

**ADDIS ABABA UNIVERSITY**  
**COLLEGE OF HEALTH SCIENCES**  
**SCHOOL OF PUBLIC HEALTH**

**Assessment of Knowledge, Attitude and Practice on Malaria and  
Its Control strategies in Shashemene Woreda, Oromia Regional State.**

**By: Kedir Gobena ( BSc)**

**A Thesis submitted to the School of Graduate studies of Addis  
Ababa University in partial fulfillment of the Requirements for  
the Degree of Master in Public Health (MPH)**

**Advisor: Dr. Wakgari Deressa (BSc,MPH,PhD)**

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**I**

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**Assessment of Knowledge, Attitude and Practice on malaria and its control among  
community of Shashemene woreda, West Arsi zone, Oromia Regional State, Ethiopia.**

**By :KEDIR GOBENA(BSc)**

**Approved by the Examining Board**

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## **Acronyms**

**AIDS:**Acquired Immune Deficiency Syndrome

**CHWs:**Community Health Workers

**CSA:**Central Statistical Authority

**DDT:**Dichloro-Diphenyl-Trichloroethane

**FGDs:**Focus Group Discussion

**FMOH:**Federal Ministry of Health

**GDP:**Gross Domestic Product

**HSDP:** Health Systems Development Programme

**HEWs:** Health Extension Workers

**IEC:** Information Education and Communication

**IRS:**Indoor Residual Spraying

**ITNs:** Insecticide Treated Nets

**LLIN:** Long Lasting Insecticide Net

**MOH:**Ministry Of Health

**PHC:**Primary Health Care

**RBM:**Roll Back Malaria

**RDTs:** Rapid Diagnostic Tests

**UNICEF:**United Nations Children's Fund

**WHO:**World Health Organization

## Abstracts

**Background:** The burden of malaria in endemic locality is significantly affected by the knowledge, attitude and practice of the community towards utilization of the available control strategies. The accessibility of health facilities with all necessary materials for malaria case treatment, the availability of vector control options may not necessarily bring about the desired reduction in the burden of disease with out communities' knowledge about use of those control strategies.

**Objective:** To assess the knowledge, attitude and practice (KAP) regarding malaria and its control in a rural population of Shashemene Woreda.

**Methods:** The study used a community based cross-sectional household survey that was carried out from October 20, - November 20, 2010, in the rural areas of Shashemene Woreda in West Arsi Zone of Oromia Regional, South Ethiopia. All households in the malarious kebeles of the woreda were randomly selected for the study. Both quantitative and qualitative research methods were used for data collection. A structured questionnaire for collecting socio-demographic and malaria-related information was administered to the head of the household or representative living at least more than six months in that house or any family member with the age greater than 18 years.

**Results:** Of 542 households selected for the study, 529 households participated, yielding a response rate of 97.6%. Most of the respondents (98.9%) were able to mention at least one symptom of malaria. Mosquito as a cause of malaria was recognized by majority of the respondents (72.6%). Most of the households (79.4%) had insecticide-treated net (ITN) with utilization of 52%, the indoor residual spray coverage and re-plastering rate of the sprayed houses were, 85.4% and 17.9% respectively. There was statistically significant association of high malaria knowledge score with educational status (Adjusted OR 0.497, 95% CI 0.297-0.832). In addition adult age group specially 30-40yrs and owning radio at home were significantly associated with treatment seeking behavior with in 24hrs (Adjusted OR: 2.609, 95% CI 1. (1.131-6.019) and OR: 1.810(95% CI 1.014-3.233) respectively. Age group among respondents was observed statistically significant when the dependent variable was the use of

ITN with (Crude OR=3.960, 95%CI 2.237-7.011) for age group <30yrs and also remain statistically significant after adjusting for confounding variables by multi-variate analysis with (Adjusted OR=3.122, 95% CI (1.557-7.6.257). The finding shows utilization of ITNs among younger age groups was almost 4 fold than those who were at old age groups.

**Conclusion:** The findings of this study shows, study community have good knowledge on both malaria and its control interventions. Moreover the attitude of the study community towards the available intervention is found to be good. However, the study findings reveal that the practice of the study community on the use of other available intervention strategies is low.

## VIII

## **1. Introduction**

### **1.1. Statement of the problem**

Prevention of the disease through better knowledge and awareness is the appropriate way to keep the disease away and remain healthy. In addition health-seeking behavior may enhance or interfere with the effectiveness of control measures and also knowledge, attitude and practices showed that direct interaction with community plays an important role in avoiding malaria problem. Perceptions about malaria illness, particularly households' perceived susceptibility and beliefs about the seriousness of malaria are important preceding factors for decisions to take preventive and curative actions against malaria. General knowledge about causes of malaria and means of transmission are also important factors for utilization of both IRS and insecticide-treated nets (ITNs). These may in turn influence the perception of the community on the usefulness of adopting specific behavior (1).

Knowledge, attitudes, practices of communities contributes immensely to sustainable control of endemic diseases such as malaria. Strategic malaria control involves primary prevention which focuses on vector control and personal behavior change specifically through the consistent use of insecticide treated nets, willingness to make indoor residual spray as well as prompt and effective case management. The understanding of the possible causes, modes of transmission, and individuals' preference and decision about adoption of preventive and control measures vary from community to community and among individual households (2).

### **1.2. Rationale**

In Ethiopia, despite the intense activities pertaining to the distribution of ITNs, performing indoor residual spraying and provision of anti-malarial drugs free of charge, many questions about malaria remain unanswered. These includes, the extent to which people are aware of the benefit of ITNs and IRS the value they give them, factors affecting its utilization and the individual and external factors influencing those interventions(3). In Oromia Region, although a variety of interventions were used against malaria prevention and control their utilization was low; for instance household possession of insecticide treated nets was 100% but the available ITNs were being utilized for other purposes than malaria prevention and in most areas the utilization coverage was very low (4).

This community based study was conducted to investigate some of the gaps concerning knowledge, attitudes and practices toward malaria and its control strategies among people living in Shashemene woreda.

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This study was conducted in order to know: how the community recognizes the cause, symptoms of malaria and control strategies, why malpractice or low utilization of the available government control strategies and whether the available IEC/BCC activities regarding malaria and its control was effective in influencing the community's knowledge, attitude and practice towards different interventions, so having had such concepts this study would generate a vital information that has important contribution in the evidence based re-design of malaria control programs.

## **2. Literature review**

### **2.1. Malaria prevention and control strategies**

#### **a. Early diagnosis and prompt treatment**

Early, prompt and accurate diagnosis and treatment is crucial to the management of morbidity and mortality caused by malaria and is one of the main interventions used in the global control of malaria. Adequately and promptly treated, malaria is a curable disease. But severe malaria can develop from uncomplicated disease within hours and most deaths from malaria occur in rural areas where there is poor access to health care facilities. Chronic infection, although not as dramatic as severe malaria, also requires treatment because it can lead to anaemia. Prompt treatment can also slow the development of drug resistance, and in areas of low transmission can interrupt malaria transmission by reducing the number of gametocytes that can be transmitted to the mosquito host. In areas of high transmission, many people carrying the parasite do not have disease symptoms and do not receive treatment, so the number of gametocytes circulating in the population cannot be reduced in this way (5).

Self-diagnosis and treatment in malarious areas are widely established practices and includes using herbal remedies and traditional healers, as well as buying anti-malarials over the counter. Many people will not seek help from primary health care facilities unless these approaches fail and facilities are close by, so effective treatment can be delayed. Parents, carriers and shopkeepers can be educated to provide appropriate drug doses and advice on other aspects of care such as how to control fever, and so encourage prompt and effective treatment (5).

#### **b. Selective vector control**

Vector control is an important part of the global malaria control strategy. Vector control is the primary public health intervention for reducing malaria transmission at the community level. It is the only intervention that can reduce malaria transmission from very high levels to close to zero. In high transmission areas, it can reduce child mortality rates and the prevalence of severe anaemia. For individuals personal protection against mosquito bites represents the first line of defence for malaria prevention (6).

### **i. Indoor residual spraying (IRS)**

Most of the insecticides having residual effect are sprayed indoors, so that mosquitoes after having bite on an infective person will rest in the house and will pick up sufficient insecticide particles sprayed on the walls and other indoor surfaces of the house and its longevity will be reduced so much so that it does not survive to become infective. Its full potential is realized when at least 80% of houses in targeted areas are sprayed. Indoor spraying is effective for 3–6 months, depending on the insecticide used and the type of surface on which it is sprayed. DDT can be effective for 9–12 months in some cases. Longer-lasting forms of IRS insecticides are under development (6).

### **ii. Long lasting insecticide nets (LLINs)**

The result of malaria indicator survey in Ethiopia shows in malarious areas 68.9% of households owned at least one net of any kind and 65.6% owned at least one ITN. Also in those areas, 38.3% of households reported owning more than one net. At the national level, 55.7% of households surveyed currently own a mosquito net of any kind and 53.8% own one that has been treated with insecticide at one point in time (an “ever-treated” net). 53.3% of households report owning an ITN, and 29.7% report owning more than one ITN. The average number of ITNs per household was 1.1 in malarious areas and 0.9 overall. 65.3% of households in malarious areas reported owning at least one LLIN, and 36.6% own more than one LLIN. Overall, 53.1% of the surveyed households own at least one LLIN and the average number of LLIN per household is 0.9, where as it is 0.7 per house hold in Oromia region.

As with ITNs, the percentage of households owning an LLIN was higher in rural areas (56.0%) than in urban areas (39.4%). More over, the same survey result for in Oromia region shows 45.6% of the surveyed households have at least one net, 23.2% have more than one nets. When it was assessed the insecticide treated nets specifically, 41.4% and 21.6% of the surveyed households have at least one and more than insecticide treated nets in the region respectively. As far as long lasting insecticide net is concerned 41.0% and 21.4% of the surveyed households have one and more than one in Oromia region respectively(7).According to the assessment conducted in Ethiopia, in 1999, Forty-one percent of the respondents had heard about the mosquito net. Only 5.3% of the respondents in the survey reported the presence of at least one mosquito net in their households. Most of the respondents (92.5%) were interested in using mosquito nets sometime in the future (8).

### **iii. Environmental management**

In the early 1990s in cities in sub-Saharan Africa, malaria was controlled using environmental Management for vector control. Environmental management for vector control is not intended to replace other control strategies. Rather, it provides a basis on which other methods such as chemical controls can build in a complementary fashion, while reducing the environmental costs and resistance risks incurred by excessive use of insecticides. Environmental management for vector control is a particularly powerful approach in the context of development projects, especially infrastructure projects such as dams, irrigation schemes, roads and railroads, airports, flood control projects and urban developments (9).

### **C. Epidemic prevention and control**

Some 110 million Africans live in areas at risk for epidemic malaria. The increasing frequency of epidemics in both low-risk areas and areas of moderate transmission make imperative the institution of special responses to epidemics, in addition to regular malaria control activities. The impact of epidemics can be greatly reduced by timely detection or, ideally, prediction and prevention. Timely response may include the deployment of additional drug stocks, use of different drugs, and vector control (10).

In Ethiopia although the extent of suffering caused by malaria epidemics is not adequately documented, it is generally believed that morbidity, mortality, and the overall economic impact of the epidemics are enormous. For example, the number of deaths during the malaria epidemic that hit Ethiopia in 1958 was estimated at more than 150 000 out of 3 million clinical cases (a case-fatality rate of 5%). Adults account for a relatively large proportion of epidemic cases and deaths. On top of that there was a large epidemic in 2003 in the country, but since then, no major outbreaks have been reported. Government pre-positioning of emergency supplies allows rapid response during epidemic situations with IRS as the key prevention intervention (10).

