(87%)(28). Only minority(3%) stated better protection against illness(28). In a social marketing program in Tanzania the main motivation for use was mosquito nuisance rather than malaria control, with the use being largely seasonal(34).

Housing condition and mosquito net use

Few studies mentioned logistical problems of households to use nets. In Kenya sleeping arrangements were generally perceived as posing challenges, as sleeping areas for children in living rooms and kitchens require daily commitment to mount and dismount nets(30).In a study in Afghan refuges, 11% of the study population slept on floor. For such people nets were suspended from ceilings or between four upright poles held in mud filled *ghee* cans(19). Among technical problems mentioned in a study in Kenya was 'no room to hang child's net'(23).

Housing condition also appears to contribute to washing of nets. In a study in Latin America, 3 months after impregnation, 45% households in Nicaragua and a similar proportion in the other study had washed their treated nets. Reasons were dirt due to kerosene lamps, children's excreta and dust (26).

Impact of Plasmodium species type on net efficacy

Most of studies on efficacy of ITNs were conducted in areas where *P.falciparum* infection predominates, which seems to respond to insecticide treated materials. In studies conducted in Latin America, better results were seen in areas where high proportion of *P. falciparum* was relatively higher(25). A study was conducted in Nicaragua, in a place where *P. vivax* is the

major strain, to estimate the variation of protective efficacy according to the coverage of ITNs. It was found that where the individual coverage was around 50%, the protective efficacy of ITNs against clinical malaria episodes was 68%.There was no protective efficacy when coverage was less than 16%. The above mentioned paper stated that in areas with a high proportion of *P. falciparum infection,* ITNs would probably reduce clinical malaria episodes(25). It is worth noticing that the degrees of effectiveness witnessed were attained through high coverage, mostly higher than 50%. In a trial conducted in Turkey, where *P. vivax* is the major strain, it was found that untreated nets did not confer significant protection against clinical malaria (35).

It might therefore be difficult to say, with certainty about the efficacy of ITNs where their coverage is low, and *P .vivax* infection contributes to about 40% of the morbidity like the different parts of Ethiopia.

Studies pertaining to ITNs in Ethiopia are scarce. A KAP study in 1995/96 on ex-refugees showed that 70% knew that mosquito net use could prevent malaria and 100% stated that mosquito nets would be used if available(36). In the same study 24% of households were using nets purchased at a mean cost of 32 Birr. The mean amount a family could spend on mosquito nets was 13 Birr (36).

This study will try to answer relevant issues in the use of ITNs in the Ethiopian context. Since the use of the nets is related to perception and the view of the population required, the qualitative method used in the study added to its' relevance.

1.3 Statement of the problem

There has been limited use of mosquito nets in Ethiopia historically. Implementation of ITNs' use for malaria prevention is still at an early stage. Strong seasonal transmission of malaria renders malaria much more sensitive to anti-vector measures such as the use of ITNs(6,11).

Studies pertaining to ITNs are scarce in Ethiopia. In a KAP study carried out in Tigray it was found that in addition to the high knowledge regarding the benefits of DDT and environmental measures of malaria control, 70% knew that mosquito net use could prevent malaria and 100% believed that mosquito nets would be used if available(36). In this study, affordability and willingness to buy mosquito nets were appraised. Accordingly, 17/100 stated that the government should provide nets for free. When asked about affordability, the mean amount a family could spend for one mosquito net was 13(+/-9) Ethiopian Birr. 14/100 respondents said that they could pay nothing (36).

Another study was conducted in a rural community in Butajira to assess KAP on malaria, the mosquito vector and anti- malarial drug(37). It was found that study subjects were familiar with the symptoms of malaria and to a lesser extent with the association between mosquito and malaria. Yet, only 13% mentioned mosquito net use as a preventive measure(37).

In line with the Roll Back Malaria objective and strategies, the national malaria prevention and control approach in Ethiopia focuses on four main strategies. These include early diagnosis and prompt treatment, selective vector control including use of ITNs, malaria epidemic prediction, early detection and containment and prevention of malaria during pregnancy(9). In Ethiopia the distribution of ITNs through the health care delivery system was first introduced in 1997.

Following a number of small scale distributions, in 2000-2003 UNICEF donated a total of 1.42 million ITNs and the distribution continued thereafter(6).The country has also waived tax on ITNs. The national strategic plan for ITNs aims to scale up use and coverage by target districts to 60% by the end of 2007. Major constraints mentioned were low awareness, poor institutional capacity and low income of the population to buy nets(6).

Despite the activities pertaining to the distribution of ITNs, many questions remain unanswered. The extent to which people are aware and acquire nets is not understood clearly. Observation and rumors of not hanging nets at all, hanging nets in a wrong manner and place and not giving priority to children and pregnant mothers deserve close examination. The perception of the population on the role of ITNs in the prevention of malaria is still another issue. Thus, this study tries to describe the status of utilization and factors affecting it in Serbo Town, Oromia region, where ITNs have been distributed.

2 Objectives of the study

General objective

Assess the use of ITNs by households and factors affecting utilization in Serbo Town.

Specific objectives

1. Assess coverage of ITNs in terms of possession
2. Examine socio-demographic, behavioral and organizational factors that influence ITNs' possession and use.
3. Study use of ITNs by households especially under five children
4. Assess the current condition of nets that are already acquired by households
5. Explore the view of different stakeholders on the current status of ITNs' distribution and use.

3. Methodology

Study area and population

The study area is Serbo Town, located in Kersa Woreda Jimma Zone, Oromia Region, south west of the capital, 19 Kms from Jimma Town. Its altitude is 1640 meters above sea level, with Woinadega climatic condition. The annual temperature ranges between 11.2 and 29.6 degree Celcious and the annual rainfall is 1150 mm. According to the 1994 Population and Housing Census the Town had 3398 inhabitants (with 52% females). In the preliminary survey conducted at the beginning of the study, 1089 households were registered. The 2003 statistical abstract of the Central Statistical Authority estimated the total inhabitants to be 5530(38).Malaria has been a major health problem of the Town. Its transmission follows the unstable pattern that follows the big rains (Kiremt) and the small rains (Belg). The health professionals in the Town claim that many of the inhabitants prefer self treatment using anti malarial drugs that they buy in the Town when experiencing febrile illness. Some go directly to Jimma for treatment. Since a year and three months before this study was conducted, mosquito nets have been distributed in the Town in a manner detailed in the result part. Health workers claim to have tried to disseminate information on how to use mosquito nets through house visiting and general meeting of the Town's inhabitants.

Study design

Both qualitative and quantitative approaches were used. Primarily cross sectional study was conducted using interviewer administered questionnaire and inspection to see the condition of the nets in the households. This was followed by a qualitative approach to look deeper into

factors that led to possession and different patterns of use of mosquito nets. The qualitative approach encompassed focus group discussion with community members and in-depth interview with relevant stakeholders.

Population

i) Quantitative cross sectional study

All households in the Town who have at least one child aged five years and under were included in the study. The study units were the above mentioned households. Children aged five years and under rather than only under five were included. This is because main distribution of nets took place a year back. Thus, age of a child as a determinant of net possession forced the inclusion of those who were under the age of five by then. Another reason was anticipated inability to exactly mention the age of children.

ii) Qualitative study

-Residents of the Town who have at least one child aged five and under were involved in the focus group discussion

Sampling strategy

Sample size

To estimate a single population proportion ,where P is the proportion of households that let all children aged five and under to sleep under the net, provided that there is at least one child. Since P is unknown the maximum, i.e. 0.5 was taken.

the following formula was used

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

Where

Z=1.96

p =0.5

d=0.05

with 10% contingency the total sample size was 422. No population correction was used for the need of extrapolating the result to similar areas. Since the total number of households with the required character was 460, all were included in the study.

Data collection method

Cross sectional survey

Field activities started on the 26th of December 2004 and ended on the 6th of February. Data collectors who were residents of the Town and completed high school were recruited to serve in this study. Recruitment was done taking into consideration their past involvement in similar activities. They were trained by the principal investigator. Training included briefing about the objectives, relevance of the study and administration of the questionnaires. They were also trained how they to spell out the questions. In addition, data collectors were trained on how to use the check list with practical demonstration of using a net.

The questionnaire was pre tested in a Town named Asendabo, located 35 Kms from the study site. Questions difficult to ask were rephrased. Then each house in Serbo Town was given a house number. Those households having children aged five years and below were identified during this process and included in the data collection. Then data collectors interviewed heads of households (spouses of heads of households if the head is absent) where there is a marital

relationship. If not, the person registered as the head of the household by legal authorities was taken. Such people were grand parents or single parents. If the respondent was not found or failed to show the net, two repeat visits were done. Ten households were excluded either because the respondents could not be found or could not give complete information (like showing a net that was said to be in the house).

The instruments for the cross sectional study were a questionnaire and a checklist. The questionnaire is a structured one adapted from a study in Uganda and modified(39).The questionnaire was prepared in English and translated in Amharic. Main points included were socio-demographic characteristics, knowledge on malaria and nets, pertinent health beliefs and possession and use of nets by the family members. The checklist is prepared by the principal investigator. One check list was used for one net. Size of holes and tears were measured using a ruler. Field supervision was conducted which included rechecking of some of the questionnaires on house to house basis.

Qualitative approach

Five focus group discussions were conducted. The first was excluded from the analysis. This was because some of the questions that were included in the other discussions were not there. Yet, it served as a means of generating relevant questions for the subsequent discussions. Among the four, two were for men and two for women. The first stage, i.e. recruitment was done by the principal investigator and recruiters(some of the data collectors). Respondents were men and women who had at least one child aged five years and under. Respondents were selected making sure that their residences are fairly distant and evenly distributed in the four zones of the Town.

Even though the purpose was to pick individuals who do not know each other, it was not possible to fully accomplish that purpose. After selection of 10 potential participants and two reserves (for possible refusals) recruiters contacted the people to get consent and appointed them to come to the health center, where the discussion took place in a mini assembly hall. The facilitator was the principal investigator. A list of questions which were modified during the process of the data collection were used. The response was tape recorded and notes were also taken. The note taker was a teaching staff member of the Jimma University. The discussions took from one and half hour to two hours. Most were actively participating, particularly in the men's groups .Maximal effort was exerted during moderation to ensure full participation of all.

The information gathered was transcribed before conducting the next discussion. The number of FGDs was not increased from the planned as the point of redundancy was believed to be reached. Discussion was conducted in Amharic. Points of discussion were sleeping habits, malaria as a problem, means of prevention of malaria, distribution and use of nets, reasons for different patterns of use and others.

The second part of the qualitative study was in depth interview of relevant stake holders. Four individuals were interviewed. They were; the malaria and other communicable diseases control team leader of Kersa Wereda, the malaria prevention and control expert at Jimma Zonal Health Department, head of malaria and other vector borne diseases prevention and control program at Oromia health bureau and a vector control expert (working also as ITNs focal person) at FMOH. Discussion points were, magnitude of malaria, control and prevention strategies, role of ITNs, source and method of distribution of ITNs, appropriateness, affordability, and other issues pertaining to utilization of nets, studies addressing the above issues and others. Notes were taken

and the discussion tape recorded. Transcribed note was then summarized and report written. All the mentioned activities were done by the principal investigator

Operational definition of terms

Tear – Loss of integrity of a net that communicates with the edge and greater than 2 centimeters

Hole- Loss of integrity or opening of a net that does not communicate with the edge and is greater than1centimeter.

Knowledgeable-A respondent who answered at least four of the seven knowledge related questions

Better perceived benefit-mentioning malaria prevention as a benefit of net use and believing in lesser probability of getting ill while using a net.

Exposed to health education-Claimed to get health education on malaria in general and mosquito net in particular

Worn out net-a net that was not hanged and was labeled by the respondent as no more useable.

Majority(in reporting qualitative finding)-More than half but not most e.g. five out of eight, five or six out of nine

Most(in reporting qualitative finding)-All the respondents with the exception of one or two

Young children-(for the quantitative result part) children aged five years and under.

Data analysis

Data was entered into computer. Statistical package SPSS 11.0 for windows was used for analysis. Proportions and means are used to describe the parameters investigated. Odds ratio is calculated .Logistic regression was done to identify factors related to ever use and purchasing.

Only one randomly selected net was included in the analysis for those households possessing more than one.

In the qualitative part the transcribed note was translated. Following this manual coding was done using themes that were priory listed and those developed during translating and reading the transcript. Result was written reorganizing ,summarizing and quoting when needed.

Ethical consideration

Research proposal was presented to the DCH/AAU for approval. Consent from respondents had been mandatory for conducting the interview. The data collectors were oriented during the training so that they would provide proper advice for the respondents regarding any malpractice they have come across. Similar information provision was done by the principal investigator for the participants of the focus group discussions. During and after data collection (prior to finalizing the thesis) information pertinent to intervention was provided to the woreda and regional health institutions and health workers. The information included any improper use of ITNs and its reasons that deserve prompt action.

Communication of the results.

Results will be submitted to the Department of Community Health and presented orally. To help in future interventions the result will be communicated to governmental and non-governmental bodies. These include the Woreda Health Desk, the Zonal Health Department, Federal Ministry of Health Malaria And Other Vector Borne Diseases Control Team, World Health Organization country office, United Nation Children's Fund and others. In addition effort will be exerted to publish the paper and critiques that will be written based on the practical exposure.

4. Result

I Quantitative study

A) Descriptive

i)Socio demographic characteristics

A total of 450 households were included in the study, the respondents being either the head of the household or the spouse. As depicted in Table one, one hundred and fourteen(25.3%) were husbands and 270(60%) were wives in households where there was a marital relationship. The rest were single heads of households or grand parents. Mean age of the head was 38.6 years. On average there were 5.16 persons per household. Two hundred and sixty eight(59.6%) of the households had more than four members. In 181(40.2%) households two or more children age five and under were found. Two-hundred and sixty-nine(59.6%) of the households had a functioning radio while 44 (9.8%) had a functioning television. Eighty-seven (19.3%) of the heads could not read and write while 98(21.8) had education above grade 10. Among mothers 174(38.7%) could not read and write while 38(8.4%) had education greater than grade 10. Ninety-five (21.1%) were government employees, 90 (20%) were merchants and 69 (15.5%) were farmers. This list is followed by daily laborers and house wives .