#### **2.2. Knowledge of the cause(s) of malaria**

A study conducted in Tigray revealed that mosquito as a transmitter of malaria was recognized by nearly half of the respondents (48.8%). Almost all the respondents (92.7%) believed that malaria can be cured and pointed modern medicine as the adequate treatment (96.4%). Though the majority of participants (74.7%) believed that malaria is a preventable disease, 15.6% considered the opposite and 9.7% did not know (11).

According to the findings from Adam Tulu District, East Shoa Zone, on malaria-related perceptions and practices of women with children under the age of five years, most respondents (81%) said that malaria could be transmitted from one person to another. About 60% of the women perceived that malaria is transmitted by mosquitoes (12). Study conducted in Asossa reflects mosquitoes' ability to transmit malaria was mentioned by 174 (29.9%) of the respondents. Five hundred fifty five (95%) of respondents identified that mosquitoes bite during the night. Three hundred fifty two (60.6%) of the respondents stated that mosquitoes rest in dark places inside the house during the day. Modes of malaria transmission recognized by study participants were dirty environment (53%) and mosquito bites (47.5%) (13).

Study from Jimma Town shows about 88.6% of the study subjects indicated mosquito bite as causes of malaria, while other respondents indicated exposure to unhygienic conditions and cold weather as causes of malaria. And only about 3.8 percent indicated witchcraft as the cause of malaria (14).

Study in Nigeria revealed that "the sun can cause malaria by either shining directly on the child or on the breast of a lactating mother, if she stays too long under the sun, especially while at work in the farm, the breast milk will heat up and when that child eventually sucks, it will cause malaria". It is also believed that malaria can be acquired in other ways such as through breast milk according to 80 (26.7%) respondents, from bodily contact 46 (15.3%), drinking dirty water 44 (14.7%), inhalation 26 (8.7%) and sharing the same cup 34 (11.3%) (15).

Pertaining to the sources of information, in Nigeria, five hundred six respondents (52%) heard of malaria from neighbors and 255 (26%) received information from local government health workers. Other sources of information included the health center, media (newspaper, radio, and television), relatives, friends, midwives, and school. As far as the mode of malaria transmission is concerned some said that incriminated sleeping together (38.7%) with a malaria patient as a cause for the disease. Other respondents also mentioned breathing from malaria patient (16.9%) and exposure to swampy areas and cold weather (4.9%) as a cause for malaria. Nearly 1% of the respondents who reported the transmissibility of malaria did not know how it is transmitted, while 9% said that either malaria could not be transmitted from one person to another or gave "did not know" responses (15).

Having the correct knowledge that mosquito bites transmit malaria was significantly influenced by level of education: 22 (19.8%) for no education, 39 (35.1%) for primary education, 59 (53.1%) for secondary education and 51 (46.2%) for post secondary.

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Regarding malaria transmission, 61.8% of the study subjects believed that malaria could be transmitted from person to person.

However, 32.7 percent of the study subjects perceived that malaria could not be transmitted from person to person, and the rest 5.5 percent of them do not know whether malaria is transmitted from person to person. With regard to malaria transmission, 85% of the respondents indicated that the mosquito bite was the mode of malaria transmission. The remainder identified house fly (6.4%), marsh area (2.8%), drinking dirty water (1.6%), and blood transfusion (1.6%) as the mode of transmission (15).

### **2.3. Perceived symptoms and severity of malaria**

According to the findings from Indonesia most residents correctly associated the typical clinical symptoms with malaria attacks. Nine hundred seven respondents (93%) reported fever and chills as primary indicators of malaria illness. Nausea and vomiting (17%), headache (7%), fatigue (5%), and dizziness (5%) were also cited. Only 49 respondents (5%) reported not recognizing any attributable malaria symptom. Concerning the burden of the disease it was found that 574 (57%) had been ill with malaria at least once in their lifetime, 738 (74%) believed that malaria illness was dangerous and often fatal, and 445 respondents (45%) personally knew of one or more malaria-related deaths (16).

According to the 2007 Ethiopia malaria indicator survey (MIS), treatment was sought for 16.3% of children within 24 hours of onset of fever and 11.9% took an anti-malarial drug (7). Among children who were treated with an anti-malarial drug 40.0% took it within 24 hours of onset of fever. Among the febrile children who were treated with an anti-malarial drug within 24 hours of onset of fever, 10.8% sought their treatment from a health extension worker, 2.6% from other level of government health facility, 22.6% from private health providers, 39.7% used home treatment, and 24.3% sought treatment from shops (7).

Study carried out in Jimma Town showed knowledge about signs and symptoms of malaria was relatively high with most respondents indicating awareness of key symptoms including raise in temperature/hot body 91.5%, followed by other symptoms like headache 85.5%, shivering 77.9%, loss of appetite 73.7%, vomiting 73.2% cough 13.0%, yellowish urine 33.9% and restlessness 13.9% (14). The same study conducted in Tigray revealed a relative good knowledge about malaria by this rural female population of northern Ethiopia. Most of the women could recognize at least one classic symptom of malaria (92.7%) and thought that malaria is a preventable and curable disease (11).

## **2.4. Knowledge and practice about malaria prevention**

### **a. Insecticide treated nets (ITNs)**

According to Ethiopia malaria indicator survey 32.7% of women and 35.0% of pregnant women had slept under an LLIN the previous night. These percentages were 41.5% and 42.5%, respectively, in malarious areas. The coverage in Oromia shows 28.7% and 57.5% for all women and pregnant women respectively (7). According to the findings from one of the African countries, overall, 38.8% of study households reported ownership of one or more bed nets (not checked whether treated or untreated). Among these, 46.8% were reported as belonging to children less than five years of age, 8.9% to children above five years of age, 43.5% to mothers and 4.8% to fathers. The recorded usage was 65.3%, and among 34.8% of the households, who did not use bed nets the reasons were low mosquito population density and low disease incidence (10).

### **b. Indoor residual spraying**

Globally, more than 168 million people were protected against mosquitoes by IRS in 2009, 73 million of them in 27 African countries, up from 59 million people in 2008. IRS is a highly effective intervention that involves spraying the interior walls of homes with insecticides. In 2010, four countries in sub-Saharan Africa dependent on IRS, and seven others using it as a mixed strategy with LLINs, succeeded in covering more than 80% of their target populations. By the end of 2010, when accounting for ITN delivery and the application of indoor residual spraying in certain areas, projections indicate that spraying and sufficient numbers of nets will have been delivered to 90 percent of the target population to achieve universal coverage (17).

IRS in Ethiopia was initiated in 1959 with the global malaria eradication campaign. Blanket spraying with DDT continued until the late 1970s in almost all affected areas. In the early 1980s, the eradication program was transformed into a control program with IRS as the major intervention. Blanket spraying was replaced by selective application. The use of only DDT continued until the early 1990s when time-limited replacement with malathion was considered in selected areas where vector populations resistant to DDT were encountered. At present, either DDT or malathion is sprayed in the different areas based on the local vector susceptibility to the two insecticides (3).

During the 1990s, shortage of funding and supplies resulted in very scanty targeted spraying. Up to 2005, IRS was fully funded by government but is now partially supported by the Global Fund to fight AIDS, Tuberculosis and Malaria (GFATM). In 2006 IRS was implemented in 2862 villages in all 10 administrative regions except in Addis Ababa. However, district-specific data on IRS operations is not readily available. Since the early 1990s, IRS operations were decentralized and are now entirely managed by regional and district health teams. Owing to low technical capacity for IRS at district offices and the lack of a robust IRS reporting system to the federal MOH, monitoring of the IRS program is very difficult. Hence, there is no reliable list at national level of districts that implement IRS (3).

In Ethiopia, the MIS 2007 revealed that 20% of the surveyed households had been sprayed with indoor residual insecticide in the last 12 months. The mean number of months since spraying was 4.7 months. Among households sprayed in the last 12 months, 87.6% also had at least one ITN; and among ITN-owning households, 26.7% had been sprayed within the last 12 months (7).

The result of Ethiopia malaria indicator survey shows, 14.2% of all households had been sprayed in the past twelve months, 97.3% of them by government agents. Twenty percent of households in areas below 2,000m had been sprayed in the last 12 months. A greater percentage of rural households was sprayed (15.3%) compared to urban households (9.0%). Twenty percent of households in malarious areas had been sprayed in the last 12 months. The result shows 12.5% for Oromia regional state of which 94.4% was covered by government and the left by private (7).

Study conducted in Tigray reveals that from the sampled households' environmental management (82.3%) and impregnated bed nets (46.2%) were the most commonly mentioned preventive strategies (11). The same study from Asossa Western Ethiopia showed that Knowledge of mosquito behavior (resting and breeding places and feeding time) is important to take appropriate malaria preventive actions and for the proper use of ITNs. The majority of respondents identified the indoor resting characteristic of mosquitoes (60.6%) as well as mosquitoes' habit of night-time feeding (95%) (13).

### **c. Malaria treatment seeking behavior**

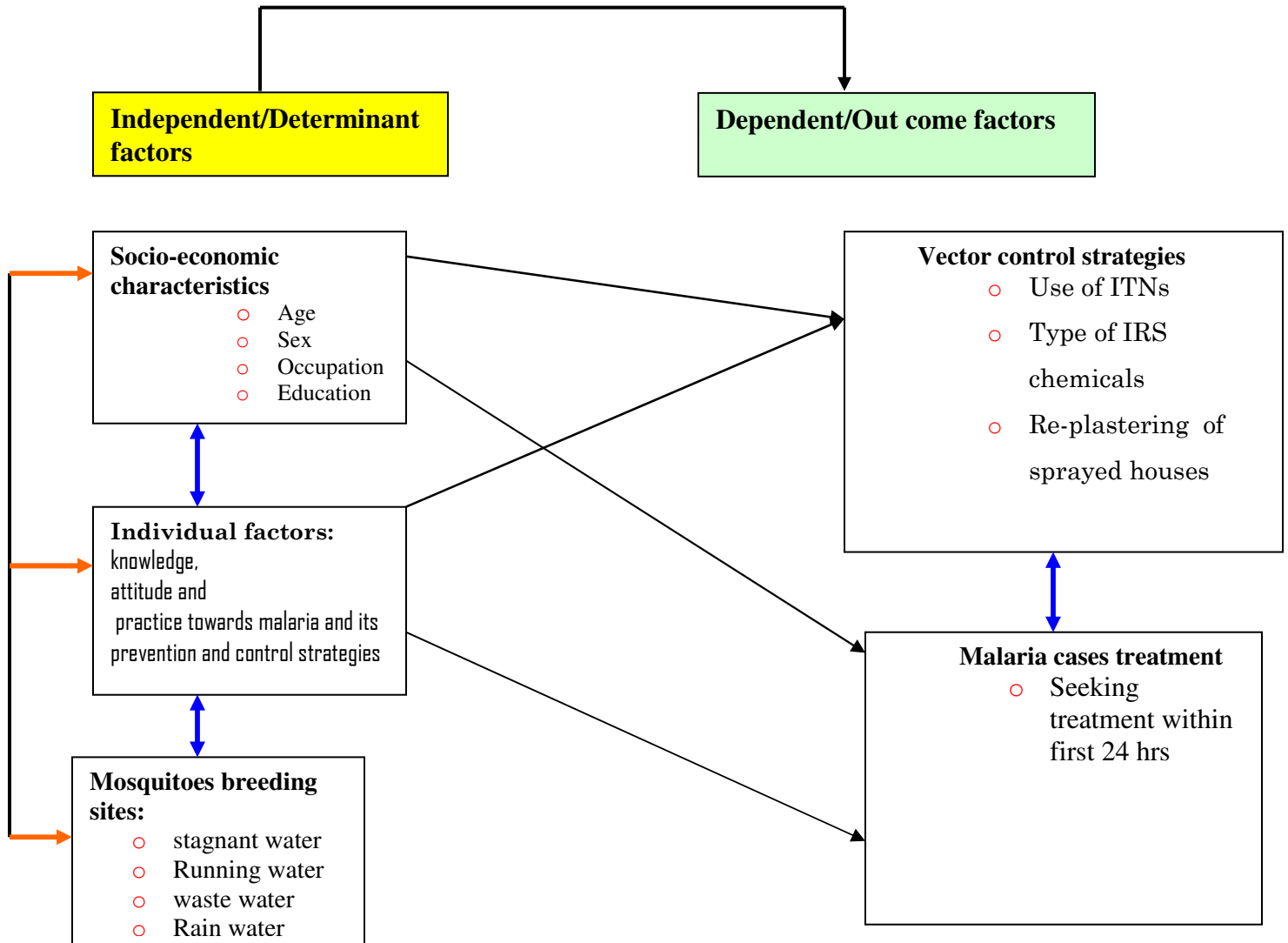
Study conducted in Nigeria reflects that majority of the respondents, 40(60%) took their children to the traditional healer for treatment and other sources of care for severe cases were home herbs 10 (14.3%), drug sellers 6 (8.6%), private clinic 2 (2.6%) and the local government health centre 4 (5.7%) (15).

According to the study result from Kenya the most frequent initial sources of treatment for malaria in adults and children were medical facilities (66.0% and 66.7%) and local shops (19.0% and 30.3%). Adults and children who initially visited a medical facility for treatment were significantly more likely to recover and require no further treatment than those who initially went to a local shop (adults, 84.9% v. 36.8%,  $P < 0.0001$ , and children, 79.6% v. 40.0%,  $P = 0.002$ , respectively). Individuals who attended medical facilities recalled receiving anti-malarial medication significantly more frequently than those who visited shops (adults, 100% vs. 29.4%, and children, 100% v. 5.0%, respectively, both  $P < 0.0001$ ) (17).

The result of malaria indicator survey in Ethiopia shows 22.3% of children under age five years reported a fever in the two weeks preceding the survey. Of these, 15.4% and 12.5% sought medical attention within 24 hours of onset of fever nationally and in Oromia region respectively, 9.5% took an antimalarial drug, and 3.9% took the drug the same day of fever onset. Among those who were treated with an antimalarial drug, 41.3% took an antimalarial within 24 hours of onset of fever, and 42.6% were treated with an ACT. Among the febrile children who were treated with an antimalarial the same day of fever onset, 6.7% sought their treatment from a health extension worker, 27.6% from another level of government health facility, 36.4% from private health providers, 12.8% used home treatment, and 1.5% sought treatment from shops (7).

Study from Jimma revealed that from the households in which at least a person has had experienced malaria illness, almost all 85.3 percent sought health care outside home. Of which, 43.1 percent sought treatment outside home after two days or more days, 30.1 percent after a day. And only 26.8 percent sought within 24 hours (14). Study conducted in Eritrea on cases referred to hospital revealed that Health facilities (hospitals, health centres, health stations, clinics) were found to be the most commonly used treatment source (81.8%) for most of the respondents followed by pharmacies (11.25%) and finally the community health agents (6.9%) (18).

According to President’s Malaria Initiative (PMI) at the end of 2010, 85% of children under five with suspected malaria will have received treatment with ACTs within 24 hours of onset of their symptoms (17).



**Fig1: Conceptual Frame work showing predictors and out come variables for KAP survey on malaria**

### **3. Objectives**

#### **3.1.General objective**

To assess knowledge, attitude and practice on malaria and its control strategies in Shashemene Woreda in Oromia Region.

#### **3.2. Specific objectives**

To assess the community knowledge towards malaria and its control.

To assess attitude towards malaria and its control strategies

To assess factors influencing the practices on different malaria control strategies at community level.

## 4. Methods and materials

### 4.1. Study area and population

The study was carried out in October 20, - November 20, 2010 in rural areas of Shashemene Woreda in West Arsi Zone of Oromia National Regional State. The capital of the Woreda Shashemene is located 250 kilometers South of Addis Ababa. According to the 2007 population and housing census of Ethiopia, the total population of the woreda was 247,282 and 51,517 households. Of the total population 159,726(65%) are at risk of malaria. The woreda has 43 kebeles of which 28 (65%) are malarious. Of the total malarious kebeles, 21 were covered by indoor residual spraying( IRS) , 14 kebeles were covered by Long Lasting Insecticide Treated Nets LLINs , but only 14 kebeles were covered by both IRS and LLIN(20).

The major health problems of the Woreda include malaria, malnutrition and acute watery diarrhea. Malaria transmission is through out the year with high transmission from September-December and moderate transmission from April – June. In the past year (2002EC), malaria was a top ten leading causes of outpatient consultation (OPD). In the woreda a total of 109,150 clinical and 1427 confirmed malaria cases were treated at OPD. Of 8592 blood films seen by microscope and rapid diagnostic tests (RDTs), parasite prevalence rate was 17%. Plasmodium falciparum constituted about 51% of the cases, and 36% were P.vivax and remaining are mixed infection of both plasmodium falciparum and plasmodium vivax (20).

### 4.2. Study design

The study used a community based cross-sectional household survey. Both quantitative and qualitative research methods were used for data collection.

### 4.3. Source and study population

**Source population:** All households in the Shashemene Rural Woreda were the source population for the survey.

**Study population:** All households in the malarious kebeles of the woreda from which sampled population was randomly selected for the study and households were study subjects in this study.

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## **Qualitative research method**

Health extension workers and kebele leaders were consulted for selection of discussants for focus group discussion (FGD). One of the criteria for selection of FGD was those who are living in the selected villages and enrich by the information about malaria. Based on those criteria most model families were selected. The objective of this study was to supplement the findings of quantitative research and to brain- storm if any new ideas. This FGD was carried out at the end of quantitative research.

### **4. 4. Sample size determination**

For this survey the sample size was determined based up on the following assumptions and formula for single population proportion

$$n = (z\alpha/2)^2 [p(1-p)] /d^2$$

1. Twenty percent of households in malarious areas had been sprayed in the last 12 months (7)
2. At 95 % confidence interval is assumed
3. Z= the confidence limits of the survey result which is 1.96
4. A margin of error of 0.05 is assumed

$$n = (1.96)^2 * (0.2 (0.8) / (.05)^2 \dots\dots\dots = 246$$

From design effect of cluster sampling by applying 2 as a selected value for multiplication the sample size will be (246\*2=492)

For non – response, 10 % (50) of the sample size is added which makes a total sample size of 542.

### **Qualitative study**

A total of three FGD was conducted in three villages with six participants in each group until the intended objective was set (till point of saturation of the ideas) and the flow of the idea was from general to specific. .The study population comprised of 8 males and 10 females totally and had a combination of youngsters, adult and old aged married people. Homogeneous group was discuss together( male group, female group, and combination).

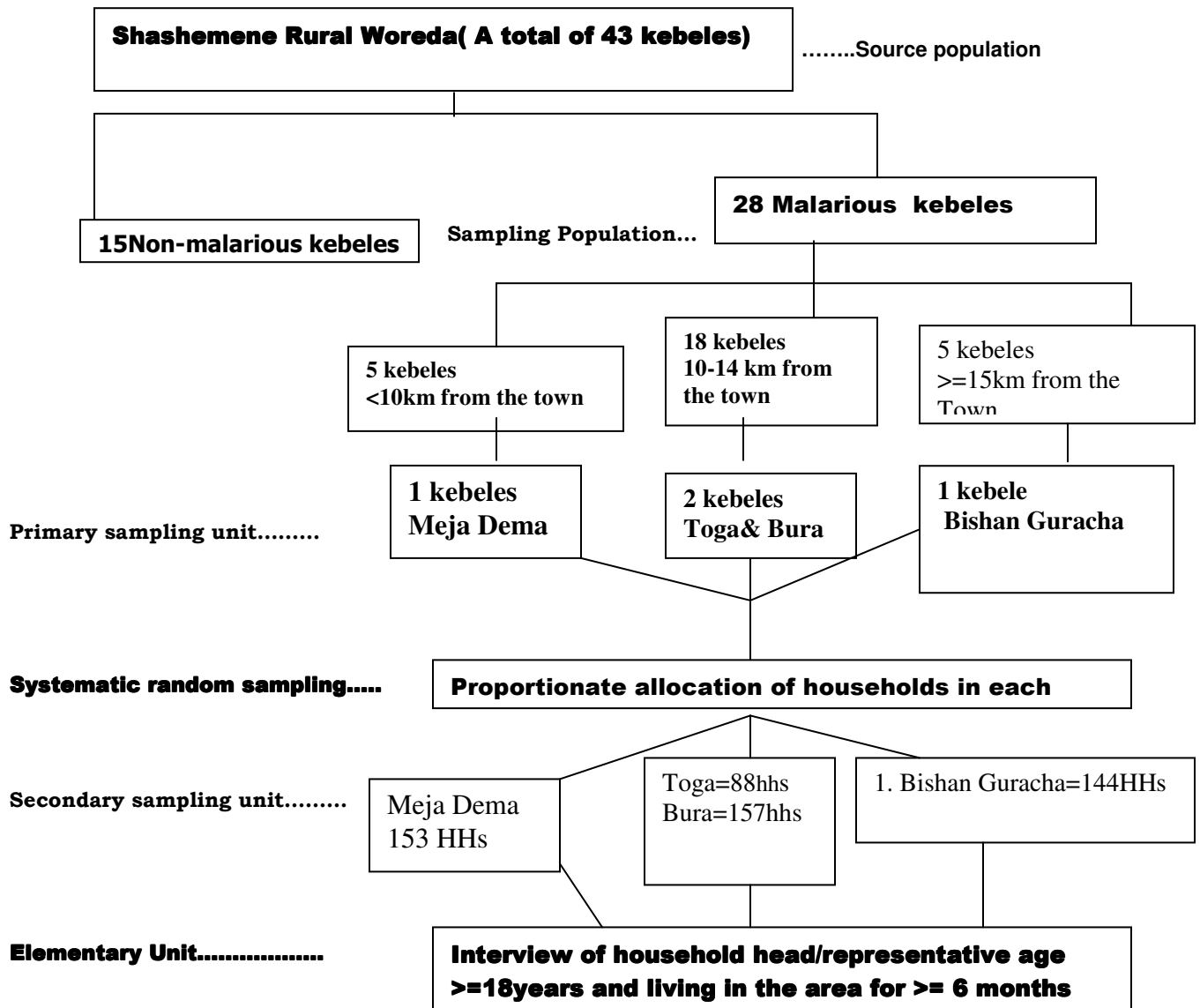
### **4. 5. Sampling procedures**

#### **Quantitative**

Multi-stage sampling procedure with primary and secondary sampling unit was carried out. According to the information obtained from the District Health Office, 28 gandas (kebeles) of the total 43 gandas (kebeles) in the woreda were malarious including semi-urban kebeles. All the malarious kebeles were listed with their household size and different interventions coverage for the convenience of kebeles` selection. From fourteen kebeles which were covered by both LLIN and IRS, only four kebeles ( Bishan Guracha,Bura Borama, Meja Dema, and Toga) were selected for the study

**=13=**

by simple random sampling after stratification of kebeles into high, medium and low malaria situation based on previous history and current malaria report. The sample size was distributed to each kebele with proportional allocation of households ( Bishan Guracha,144 ,Bura Borama 157, Meja Dema 153, and Toga 88), households for interview were selected at interval of eight households. (Annex4)



**Fig2: sampling Procedure for study population in Shashemene Woreda Qualitative**

A total of 3 focus group discussion were conducted in three kebeles ( Bishan Guracha, Toga and Bura Borama) with 6 interviewee and there were 2-4 female in each group. Appropriate participants for the discussion were recruited by health extension workers and kebele leaders.