Table 1 Distribution of households by socio demographic characteristics in Serbo Town, Jimma Zone, SW Ethiopia. .January 2005

Characteristics		**No (%)**
Status of the respondent	Husband	114(25.3)
	Wife	270 (60.0)
	Other	66 (14.7)
Age of head	<25	42(9.3)
	25-40	280(62.2)
	>40	128(28.4)
Number of family	4 or less	182 (40.4)
	>5	268(59.6)
No of children aged 5 and under	1	269(59.8)
	2 or more	181(40.2)
Possession of radio	Yes	259(57.6)
	No	191(42.4)
Possession of television	Yes	44(9.8)
	No	406(90.2)
Number of rooms	1	65 (14.4)
	2	172(38.2)
	3	126(28.0)
	4 or more	87(19.3)
Number of beds	0	79(17.6)
	1	238(52.9)
	2 or more	133(29.6)
Education status of the head	Cannot read and write	87(19.3)
	Read and write up to Grade 4	102(22.7)
	Grade 5 up to grade 10	163(36.2)
	Higher than grade 10	98(21.8)
Education status of the mother	Cannot read and write	174(38.7)
	Read and write up to grade 4	87(19.3)
	Grade 4 up to grade 10	151(33.6)
	Higher than grade 10	38(8.4)
Occupation of the head of the household	Government employee	95(21.1)
	Merchant	90(20)
	Farmer	69(15.3)
	Daily laborer	67(14.9)
	House wife	40(8.9)
	jobless	32(7.1)
	other	57(12.6)

ii) Sleeping conditions

Not everyone in the Town slept on bed. Seventy nine(17.6%) of the households had no bed. As in Table 2, 281(62.4) had one sleeping floor or *medeb* while 100(22.3%) had more than one. In 200(44.4%) households one up to three people slept on bed while in 188(41.8%) of households a similar number of people slept on floor or *medeb.*

Table 2 Distribution of the households by sleeping arrangements Serbo town , Jimma Zone, SW Ethiopia, January 2005.

character		**No(%)of households**
Number of beds	0	79(17.6)
	1	238(52.9)
	2 or more	133(29.5)
Number of sleeping floor/*medeb*	0	69(15.3)
	1	281(62.4)
	2 or more	100(22.3)
Number of people sleeping on bed	0	79(17.6)
	1-3	200(44.4)
	4 or more	171(38)
Number of people sleeping on floor/*medeb*	0	153(34.0)
	1-3	188(41.8)
	4 or more	109(24.2)

iii) Access to information, knowledge and perception.

As depicted in Table 3, one hundred and thirty six(30.7) got health information pertaining to malaria in general and nets in particular. Three hundred and thirty two(73.8) were labeled as knowledgeable as they correctly answered at least four of the seven knowledge questions(Table 4). One hundred and ninety eight(44%) were labeled as having a better perceived benefit as they specifically mentioned malaria prevention as benefit and that users were at least less likely to develop malaria. Common sources of information were radio and health workers

Table 3 Distribution of the respondents by factors predisposing to net use Serbo Town, Jimma Zone, SW Ethiopia, January 2005.

Factor	Category	No(%)
Got health education	Yes	136(30.2)
	No	314(69.8)
Knowledgeable*	Yes	332(73.8)
	No	118(26.2)
Perceived benefit	lesser	252(56)
	better	198(44)

*Mentioned at least three of the seven knowledge related questions

At least three symptoms of malaria were mentioned by 387(86%) of respondents. Children and/or pregnant women were labeled as more affected group by 323(71.8). Three hundred and sixty two(80.4%) knew the need for treatment while only 178(38.9%) mentioned the interval (6 months) between successive treatments(Table 4).

Table 4 Distribution of the respondents by their knowledge pertaining to malaria and its prevention. Serbo Town, Jimma Zone, SW Ethiopia, January 2005.

character	No(%)
Know at least three symptoms of malaria	387(86)
Know that children and/or pregnant women are more affected	323(71.8)
Know the cause of malaria*	292(64.9)
Know about the need for treatment	362(80.4)
Know reason for treatment**	355(78.9)
Know the need for retreatment	269(59.8)
Know interval between successive treatments	178(38.9)

*Mentioned either living near collected water or mosquito bite.
**mentioned either repelling and/or killing of mosquitoes

iv) Malaria and its prevention

In 283(62.9%) of the households there had been at least one individual who had an illness perceived to be malaria in the past two months. Different methods were reported as a main method for prevention of malaria by the households. As described in Table 5, one hundred and sixty three(36.2%) of the respondents mentioned cleaning home and the surrounding area, followed by mosquito net use by 105 (23.1%) and smoking by 75(16.4%).

Table 5 Distribution of the respondents by methods of prevention of malaria Serbo Town, Jimma Zone, SW Ethiopia, January 2005.

Main method of prevention	**No(%)**
Cleaning home and environment	163(36.2)
Mosquito net use	105(23.1)
Using smoke	75(16.4)
Closing doors and windows	19(4.2)
Use traditional plants	19(4.2)
Other methods	34(7.5)
Do not do anything	35(7.8)

As shown in Table 6, a total of 224(49.8%) households had no mosquito net, 175(38.9%) had one net, 46(10.2%) had 2 nets while 5(1.1%) had three. Not all mosquito nets were used over the sleeping areas. Twenty six(11.5%) were used as curtains, 14(6.2%) were in package , 8(3.6%) were used for other purposes and 13(5.8%) were said to be out of use. Only seventy eight(17.3%) households let all the young children sleep under the net the previous night. Yet the figure for ever sleeping under a net was169(37.6%). Forty-nine(29.7%) of the households possess a net with one to five holes with size more than one centimeter. Twenty six(15.8%) households possess a net with more than five holes(Table 6). Among the households who hanged

it over their sleeping place at the time of data collection, 74 (93.7) had it over a bed and the rest over a sleeping floor.

Mean number of nets was 0.63 per household. Mean number of individuals per net was 4.7(for those who possess at least one mosquito net). Ninety three (42%) of those who possess bought the net while the rest were given for free. Main reason for not having a net was unfair distribution (93 or 41.5%) followed by high cost of nets (46 or 20.5 %). Mean interval between successive washings for those who have net was 8.9 weeks. The average time since acquiring net was 14.3 months. It has been more than six months for 156 (69%) nets since treatment.

Table 6 Distribution of households in Serbo Town by use of mosquito nets, Jimma Zone, SW Ethiopia. January 2005.

Characteristics		**No (%)**
Number of nets	0	224 (49.8)
	1	175(38.9)
	2	46(10.2)
	3	5(1.1)
Purpose of use	Hanged	79(35.0)
	Stored after previous use	86(38.1)
	Curtain	26(11.5)
	In package	14(6.2)
	Worn out	13(5.8)
	Other purpose	8(3.5)
Slept under a net the previous night	No one	358(79.8)
	Only Other than young children	2(0.4)
	Some young children	12(2.7)
	All young children	78(17.3)
Ever slept under a net	No one	234(52)
	Only other than young children	15(3.3)
	Some young children	32(7.1)
	All young children	169(37.6)
Number of holes(among nets used /useable over sleeping areas =165)	0	90(54.5)
	1-5	49(29.7)
	>5	26(15.8)

B Analytic

Better adherence was seen in those aged five and under than in those older when individuals were taken as units of analysis. One hundred and twenty five (19%) of those aged five and under slept under a net the previous night. The corresponding figure for those aged six and above was 231(14.1%). The difference is statistically significant (p=0.003). Similar result was seen for ever sleeping. Two hundred and sixty two (39.9%) of those aged five and under have at least once slept under a net while 547(33.4%) of those aged six and above had the above mentioned practice. The difference is again statistically significant (p=0.003).

As the time of the conduct of the study was not of the peak transmission season for malaria and only 78(17.3%) of the households let children, five years and under, sleeping under a net the previous night, the factors associated with such practice were not delineated. Univariate analysis of different variables as related to letting all children five and under sleep under a net at least once was done. As seen on Table 7 educational status (being grade five and above) for both the head and the mother, being a government employee or a merchant , being in the age group 25-40, possession of a radio, possession of a television, having two or less persons per room, having only one under five child, number of beds, being knowledgeable, receiving health education, and having better perceived benefit were all associated with letting all children aged five and under sleep under a net at least once. When controlling for confounders possession of a radio, having less than two persons per room, being knowledgeable, getting health education and having bed and age of head between 25 and 40 retained their significance. When analyzed separately buying a net was also associated with ever sleeping by all under fives as compared to acquiring the net for free. As seen on Table 7 those who possess a radio were 2.5 more likely to have let their

young children sleep under a net (95% CI 1.43-4.37). Households with two or les persons per room were 1.74 times(95% CI 1.06-2.84) more likely to have a similar practice. Those who own beds were more likely to use nets. User households, however, did not have significantly different perception on the benefits of nets.

Table 7 Logistic regression of predictors of ever sleeping under a net for all children aged five and under in a household in Serbo Town, Jimma Zone, SW Ethiopia. January 2005.

		Ever slept under a net(all aged five and under)		OR (95% CI)	Adjusted OR
		Yes	No		
Age head	<25	12(28.6)	30(71.4)	1.02(0.47-2.21)	0.81(0.32-2.07)
	25-40	121(43.2)	159(56.8)	1.95(1.24-3.06)	1.85(1.01-3.42)
	>40	36(26.1)	92(71.9)	1.00	1.00
Education of head	Higher than grade 10	57(58.2)	41(41.8)	5.33(2.77-10.26)	0.83(0.31-2.19)
	Grade 5 to10	66(40.5)	97(59.5)	2.61(1.42-4.78)	0.79(0.35-1.81)
	read and write up to grade 4	28(27.5)	77(72.8)	1.45(0.74-2.85)	0.79(0.33-1.89)
	Can't read and write	18(20.7)	69(79.3)	1.00	1.00
Education of mother	Higher than grade 10	26(68.40)	12(31.6)	6.03(2.81-12.92)	1.62(0.61-4.33)
	Grade 5 to10	71(47.0)	80(53.0)	2.47(1.55-3.93)	0.93(0.5-1.71)
	read and write up to 4	26(29.9)	61(70.1)	1.19(0.67-2.10)	0.61(0.29-1.26)
	Can't read and write	46(26.4)	128(73.6)	1.00	1.00
Occupation head	Merchant/governmen t employee	97(52.4)	88(47.6)	2.96(1.99-4.39)	1.24(0.73-2.1)
	other	72(27.2)	193(72.8)	1.00	1.00
Person with malaria	At least one	57(34.1)	110(65.9)	0.79(0.53-1.18)	0.75(0.46-1.22)
	No one	112(39.6)	171(60.4)	1.00	1.00
Radio	possess	137(52.9)	122(47.1)	5.58(3.55-8.76)	2. 50(1.43-4.37)
	Do not possess	32(16.8)	159(83.2)	1.00	1.00
Television	possess	26(59.1)	18(40.9)	2.56(1.40-5.01)	0.86(0.40-1.87)
	Do not possess	143(35.2)	263(64.8)	1.00	1.00
Person per room	Two or less	120(46.7)	137(53.3)	2.57(1.72-3.87)	1.74(1.06-2.84)
	More than two	49(25.4)	144(74.6)	1.00	1.00
Number of beds	2 or more	72(54.1)	61(45.9)	29.73(8.95-98.70)	14.49(3.86-54.89)
	1	94(39.5)	144(60.5)	16.44(5.05-53.48)	10.73(3.01-38.28)
	0	3(3.8)	76(96.2)	1.00	1.00
Knowledge	More knowledgeable	158(47.6)	74(52.4)	8.83(4.58-17.30)	5.34(2.51-11.1)
	Less knowledgeable	11(9.3)	107(90.1)	1.00	1.00
Health education	got	75(54.3)	63(45.7)	2.76(1.83-4.17)	1.82(1.11-2.98)
	Did not get	94(30.1)	218(69.9)	1.00	1.00
Perceived benefit	better	90(45.5)	108(54.5)	1.83(1.24-2.69)	1.49(0.93-2.38)
	lesser	79(31.3)	173(68.7)	1.00	1.00
Source of net	Free	44(33.1)	89(66.9)	1.00	
	bought	17(18.3)	76(81.7)	2.21(1.69-4.8)	

As nets were partly purchased and partly obtained freely, distribution of those who did and did not purchase was observed. None of those possessors without a bed had obtained their net through purchasing. Thus, number of nets was not included among the variables in the analysis. Those who purchased were more likely to have heads and mothers with education above grade 4, be government employees or merchants, possess a radio, possess a television, have two or less people per room, be knowledgeable and get health education. Having better perceived benefit, presence of a person with malaria and age of the respondent were not associated with purchasing. When controlling for confounders, education higher than grade 10 for the head, occupation of the head, possession of a radio and being knowledgeable retained association. As described on Table 8, merchants or government employees were 3.47(95% CI 1.86-6.47) times more likely to acquire a net through purchasing.