## **4. 6. Inclusion and exclusion Criteria**

### **Inclusion criteria**

For interview all households` head in the selected malarious kebeles of age greater than 18 years and have been living there for at least 6 months prior to interview

## **4.7. Variables**

### **Dependent Variables**

Re-plastering of sprayed houses

Choices of IRS chemicals

Treatment Seeking within first 24 hrs of malaria onset.

### **Independent Variables**

Socio-demographic characteristics (age, sex, marital status, occupation, religion, education status , family size)

Economic factors (monthly income, household possession of radio)

Individual factors (knowledge, attitude and practice towards malaria and its prevention and control strategies).

Type of ITNs

## **Operational Definition**

**Malaria Control:** is a process that requires eradicating the carrier mosquito or reducing man-vector contact so as to cut in the life-cycle of the parasite.

**Knowledge:** assessment of what the individuals know about malaria, its prevention and whether that knowledge is right or wrong

**Attitude:** assessment of the predisposition to respond in favor or unfavor toward malaria and its prevention.

**Risk factor:** mosquito breeding sites that may contribute for high risk of malaria.

**Practice:** regular utilization of malaria control interventions as part of their behavior.

## **4. 8. Data Collection Methods**

### **Structured questionnaire**

#### **Data collection**

The field work was conducted from October 20, - November 20, 2010. Data were collected using a standard structured questionnaire adopted from the 2004 WHO/UNICEF guidelines for core population coverage survey (24), and translation to the local language (Oromifa ) was made carefully with local people who know Afan Oromo( Oromifa) and health professionals. Based on this guideline structured 44 questions were developed. Head of the household with special emphasis for mothers, since they are the primary care givers at home were interviewed.

The questionnaire included three parts. The first part was concerning about socio-demographic details (age, educational level, gender, no of under five children and pregnant mothers in the house, economic status, religion). The second part investigated knowledge about malaria transmission, treatment and prevention, and risk perception of the disease. The third section paid attention to prevention and treatment practices of the respondents (Annex 1).

The questionnaire took approximately 30 minutes to administer. Respondents were interviewed in their own homes. The questionnaire was piloted in one village out of those which were selected for the survey. Results were discussed and some questions modified. Informed consent was obtained from all study participants.

#### **4.9. Training and supervision**

Five enumerators who have completed 10<sup>th</sup> grade and can speak Oromifa were recruited and two-day training was given for data collectors and supervisors on the tools to be used, purpose of the study, and how to approach respondents and obtain oral consent. Supervisors checked for completeness of questionnaires every day. Incomplete questionnaires were returned to the data collectors on the following day for correction by re-visiting the households. Five percent of interviewed households were randomly selected and re-interviewed by the supervisors.

#### **4.10. Pre-testing**

Pre-testing was carried out in one of the malarious kebeles out of the study area, Chulule Habara, for both quantitative and qualitative data collection tools.

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Data collectors were exposed to practical situation before the start of the actual data collection and in the presence of principal investigator both the interviewers and supervisors assessed for clarity, understandability, flow and completeness of questions and time needed to fill them. Finally modification was made.

#### **4.11. Focus Group Discussions**

Discussion was moderated by zone malaria expert to lead the discussion in appropriate way and tape recorder was used to recall some issues that were missed during note taking. Those selected interviewees were expected to answer the unstructured questionnaires one by one based on the chance given to them from the investigator.

#### **4.12. Data processing and analysis**

Data from all the questionnaires were coded, entered, descriptive (means, SD, tables, figures) was done by Epi Info computer software. Bivariate and multivariate analyses were also run using SPSS for windows version 15.00. The strength of association was interpreted using the adjusted odds ratio and 95% confidence interval. Four dependent variables were developed to include the following aspects: (i) malaria knowledge (a score was created with eleven variables: to correctly mention the symptoms of malaria, the cause of malaria and prevention methods) (ii) malaria prevention practice (utilization of ITN, malaria treatment practice (to seek for medical treatment within 24 hours of the disease onset), sprayed houses re-plastering rate).

Associations between participants' characteristics and positive malaria related KAP were analyzed using  $X^2$  test. Logistic regression was applied to further analyze the relationships between significant socio-demographic factors in the bi-variate analysis ( $p < 0.05$ ). To analyze qualitative data no statistical software was applied, but simply using the responses of the groups' members which were collected by tape recorder and note taken by hand so that attempt was made to conclude the ideas from general to specific after saturation point was reached and link with the findings of quantitative survey.

### **13. Ethical Consideration**

This study was reviewed and approved by the Institutional Review Board of college of health science at Addis Ababa University. Official letter was written by the School of Public health at Addis Ababa University to Oromia Regional Health Bureau,

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based on that letter the regional Bureau wrote support letter to West Arsi zonal health office and from the West Arsi zone to Shashemene Rural Woreda and the Woreda wrote letter to kebeles selected for the study. After explaining the importance of the study, informal consent was obtained from each individual participant before the start of interview.

#### **Data quality Assurance**

The quality of data was assured by properly designing and pre-testing of the questionnaire ahead of data collection at near by village out of those which were selected. Proper training of the interviewers and supervisors to avoid any bias, proper categorization and coding of questionnaires. Furthermore, supervisors and the principal investigator checked the collected data carefully on daily basis for their completeness, accuracy, and clarity.

#### **Confidentiality**

The some of the information gathered during this study was remain confidential during this project. Privacy of the respondents was kept by giving them free chance to be participated in the study, even if they were willing to participate in the study convenient time for data collection was determined by interviewees, for sensitive questions like economic issues and the like by asking them alone in their own houses and the filled questionnaire was not be shown to their neighborhood.

#### **Dissemination of the result**

The results of the research will be published in the form of a graduate paper and may be published in a professional journal or presented at professional meetings. The information will help health professionals and others to better understand of knowledge, attitude and practice of rural community on malaria and existing government control strategies. Based on the opportunity may be found the findings will be disseminated to woreda`s community which was selected for the study.

## 5. Results

### 5.1. Socio-demographic characteristics

Of 542 households selected for the study, 529 households participated, yielding a response rate of 97.6%. The mean age of the respondents was  $36.3 \pm 11.1$  years and ranged from 18 to 80 years of age, 277(52.4%) and 252(47.6%) males and females respondents were participated in the survey. Concerning educational background majority 204(38.6%) of the surveyed households were illiterate. Orthodox Christianity was (42.1%), Muslims 38.6% and the left were others, protestant, Catholic and Adventist. (Table1)

Pertaining to number of family size and their sub-groups were concerned, majority (61%) of the study households had family size 4-8 members and 71(13.4%) pregnant women in 529 sampled households. The average family size was  $5.7 \pm 2.1$  and households who had one or two children under five years were 38.2% and 16.3% respectively. The average number of children under five years of age per household was 1.75 (SD0.77). Economic status of the respondents showed, almost half (49.5%) were getting 100-500 income per month and the mean monthly income was  $457 \pm 22.58$  ETB or 0.9 dollar per day and 68.6% of them had radio. Half (50.3%) of the respondents living houses had 2 sleeping places and the mean sleeping place per household was  $2.04 \pm 0.86$ . (Table 1)

**Table 1. Socio-demographic characteristics of the participants in Shashemene Woreda,  
West Arsi zone ,Oromia, Ethiopia,Nov,2010**

<b>Variables</b>	<b>n=529</b>	<b>frequency</b>	<b>%</b>
<b>Age of the household</b>			
Under 30 yrs		196	37.1
30-40yrs		154	29.1
41-50yrs		69	13.0
>50 yrs		110	20.8
<b>Gender of the household</b>			
Male		277	52.4
Female		252	47.6
<b>Education level of the household</b>			
Illiterate		204	38.6
Elementary		161	30.4
High School and above		164	31.0
<b>Religion of the household</b>			
Muslim		204	38.6
Orthodox		223	42.1
Protestant		89	16.8
Others		13	2.5
<b>Number of family members</b>			
<4		156	29.5
4-8		323	61.0
>8		50	9.5
<b>Number of pregnant mothers in the house</b>			
		71	13.4
<b>Number of U5 children in the house</b>			
1		202	38.2
2		86	16.3
3		6	1.1
<b>Monthly income in ETB</b>			
<100		51	9.6
100-500		262	49.5
>500		216	40.9
<b>Availability of radio</b>			
Yes		363	68.6
No		166	31.4
<b>Number of sleeping place/s</b>			
One		135	25.5
Two		266	50.3
Three or more		127	24.2

## **5.2. Malaria knowledge, attitudes and practices**

### **5.2.1. Malaria knowledge**

#### **A. Signs and symptoms of malaria**

Malaria related knowledge of the participants is summarized in (Table 2). Chills and Shivering were the most frequently reported malaria symptoms 417 (78.8%), followed by fever 312 (59.0%) and headache 291 (55.0%). Most of the respondents (98.9%) were able to mention at least one symptom of malaria and 64.0% could mention three symptoms.

#### **B. Perception about the Causes of Malaria**

Mosquito as a cause of malaria was recognized by majority of the respondents 392 (72.6%), followed by other causes (hungry, strong sun heat and bad odour 100(18.9%).

#### **C. Mosquito Breeding Sites**

With regard to the knowledge of mosquito breeding sites, 332(62.8%) of the respondents mentioned stagnant water and swampy areas, 186(35.2%) cited waste materials.

#### **D. Malaria Preventive Measures**

For the question on the type of malaria preventive measures, 362(68.4%) of the respondents cited draining of mosquito breeding sites, followed by the use of insecticide nets (ITNs) 351(66.4%) and 118(22.3%) taking tablets.

**Table 2. Malaria related knowledge of participants in Shashemene Woreda, West Arsi zone ,Oromia,Ethiopia, Nov 2010.**

<b>Variables</b>	<b>Yes</b>	<b>No</b>
	<b>n(%)</b>	<b>n(%)</b>
<b>Knowledge</b>		
<b>Malaria sign and symptom</b>		
Chills and shivering	417(78.8)	112(21.2)
Fever	312(59)	217(41)
Headache	291(55)	238(45)
Thirsty	269(50.9)	260(49.1)
Joint and body pain	168(31.8)	361(68.2)
Vomiting	162(30.6)	367(69.4)
Diarrhoea	33(6.2)	496(93.8)
<b>Causes of malaria</b>		
Through mosquito bites	392(72.6)	145(27.4)
Others ( hungry, strong sun heat...)	100(18.9)	429(81.1)
Through bodily contact	13(2.5)	516(97.5)
By flies	13(2.5)	516(97.5)
Do not know	19(3.6)	510(96.4)
<b>Mosquitoes breeding sites</b>		
Stagnant water and swampy areas	332(62.8)	197(37.2)
Waste materials	186(35.2)	343(64.8)
Others	9 (1.7)	520(98.3)
Do not know	2 (.4)	527(99.6)
<b>Methods of malaria prevention</b>		
Drain stagnant water	362(68.4)	167(31.6)
Use of insecticide treated net s( ITNs)	351(66.4)	178(33.6)
Taking tablets	189(35.7)	340(64.3)
Indoor residual spray ( IRS)	118(22.3)	441(77.7)
Fumigation	17(3.2)	512(96.8)
Closing windows and doors early in time	12 (2.3)	517(97.7)
Clear vegetation	9(1.7)	520(98.3)
Aerosol/Mobile	4(.8)	525(96.8)

Percentage could be >100% due to multiple response

### 5.2.2. Attitude towards Malaria and its control strategies

Majority of the respondents 433(81.9%) mentioned that malaria is a serious problem compared to other diseases available in their locality (Table 3). Concerning the seriousness of the disease, almost all respondents 524(99.0%) believed that malaria is a serious disease and respondents` attitude to wards susceptibility of malaria was high (82.4%).

**Table 3.Malaria related attitude of participants in Shashemene Woreda, West Arsi zone ,Oromia,Ethiopia, Nov 2010.**

Variables	n= 529	frequency	%
<b>Opinion about how serious a problem malaria in the area</b>			
Very serious		433	81.9
Some what serious		96	18.1
<b>Opinion about how serious a disease malaria is</b>			
Very serious		524	99.0
Some what serious		5	1.00
<b>Do you think you can get malaria(susceptibility to malaria)</b>			
Yes		436	82.4
No		93	17.6

More than half of the respondents 342(64.6%) believed that malaria as transmissible and almost all the respondents 469 (88.7%) said that malaria as a preventable disease. In Comparison with modern and traditional medicine, majority 420(79.4%) preferred the former.

Two-third of the respondents 342(64.7%) preferred rectangular mosquito nets to conical and majority 441(83.4%) Deltamethrine to DDT for indoor residual spray (**Table 4**).

**Table 4. Malaria Related Attitude of Participants In Shashemene Woreda, West Arsi Zone ,Oromia, Ethiopia, Nov 2010**

Variables	Disagree	Agree
	n(%)	n(%)
Malaria is transmissible disease	187(35.4)	342(64.6)
Malaria is a preventable disease	60(11.3)	469(88.7)
Traditional medicine is better than modern medicine in curing malaria	420(79.4)	109(20.6)
Rectangular mosquito nets is better than Conical net	187(35.3)	342(64.7)
Deltamethrine is better than DDT for IRS	88(16.6)	441(83.4)

### **5.2.3. Respondents Practice towards the Available Malaria Control Strategies.**

#### **A. Long Lasting Insecticide Nets (LLINs)**

A total of 793 LLINs were identified in the surveyed households; of which 113(26.9%) received one LLIN, 241(57.4%) two LLINs and 66(15.7%) three or more LLINs based on the size of their families. The average number of LLIN per household was 1.90(SD 0.658), [95%CI: 1.85-1.96], Most of the households 420(79.4%) had at least one LLIN which got from the government. Regarding utilization 275(52%) of households were using at least one LLIN , of which 24(4.3%) under 5 children, 15(2.8%) children age 5-10 years, 258(48.8%) wife and husband including pregnant women, since it was difficult to separate sleeping place of pregnant mothers from their husbands (**Table 5**).

**Table 5. Malaria Related practice of participants in Shashemene Woreda, West Arsi zone ,Oromia,Ethiopia, Nov 2010.**

Variables	Yes n(%)	No n(%)
<b>Mosquito Nets possession and utilization</b>		
<b>Does your family have mosquito Net?</b>	420(79.4)	109(20.6)
<b>Number of LLIN received by the HH</b>		
One	113(26.9)	NA
Two	241(57.4)	NA
Three or more	66(15.7)	NA
Total	420(100.0)	
<b>Did your family use mosquito nets during the</b>		
<b>Previous night?</b>	275(52)	145(27.4)
<b>Who used the mosquito net previous night?</b>		
Children under 5 years	23(4.3)	257(48.6)
Children 5-10 years	15(2.8)	265(50.1)
Wife(including pregnant women) and husband	258(48.8)	22(4.2)
<b>What was the reason for not using mosquito net?</b>		
Not suitable to hang the net	85(59)	NA
No mosquito last night	29(20)	NA
Hot weather	19(13)	NA
Others(it was washed, do not belief that it prevents)	12(8)	NA

## B. Indoor Residual Spray

According to this survey 452(85.4) of the houses were sprayed with deltamethrine and of this houses 81(17.9%) were re-plastered with in three months right after spray operation has been carried out. When asked about the reasons of re-plastering, 29(36%) HHs said to decorate the houses any time, 23(28%) due to holy day, 15(19%) do not aware about re-plastering effect and the left 14(17%) to cover the crack on the wall to avoid other insect nuisance (**Table 6**).

**Table 6. Malaria related practice of participants in Shashemene woreda , West Arsi zone ,Oromia,Ethiopia, Nov 2010.**

Variables	Yes n(%)	No n(%)
<b>Indoor Residual spray (IRS)</b>		
Has your house been sprayed in the past 6 months?	452(85.4)	77(14.6)
Have you re-plastered your house in the past 6 months?	81(17.9)	371(82.1)
<b>What was the reason for re-plastering?</b>		
To decorate the house any time	29(36)	NA
Holy-day	23(28)	NA
Do not aware about re-plastering effect	15(19)	NA
To cover the crack on the wall to avoid other insects	14(17)	NA

### C. Treatment seeking behavior

Regarding treatment seeking behavior within 24hrs after recognition of malaria sign and symptom majority 450(85.0%) were aware to visit health facility to get service (Table 7).

**Table 7. Malaria related practice of participants in Shashemene woreda , West Arsi zone ,Oromia,Ethiopia, Nov 2010.**

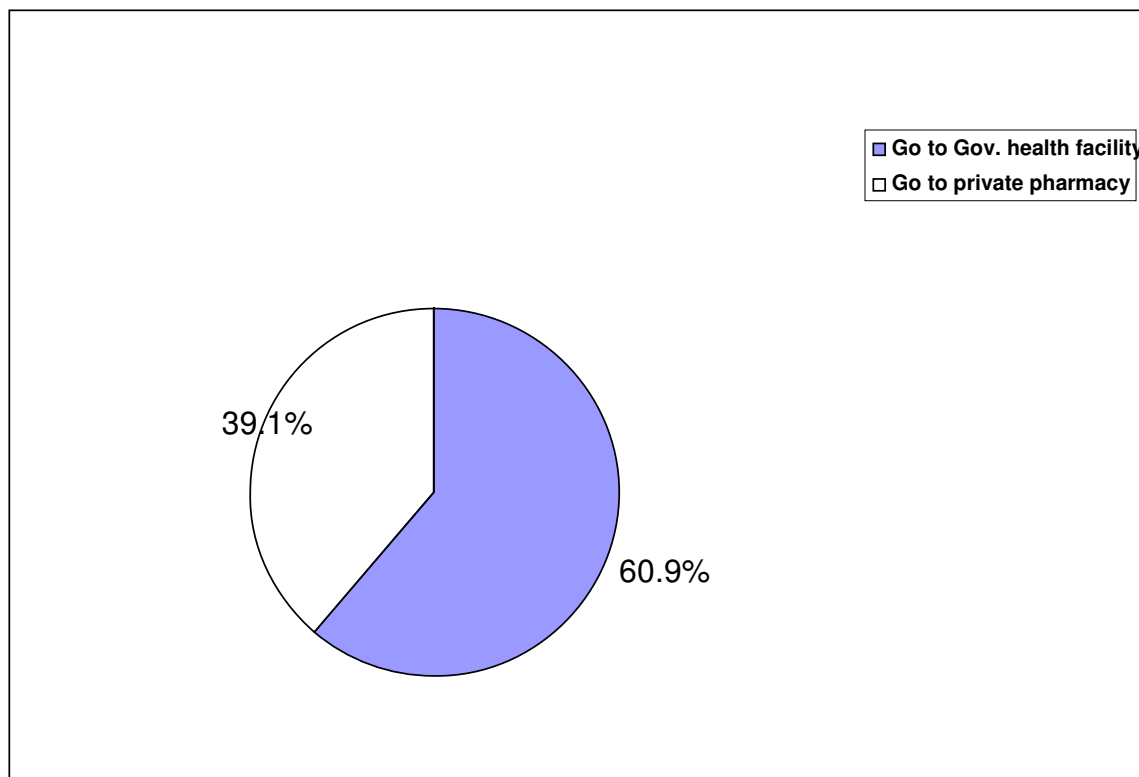
Variables	Yes n(%)	No n(%)
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#### **Treatment seeking behavior**

**At what point do you go to health facility when you/  
your family member/s Get sick from malaria?**

As soon as I realize that my family member shows symptoms that might be related to malaria	450(85.0)	NA
When symptoms that look like malaria signs last for a week	74(14.0)	NA
When treatment of my own does not work	5(1.0)	NA

Regarding to the preference and accessibility to health facilities, 322(60.9%) of the surveyed households were using government and the rest 207(39.1%) were visiting private pharmacies and clinics. ( Figure 3)