Table 8 Logistic regression of predictors of purchasing at least one net for households in Serbo Town, Jimma Zone, SW Ethiopia. January 2005

Variable		Purchased a net		OR (95% CI)	Adjusted OR (95% CI)
		Yes	no		
Age head	<25	6(14.3)	36(85.7)	1.02(0.38-2.76)	1.06(0.33-3.38)
	25-40	69(24.6)	211(75.4)	1.33(0.46-4.02)	1.19(0.59-2.37)
	>40	18(14.1)	110(85.9)	1.00	1.00
Education head	Higher than grade 10	45(45.9)	53(54.1)	23.7(7.03-80.4)	5.17(1.29-20.8)
	Grade 5 to10	34(20.9)	129(79.1)	7.38(2.2-24.7)	3.19(0.86-11.84)
	read and write up to grade 4	11(10.8)	91(89.2)	3.38(0.91-12.96)	2.2(0.54-8.85)
	Can't read and write	3(3.4)	84(96.6)	1.00	1.00
Education of mother	Higher than grade 10	17(44.7)	21(55.3)	5.59(2.56-12.20)	0.81(0.28-2.28)
	Grade 5 to10	43(28.5)	108(71.5)	2.75(1.56-4.86)	0.85(0.42-1.72)
	read and write up to grade 4	11(12.6)	76(87.4)	1.00(0.46-2.17)	0.45(0.18-1.01)
	Can't read and write	22(12.6)	152(87.4)	1.00	1.00
Occupation head	Merchant/ government employee	72(39)	113(61)	7.4(4.33-12.63)	3.47(1.86-6.47)
	other	21(8)	244(92)	1.00	1.00
No of five and under	2 or more	37(20.4)	144(79.6)	0.98(0.61-1.56)	1.34(0.77-1.63)
	1	56(20.8)	213(79.2)	1.00	1.00
Person with malaria	At least one	34(20.4)	133(79.8)	0.97(0.61-1.56)	0.93(0.53-1.63)
	No one	59(20.8)	224(79.2)	1.00	1.00
radio	possess	81(31.3)	178(68.7)	6.78(3.57-12.87)	2.48(1.19-5.17)
	Do not possess	12(6.3)	179(93.7)	1.00	1.00
television	possess	23(52.3)	21(47.7)	5.26(2.75-10.02)	1.75(0.82-3.76)
	Do not possess	70(17.2)	336(82.8)	1.00	1.00
Person per room	Two or less	65(25.3)	192(74.7)	1.99(1.22-3.25)	1.23(0.74-2.36)
	More than two	28(14.5)	165(85.5)	1.00	1.00
knowledge	More knowledgeable	87(26.2)	245(73.8)	6.62(2.81-15.59)	3.75(1.46-9,67)
	Less knowledgeable	6(5.1)	112(94.9)	1.00	1.00
Health education	got	38(27.5)	100(72.5)	1.78(1.11-2.85)	1.09(0.62-1.92)
	Did not get	55(17.6)	257(82.4)	1.00	1.00
Perceived benefit	better	48(24.2)	150(75.8)	1.47(0.93-2.33)	1.02(0.59-1.75)
	lesser	45(17.9)	207(82.4)	1.00	1.00

II Qualitative study

A) Focus group discussion

I Sleeping areas

Common sleeping places in the Town were said to be either bed or floor. Use of floor was in two forms. One, which is uncommon in Towns, but rather used in rural areas is "Medeb', floor built up in the shape of a bed. The other is simply the floor over which the sleeping material is laid. The sleeping material might be *Jiba* (mat made of dried part of false banana) alone or a *Jiba* with other materials. What determines this, by and large appears to be the income of the people. Although rural urban difference was also mentioned by some

A male respondent elaborated:

> "The majority use bed. It is in the rural areas that one finds *Medeb* or *Jiba.* In the Town there are mattresses made of hey."

Parents usually get priority to use a bed, if any, and children sleep on floor. Mostly all sleep in the same room. Nevertheless, this does not apply to all children. The young ones sleep with parents. Estimated age to separate from parents and go to floor ranged from four to five up to seven to eight years. As one mother put it :

> "By and large young children with their mother sleep on bed, not on floor. The youngest, with the mother sleep on bed. How can all sleep on bed?"

the idea is also captured in the following citation from a father

> "We divide them (the children) as mature and not mature (*Yederesu* and *Yalderesu*).At most those up to seven and eight sleep with parents in most cases."

II Change of sleeping places

A number of causes to change a sleeping place were mentioned. The ones agreed upon by all groups were; delivery of a wife (for a husband to go to floor), insects, illness, visitors, discomfort due to different reasons(e.g. coldness) grief and marital disharmony. When insects disturb (which was said to be common), someone prepares another sleeping area at another corner, and movers to it. As to guests, a separate place on floor is prepared. On the other hand, loss of a family member causes change of sleeping place from bed to floor for family members. This extends for forty days or more. It also causes visitors to spend up to seven days in the house. Yet, this is common in the Christians, who constitute the minority. As one mother stated:

> "neighbors do not leave until the seventh day. The others return home at most on the third day. Up to the fortieth day family members sleep on floor. No one sleeps on bed."

III Malaria as a problem

All in the discussants agreed that malaria is indeed a big problem, although their points of explanation and emphasis slightly differed. The females claimed that it is a killer disease, particularly for children. In addition, in one group of women, the impact on the head of the household and the house economy was emphasized. One house wife described it as:

> "A head of a household might be in bed for a long time; he is the one to take care of the family. The family will be in a problem. There might be no one to help them".

The men specifically emphasized the negative impact of the illness on schooling, work, like farming and expenses for treatment. As one male respondent put it :

"When a man gets malaria, he cannot work. If he is a student he quits school. If he is a farmer he abandons farming. Source of every problem is malaria."

IV Cause of malaria

The first response in three of the four discussions revolved around the mosquito as a cause. Phrases mentioned were "unclean environment", "Lack of cleanliness", "accumulated dirty water" or "mosquito bite". In all groups, most of the discussants agree with similar explanations of causation. But in addition, all groups mentioned hunger, exposure to sun, exposure to cold air, being in rain, exhaustion due to long distance travel, drinking water after exhaustion and thirst and drinking dirty water as causes of malaria. Nevertheless, the mechanism is different from the first and 'main' method.

Malaria is believed at the beginning to enter through bite of an insect. But once in, it will not be eliminated, as one male respondent put it:

"If you go any where it enters first through insect bite. But it does not get any medicine that will take it out of the body. It will decrease when the drug is taken, but is not eliminated."

This malaria which is 'inside the person' is believed to recur when the person is exposed to the number of causes mentioned above. Those causes are not believed to cause malaria in someone who does not already have it due to insect bite. The following quotes elaborate this. A father explained:

"It (hunger) doesn't cause malaria on someone who doesn't already have it inside him. For example if I had malaria in the past, treated and improved, it (the malaria) will not be cleared from my liver. If I get hungry or be exposed to the sun, it will be activated. But this doesn't work for some one who does not have it inside."

A mother claimed that:

> "when one is thirsty after spending time in the sun and drink water or walks in the rain it will be activated. If one walks in the rain, he will develop the disease. When people go to the countryside and drink dirty water it starts."

Among these causes of such 'reactivation' hunger and exposure to sun were repeatedly raised.

V More affected groups

Majority in all groups agreed that children and pregnant women are more affected. The first response in all groups had been that of children. The reason, however, is that children will drop their clothes while asleep, thus get exposed to mosquitoes, and that they do not speak out their complaint.

As a male respondent claimed:

> "Unlike adults young children do not say 'I have headache' or so. And also their strength is not like the adult. By the time they reach health institutions the disease has already been over their capacity. Even there is difficulty to wait the result of the blood test. While they are waiting the children might accidentally shiver and lose consciousness. They don't know at the beginning and they don't say it".

VI Methods Used for prevention

It was expressed that all the respondents and the people living around them use different methods of prevention. The commonest, mentioned by all groups are cleaning their environment, using smoke, closing doors and windows and eating garlic. Cleaning the environment had been exemplified by removing broken utensils, cleaning marshy areas, and cleaning the house.

Smocking is widely practiced using trees with local names '*Tsid*' '*Bisana*' and '*weira*'. It is believed that smoke either 'kills the mosquito or makes her weaker'. Garlic is eaten on daily basis-with butter if the economic condition allows. The majority of the Town's inhabitants , use garlic and smoke. Nets (ye'alga agober), named also as 'zanzira' by those participants with military background, were also mentioned by all groups . But they were called as 'relatively new' by one of the men's groups. The women's groups particularly mentioned mosquito nets nearly at the end of the list of activities to prevent malaria. Less commonly mentioned methods had been insecticides sprays for those who can afford (by one male and one female group), mechanical killing of insets (one men's group) and keeping the light on throughout the night (by one male group)

A combination of prevention measures appeared to be practiced rather than a single one as was expressed by a father:

> " I used garlic too. And I bought a mosquito net because I have a little child. When we heard that people still get sick, while sleeping under a net, because I worry much for my child, we started using this smoking, closing the doors early. With the exception of my child, me and my wife use the garlic every morning. After I started using garlic, I have started to conclude that all the drug is unnecessary."

VII Distribution of nets, ownership and source

The time of distribution of nets for the area was the 1996 (EC) peak malaria transmission time. Distribution at the beginning was through buying the net for 18 Birr. Later people who participated in environmental control measures like filling holes were provided a net in return to

their contribution. The final means of distribution was through house to house provision for those households who did not have nets by the time of distribution. The participants however claimed that there was unfairness in the last measure as there were many who did not receive as well as others who received more than one.

As one father put it:

> "First it came to this health center. Those who have money bought, even from other places. At the beginning it was sold for 18 Birr. When the transmission of malaria become very high, people started to manually close water sources and were provided nets in return. Many people obtained in this manner."

A mother said:

> "In my neighborhood there was too much malaria. All my family was sick. Some took five and six nets for one household, but we did not get any. They were distributing for houses, but they have skipped some. They did not give it properly"

There was agreement by the majority in the unfairness of the distribution.

VIII Health education pertaining to nets

Health education pertaining to nets was claimed (by the men's groups)to be given at the beginning of the distribution. It was given to the residents of the Town through assembling people. Majority of women in both groups did not get such education. Their sources were rather education given by those who were selling or distributing . Their other source was the 'manual' in the net.

A mother claimed:

" It was given in an assembly hall. Later when you buy the net, the committee members, who have the training, would show you about the use of the glove(for protection of individuals during treating), how to immerse the net, for how long to wait etc."

All groups, however, agreed that there should be more education to avert the prevailing malpractice. Health education was emphasized during detailing reasons for malpractices. It was also labeled as a mandatory act for future net distribution

A mother claimed:

"It is good if it comes now. But before distribution the concerned body should give education for dwellers."

IX Patterns of use

In all discussions it was mentioned that nets were sold (by some of those who were given for free or bought for cheaper price), used 'properly hanged' and used as curtain. The men's groups mentioned that there are some who still kept the nets in package. Use for covering shelves in liquor houses and covering of pictures on wall were also mentioned by the men's group. The females, particularly mentioned use as scarf (to cover hair). Individual mothers mentioned cutting nets to use the pieces to cover children faces so as to prevent flies and to tailor dresses.

As one respondent put it:

"…..It was being sold for 25 Birr. It was being taken to Jimma, or other places. Part of it was taken to the countryside and used as hair cover. Some used it to tailor dresses. In some areas of the Town it was used to cover shelves of liquor houses. But what remained in the Town was by and large used for beds."

Though most possessors claimed to use what they had, one farmer and one daily laborer confessed selling and using as curtain respectively.

A. Selling

In all groups selling of nets was emphasized. Reasons given, however, had some differences. The men's groups focused on points like poverty and unfair distribution. The time of distribution was the 'dark period'. There was no money though there was great need of it due to the malaria epidemic. People needed the money, which amounted up to 40 Birr. Such amount buys grain that would suffice to feed a family for a month. It could help to get better medical care. The saying of a father can summarize the above points :

A male respondent said:

> " the time was dark. Money could not be found. I do not hang a net while I am hungry. I will sell it and eat. If I hang it while I am hungry, it has no meaning. If I sell the net and buy *teff,* it can feed my family for a month."

Unfair distribution which helped some to posses more than one net and helped the poorer segment of the society was incriminated as a cause to sell nets by minority.

In the females groups, need for money was also mentioned. But the more emphasized factors were possession of extra nets and doubting the effectiveness of nets. Minority in one group mentioned that a net does not suffice for all family members. Thus people might sell it preferring not to use rather than use by only some of the family members. The above belief can be seen in the words of a mother:.

> " 'Whether or not there is a net, we are still getting sick; as usual we will go to the health center' is what they (residents of the Town)say"

Another woman claimed:

"From some houses more than one person took. If the bed is only one for a person who took two, one is extra and he sells it."

B. Using as curtain and other uses

In all groups using as curtain of doors and windows was described as a common practice by the majority. Reasons were however different. Lack of proper health education and doubting the benefit of nets were persistently mentioned. Two groups (one male and one female) mentioned possession of extra net as a reason. Free distribution, desire to prevent malaria using the curtain, fear of the chemical and frustration due to failure to let all family members sleep under a net were mentioned, one by each group. Beauty of the net was also mentioned by one group. Benefit of the nets as perceived by some of the people who used it as a curtain was described by a mother as follows:

> "A neighbor who has taken, used half of it for window and half of it for door. They (his family) say 'what is it's use? It doesn't prevent' so they tore and used it for door and window."

In contrast to the above, the desire for 'better protection' also led some to cut it and use it as a curtain. But this was not described as a common practice, at least in the urban setting. The following quote of a father elaborates the idea:

> "Immediately after they have taken it, due to lack of knowledge, they put it on windows to prevent malaria. People at the periphery of the Town and countryside were tearing it in that manner. They were using the pieces to close the holes (on the wall). It was to prevent malaria, just like the smoking."

Fear of the chemical, as a cause to use as curtain was said only by one individual

A reason for use as curtain and others like scarf, or possibly dresses, however appears to go beyond the above mentioned. Nets were perceived as a better quality cloth with ornamental value. To direct questioning, most participants in all discussions agreed that nets are viewed as beautiful and therefore are valued possessions. An old farmer said:

> "Since it is the first time, it is pleasing to use the net as curtain or cover a picture on wall. It is seen as a beautiful thing. It looks good when seen on a bed."

A woman participant said:

> "People say that there used to be a hair dressing like that and they wear it. Since it has openings, it is comfortable for hair cover. It lets in air"

C. Seasonal use of nets

Majority of those who had nets claimed to use the net throughout the year. This is because it helps not only for the prevention of malaria, but also for mosquito nuisance. As a young father described it:

> "As to me, once a person starts to use a net, he cannot sleep without it later on. I cannot sleep without a net. During the night, there are insects. Some houseflies might disturb, but there is no discomfort if there is a net."

Some claimed that they put it off because there is no mosquito or malaria at that time. Yet, when responding about the commoner practice in the area, the majority claimed that nets are mostly used during the 'time of malaria'. As a mother claimed:

> "By the time malaria was widespread, everybody hanged. But then it decreases. They washed it and put it in a box. They will hang it in the summer, when the mosquito number increases."