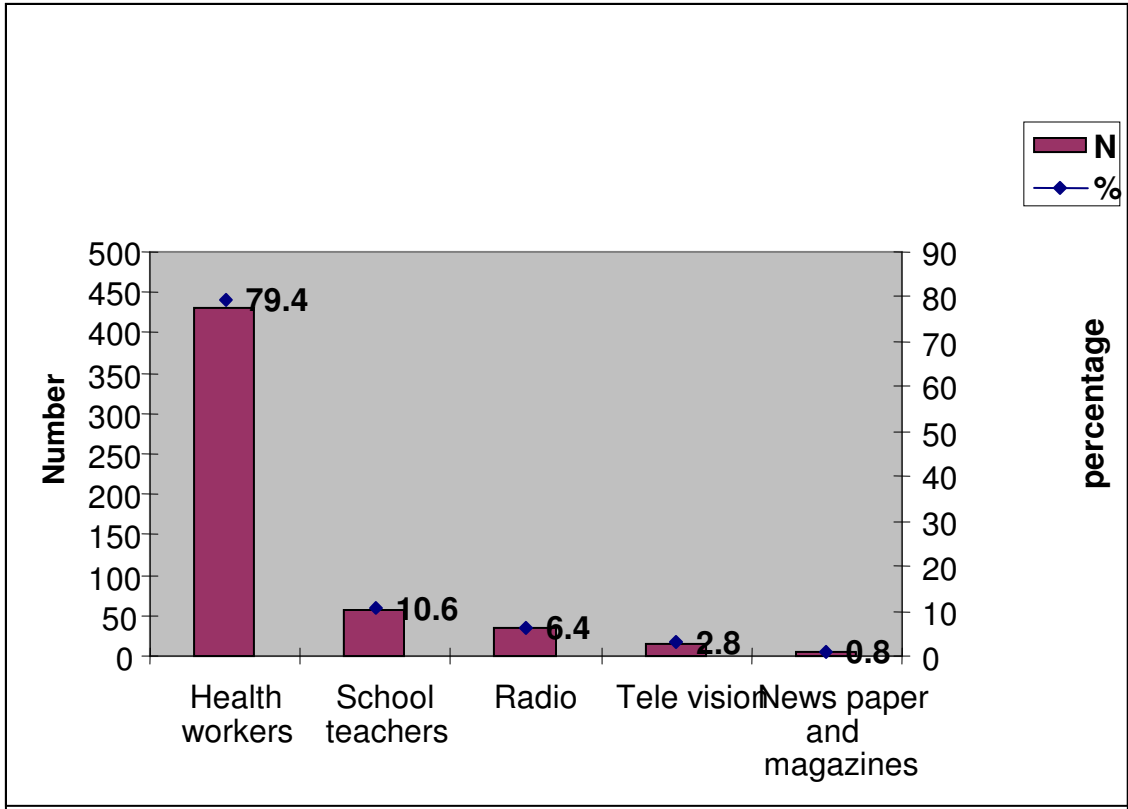


**Fig 3. Percentage of Sampled Households preference for malaria treatment, Shashemene Woreda, Nov 2010.**

### **5.3. Sources of information about malaria and its control intervention**

#### **A. sources of information on malaria sign and symptom.**

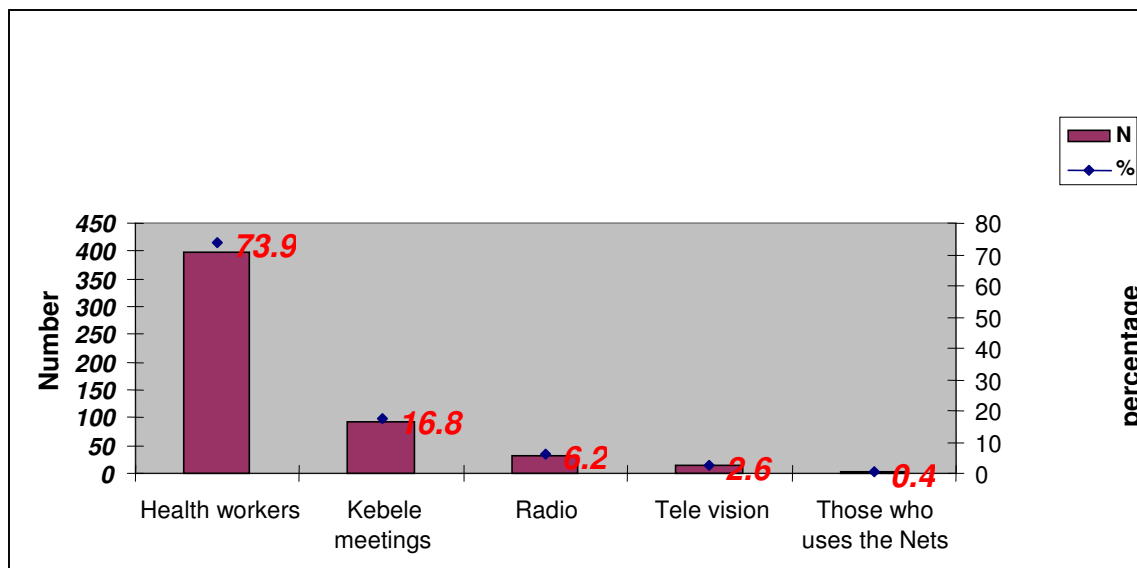
Majority of the respondents 420(79.4%) got information from health workers mostly from health extension workers assigned at each villages, 56(10.6%) from school teachers, 34(6.3%) from radio, 15(2.8%) from Television and 4(0.8%) from News paper and magazines (**Fig 3**)



**Fig4.source of information about sign and symptom of malaria in surveyed households. in Shashemene district,West Arsi zone,Oromia,Nov,2010**

**B. Sources of information about the advantage of Insecticide treated nets**

Most respondents, 391(73.9%) got information about the use of the nets from health workers, 89(16.8%) from kebele meetings, the rest from radio, TV and those who have used the Nets, 33(6.2%), 14 (2.6%), 2(0.4%) respectively.(Fig 4)



**Fig5. Source of information about mosquito Nets in surveyed households in Shashemene woreda, West Arsi zone, Oromia, Nov, 2010**

#### 5.4. Determinants of KAP of malaria

##### 5.4.1. Association between background variables and respondents knowledge score

**Table 8.** Shows the results of the logistic regression analysis for background variables with knowledge of the respondents. Association before and after adjusting for possible confounding factors revealed that malaria knowledge was strongly statistically associated with the educational level of the respondents. The result of bi-variate analysis shows there was positive correlation of high knowledge score with educational status with (p-value <0.01) and also there was statistically significant association of high malaria knowledge score with educational status after adjusting for confounding factors (Adjusted OR 0.497, 95% CI 0.297-0.832).. The result shows uneducated and elementary level of households' knowledge about malaria was 50% and 44% less than those who were high school and above respectively.

All other variables did not show any statistical significance after adjusting for confounders. Monthly income shows statistical association before adjusting for confounding variables with (Crude Odds ratio 1.6, 95%CI 1.092, 2.383). The result shows malaria knowledge of those who are getting monthly income 100-500ETB was 1.6 times higher than those who got greater than 500ETB. Those who had radio seem to have malaria knowledge 1.45 times higher than those who did not, but this association is not statistical significant (Crude Odds ratio 1.466 95% CI 0.973, 2.208).

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**Table 8. Logistic regression analysis for high knowledge score showing the Crude OR and adjusted OR for background variables and their 95% confidence intervals.**

Variables	Knowledge score		Crude Odds Ratio	Adjusted Odds Ratio	
	High n (%)	Low no (%)	OR(95% CI)	OR( 95% CI)	
<b>Age of the respondent</b>					
<30	59(30.1)	137(69.9)	0.775(.495-1.215)	0.770(.479-1.238)	
30-40	55(35.7)	99(64.3)	.920(.509-1.662)	.879(.459-1.683)	
41-50	22(31.9)	47(68.1)	1.148(.684-1.929)	0.863(0.462-1.613)	
>50	30(27.3)	80(72.7)	1.0	1.0	
<b>Gender of the respondent</b>					
Male	88(31.8)	189(68.6)	1.014(.702-1.464)	.883(.595-1.310)	
Female	78(31.0)	174(69.0)	1.0	1.0	
<b>Educational status of the respondent</b>					
Illiterate	48(23.5)	156(76.5)	.532(.337-.839)*	.497(.297-.832)**	
Elementary	59(36.6)	102(63.4)	.548(.348-.862)	.557(.319-.973)*	
High school and above	59(36.0)	105(64.0)	1.0	1.0	
<b>Religion on the respondent</b>					
Muslim	59(28.9)	145(71.1)	.803(.532-1.211)	.904(.576-1.420)	
Orthodox Christian	75(33.6)	148(66.4)	.842(.492-1.440)	.941(.536-1.653)	
Protestant	29(32.6)	60(67.4)	1.356(.360-5.104)	1.832(.474-7.084)	
Others	3(23.1)	10(76.9)	1.0	1.0	
<b>Family size of the household</b>					
<4	45 (28.8)	111(71.2)	1.057(.527-2.122)	.759(.487-1.184)	
4-8	106(32.8)	217(67.2)	.877(.459-1.677)	.898(.427-1.888)	
>8	15(30.0)	35(70.0)	1.0	1.0	
<b>Monthly income of the household</b>					
<100ETB	18(35.3)	33(64.7)	1.057(.559-2.000)	1.802(.918-3.537)	
100-500ETB	69(26.3)	193(73.7)	1.613(1.092-2.383)*	1.305(.653-2.609)	
>500ETB	79(36.6)	137(63.4)	1.0	1.0	
Owing of radio	Yes	123(33.9)	240(66.1)	1.466(.973-2.208)	1.355(.873-2.105)
	No	43(25.9)	123(74.1)	1.0	1.0

Knowledge score:0-11: Low=0-6, High=7-11

\*(statistically significant at p- value=0.05), \*\*\*(statistically significant at p- value=0.01)

#### 5.4.2. Association between Background Variables and Practice on Available Malaria Control Strategy (Treatment Seeking Behaviour)

In this survey adult age group specially 30-40yrs and owning radio at home were significantly associated with treatment seeking behavior with in 24hrs (Adjusted OR: 2.609, 95% CI 1. (1.131-6.019) and OR: 1.810(95% CI 1.014-3.233) respectively. The result shows that treatment seeking behavior with in 24hrs after the on set of malaria sign and symptom in those who were at the middle age (30-40yrs) was 2.6 times than the oldest age groups and those who had radio were 1.8 times more than in seeking treatment than those who had not have radio. Other variables( sex, educational status, monthly income etc) did not show any statistical significance in this survey. (Table 9)

**Table 9. Logistic regression analysis for treatment seeking behavior showing the Crude OR and adjusted OR for background variables and their 95% confidence intervals (95% CI)**

Variables	Treatment seeking with in 24hrs		Crude Odds Ratio OR(95% CI)	Adjusted Odds Ratio OR( 95% CI)
	Yes, n (%)	no, n (%)		
<b>Age of the respondent</b>				
<30	175(89.3)	21(10.7)	0.641(0.299-1.374)	0.605(0.270-1.353)
30-40	143(92.9)	11(7.1)	2.516(1.225-5.165)*	2.609(1.131-6.019)*
41-50	53(76.8)	16(23.2)	1.966(1.020-3.791)	2.050(0.901-4.662)
>50	89(80.9)	21(19.1)	1.0	1.0
<b>Gender of the respondent</b>				
Male	235(84.8)	42(15.2)	0.666(0.397-1.116)	0.703(0.398-1.244)
Female	225(89.3)	27(10.7)	1.0	1.0
<b>Educational status of the respondent</b>				
Illiterate	174(85.3)	30(14.7)	1.016(0.568-1.818)	1.185(0.595-2.358)
Elementary	137(85.1)	24(14.9)	0.584(0.303-1.127)	0.813(0.362-1.826)
High school and above	149(90.9)	15(9.1)	1.0	1.0
<b>Religion of the respondent</b>				
Muslim	187(92.7)	17(8.3)	1.911(1.029-3.548)*	1.721(0.872-3.396)
Orthodox Christian	190(85.2)	33(14.8)	2.597(1.258-5.363)**	3.260(1.489-7.137)
Protestant	72(80.9)	17(19.1)	2.000(0.409-9.772)	3.365(0.642-17.649)
Others	11(84.6)	2(15.4)	1.0	1.0
<b>Family size of the household</b>				
<4	133(85.3)	23(14.7)	0.841(0.458-1.458)	0.797(0.438-1.450)
4-8	282(87.3)	41(12.7)	0.643(0.231-1.790)	0.456(0.151-1.378)
>8	45(90.0)	5(10.0)	1	1
<b>Monthly income of the household</b>				
<100ETB	46(90.2)	5(9.8)	1.707(0.604-4.553)	1.665(0.587-4.724)
100-500ETB	221(84.4)	41(15.6)	1.096(0.396-3.038)	1.173(0.388-3.544)
>500ETB	193(89.4)	23(10.6)	1	1
Owing of radio				
Yes	323(89.0)	40(11.0)	1.709(1.018-2.870)*	1.810(1.014-3.233)*
No	137(82.5)	29(17.5)	1.0	1.0

\*(statistically significant at p-value=0.05), \*\* (statistically significant at p-value=0.01)

#### **5.4.3. Association between background variables and Practice on available malaria control strategy (Utilization of Insecticide Treated Nets[ITNs])**

Age group among respondents was observed statistically significant when the dependent variable was the use of ITN with (Crude OR=3.960, 95%CI 2.237-7.011) for age group <30yrs and also remain statistically significant after adjusting for confounding variables by multi-variate analysis with (Adjusted OR=3.122, 95% CI (1.557-7.6257)). The finding shows utilization of ITNs among younger age groups was almost 4 fold than those who were at old age groups. The result of bi-variate analysis also shows strong association when independent variable is educational status with p-value <0.001(crude Odds ratio=0.393, 95% CI 0.236-0.656). According to this survey result, the tendency of utilizing insecticide nets in illiterate age groups is 60% less than those who are high school and above (Table 10).

**Table 10. Logistic regression analysis for Net utilization showing Crude OR and adjusted OR for background variables and their 95% confidence intervals.**

Variables	Utilization of mosquito nets		Crude Odds Ratio	Adjusted Odds Ratio	
	Yes, n (%)	no, n (%)	OR(95% CI)	OR( 95% CI)	
<b>Age of the respondent</b>					
<30	129(79.1)	34(20.9)	3.960(2.237-7.011)***	3.122(1.557-6.257) **	
30-40	75(61.5)	47(38.5)	1.596(0.911-2.797)	1.343(0.701-2.574)	
41-50	32(59.3)	22(40.7)	1.623(0.815-3.230)	1.502(0.720-3.134)	
>50	39(48.1)	42(51.9)	1	1	
<b>Gender of the respondent</b>					
Male	146(67.6)	70(32.40)	1.195(0.799-1.788)	1.138(0.724-1.791)	
Female	129(63.2)	75(36.8)	1	1	
<b>Educational status of the respondent</b>					
Illiterate	97(57.4)	72(42.6)	0.393(0.236-0.656)***	0.617(0.331-1.149)	
Elementary	84(65.6)	44(34.4)	0.578(0.333-1.003)	0.652(0.352-1.174)	
High school and above	94(76.4)	29(23.6)	1	1	
<b>Religion of the respondent</b>					
Muslim	107(61.5)	67(38.5)	0.955(0.615-1.483)	0.690(0.418-1.138)	
Orthodox Christian	102(62.6)	61(37.4)	0.465(0.246-0.877)*	0.464(0.237-0.910)	
Protestant	55(77.5)	16(22.5)	0.145(0.018-1.150)	0.141(0.017-1.151)	
Others	11(91.7)	1(8.3)	1	1	
<b>Family size of the household</b>					
<4	76(67.9)	36(32.1)	1.136(0.709-1.818)	0.988(0.586-1.667)	
4-8	171(65.0)	92(35.0)	1.282(0.623-2.637)	1.064(0.477-2.373)	
>8	28(62.2)	17(37.8)	1	1	
<b>Monthly income of the household</b>					
<100ETB	23(54.8)	19(45.2)	0.627(0.321-1.225)	0.659(0.317-1.370)	
100-500ETB	141(65.9)	73(34.1)	0.578(0.290-1.153)	0.673(0.311-1.459)	
>500ETB	111(67.7)	53(32.3)	1	1	
Owing of radio	Yes	186(64.8)	101(35.2)	1	1
	No	89(66.9)	44(33.1)	0.910(0.589-1.406)	0.909(0.590-1.400)

Statistically significant at p- value: \*0.05, \*\*0.01, \*\*\*0.001

## **5.5. Focus Group Discussion Results**

This discussion was guided by the list of questionnaire (Annex:2) and three kebeles were selected for the discussion. In the discussion a total of 18 participants were involved with 2-4 females in a group. Participants were selected by health extension workers and kebele administrators, which consists of: young group, women group, a mixture of old male and female group.(Annex:3).According to the discussion the following results were summarized assisted by note taken during the discussion and tape recorder.

### **a. Community Knowledge about Malaria and its Transmission**

Almost all respondents described malaria as a major problem in their area and mothers and young children are high vulnerable to the disease. Of 18 participants involved in the discussion 70% or more indicated mosquito as a cause of malaria, and transmission occurs when persons are bitten by mosquitoes. Moreover, “Shekere” is a local name for malaria and the common signs of the disease in their areas are divided in to two:

1. Body type of malaria: chills and shivering, thirsty.....(plasmodium vivax)
2. Head type of malaria: onset with high fever and headache and acute. ( plasmodium falciparum)

### **b. Behavioral determinants and perception of community regarding malaria prevention practices**

Majority of the participants described that now a days multitudes are accustomed to utilize modern medicine than traditional one, but few of the elaborated about the effectiveness of traditional medicine like “ Hargisa, kullubi, Ganjibello” in their local languages either to prevent or to treat the disease as well. In addition to this idea they discussed about the advantage of environmental management to prevent mosquito breeding.

### **c. Behavioral barriers for use of Insecticide Nets.**

The group described about the type and advantage of insecticide mosquito nets. They know different brands like rectangular and conical type with different colors. They did not close the reality about utilization of the nets by the community saying that utilization is low due to low malaria density( Bishan Guracha and Toga Villages) and also inconvenience of the net to hang specially in Tukul houses

(Maja Dema dwellers). Due to this problem they said most community members are using the nets for other purposes like closing of windows, dressing under the beds to prevent other insect nuisance etc.

They believe that if person will not use the nets he/she can contract the disease and also the group proposes solution to improve utilization by sustainable IEC activities and create community awareness and self determination.

#### **d. Perception of community about Indoor Residual Spraying**

According to the discussants responses IRS operation is a long history in their locality and except in rare cases almost all community members made their houses to be sprayed in the past six months. They said there were few refusals due to mis-understanding DDT and Deltamethrine chemicals, by having mis-conception of DDT as multiplier of other insect nuisance and of course currently DDT is less efficacious to kill mosquitoes when compared with previous DDT( Bura village respondents). On top of this they also described IRS operation was being carried out twice a year in previous years but recently once a year , they also asked if there were any health hazards occurred in the community due to IRS, the response of the them was no any hazard occurred so far.

#### **e. Available communication channels and media for malaria prevention and control**

The group asked about the source of information regarding malaria in the community: They described interpersonal communication with health extension workers and seldom community meetings on the issues and few of them use radio during their free time. They asked about convenient time to listen malaria messages. The response of the group members was evening and Sunday.

#### **f. Treatment seeking behaviour and source of treatment for malaria**

A group asked about the time they visit health facility right after they recognize the sign of malaria and sources of treatment. The responses were at ancient time due to inaccessibility of services and transportation cost we stay until the disease become severe by taking local remedy, but thanks to our government now we have health post in our kebele and every body visit health post as long as he/she understands the sign of malaria. Said by most of the members of the group.

## 6. Discussion

This study has shown relatively good theoretical knowledge about malaria by this rural community of the study area. Most of the respondents recognized at least one classic symptom of malaria (98.9%) which is similar with the survey result conducted in Tigray region(13). This theoretical knowledge might be due to the presence of accessible house to house health extension services that focuses on IEC/BCC.

The majority of the respondents (72.6%) associated the disease with mosquitoes, This finding was more related with findings in the country: Adami Tulu , and Jimma ( 12,14) but higher than that of ,Nigeria, Tigray and Asossa ( 11, 13, 15). Though majority of the respondents were correctly associate the cause with mosquito still large amount (18.9%) correlate the disease with hunger, sun stroke, cold, bad odour and even to evil spirit, the rest with body contact with patients. For any vector control interventions unless the community acquires enough knowledge about the mode of transmission the intended out come might not be as expected, there is too much work to do in this area.

Regarding the malaria prevention method majority (68.4%) believed in draining of stagnant water, followed by using Insecticide Treated Nets(66.4%), taking tablets(35.4%) and few of them (22.3%) with Indoor Residual Spraying. In spite of the fact that environmental management is the first priority area to control vector at larval stage, comprehensive knowledge on integrated vector control (IVC) is mandatory. There was paradoxical notion when we compare knowledge about prevention of malaria with practice. For instance ITNs possession and utilization was 79.4% and 52% respectively. This findings were high when compared with other African countries (2) and it is not encouraging when looked in sight of target set by RBM and WHO (>=80%) for both operational coverage and utilization (4). Concerning Indoor Residual Spraying (IRS) operational coverage was high (85.6%) and the finding is similar with the target set by RBM and WHO (2 ). Although the coverage for adult vector control was high in the study area it did not show clear understanding by beneficiaries primarily to prevent malaria since the knowledge was low.

In the study respondents` perceived susceptibility to and perceived severity of malaria was 82.4% and 99.0% respectively which decisive to the likelihood of behavior change, according to the latest modified Health Belief Model (22). The main influences on behavior are perceived susceptibility to a disease, perceived severity of a disease, perceived costs and benefits of taking preventive action, perceived barriers to taking action, and cues to action (advice from peers, mass media campaigns, illness of a family member, or a newspaper article relating to the problem). There must be sufficient concern for health on the individual's part to make health issues relevant (22). Accordingly there were some gaps in the study community to bring behavioral change at large, unless community internalize the benefit of the available government malaria control strategies, it is difficult to practice those interventions .This was reflected by showing a large gap between knowledge about the available control strategies and operational coverage of the interventions. This gap might be due to free of charge for all strategies specially at grass-root level which may reduce attention about utilization.

Regarding the source of information about malaria and its control intervention, majority of the respondents were heard from health extension workers (79.4% and 73.9%) respectively. Despite high coverage (69%) of radio possession in the community, the potential of the community to utilize the available media was also very low especially for radio (6.3% and 6%) respectively both for malaria sign and the use of ITNs. This finding was different from the survey result from Nigeria, which showed 26% of the information got from local government health workers and majority (52%) got from neighbors (18). This discrepancy might be due to policy difference, in Ethiopia assigned two health extension workers per village are engaged more on health education at household level. The role of school in diffusion of information regarding malaria was 10.6%, but no message related to ITNs at this sites.

Two-third (64.6%) believe that malaria as transmissible this result is higher than the findings revealed from Assosa and Jimma Town (13,14) and majority(88.7%) believe malaria as preventable which is similar with the findings of Tigray and Adam Tulu (11,12).

Most of the respondents (79.4%) believed that bio-medical option of treating malaria cases by health professionals was better than traditional, which is lower than the finding from Tigray, jimma Town, (11, 12) and contradict the findings from Nigeria where most malaria cases(60%) go traditional medicine and only 5.7% to modern one(15).

=38=

As 20.6% of the respondents who believe in the effectiveness of traditional medicine in study area, it is hard to think of malaria elimination, unless hard work will be done to bring them to modern medicine. According to the response from FGD, traditional medicine: - most of the time old people choice local remedies to treat malaria until the disease become severe. ( like: Hargissa "local leaf", Qullubi"white onion", Ganjibello).

In this study the use of health posts as first choice for treatment (60.9%) was too low when compared with the study from other African countries (2, 17) which might not reflect issues of accessibility but issue of quality in the health facilities since there is one health post for each village according to government policy.

Most of the households (79.4%) have a bed-net which had been distributed by the government. This result does not encourage the campaign of the Ministry of Health to reach 100% ITN coverage by 2010. The MCP recommends the use of ITNs all year round but with high emphasis to peak transmission season and this study was also conducted in the same season, (October-December). While a small proportion of the population (52%) was using at least one ITN during the study period which was low in comparison with the target set by RBM and WHO (2,19), and also very low when observed by different sub groups of the community( <5yrs, pregnant mothers, 5-10yrs...etc).

Age of the respondents was statistically associated and independent contributing factor to the appropriate use of ITNs. Having younger age groups showed 3.9 times better in utilization of ITNs when compared with older age groups with( Adjusted OR:3.866, 95%CI,1.951,7.660). Utilization was also affected by the shape of the Nets (Rectangular or conical shape), 79.4% of the respondents agree that rectangular type is better than conical one. On top of that one of the selective vector control options is indoor residual spraying, in this study IRS coverage was 83.4% which is similar with other areas findings(7) .The re-plastering rate was (17.9%) with in three months immediately after spray operation when compared with one of other African countries it was high(16).

As far as the type of chemical for IRS is concerned majority (83.4%) of the surveyed households prefer Deltamethrine to DDT. The reasons for preference according to FGD were: it kills other insect nuisance, no stain on the wall and no odour after spray operation.