D. Priority of net use

Majority of the participants claimed that in their surrounding, priority to use net is given to 'him', that is the husband , and then his wife. The reasons are importance of the head of the household to the family and use of the 'bed of the family' by parents and the floor by children.

As the head of the family is the bread winner, his health is valued .As one respondent claimed:

> "The answer of such parent (if asked why) would be 'if I am healthy I can work and help my children and get treatment (if sick). It is when I am healthy that my children eat.'"

Another Respondent said:

> "The husband is the head of the house. Existing benefits start from him. He is the head of everything in the house. When such a thing (net) comes it is considered like an honor, like a reward. Therefore he uses it for himself."

In additions nets are considered to be mount over a bed and beds are used by the parents as detailed later on. Yet, majority of the possessors among discussants claimed to use primarily for children.

This prioritization, however, is unlikely to hinder the use of net by most of the young children. This is because they sleep with their parents on bed and get the benefit by virtue of this sleeping arrangement. An old farmer claimed:

> "those under the age of seven sleep with their parents. If they (parents) give priority to themselves it is with those under the age of seven. The one older than seven is in the living room. When we say little children are affected, it means the ones with parents."

E. Washing of nets

Nets were washed with soap and water for their cleanliness. The intervals mentioned by few from personal experience were however in months. Reasons mentioned are housing condition (mentioned by all groups) use of smoke and lack of the chemical (each by one group).

Housing condition affects washing through imparting dust on the net while cleaning the house. As one mother explained:

> "Our wall is made of mud. The floor is earth. The net gets dirty quickly since it attracts dirt. It is washed at least once within a month or within two months"

The smoking was explained by a father as follows:

> "majority of the houses use smoking to kill the mosquito. There are those who burn wood. Because of that nets get darker. The color is green, but it gets dark. People say it is dirty and wash it."

A third point mentioned by two groups was lack of re treatment which revealed that washing started after failure to retreat the nets due to lack of chemical.

As a female respondent was quoted saying:

> "At the beginning it was promised that the drug would be given every six months. This was not done. Now people wash it using water."

F. Treating nets

In all the four groups most of the discussants claimed that the nets in the Town are treated. Retereatment however was not done at all because the tablet (K-O tab) was not available in the area. This, however, did not prevent many from using, as the mosquito cannot 'get in'. Insecticide was not considered as creating a problem enough to prohibit usage with exception of

one father who throw the chemical and use the net as curtain. Yet it was a source of fear for parents at the beginning. One mother said:

> "By the time it came and people hanged, there was a fear of chemical both for children and themselves."

G Other issues of the net utilization

The current condition of the net was described by 3 of the four groups as bad. The details being tear and change of color. Reason for this in turn are dust in the house due to the floor which is earth, smoking, and lack of treatment which led to washing of the net.

Two groups mentioned the practice of letting the nets in the package and not using. Reasons given, however differ. Some were assumption that the price of nets would increase (to sell it later), not believing in it's ability to prevent malaria, scarcity (possession of only one which does not suffice for all), having extra nets (beyond for beds) and lack of bed. No majority opinion was found.

X .Benefit of nets

Ability of nets to prevent malaria and other nuisance, as well as their failure to do so was mentioned, even prior to direct questioning. During that period both men's group mentioned that nets as one method for prevention (even the preferred one by some) and that they are good for children. Advantages of net for children was also mentioned by women though by few. The women spoke more on the reason of the people for using of nets for other purposes. Majority in both groups claimed repeatedly that according to most people nets might not prevent against malaria. This is an explanation for the selling of nets and use as curtain.

A mother claimed:

"There are people who say 'while using the net we and our children got sick'"

Benefit of nets as perceived by other people was inquired. Response was similar in all that some believe in its ability to prevent malaria and some do not. A male respondent said

> "There are those who say it prevents. There are who blame the net because malaria frequently affected them while using. When I tell such people that I have benefited , they do say 'The net doesn't help, rather the malaria frequented us'"

All groups also mentioned belief of the people around them in the ability of nets to prevent nuisance form other insects. When asked to give their own view on benefit of nets, there had been arguments. But the majority in all groups said nets protect against disturbance from other insects and from malaria partially. Protection was said partial because nets prevent 'only when people are in bed.'

A male respondent explained the belief as:

> "Does a net really prevent against malaria? It is only when we sleep. The mosquito flies even during the day. When we asked ourselves why we had malaria while there is the material called net, we got an answer. That is, the net serves only while we are in bed. The mosquito moves out of bed. Therefore, we cannot state that we can wholly prevent malaria."

A mother claimed:

> "In fact it might not bite me while I am sleeping. But it would still get us when we are out. Therefore, it is beneficial only during the time when I am sleeping. It is not when I am out."

XI Problem as a result of using

With exception of one mother who complained of heat while using a net other participants claimed that there are no such problems as suffocation or feeling of hotness.

XII Proper user

Those who use nets 'properly' were those who are educated and have a better income. This was agreed by all groups. The men added that someone who suffered form the consequence of malaria is also likely to be a good user.

A male respondent said:

> "The one who uses nets properly is he who has better education and who has the wound, i.e. malaria had costed him much in the past"

XIII The need for bed

All groups agreed that nets are by and large used on beds. Even if they are sometimes used over a sleeping floor, it is temporary. One reason is that it is difficult to manipulate nets if used over a floor. A male respondent was quoted saying:

> "In our house the floor is earth. We use *Jiba* on the floor to sleep. In the morning we shake and beat it to remove the dust and put it in one corner. If we put (tuck in) the net under the *Jiba*, it will pick the dust. Then we have to wash the net every day. We can simply shake and beat the *Jiba*, but the net holds the dust"

A female respondent explained as:

> "In fact, if there is a mattress, it can be done. One can put the mattress on the *Jiba* and tuck in the net under the mattress. But if it is on *Jiba*, how would it be mounted?"

Another reason is the health education ,which, as one male participant put it

> "When the information was given, it was said 'on your bed'. Nothing was said about hanging it over a floor or *medeb*."

Beauty when seen over the bed and the fear of what people would say also hinders from using over floor or *medeb*. Since the net is a possession that is valued, it is supposed to be put on tidier areas and not touch dust.

A mother pointed out:

> "It is for beauty. People believe that nets look good on bed not on mattresses."

A father said:

> "….and when a neighbor comes for coffee ceremony, what would she say when she sees the net over a *Jiba*?...."

XIV The role of income

Though not specifically sought, in all groups economic condition was mentioned as a reason for many of the practices prevailing. The men's groups more frequently mentioned the issue. Economic status was said to determine whether someone will purchase a bed, a mattress or simply a *Jiba*.

As a mother said:

> "…. rather than rural urban difference, it is he living condition that determines whether one sleeps on bed or floor. There are some who sleep on '*selen*' or mattress made of hay. Those who have (money) use mattresses made of sponge. In the rural area there are people who sleep on bed. There are people in the Town who sleep on floor. It is determined by the living condition."

The number of rooms which also depends on the income was also mentioned as one factor in determining sleeping place. Common reason for change of sleeping place, disturbance by insects may occur when one cannot afford for insecticides. Preventive measures, like use of spray and even better preparation of garlic were for “those who have”. Acquisition of a net requires money, which for same was unattainable. Even when given for free, the poverty makes selling of the net a tempting act.

A father claimed

> “According to what I saw, it was those who have nothing (financially) who had sold their nets. It was those who could not pay for medical care that sold a net. After selling a net and borrowing money, a poor father would pay for his sick child’s treatment.”

XV future use of nets

Most in all groups agreed that future distribution of nets is important. Majority in three groups emphasized in addition the need for educating. A mother said

> “since they do not know how to use, they might again sell it and use as curtain. Therefore, education and warning that it will be checked on house to house basis is important. Free distribution is important. The majority do not have money. Some might prefer to die than spending 18 Birr for net.”

B) In depth interview

Four individuals were interviewed. The respondents were ;the malaria and other communicable diseases control team leader of Kersa Wereda, the malaria prevention and control expert at Jimma zonal health department, head of malaria and other vector borne diseases prevention and control program at Oromia health bureau and a vector control expert (working also as ITNs focal person) at FMOH. They had one to three years experience in the positions they were working. Discussion points were, magnitude of malaria, control and prevention strategies, role of ITNs, source and method of distribution of ITNs, appropriateness, affordability, and other issues pertaining to utilization of nets, studies addressing the above issues and others.

Malaria was labeled as a major problem for the dwellers and administrative units of the levels considered. Reasons are that it contributes highly for morbidity and mortality, affects productivity and schooling and costs a lot for prevention and control. Twenty one of the 33 kebeles in Kersa Wereda and 11 of the 13 weredas in Jimma Zone are malarious. Malaria is said to get due attention by the government and donor agencies. Yet there is very low capacity to avail insecticide for spray and appropriate drug for case treatment. Nets particularly are entirely donated items.

Malaria prevention and control at federal level is organized as a team comprising of nine individuals. In the Oromia Regional Health Bureau, it assumes a level of a program under which there are two teams-vector control and epidemiology. There is one expert at the zonal level who bridges the gap between the region and weredas. In Kersa Woreda, there were three experts and

one team leader. But the wereda level manpower is variable from one wereda to the other, being dependent on the magnitude of the problem.

Control strategies are early case detection and management, epidemic prediction and control and selected vector control. Cross cutting strategies were, however, mentioned only at the Federal level. The vector control measures (sub strategies) mentioned by all were indoor residual spray, insecticide treated nets and environmental management. They are being used in an integrated manner. Net distribution started in the zone, in a larger scale two years back. Only selected houses on the basis of nearness to breeding sites were sprayed. The main reason was the cost of DDT. Environmental control measures were also conduced by the Wereda Health Desk and the community.

There is no clear prioritization among the vector control methods. At the wereda and zone level, however, nets were said to be better since they are cheaper compared to indoor spray. Yet the actual cost of nets was unknown by all respondents, except the one at the Federal level. He stated that the currently available long lasting nets cost $5.

At the Federal Ministry level, general strategy for distribution and use of ITNs is prepared to be used at all levels. Distribution channels are both private and public sectors. In the private sector, foreign companies supply nets. The government supports this through tax exemption. In the public sector, at the Federal level, the amount of nets a region has to get is decided and supplied accordingly. The Region does the same for the zones and weredas. For the past few years, UNICEF had been the main supplier of nets. But currently the Global Fund is assuming the

lion's share. It supplied 1.2 million nets this year alone and is expected to double this figure in the coming. Nets obtained from the UNICEF were being sold in order to sustain the supply through a revolving fund and avoid dependency. But both at the Federal and Regional level, there is a shift of strategy to supply nets for free, at least in rural areas. Reasons are, inability of people to pay the 18 Birr (cost of one net) and the desire to achieve a high coverage. But the practical procedure of distributing nets at the wereda and zonal level were not clear. When the epidemic worsened, the idea of selling was changed to free distribution in the study area. In some others, selling remained the sole means of distributing. In weredas where nets were sold, the money was deposited in the account opened for the revolving fund. However it was not collected to supply another round of nets as promised by UNICEF Ethiopia. As stated by the expert, at the zonal level there were no clear guidelines on how to distribute nets. But the respondent at the wereda level got training on how to distribute and promote proper use of nets.

Eight thousand nets have been distributed in the wereda in the past Ethiopian year. One thousand and five hundred of those in Serbo Town. None have been distributed in the study year. At the zonal level, 14,500 nets have been distributed, mainly to resettlement areas. At regional and federal level it was said that large number of nets are expected to be distributed in the near future. The major stake holders like the Global Fund are committing themselves to do so.

When it comes to appropriateness of nets at the practical housing condition of Ethiopia, all respondents said that they can be used. The Wereda level Manager mentioned the presence of smoking as a problem, but not as grave enough to prohibit use. Details of living conditions, like sleeping places, condition of floor, crowding, possibility of animals sharing rooms and others

were not mentioned. The need for better IEC was emphasized at wereda, zonal and regional level.

At the Wereda level it was recognized that there were a number of malpractices like not using the provided nets at all, using it for other purposes and others. They were attributed to the poor IEC and urgency at the beginning of distribution due to the epidemic. Some of the malpractices were also mentioned by the expert at the zonal level. The head of the Regional Malaria Control Program claimed that "there might be malpractices", but did not mention them. Even lesser information was given at the federal level on specific malpractices. But it was mentioned that utilization (sleeping under a net the previous night) varied between 10 and 64% from one area to another.

According to the respondents of the interviews no studies were conducted or results of studies found at wereda, zonal and regional levels. Yet there has been a study in different weredas of the Jimma Zone, on areas of resettlement, by UNICEF Ethiopia. But the result was not submitted. At the federal level ,UNICEF had submitted a summary of the above mentioned finding and Net Mark has submitted full report on a KAP study.

Practical lifespan of nets was not known with certainty, but by all it is agreed that it is shorter than the expected 4 to 5 years, particularly in rural areas. The expert at the federal team estimated that the average lifespan would be about two years. He did not also believe that there might still be groups waiting for re treatment, as the nets would be worn out.

Nets were unaffordable, even at a price of 18 Birr. This applies particularly to the rural areas . Mainly for this reason free distribution was voted for future action in rural areas.Urban areas are supposed to be supplied by the private sector.

Things that have to be done in the future were expressed. At wereda level proper health education and availing of tabs for re treatment were mentioned. A Zonal level the need for clear guideline on how to handle distribution and related issues of availing permanently treated nets, addressing the issue of affordability and proper use of the revolving fund by UNICEF Ethiopia were mentioned. Some of the concerns were already addressed as distribution will be free and nets will be permanently treated. At Regional level things that were thought of as deserving improvement were increased and sustainable supply of nets, capacity building activities(training personnel), conducting studies and better IEC activities. At Federal level better use by individuals and more effort by government and other bodies to avail nets were emphasized.

5. Discussion

Methods of prevention mentioned were: cleaning of the environment, use of mosquito nets and smoke of different plants in that order. This partly differs from the prevailing practice in some African countries. In one study in Kenya, mosquito coils were used by 43% of the households and a third burned cow dung(27). In a study in Burkina Faso, mosquito coils were the most commonly used methods(28). In Ghana, it was believed that mosquito bite can be avoided through use of mosquito nets, burning coils and malaria chips and certain herbs(33).

An average of 5.16 persons per household is similar to the national figure(38). For such size, two mosquito nets per household are required as described by the vector control expert. Therefore, the 0.63 nets per household can be said a low figure. This figure was lower than the finding in other African countries, where the figure for untreated nets was 0.85 nets per household and that for ITNs was 0.25 nets per household(40).

Possession of at least one net was reported by 50.2% of the households. Ever use by young children was, however, 37.6%.The lions share of explaining the discrepancy goes to use of nets for other purposes than primarily intended. The Town was supplied with 1500 nets. This suffices to avail one net per household, irrespective of presence of biologically vulnerable family members. The lower than expected number of nets speaks in favor of unfair distribution and/or selling of nets. Different figures for possession and use had been reported in other areas. Those sited here are the ones other than previous sites of trial, which have very high proportion of possessors due to free distribution for all.

In a study in one municipality in Uganda, 55% of the households studied had at least one mosquito net(24). In a study in Burkina Faso, 49% of respondents reported ownership of at least one mosquito net in the year 2000(25).The 2000-2001 Demographic and Health Survey of Uganda showed that thirteen percent of households in the country possessed at least one net(29). Yet, in the same study only eight percent of children living with their mothers usually sleep under a mosquito net. The explanations given were that children were less likely to use mosquito nets even if available and those who do not share bed with their parents were less likely to do so (29). The latter appears to work for the current study as some of the young children who have younger brothers or sisters did not have the chance to sleep under the net. But another reason had been not using the net for its actual purpose. In 69 surveyed regions in12 countries in Africa, ITNs possession varied between 0.1-25.5%.The corresponding use during the preceding night by children under age of five was 0-16%. Explanation given was that the nets were not enough for the family members (22).

Regarding the condition of nets, 6.2 % of the nets were in package and 5.8% were worn out. Of the total nets considered 15.8% had more than 5 holes. In a study conducted in western Kenya, approximately 30% of the nets already in the households were unused(23). In another study in Kenya, 21% of nets were labeled as worn(21). This goes with the suggestion by the respondent at Federal level, who stated that the practical life span of nets would be around two years. It has been more than 6 months since treatment of nets for 69% of the households. In a study conducted in Kenya, two years have elapsed since treatment for 89% of the nets(21). In a study in Uganda, only 12% reported that nets were impregnated(24). Failure to treat net appears to be a bottleneck

in many African countries. Fortunately, even untreated nets were said to protect against infection provided that they are in good condition (16,21). On the other hand, a large number of nets had holes, which leads to failure in being even physical barriers. This issue is, however, partly addressed as future distribution uses only long lasting nets. But health education to mend holes on nets is almost absent.

Higher ever use by under 6, compared to those aged six and above (39.9Vs 33.4) was in contrast to many experiences in Africa. In Kenya, a 14.5% reduction in probability of adherence was observed in children under the age of five(23). Children were however said to have this higher coverage by virtue of their sleeping with their mothers. This is in congruity with a finding in Uganda where young children sleeping with their mothers had higher chance of net use(29).

Although the reason for failure to own a net was mainly maldistribution, the factor attributable to the individual household was cost. This problem has been faced in other African countries. The fact that purchasing was associated with higher paying jobs was indicative of income as a determinant of acquiring. Prices range from US$ 2 in Rwanda and Malawi(which is similar to that of Ethiopia) to US$ 21 in Burkina Faso(40). Nets had been labeled as too expensive and this reason was mentioned as the main reason for not possession in other studies (32,27,28). In a study in Tanzania, families with high income were almost three times more likely to have a mosquito net than those with low income(31). In a study in highland Kenya, reason for not having a mosquito net was mainly financial. The same study suggested that purchasing ITN for households could be the cost of sending three children to primary school for the year(33). The FGDs in the current study yielded similar result. It was found that the cost of ITNs, or their

market price for a seller (after getting for free) was a one month expense for a family's food. Trial to sell nets would better be conducted in times when there is better income in the year.

Independent predictors of purchasing had been possession of a radio, being knowledgeable and occupation of the head. This partly goes in harmony with a study in Uganda(24). In this study predictors were; ownership of a television, being skilled worker, professional or owning major business and having better health belief(24). Such variables point towards knowledge and socioeconomic status as major factors. The result of the qualitative result strengthens this. In a demographic and health survey in Uganda, the proportion of households in the higher 20% of wealth index quintile used mosquito nets as compared to the lowest 20%(29). In Gambia, it was seen that child net use and proportion of nets that are in good condition increased with income status of the households(16).

Predictors of ever use slightly differed from that of purchasing. Having better paying occupation like trade and government employment was not among the predictors, as nets were partly distributed for free. This strengthens the assumption that better income is represented by the above mentioned occupations. Of particular interest among predictors of net use were having less than two persons per room and possession of bed. When we combine this result with the two qualitative results a clearer picture immerges. Nets were said to be unsuitable for a large family by some FGD participants. In addition, the Zonal Level expert observed in resettlement areas that the houses of farmers are not big enough to spread two nets. The role of beds is elaborated quiet well in the FGDs.

Unlike the result of the current study, presence of a bed has not been found in other literatures as a determinant factor. Possible explanation being most of the houses, even rural, where the cited studies were conducted had beds. Person per room as well was not mentioned as determinant. An exception is a study in Kenya where sleeping arrangement for children in living rooms and kitchens required daily commitment to mount and dismount nets, which was tedious (30).

The reality of parents getting priority over the use of a bed (if present) is similar to a prior observation in Kenya(30). This has implication in mosquito net use as a young child would be displaced from a bed, where there is better chance of net use, in favor of a younger child. Such practice was also witnessed in the above mentioned Kenyan experience(30).

Health beliefs pertaining to transmission of malaria are important for preventive services. Favorable beliefs were important in predicting use of mosquito nets. People who used nets were more likely to believe that malaria is transmitted by mosquitoes and could be cured by modern medicine (24). The fact that explanation given to malaria causation are naturalistic is in contrary to some findings elsewhere in Africa where supernatural causes are implicated. This is a favorable point for better practice(28). In a study in Southern Ghana, mosquitoes were incriminated by most respondents as cause of malaria. But heat from scorching sun and any other heat related work, poor eating habit, constipation and others were mentioned by a relative minority(32). In Rural Burkina Faso, although most people mentioned mosquito as transmitter of the malaria, humidity exposure to rain and cold were also mentioned as causative factors(28). When the male heads among Afghan refuges who participated in one study were asked about causes of malaria, 86% stated mosquito bites(19).

Before a trial in western Kenya 47% of mothers stated that getting cold was the sole cause of malaria(27). While participants in all ten FGDs in a study in Kenya cited mosquito as a cause of malaria, this coexisted with traditional beliefs that cold weather and dirty water cause malaria. This may suggest that mosquito nets alone are not enough protection against malaria, and has implications on adherence(30). Coming to this study, similar perception like the above and some additional, like hunger were mentioned. Causes mentioned other than the 'main method' i.e. mosquito bite, appear to be explanations for relapse of *P. vivax* malaria. Existence of such beliefs did not appear to prohibit the majority form taking action against the mosquito in this study.

According to the majority of our respondents, more affected groups were young children and pregnant mothers. This is in contrast to some studies in other African countries(27). Use, however, did not match the belief as some young children did not sleep under the nets. Qualitative data again suggest that priority use is given to the head, protection of the child being mostly by virtue of sleeping habit. In Uganda, relationship between sleeping arrangements and mosquito net use was analyzed from the demographic and health survey(29). The result suggested that the decision at the house hold level is to use mosquito nets primarily for parents. Child protection was simply a co-incidence when the child happens to share a bed with parents. This led the authors to conclude that increasing household nets ownership does not necessarily increase their use by the under fives(29). Adult men were the group who repeatedly used mosquito nets often followed by mothers with young children and elderly persons(28). Households with under five children or with pregnant women did not have a higher use of mosquito net use(24). Presence of mosquito net use by male adults has also been observed in

other sub Saharan African countries(28). Traditionally, adults, by virtue of their age and position as family income earners get priority coverage. The explanation is likely to be economical as well as cultural, as heads are valued and are income generators of the house.

Like the current finding, selling of nets had been observed in other areas. But use for other reasons like curtains appear to be uncommon. There are common reasons however that lead to either or both. Belief in the effectiveness of nets, appears to be behind both activities. There appears to be over expectation of prevention of malaria by the nets. Some expected absolute protection, even for adults. In reality, some who used the nets do develop malaria as infection might occur before going to bed(19). It was found that 10.5% of bites were not prevented and those were mostly before dawn. Potential exposure occurs when people leave the bed to check on noise or urinate. People might not tuck in the net properly when returning(20). Such failure of nets to render the required protection appears to let people sell them or use them for other purposes. Another reason for selling was of course poverty.

Doubting effectiveness of nets in other countries, however, led people to use them combat nuisance rather than avoid nets totally. In a study to monitor community responses to malaria control measures in Nigeria, the proportion of people who perceived that mosquito net prevent malaria(22%) was less than those who believe in its prevention against mosquito bite(96%) (20). In a study done to assess malaria prevention by mosquito nets in Burkina Faso, all respondents were interested in future use of treated nets, since they provide protection against mosquito(87%), only minority (3%) stated better protection against illness(25). In a social

marketing program in Tanzania, the main motivation for use was mosquito nuisance rather than malaria control(34).

Other factors might have also led to such dissatisfaction. One is the presence of *P. vivax* infection in considerable proportion. Where people cannot clearly know the difference between *vivax* and *falciparum* infections, malaria relapse can be taken as a reinfection. In fact most of the studies conducted pertaining to ITNs were in areas where *P. falciparum* infection by and large predominates. Another phenomenon is resistance to the current widely used anti malarial drug (Sulphadoxine Pyrimethamine) which can lead to temporary clinical cure without parasitological clearance. The therapeutic efficacy of SP was studied in 11 sentinel sites in Ethiopia. It showed a mean treatment failure rate of 35.9% on 14 days follow up and 71.8% on 28 days follow up(38). According to a study in Kenya, a total resistance to treatment of 34.9% was found; with 18.5% failing within 14 days and another16.4% between 14 and 28 days after treatment(41).

The fact that all those who purchased nets had beds and that 93.7% of the nets were hanged over a bed was indicative of use of nets mostly over beds. The Result of the qualitative study strengthens this. The reasons for such practice had been the health education given (which said nothing about using over a floor), practical problem of using the nets over floor(as nets easily adhere dust), norm of the area (despising those using it over a floor) and even the name of the net which includes the word 'bed'. This should be a point of concern as many households, particularly in rural areas do not have beds. Fortunately enough, the vector control expert at the Federal level claimed that 'mosquito net' has been a term preferred than 'bed net' for the same

mentioned reason. But this awareness was not reflected by the other three respondents from the Regional, Zonal and Wereda levels respectively.

Distribution efforts were also mentioned as possible contributors to malpractices. Free distribution was said to work in other areas. For example in Kenya a year after free distribution of ITNs, 91% of the nets among sampled households remained in the target homestead(42). In the current study area however, free distribution had led to selling partly due to acquiring excess by some or economical reasons. Yet, this does not to speak against benefits of properly conducted free distribution.

Nets were reported as being valued possession of a household, beyond being means of prevention of disease. In a study in western Kenya, ITNs were possibly viewed as possessions to safeguard rather than a tool to protect against malaria(27). This has a positive outcome in that it can lead households to purchase nets, but yet lead to use by adults and only over a bed. This being one observation, the values of net goes beyond this in the study area. Nets by some appear to be taken as better quality cloth with cheaper or no price.

Living condition was observed as an important point in using the net. In households where there are many people sleeping in the same room, there is smoke for preventive activity or domestic use, floor which is earth and no bed, use of mosquito nets as a preferable means of malaria prevention is questionable. Health Education which linked nets with bed and physical character of the net (green color, easily attaching dust) in the study area added to this difficulty. Taking

into consideration the above points more difficulty is expected in rural areas regarding using nets.

Washing has been a common problem in many setups. But it doesn't appear to be so in the study area. The interval of 8.9 week between successive treatments was most likely due to lack of re treatment as some respondents in he FGDs stated.

Problems as a result of sleeping under a net, like perceived heat or others, were rare. This is in contrast to other findings. In the study conducted in western Kenya main problems while using are related to sleeping arrangement and perceived heat under nets(30). In a study conducted in Ghana, reason for non use in a treated net cluster were warm weather and absence of mosquito nuisance(43). Other problems infrequently mentioned by studies were chemical smell and daily mounting of nets(27). Possible explanation in this study might be the lower temperature compared to the tropical environment of other study sites.

From the in depth interviews, it can be inferred that selection of control measures is unlikely to be under the jurisdiction of federal, regional or zonal authorities. One reason is that nets are entirely donated items. The other could be the recent decentralization which gives the mandate to the weredas. The recently organized woreda level offices appear to have administrative and personnel difficulty to shoulder the responsibility. Focus on capacity building is therefore mandatory. Extent of accountability of organizations is not clear. An organization has supplied nets but failed to ensure retretment. It established revolving fund and could not supply nets according to its own plan.

Future distribution envisages free provision. But lessons from the field indicate that selling, not using at all and use for other purposes are possible results of poorly conducted free distribution. Possibility of such problems should be borne in the minds of the stakeholders. Caution has to be taken to avert them; mainly through health education and efficient distribution.

Compared to other preventive measures like insecticide residual spray, mosquito net use demands a considerable effort from the target users. The observed beliefs and practices are unlikely to be explained as natural responses to a diffusion of a new innovation. The practical living condition of people deserves to be considered prior to voting for this method.

The health belief model can be used to explain the observed behavior, as the model is used to explain similar preventive behaviors. There does not appear to be a significant problem in perceiving susceptibility and severity. Constructs that appear to be bottlenecks appear to be perceived benefit, perceived barriers and cues to action.

6 Strengths and Limitations of the study

Strengths

The study addressed an area worth being elaborated currently. This is because the different stakeholders in the prevention of malaria aim to markedly increase distribution of nets.

The use of qualitative methods helps to clearly understand the situation from the perspective of the respondents.

Inspection of nets, rather than rely on verbal response helped to refine the information

Limitations

The cross sectional nature of the study by itself might have masked the relationship between some variables and outcomes. For example people might have acquired better knowledge because they were provided with the nets rather than the vice versa.

The use of nets during the peak transmission season could not be assessed due to logistic problems. Ever sleeping was used as an approximation.

It was observed that people were not comfortable to admit selling a net. Use as curtain was recorded when respondents claim doing so. Taking into consideration the above facts and the result of the FGDs , there might be underestimation of the above practices.

Due to possible disappointment and anticipated deliberate misinformation that might be given in assessing income, it was not directly asked. Rather classification of occupation of heads into better paying jobs as government employment and trade and other jobs was done.

7 Conclusions and recommendations

Conclusions

- Not all nets distributed to households are used for malaria or insect nuisance prevention.
- Reasons for such behavior were diverse, i.e. economical, housing condition, health belief, organizational effort and possibly biological.
- young children had better protection compared to other age groups. Yet this is a result of sleeping arrangement than proper health belief .
- Organizational effort to retreat, promote proper use and maintain the existing nets is insufficient.
- the practical life span of nets might be shorter than desired.

Recommendations

- Selection of malaria control measures including that of nets should take into consideration local situation like income, crowding, sleeping areas and others.
- Once chosen as methods of prevention mosquito net distribution should have proper guideline and local capacities for doing so should be strengthened. Distribution time should also take into consideration seasonal variation in income.
- Health education should be provided on continuous and when possible on house to house basis rather than as a one time activity.
- Education messages should focus on need for prioritizing young children, possible use over sleeping floors, mending holes on nets using local material and others.
- Color and design of nets should take into consideration housing condition (like dust and smoke), sleeping areas(as it is the lower edges of nets which adheres dust) and the trend of using for other purposes.

- Well designed studies should be conducted to address different issues of use of ITNs in a larger scale, their preference as compared to other control measures, and the role of relapse and drug resistance.

Annex 1-References

1) Nahlen B, Clarc J, Alnwick D. Insecticide treated mosquito nets. American Journal of Tropical Medicine and Hygiene.2003;68(4):1-5

2) UNICEF. Malaria, a major cause of child death and poverty in Africa. 2004

3) Newman R, Hailemariam A, Jimma D, Degifie A, Kebede D ,Rietveld A, et al. Burden of malaria during pregnancy in areas of stable and unstable transmission in Ethiopia during a nonepidemic year. The Journal of Infectious Diseases. 2003;187:1765-72.

4) Simon J, Larson B, Zusman A, Rosen S. How will reduction of tariff and taxes on insecticide-treated mosquito nets affect household purchases. Bulletin of the World Health Organization .2000; 80(11): 892-899

5) Federal democratic republic of Ethiopia. Ministry of Health .Malaria Diagnosis and treatment Guideline for Health Workers in Ethiopia. July 2004.

6) Ministry of Health .Federal Democratic Republic of Ethiopia. Insecticide Treated Nets (ITNs) National Strategic Plan for Going to Scale With Coverage and Utilization of in Ethiopia, 2004 – 2007. August 2004

7) Deressa W, Chibsa S, Olana D. The Distribution and Magnitude of Malaria in Oromia ,Ethiopia. Ethiopian Journal of Health Development.2004; 18(3): 164-70

8) Deressa W, Chibsa S, Olana D. Magnitude of Malaria admissions and deaths at hospitals and health centers in Oromia ,Ethiopia. Ethiopian Medical Journal.2004 ;42 :237-46

9) Federal democratic republic of Ethiopia. Ministry of Health. Malaria Control Profile. March 2000.

10) Roozendaal A. Vector control methods for use by individuals and communities.WHO.1997.

11) Malaria and Other Vector – borne Diseases Prevention and Control Team. Disease Prevention

& Control Department Ministry of Health. Guideline for malaria vector control in Ethiopia. March 2002

12) Manga L, Bagayako M, Ameneshewa b, Faye o, Govere J, Fondjo E ,Basimike M, Silah J, Tewolde G. Mass mosquito net impregnation campaigns: An effective way to increase net reimpregnation rates. Communicable disease bulletin for the African region.2(1):1-3

13) www.rbm.who.int. Roll Back Malaria. March 2002.

14) Nahlen B, Clark J, Alnwick D. Insecticide treated mosquito nets. American Journal of Tropical Medicine and Hygiene. 2003;68 (4 suppl): 1-2

15) Curtis C, Mnzava A. Comparison of house spraying and insecticide-treated nets for malaria control. Bulletin of the World Health Organization .2000;78(12):1389-1399

16) Clarke S, Bogh C ,Brown R, Pinder M, Walraven G, Lindsay S. Do untreated bed nets protect against malaria? Transactions of the Royal Society of Tropical Medicine and Hygiene. 2001 ;95:457-62

17) Dallo D, Cousens S, Cuzin-Ouattara N, Nebie I, Ilboudo-sanogo E, Esposito F. Child mortality in a west African population protected with insecticide treated curtains for a period of up to 6 years. Bulletin of the World Health Organization .2004;82(2):85-91.

18) Philips-Howard P, Nahlen B, Kolczac M, Hightower A ,Ter Kuile F, Alaii J, et al. Efficacy of permethrin treated mosquito nets in the prevention of mortality in young children in an area of high perennial malaria transmission in western Kenya. American Journal of Tropical Medicine and Hygiene. 2003;68 (4 suppl): 23-29

19) Rowland M, Bouma M, Ducornez D, Durrani , Rozendaal J, Schapira A ,Sondorp E. Pyrethroid impregnated mosquito nets for personal protection against malaria for Afghan refugees. Transactions of the Royal Society of Tropical Medicine and Hygiene.1996;90:357-361

20) Brieger W, Onyido A, Sexton J, Ezike V, Berman J, Ekanem O. Monitoring community response to malaria control using insecticide-impregnated mosquito nets , curtains and residual spray at Nsukka, Nigeria. Health Education Research ,Theory and Practice.1996;11(2):133-45

21) Mwani T, Ross A, Marsh K, Snow W. The effects of untreated mosquito nets on malaria infection and morbidity on the Kenyan coast. Transaction of The Royal Society of Tropical Medicine and Hygiene. 2003;97:369-72

22) Korenromp E, Miller J, Cibulskis R , Cham M, Alnwick D, Dye C. Monitoring mosquito net coverage for malaria control in Africa: possession vs. use by children under five years. Tropical Medicine and International Health. 2003;8(8):693-703

23) Alaii J, Hawley W, Kolczac M , Ter Kuile F, Gimnig J, Vulule J ,et al. Factors affecting use of permethrin–treated mosquito nets during a randomized controlled trial western Kenya. American Journal of Tropical Medicine and Hygiene.2003;68 (4 suppl): 149-60

24) Nuwaha F. Factors affecting the use of mosquito nets in Mbarara municipality of western Uganda. American Journal of Tropical Medicine and Hygiene.2001;65(6): 877-82

25) Kroeger A, Gonzalez M, Gonzalez J. Insecticide-treated materials for malaria control in Latin America: to use or not to use? Transactions of the Royal Society of Tropical Medicine and Hygiene.1999;93:565-70.

26) Krooger A, Mayer R, Mancheno M, Gonzalez M, Pesse k. Operational aspect of mosquito net impregnation for community-based malaria control in Nicaragua, Ecuador, Peru and Colombia. Tropical Medicine and International Health.1997;2(6):589-602

27) Alaii J, Van Den Borne H, Kuchur P, Hawley W, Mwenesi H , Vulule J ,et al. Perception of mosquito nets and malaria prevention before and after a randomized controlled trial of permethrin –treated mosquito nets in western Kenya. American Journal of Tropical

Medicine and Hygiene. 2003;68: 42-148

28) Okrah J, Traore C, Pale A, Sommerfeld J, Muller O. Community factors associated with malaria prevention by mosquito nets: an exploratory study in rural Burkina Faso. Tropical Medicine and International Health. 2002;7(3):240-48.

29) Mugisha F , Arinaitwe J. Sleeping arrangement and mosquito net use among under fives. Results from the Ugandan demographic and health survey. Malaria Journal. 2003; 2(1):40-4

30) Alaii J, Van Den Borne H, Kuchur P, Shelley K, Mwenesi H, Vulule J ,et al. Community reactions to the introduction of permethrin-treated mosquito nets for malaria control during a randomized controlled trial in northern Kenya . American Journal of Tropical Medicine and Hygiene. 2003;68(4):128-36.

31) Abdulla S, Armstrong S, Nathan R, Mukasa O, Marchant T, Smith T, Tanner M, Ledger C. Impact on malaria morbidity of a program supplying insecticide treated nets in children aged under 2 years in Tanzania : community cross sectional study. British Medical Journal.2001;332 (7281):270-273

32) Ahorlu C, Dunyo S, Afari E, Koram K, Nkrumah F. Malaria related beliefs and behavior in southern Ghana: implications for treatment, prevention and control. Tropical Medicine and International Health.1997;2(5):488-499.

33) Guyatt H, Ochola S, Snow R. Too poor to pay: charging for insecticide-treated mosquito nets in highland Kenya. Tropical Medicine and International Health.2002;7(10):846-52

34) Schellenber A, Abdulla S, Minja H, Nathan R, Mukassa O, Marchant T, et.al**.** KINET:A social marketing program of treated nets and net treatment for malaria control in Tanzania, with evaluation of child health and long-term survival. Transactions of the Royal Society of Tropical Medicine and Hygiene.1999;93:225-231.

35) Alten B., Caglar S, Simsec F, Kaynas S. Effect of insecticide –treated mosquito nets for malaria control in southeast Antonelia-Turkey. Journal of Vector Ecology. June 2003. 97-107

36) Malaria control department. Regional health bureau ,Tigray, Ethiopia. The community based malaria control program in Tigray, North Ethiopia

37) Deressa W, Ali A, Enquosellassie F. Knowlede attitude and practice about malaria ,the mosquito and antimalarial drugs in a rural community. Ethiopian Journal of Health Development.2003;17(2):99-104

38) Federal Democratic Republic of Ethiopia. Central Statistical Authority. The 1994 population and housing census of Ethiopia. April 1996.

39) Ogojo F. Knowledge attitude and practice related to malaria and insecticide treated nets in Uganda. www.cmsproject.com. 2001

40) Cham K. Report of the third meeting of the technical support network. Insecticide-treated netting materials. Roll Back Malaria. http://www.rbm.who.int/

41) Ogutu B, Smoak B, Mbori-Ngacha D, Nduati R, Mwathe F, Shanks G . The efficacy of pyrimethamine sulfadoxine (Fansidar) in the treatment of uncomplicated Plasmodium falciparum malaria in Kenyan children. Transactions of the Royal Society of Tropical Medicine and Hygiene. 2000; 94,83-84.

42) Guyatt H, Ochala S. Use of mosquito nets given free for pregnant women in Kenya. The Lancet.2003;362(8):1549-50

43) Browne E., Maude G, Binka F. The impact of insecticide-treated mosquito nets on malaria and anemia in pregnancy in Kassena-Nankana district ,Ghana: a randomized controlled trial. Tropical Medicine and International Health.2001;6(9):667-676.

Annex 2- Questionnaire (English version)

Questionnaire no.....

House number.....

AAU Department of Community Health

Utilization of Mosquito Nets and Factors Affecting it in Serbo Town

Hello, my name is..... . I am one of the data collectors on the study with the above topic. I would like you to cooperate in answering the questions that follow. The information you will provide contributes to measures that are taken to control malaria Any information you provide will be confidential. You have the right to not to participate in the study.

Name of Interviewer: _____ Date: _ _/_ _/_ _
Start time: _ _/_ _ End time: _ _/_ _

Interviewer agreement

'I certify that I have filled this questionnaire in accordance with the training I was given and instructions stated in it. I have confirmed that the information in it is correct.'

Signed_____ Date_____

1) General information on individuals who are currently members of the household and their use of ITNs

ser.no (put the respondent first)	age in years	sex 1-male 2-female	occupation (1*)	educational status(2*)	relationship to head of household 3*	Had febrile illness which was assumed to be malaria in the past two months 1-yes, 2-no	ever slept under a net 1-yes, 2-no	Slept under a net the previous night 1-yes, 2-no
1.								
2.								
3.								
4.								
5.								
6.								
7.								
8.								
9.								
10.								
11.								
12.								

Status of the respondent_____

1* occupation (For those greater than 18 years of age)

government employee	1
merchant	2
Farmer	3
Student	4
employee (private sector)	5
house wife	6
Daily laborer	7
Has no job	8
other, specify	9

2* Educational status (for those older than 7 years)

can't read and write	1.
read and write	2.
grade 1-4	3.
grade 5-10	4.
grade 10-12	5.
10+1 up to 10+3	6.
Tertiary level	7.

3*relationship to head of household

Spouse	1.
daughter/ son	2.
sister/ brother	3.
Cousin	4.
other , specify	5.

2. Do you or anyone in your household own a functioning radio currently?

Yes	1
No	2

3. Do you or anyone in your household own a functioning Television currently?

Yes	1
No	2

4. What main symptom of malaria are you aware of? (Circle only one answer) (do not read options)
5. What other symptoms of malaria are you aware of? (Multiple responses possible)

4. Main symptom (One answer only) 5. Other symptoms (Multiple answers possible)

Fever	1.	Fever	1.
Chills	2.	chills	2.
Rigor	3.	rigor	3.
Headache	4.	Headache	4.
Vomiting	5.	Vomiting	5.
body weakness	6.	body weakness	6.
Loss of appetite	7.	Loss of appetite	7.
Body pain/joint pain	8.	Body pain/joint pain	8
Eyes become yellow	9.	Eyes become yellow	9
Don t know	10.	Don t know	10
Other (specify)	11.	Other (specify)	11

6. Which categories/groups of people are most affected by malaria? (only one answer)
(Read the options before the response)

Adults	1
Children	2
Elderly people	3
Pregnant women	4
young people	5
all are equally affected	6
Other (please specify)	7

7. What is the main cause for malaria you know of?

.....

8. Are there any other ways you can get the disease?(if any)

.....

7. Main cause (one answer only) 8. Other ways (multiple answers possible)

Working in the sun	1.	Working in the sun	1.
being in the rain	2.	being in the rain	2.
getting cold	3.	getting cold	3.
drinking dirty water	4.	drinking dirty water	4.
Living near collected water	5.	Living near collected water	5.
another person with malaria	6.	another person with malaria	6.
being bitten by mosquitoes	7.	being bitten by mosquitoes	7.
Don t know	8.	Don t know	8.
Other (please specify)	9.	No other way	9.
		Other (please specify	10.

9. Have you seen or heard any education messages pertaining to malaria from any source in the past one year?

Yes	1
No	2

10. If yes where did you see or hear these education messages from? (Multiple responses possible)

Radio	1
TV	2
News paper/magazine	3
Posters/notices	4
Friends	5
Parents	6
Health workers	7
Government officials	8
Church/mosque	9
School	10
Other (please specify)	11

11. What is the most important thing you do in your household to prevent getting malaria (if any)?
12. What other things, if any, do you do to prevent malaria? (Multiple responses possible)

11. Most important thing		12.Other things done,	
Use a bed net	1.	Use a bed net	1.
Take tablets	2.	Take tablets	2.
Use insecticide sprays	3.	Use insecticide sprays	3.
Close the doors and windows at night	4.	Close the doors and windows at night	4.
Use traditional plants	5.	Use traditional plants	5.
Use curtains	6.	Use curtains	6.
Keep the house and surrounds clean	7.	Keep the house and surrounds clean	7.
Lighting fire in the house	8.	Keep the house and surrounds clean	8.
burning thins to make smoke	9.	burning thins to make smoke	9.
Clearing collected water	10.	Clearing collected water	10.
Nothing	11.	Nothing	11.
Other (please specify)	12.	Other (please specify)	12.

13. How many rooms do you have in your house (not including the toilet/bathroom and kitchen?
.....
14 How many beds do you have in your home?
.....
15. How many sleeping mats do you have in your home?
.....
16. How many people in your home usually sleep on beds(if any)?
.....
17. How many people in your home usually sleep on mat(if any)?
.....
18. Have you seen or heard any education messages about bed nets/mosquito nets from any source?

Yes	1
No	2

19. If yes where did you see or hear these education messages from? (Multiple responses possible)

Radio	1
TV	2
News paper/magazine	3
Posters/notices	4
Friends	5
Parents	6
Health workers	7
Government officials	8
Church/mosque	9
School	10
Other (please specify)	11

20. Do you have a bed net in the household currently?

Yes	1
No	2

21. If yes, how many?

.....

22. Has the net (have the nets) been used in the previous two months?

Yes	1
No	2

23. If yes, how many?

.....

24. If you have no bed net what is the reason? (Multiple responses possible)

Bed nets are too expensive	1.
Bed nets do not protect against malaria	2.
Bed nets are not available	3.
I am not interested in putting them on every bed	4.
I don t know how to fit the net on all the beds	5.
Only children need nets	6.
Only adults need nets	7.
Don t know	8.
Other (please specify)	9.

25. Is there any net (if any) that was not used in the past two months?

Yes	1
No	2

26. If yes, how many?

.....

27. If yes what was the reason?

nets do not prevent against malaria	1.
the bed net was not treated with chemicals	2.
It is too hot sleeping in a net	3.
don t get bothered by mosquitoes	4.

it was not a malaria transmission season	5.
bed nets are not suitable for use	6.
Don t know	7.
Other (please specify)	8.

28. Can someone have malarial attack while sleeping under a net?

Yes	1
No	2
I don't know	3

29. If yes how common are such episodes?

Less than the non user	1.
Equal to the non user	2.
More than the non user	3.
I don't know	4.

30. For how long have you had bed nets in this house? (The oldest net if more than one)
.....

31. How did you obtain your bed net(s)? (if more than one net, respond about the oldest one)

It was/they were given to me for free	1
I bought it/them	2
I can t remember	3
Other, specify	4

32. Have any of your bed nets ever been washed?

Yes	1
No	2

33. If yes how often did you wash your bed net(s)(the highest frequency if more than one net was washed)?

Every .....day
.....week
.....month
.....year

34. Do you think bed nets have any benefit?

Yes	1
No	2
I don't know	3

35. If yes what do you think are the benefits of sleeping under a bed net? (Multiple responses possible).

Don t get bitten by mosquitoes	1
Don t get malaria	2
Don t get bothered by other insects	3
It is warmer	4
Other: (please specify)	5

36. Do you think there are problems associated with sleeping under a bed net?

Yes	1
No	2
I don't know	3

37. If yes what are they? (Multiple responses possible)

It is too hot sleeping under a net	1
Mosquitoes can still bite through the net	2
It is difficult if you want to get up in the night	3
It takes time to tuck the net each night	4
There is not enough air	5
Other, specify	6

38. Have you ever heard about bed nets treated with insecticide?

Yes	1
No	2

39. What do you think is the reason for treating bed nets? (Multiple responses possible)

To kill mosquitoes	1
To make the net stronger	2
To repel mosquitoes	3
I don't know	4
Other (specify)	5

40. Do bed nets have to be re-treated?

Yes	1
No	2
I don't know	3

41. If yes after how long do nets have to be re-treated?
Every ____Months
Every ____years
Don t know.

42. Are any of your bed nets treated with insecticide?

Yes	1
No	2

43. If yes, How many.
.....

44. How long has it been since your bed net/s have last been treated? (If there are more than one net mention abut the recently treated one.)

3 months	1
3-6 months	2
>6 months	3

> a year	4
I don't know	5

This is the end of the interview. Thank you very much for participating in this research

Annex 3 –Questionnaire (Amharic version)

የመጠየቂያ ቁጥር----------

የቤት ቁጥር----------

አ.አ.ዩ. የህብረተሰብ ጤና ትምህርት ክፍል

በሰርቦ ከተማ የአልጋ አጎበር አጠቃቀምና ይህንንም የሚወስኑ ነገሮች

ጤና ይስጥልኝ ስሜ ---------- ይባላል። ይህ "በሰርቦ ከተማ የአልጋ አጎበር አጠቃቀምና ይህንንም የሚወስኑ ነገሮች" በሚል ርእስ የሚካሄድ ጥናት ሲሆን እኔም የጥናቱ የመረጃ ሰብሳቢ ነኝ። ከዚህ በመቀጠል ያሉትን ጥያቄዎች በመመለስ ትብብር እንዲያደርጉልኝ በትህትና እጠይቆታለሁ። የሚሰጡት ምላሽ ወባን ለመካላከል በሚደረገው ጥረት ውስጥ ገንቢ የሆነ አስተዋጽኦ ያደርጋል።ማንኛውም እርሶ የሚሰጡት አስተያየት ለሌላ ሰው አይነገርም።በራሥ ተነሣሽነት ከሚሰጡት ፈቃድ ውጭ በአዚህ ጥናት የመሳተፍ ግዴታ የለብዎትም።

የጠያቂ ስም---------- ቀን ----------
መጠይቁ የተጀመረበት ሰዓት ---------- ደቂቃ --------- ያለቀበት ሰዓት ------- ደቂቃ ----------
-

የጠያቂው ቃል

ይህንን መጠየቂያ በላዩ ላይ በተጻፈው መመሪያና ጥያቄ እንዲሁም በተሰጠኝ ስልጠና መሰረት ሞልቻለሁ። በላዩም ላይ የሰፈረው መረጃ ትክክለኛ መሆኑን አረጋግጣለሁ።

ፊርማ ---------- ቀን----------

አጠቃላይ መረጃ- በአሁኑ ሰአት የቤተሰቡ አባላት የሆኑ ሰዎች ዝርዝር እና የአልጋ አጎበር አጠቃቀም ሁኔታ

ተራ ቁጥር	እድሜ (በአመት)	ጾታ 1 ወንድ 2 ሴት	ስራ (1÷)	የት/ደረጃ (2÷)	ከቤቱ አስተዳዳሪ ጋር ያለው ግንኙነት(3÷)	ባለፈው 2 ወሮች ወባ ነው ብለው ባመኑት ህመም ተይዘው ነበረ? 1 አዎን 2 አልተያዙም	በአጎበር ተጠቅመው አድረው ያውቃሉ? 1 ያውቃሉ 2 አያዉቁም	ባለፈው ሌሊት በአጎበር ተጠቅመው አድረዋል? 1 አዎን 2 አላደሩም
1.								
2.								
3.								
4.								
5.								
6.								
7.								
8.								
9.								
10								
11								
12								

የመላሹ ማንነት----------

መላሹ በተራ ቁጥር አንድ ላይ ይስፈሩ

1፥ ስራ
ከ18 ዓመት በላይ ለሆኑ

የመንስት ተቀጣሪ	1
ገበሬ	2
ነጋዴ	3
ተማሪ	4
የግል ተቀጣሪ	5
የቤት እመቤት	6
የቀን ሰራተኛ (የጉልበት ሰራተኛ)	7
ስራ አጥ	8
ሌላ። ይገለጽ	9

2፥ የትምህርት ደደረጃ
ከ 7 ዓመት በላይ ለሆኑ

ማንበብና መጻፍ የማይችሉ	1.
ማንበብና መጻፍ ብቻየሚችሉ	2.
ከ1ኛ - 4ኛ ክፍል	3.
ከ5ኛ - 10ኛ ክፍል	4.
ከ10ኛ - 12ኛ ክፍል	5.
ከ10+1 እሰከ 10+3	6.
ከፍተኛ ትምህርት	7.

3፥ ከቤቱ አስተዳዳሪ ጋር ያለው ግንኙነት

ባለቤት	1
ልጅ	2
እህት/ ወንድም	3
የወንድም/የእህት ልጅ	4
ሌላ ። ይገለጽ	5

2 በቤቱ ውስጥ በአሁኑ ጊዜ የሚሰራ ሬዲዮ አለ?

አለ	1
የለም	2

3 በቤቱ ውስጥ በአሁኑ ጊዜ የሚሰራ ቴሌቪዥን አለ?

አለ	1
የለም	2

4 የወባ በሽታ ዋና ምልክቱ ምንድን ነው ? (አንድ መልስ ብቻ ይስጡ)
5. የወባ በሽታ ሌሎች ምልክቶች ምንድን ናቸው? (ከአንድ በላይ መልስ መስጠት ይችላሉ)

4 ዋናው ምልክት		5 ሌሎች ምልክቶች	
ትኩሳት	1.	ትኩሳት	1.
ብርድ ብርድ ማለት	2.	ብርድ ብርድ ማለት	2.
ማንቀጥቀጥ	3.	ማንቀጥቀጥ	3.
የራስ ምታት	4.	የራስ ምታት	4.
ማስመለስ	5.	ማስመለስ	5.
የሰውነት ድካም	6	የሰውነት ድካም	6
የምግብ ፍላጎት መቀነስ	7	የምግብ ፍላጎት መቀነስ	7
መገጣጠሚያ መቆርጠም	8	መገጣጠሚያ መቆርጠም	8
የአይን ቢጫ መሆን	9	የአይን ቢጫ መሆን	9
አላውቅም	10	አላውቅም	10
ሌላ - ይገለጽ	11	ሌላ - ይገለጽ	11

6 በወባ የበለጠ የሚጠቁት የህብረተሰብ ክፍሎች የትኞቹ ናቸው? (አንድ መልስ ብቻ ይስጡ)(በቅድሚያ አማራጩ ለመላሹ ይቅረብላቸው)

አዋቂዎች	1
ህፃናት	2
አረጋዊያን	3
ነፍሰ ጡር ሴቶች	4
አዋቂዎች	5
ሁሉም በእኩል ይጠቃል	6
ሌላ - ይጠቀስ ----------	7

7 የወባ መምጫ ዋና መንገድ ምንድን ነው ? (አንድ መልስ ብቻ ይስጡ)

8 ወባ የሚመጣባቸው ሌሎች መንገዶች ካሉ ቢገልጹልን(ከአንድ በላይ መልስ መስጠት ይችላሉ)

ዋና መንገድ		ሌሎች መንገዶች	
በፀሀይ ላይ መስራት	1	በፀሀይ ላይ መስራት	1
በዝናብ መመታት	2	በዝናብ መመታት	2
በብርድ መመታት	3	በብርድ መመታት	3
ቆሻሻ ውሃ መጠጣት	4	ቆሻሻ ውሃ መጠጣት	4
የተጠራቀመ ውሃ አካባቢ መኖር	5	የተጠራቀመ ውሃ አካባቢ መኖር	5
ሌላ ወባ የያዘውን ሰው መቅረብ	6	ሌላ ወባ የያዘውን ሰው መቅረብ	6
በትንኝ መነደፍ	7	በትንኝ መነደፍ	7
አላውቅም	8	አላውቅም	8
ሌላ - ይጠቀስ----------	9	ሌላ የሚመጣባቸው መንገዶች የሉም	9
		ሌላ - ይጠቀስ----------	10

9 ወባን በተመለከተ ባለፉት 12 ወራት ያገኙት ትምህርት አለ?

አለ	1
የለም	2

10 መልስዎ አለ ከሆነ ትምህርቱን ከየት አገኙት? (ከአንድ በላይ መልስ መስጠት ይቻላል)

ሬዲዎ	1
ቴሌቪዥን	2
ጋዜጣ /መጽሔት	3
በመንድ የተለጠፈ ማስታቂያ	4
ጓደኛ	5
ወላጅ	6
የጤና ባለሙያ	7
የመንግስት ባለስልጣን	8
መስጊድ/ቤተክርስትያን	9
ት/ቤት	10
ሌላ - ይገለጽ ----------	11

11 በቤተሰብዎ ውስጥ በወባ በሽታ ሰው እንዳይታመም የሚያደርጉት ዋነኛ ነገር ካለ ቢነግሩን?

12 በቤተሰብዎ ውስጥ በወባ በሽታ ሰው እንዳይታመም የሚያደርጉት ተጨማሪ ነገር ካለ ቢነግሩን (ከአንድ በላይ መልስ መስጠት ይቻላል)

ዋነና		ተጨማሪ	
ያአልጋ አጎበር መጠቀም	1	ያአልጋ አጎበር መጠቀም	1.
ክኒን መዋጥ	2	ክኒን መዋጥ	2.
የተባይ ማጥፊያ መርጨት	3	የተባይ ማጥፊያ መርጨት	3.
በርና መስኮትን በጊዜ መዝጋት	4	በርና መስኮትን በጊዜ መዝጋት	4.
ስራስርና ተክሎችን መጠቀም	5	ስራስርና ተክሎችን መጠቀም	5.
መጋረጃ መጠቀም	6	መጋረጃ መጠቀም	6.
ቤትንና አካባቢን ማጽዳት	7	ቤትንና አካባቢን ማጽዳት	7.
በቤት ዉስጥ እሳት ማንደድ	8	መቤት ዉስጥ እሳት ማንደድ	8.
ጭስ ማጨስ	9	ጭስ ማጨስ	9.
የተጠራቀመ ውሃ/ረግረግ ማጽዳት	10	የተጠራቀመ ውሃ/ረግረግ ማጽዳት	10.
ምንም አላደርግም	11	ምንም ተጨማሪ ነገር አላደርግም	11.
ሌላ ይገለጽ	12	ሌላ ይገለጽ	12.

13 ቤትዎ ባለስንት ክፍል ነው ? (የመፀዳጃ ቤትና ማብሰያን አይጨምርም)

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14 በቤትዎ ውስጥ ስንት አልጋ አለ?

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15 በቤትዎ ውስጥ ስንት የመተኛ መደብ ወይም መሬት አለ?

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16 በቤትዎ ውስጥ በአልጋ ላይ የሚተኙ ሰዎች ካሉ ቁጥራቸው ምን ያህል ነው ? (ከሌሉ ጥያቄው ይዘለል)

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17 በቤትዎ ውስጥ በመደብ ወይም መሬት ላይ የሚተኙ ሠዎች ካሉ ቁጥራቸውን ስንት ነው ? (ከሌሉ ጥያቄው ይዘለል)

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18 **የወባ መከላከያ አልጋ አጎበሮችን የተመለከተ ትምህርታዊ መረጃ አግኝተው ያውቃሉ** ?

አዎን	1
አይደለም	2

19 **መልስዎ አዎን ከሆነ መረጃውን ያገኙት ከየት ነው** ?
(**ከአንድ በላይ መልስ መስጠት ይችላሉ**)

ሬዲዮ	1.
ቴሌቪዥን	2.
መጽ·ኄት/ጋዜጣ	3.
በመንገድ የተለጠፈ ማስታወቂያ	4.
ጓደኛ	5.
ወላጅ	6.
የጤና ባለሙያ	7.
የመንግስት ባለስልጣን	8.
መስጊድ/ቤተክርስቲያን	9.
ት/ቤት	10.
ሌላ - ይገለጽ----------	11.

20 **በአሁኑ ሰዓት ከቤቶ የአልጋ አጎበር/ሮች አለ/ሉ**?

አለኝ	1
የለኝም	2

21 **ካሎት ስንት ናቸው**? (**የተጠቀሟቸውም/ያልተጠቀሟቸውም**)
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22 **ከላይ ከጠቀሷቸው ውስጥ ባለፈው** 2 **ወራት ዉስጥ በጥቅም ላይ የዋለ አጎበር አለ**?

አለ	1
የለም	2

23 **ካለ/ካሉ ስንት ነው/ናቸው**?
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24 **ምንም አጎበር ከሌለዎ ምክንያቱ ምንድን ነው** ? (**ከአንድ በላይ መልስ መስጠት ይችላሉ**)

አጎበሮች ውድ ናቸው	1
አጎበር ከወባ አይከላከልም	2
አጎበሮች በአካባቢው የሉም	3
ፍላጎቱ የለኝም	4
እንዴት እንደምሰቅላቸው አላውቅም	5
አጎበር ለልጅ ብቻ ነው የሚያስፈልገው	6
አጎበር ለአዋቂ ብቻ ነው የሚያስፈልገው	7
አላውቅም	8
ሌላ - ይገለጽ	9

25 **ባለፈዉ** 2 **ወራት ጥቅም ላይ ያልዋለ የአልጋ አጎበር በቤቱ አለ**?

አለ	1

የለም	2

26 ካሉ ስንት ናቸው?

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27 ካለ ምክንያቱ ምን ነበረ?

አንበር ከወባ አይከላከልም	1.
አንበሩ በመድሀኒት አልተነከረም	2.
በአንበር መጠቀም ሙቀትይፈጥራል	3.
ትንኞች አያስቸግሩም	4.
የወባ መተላለፊያ ወቅት አልነበረም	5.
አንበር ለአሰቃቀል/ለአጠቃቀም አይመችም	6.
ምክንያቱን አላዉቅም	7.
ሌላ ይጠቀስ	8.

28 አንድ ሰው በአልጋ አንበር በአግባቡ እየተጠቀመ በወባ በሽታ ሊያዝ ይችላል?

ይችላል	1
አይችልም	2

29 መልስዎ ሊያዝ ይችላል ከሆነ በምን ያህል ድግግሞሽ?

አንበር ከማይጠቀመው ሰው እኩል	1
አንር ከማይጠቀመው ሰው ያነሰ	2
አንበር ከማይጠቀመው ሰው የበለጠ	3
አላውቅም	4

30 የአልጋ አንበር ወደቤትዎ ካመጡ ስንት ጊዜዎ ነው ? (ከአንድ በላይ አንበር ካለ ለረጅም ጊዜ ስለቆየው ይንገሩን)

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31 የአልጋ አንበር ያገኙት እንዴት ነው (ከአንድ በላይ አንበር ካለ ለጅም ጊዜ ስለቆየው ይንገሩን)

በነጻ ተሰጥቶኝ	1
ገዝቼ	2
አላዉቅም	3
ሌላ - ይገለጽ	4

32 በእርሶ ቤት ያለ የአልጋ አንበር ታጥቦ ያውቃል ?

አዎን ያውቃል	1
ታጥቦ አያውቅም	2

33 ታጥቦ የሚያውቅ ከሆነ በየስንት ጊዜው ይታጠባል? (ከአንድ በላይ አንበር ካለ በተደጋጋሚ ስለታጠበው ይንገሩን)

በየ----------ቀናት

----------ሳምንት

----------ወራት

34 በእርሶ አመለካከት የአልጋ አጎበሮች ጥቅም አላቸው?

አላቸው	1
የላቸውም	2
አላዉቅም	3

35 ጥቅም አላቸው የሚሉ ከሆነ ጥቅማቸው ምንድን ነው/ ናቸው ? (ከአንድ በላይ መልስ መስጠት ይችላሉ)

በወባ ትንኝ አለመነደፍ	1
በወባ አለመያዝ	2
በሌሎች ትንኞች አለመቸገር	3
ከምሽቱ ብርድ መከላከል	4
ሌላ - ይገለጽ	5

36 ባልጋ አጎበር ከመጠቀም የሚመጡ ችግሮች አሉ?

አዎን	1
የሉም	2
አላዉቅም	3

37 ችግሮች ያሉ ከመሰሉት ችግሮቹን ቢነግሩን (ከአንድ በላይ መልስ መስጠት ይችላሉ)

አጎበሮች ሙቀት ስለሚፈጥሩ አይመቹም	1
የወባ ትንኞች አጎበሩ ቢኖርም ይነክሳሉ	2
በለሊት መነሳት ሲፈለግ ይከብዳል	3
በየእለቱ አጎበሩን ማስተካከል ይከብዳል	4
አጎበር ሲጠቀሙ በቂ አየር ማግኘት ይከብዳል	5
ሌላ ይገለጽ	6

38 በመዳኒት የሚነከሩ የአልጋ አጎበሮች እንዳሉ ያውቃሉ ?

አውቃለሁ	1
አላውቅም	2

39 የአልጋ አጎበሮችን በመድሀኒት መንከር ያስፈለገው ለምን ይመስሎታል? (ከአንድ በላይ መልስ መስጠት ይቻላል)

ትንኞችን ለመግደል	1
አጎበሩን ጠንካራ ለማድረግ	2
ትንኞችን ለማባረር	3
አላውቅም	4
ሌላ ይገለጽ	5

40 የአልጋ አጎበሮች አንዴ በመድሐኒት ከተነከሩ በኋላ በሌላ ጊዜ ተደግሞ መነከር አለባቸው?

አዎነ አለባቸዉ	1.
የለባቸውም	2.

አላውቅም	3.

41 **መነከር አለባቸው ካሉ በየስንት ጊዜ?**

በ የ----------ሳምንት

----------ወራት

----------ዐመት

---------- አላውቅም

42 **እርሥዎ ካሉዎት የአልጋ አጎበሮች በመድሐኒት የተነከረ አለ?**

አዎነ አለ	1
የሉም	2
አላውቅም	3

43 **ካለ/ካሉ ስንት ነው/ናቸው?**

----

44 **የአልጋ አጎበሮችዎ በመድሐኒት የተነከሩ ምን ይህል ጊዜ ሆነ?(ከአንድ በላይ አጎበር ካለ በቅርብ ጊዜ ስለተነከረዉ ይንገሩን)**

ከ 3 ወር በታች	1
ከ 3 እስከ 6 ወር	2
ከ 6 ወር 1 አመት	3
ከ 1 አመት በላይ	4.
አላዉቅም	5.

መጠይቁ በዚህ ያበቃል። ስለትብብርዎ እናመሰግናለን ።

Annex 4-checklist(English version)

Checklist for inspection of nets

Add checklists if more than one net

(for houses which have at least one bed net)

House number..... bed net No .....

1) The bed net is

.....in the package

.....Is hanged

.....other, specify .....

2 If hanged

.....is on bed

.....is on sleeping floor

.....is on medeb

3)Condition of a net that has ever been used.

a) Any holes on the net

Yes ..... no.....

b) If yes how many.....

c) Size of the largest hole

.....

d) Is there any tear?

Yes no

e) If yes how many

. .....

f) Size of the largest tear

.....cm

4) Any other observation pertaining to the use of the net?

(example cleanliness ,use of the net for other purposes)

.....

Annex 5-checklist(Amharic version)

የአልጋ አጎበርን በሚመለከት የሚሞላ ቅጽ

(ቢያንስ አንድ አጎበር ላለው ቤተሰብ ብቻ)
(ለእያንዳንዱ አጎበር አንድ ቅጽ ይሞላ)

የቤት ቁጥር----------
የአልጋ አጎበር ቁጥር ----------(ከአንድ በላይ አጎበር ካለ ለእያንዳንዱ አጎበር ቁጥር ይሰጥ)

1 የአልጋ አጎበሩ
----------እንደታሸገ ነው
----------ተሰቅሎዋል
----------ሌላ ይገለጽ

---

2 የአልጋ አጎበሩ ከተሰቀለ
---------በአልጋ ላይ ነው
---------በመደብ ላይ ነው
--------በመተኛ መሬት ላይ ነው

3 የአልጋ አጎበሩ ሁኔታ (በጥቅም ላይ ዉሎ ለሚያዉቅ ለማንኛዉም አጎበር)

የአልጋ አጎበሩ የተበሳ ቦታ ወይም ሽንቁር አለው?
አለው ---------- የለውም----------
ካለዉ ብዛታቸው ስንት ነው ?

ካለዉ የትልቁ ሽንቁር ስፋት ምን ያህል ነው ?
----------ሳ.ሜ. በ ----------ሳ.ሜ
እስከ አጎበሩ ጫፍ የሚደርስ ቀዳዳ አለው?
አለው ---------- የለውም----------
ካለዉ ብዛታቸው ስንት ነው ?

ካለዉ የትልቁ ቀዳዳ ርዝመት ምን ያህል ነው ?
----------ሳ.ሜ.

4 የአልጋ አጎበሩን አጠቃቀም በሚመለከት ተጨማሪ የሚስተዋል ነገር ካለ ይጠቀስ (ለምሳሌ ፤ የአጎበሩ ንጽህና፣ ለሌላ አገልግሎት የዋለ አጎበር)

Annex 6- Discussion Points (for focus group discussion)

1. What are the common sleeping areas?
2. Where do parents sleep?
3. Where do children sleep?
4. What are the events that result in change in sleeping place?
5. Is malaria a major problem? Why?
6. What are the measures to prevent malaria?
7. Which malaria prevention measures are practiced in the area?
8. Are bed nets being used to prevent malaria?
9. How was the distribution of bed nets in the area?
10. Describe health education activities pertaining to use of bed nets nets.
11. How do you describe the effort of local health agents ,health professionals and organizations to promote the use of bed nets?
12. How do people use the nets? Is it a proper one?
13. Is it used regularly? Why?
14. Who in the family gets priority in using it? Why?
15. Do people wash the nets? Why?
16. Are there any advantages of sleeping under a net? What are they?
17. Are there problems that arise as a result of sleeping under a net? What are they?
18. Are there barriers to the use of bed nets? (Financial, housing condition etc)
19. Are you aware of insecticide treatment of nets?
20. What is the status of the nets in the town regarding insecticide treatment?
21. Does insecticide treatment have any problem?
22. How do you describe the condition of the nets already in the houses? Are they in good condition?
23. Do you think nets should be used in the future to prevent malaria in your locality?

Annex 7-Discussion points (for the in-depth interview)

1. Magnitude of malaria.
2. Preferred control strategies and the rationale.
3. Appropriateness of ITNs in the Ethiopian/local context (applicability, feasibility sustainability)
4. Studies addressing the above issues.
5. Detail of currently on going activities pertaining to ITNs.
6. Presence and Quality of IEC activities
7. Presence and adequacy of training to health workers.
8. Financial and technical capability of the institutions to sustain supply or nets and retreatment .
9. Presence of timely and proper retreatment and reasons if not.
10. source and methods of distribution of the ITNs.
11. Status of nets that are already in the households.
12. Practical lifespan of nets
13. Points that should be rectified in the future.