Majority of the respondents (85.0%) of the respondents seek treatment within 24 hours of the onset of the illness. This is higher than which were conducted in Tigray and Jimma town (11, 14). Age of the respondents was statistically associated with treatment seeking behavior within 24hrs of disease onset with (Adjusted OR: 3.76, 95%CI 1.582-8.923) especially for age group 30-40yrs when older age groups were taken as constant. The possible reasons could be due to the better educated and economically productive age zone. Having radio at home was also strongly associated and positively correlated with treatment seeking within 24hrs with (Adjusted OR: 1.810, 95% CI 1.014-3.233).

## **7. Strength and Limitation of the study**

### **7.1. Strength of the study**

1. It attempted to collect different variables to determine KAP of the community on malaria and its control.
2. It was carried out with very high response rate.
3. It was tried to explore important primary data to use at woreda level
4. It includes both quantitative and qualitative data collection method.

### **7.2. Limitation of the Study**

The cross-sectional design gives information about a certain point of time. Answers might have been varied in different malaria seasons. Data collection relied on information given by the interviewees. But attempt was made as much as possible to minimize those biases through data quality assurance.

## **8. Conclusion and Recommendation**

### **8.1. Conclusion**

The findings of this study shows, study community have good knowledge on both malaria and its control interventions. Moreover the attitude of the study community towards the available bed nets (rectangular shape) and available spray chemical (Deltamethrine) is good. The study also shows the study community has shown high treatment seeking behavior with in 24 hours. However, the study findings reveal that the practice of the study community on the use of other available malaria control strategies is low.

### **8.2. Recommendation**

1. Though the possession of ITNs is high there is a need of scaling- up from 80%-100% to coincide with the target set and strong emphasis should be made by woreda health sector in collaboration with other government and non government organization as well as community regarding utilization of the nets.
2. Promotion of information, education and communication (IEC) activities by any body involved in malaria control program are vital components in terms of enhancing malaria related practices.
3. Despite the fact that availability of radio at this rural community was high, utilization of radio as source of information was low, so local malaria control program expertise and any partners involved on the program should encourage community to use radio as communication channel during their free time.
4. Special focus should be given to old age groups, illiterate and low educational status of the community by the malaria program implementers at woreda and kebele level.
5. Further study is recommended to verify why community prefers private health facilities to government.

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## Annexes

### Annex –I: Questionnaire

#### 1. Quantitative

##### I. Socio-demographic Characteristics

Sr. No	Questions	Alternative answers	Code
001	What is the sex of interviewee?	1.Male 2.Female	/-----/
002	How old are you? <b>Write on the space provided</b>	.....	
003	What is your marital status?	1. Single 2. Married 3. Divorced 4. Widowed	/-----/
004	What is your ethnicity	1. Oromo 2.Amhara 3.Tigire 4.Gurage 99.Others..... .....	/...../
005	What is your religion?	1.Muslim 2. Orthodox Christian 3.Protestant Christian 99.Others.....	/-----/
006	How many family members do you have including y wife and your self? <b>Write on the space provided</b>	.....	
007	How much is your monthly income?	1.<100ETB 2.100-500ETB 3.>500ETB	/...../

### I. Socio-demographic Characteristics....

Sr. No	Questions	Alternative answers	Code
008	What is your occupation?	1. Farmer 2.house wife 3. Daily laborer 4. Merchant 5.student 6.Job less 7. Government employee 99. others -----	/-----/
009	If for question 008 answer is farmer what is your f land holding? <b>Write on the space provided in hectare</b>		

### II. Knowledge, Attitude and Practice towards malaria

010	Have you ever heard of malaria?	1. Yes 2. No	/-----/																											
011	Do you know the Signs and symptoms of malaria?	1.Fever 2.Headache 3.Chills and shivering 4.Thirsty and poor appetite 5.Joint and body pains 6.Vomiting 7.Diarrhoea 99.Others NB: more than one ans. Is possible	/-----/ /-----/ /-----/ /-----/																											
012	Is malaria a health problem in y area?	1. Yes 2. No	/-----/																											
013	Where do you go when you or family member is getting sick fr malaria?	<table border="0"> <thead> <tr> <th></th> <th>Yes</th> <th>No</th> <th></th> </tr> </thead> <tbody> <tr> <td>1. Hospital</td> <td>1</td> <td>2</td> <td>/----/</td> </tr> <tr> <td>2. Health center</td> <td>1</td> <td>2</td> <td>/----/</td> </tr> <tr> <td>3. Health clinic/post</td> <td>1</td> <td>2</td> <td>/----/</td> </tr> <tr> <td>4. Private clinics</td> <td>1</td> <td>2</td> <td>/----/</td> </tr> <tr> <td>5. Private pharmacies drug store</td> <td>1</td> <td>2</td> <td>/----/</td> </tr> <tr> <td>6. Purchase drugs from</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		Yes	No		1. Hospital	1	2	/----/	2. Health center	1	2	/----/	3. Health clinic/post	1	2	/----/	4. Private clinics	1	2	/----/	5. Private pharmacies drug store	1	2	/----/	6. Purchase drugs from			
	Yes	No																												
1. Hospital	1	2	/----/																											
2. Health center	1	2	/----/																											
3. Health clinic/post	1	2	/----/																											
4. Private clinics	1	2	/----/																											
5. Private pharmacies drug store	1	2	/----/																											
6. Purchase drugs from																														

		shops	1	2	/----/
		7. Traditional healer	1	2	/----/
		8. Use the left over drugs	1	2	/----/
		9. Use traditional remedies at home	1	2	/----/
		99. Others-----			
014	In your opinion malaria is a/an	1. Ordinary disease 2. Serious disease 3.if not treated in time a serious disease 88. No idea			/-----/
015	Do you know the name of the anti- malarial drugs?		Yes	No	
		CQ	1	2	/----/
		SP	1	2	
		PQ	1	2	
		QN	1	2	/----/
		Coartem	1	2	/----/
		88. I don't know			
016	Is malaria transmissible disease (skip to Q018)?	Yes NO 88. I don't know			/----/
017	If yes to Q 016 how is malaria transmitted from person to person?		Yes	No	
		1. Through mosquito bite	1	2	/----/
		2. Through bodily contact with patients	1	2	/----/
		3. Breathing			/----/
		4. By flies	1	2	
		5. Mother to child (placenta)	1	2	/----/
		6. Blood transfusion (contaminated with malaria parasite)	1	2	/----/
		99. Other -----			
018	Malaria parasite belongs to	1. Bacteria 2. Protozoa ( <i>Plasmodium</i> ) 3. Virus 4. Amoeba			/-----/

		88. No idea			
019	What are the other conditions that are associated with malaria infection?	<p>1. Cold</p> <p>2. Cloudy weather</p> <p>3. Rain</p> <p>4. Eating maize stalk</p> <p>5. Mother to child (placenta)</p> <p>6. Dirt</p> <p>88. I don't know</p>	<p>Yes</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>No</p> <p>2</p> <p>2</p> <p>2</p> <p>2</p> <p>2</p> <p>2</p>	<p>/----/</p> <p>/----/</p> <p>/----/</p> <p>/----/</p> <p>/----/</p> <p>/----/</p>

### III. Knowledge about malaria mosquito, knowledge and attitude on prevention and control strategies

02	Where do mosquitoes mostly breed?	<p>1. Stagnant water &amp; swampy area</p> <p>2. Running water</p> <p>3. Waste material</p> <p>99. Others -----</p>	<p>Yes</p> <p>1</p> <p>1</p> <p>1</p>	<p>No</p> <p>2</p> <p>2</p> <p>2</p>	<p>/----/</p> <p>/----/</p> <p>/----/</p>
02	When do mosquitoes mostly bite?	<p>Day</p> <p>Night</p> <p>88. I don't know</p>			/----/
02	What are the mosquito resting sites during time?	<p>Unclean vegetation</p> <p>In the house</p> <p>99. Others -----</p> <p>88. I don't know</p>			/----/
02	Is malaria a preventable disease (If No See Q 026)?	<p>1. Yes</p> <p>2. No</p> <p>88. I don't know</p>			/----/
02	If yes to Q 023, what methods do you know to prevent malaria?	<p>1. Take tablets</p> <p>2. House spray with insecticides</p> <p>3. Drain stagnant water</p> <p>4. Clear the vegetation</p> <p>5. Use of mosquito net</p> <p>6. Fumigation</p> <p>7. Aerosol (mobile)</p> <p>8. Closing windows &amp; doors early in time</p>	<p>Yes</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>No</p> <p>2</p> <p>2</p> <p>2</p> <p>2</p> <p>2</p> <p>2</p> <p>2</p>	<p>/----/</p> <p>/----/</p> <p>/----/</p> <p>/----/</p> <p>/----/</p> <p>/----/</p> <p>/----/</p> <p>/----/</p>

		99. Others -----	
02	What is (are) the reason (s) of preferring method(S)	1. Easily available 2. More effective 3. Low cost 99. Others -----	/----/
02	Have you ever heard about mosquito net go to Q045)?	1. Yes 2. No	/----/
02	If yes, what is the purpose of it?	1. Protect from mosquito bite 2. Protect from other insects 3. Sleep better 4. Warmer 99. Others -----	/----/
02	Where was your source of information for Q026?	1. Heard from health workers 2. Heard on the radio 3. Heard on the television 4. Heard from kebele meetings 5. Heard/seen from neighbors 6. Heard from those who use the net 99. Other sources of information.....	/-----/
02	Do you have radio	1. Yes 2. No	/-----/
03	Does your family own Net?	1. Yes 2. No	/----/
03	If yes, how many?	-----	/----/
03	How did you obtain it?	1. Freely provided by NGO 2. Freely given by government 3. Bought from NGO 4. Bought from government 99. Other .....	/----/
03	Did your family use it during the previous night? If no go to Q035	1. Yes 2. No	/-----/
03	If yes for Q 033, who used it?	1. Children <5 2. Children 5-10 3. Wife and Husband 4. Other adult family member	/----/
03			

	If No for Q 033, what is the reason?	1.Not suitable to hang the net 2.Don't believe that it prevents 3.No mosquitoes last night 4.Hot weather 5. It is not retreated 6. It was washed 88. Don't know how to use it 99. Others.....	/-----/															
03	What type of ITNs do you like?	1.Rectangular and white 2. Rectangular and Blue 3.Conical and white 4.Conical and Blue 5. Rectangular and black 6. Conical and Black	/-----/															
03	What type of Roof the house have?	1.Corrugated sheet 2.Thatch roof	/-----/															
03	Does your kebele has regular Indoor res spraying in your house (If No Skip to Q	1. Yes 2. No 88.do not know	/-----/															
03	Do you know the name of some commonly used insecticides?	1. DDT 2. Malathion 3. Deltamethrine 99.. Others 88. No idea <b>NB: more than one answer is possible</b>	/-----/ /-----/ /-----/															
04	For question 039, if the answer is 1-3, w insecticide do you prefer?	1. DDT 2. Malathion 3. Deltamethrine 99.. Others 88. No idea	/-----/															
04	For question 040, why should you prefe	It has no Odour It kills all insects Has no staining 99.Others..... 88.don't know <b>NB: more than one answer is possible</b>	/-----/ /-----/ /-----/															
04	Have you re-plaster your house in the p months?	1.Yes 2.No <b>NB: Observe inside the house</b>	/-----/															
04	Are mosquitoes breeding sites available your home?	1. Yes 2. No																
04	If yes, how far is it from your home?	-----km/ or.....meter																
04	Are there any type activities of environm management for mosquito control?	1. Yes 2. No	/----/															
04	If yes, what type of activities being carri	<table border="0"> <tr> <td></td> <td>Yes</td> <td>No</td> <td></td> </tr> <tr> <td>1. Filling</td> <td>1</td> <td>2</td> <td>/----/</td> </tr> <tr> <td>2. Drainage</td> <td>1</td> <td>2</td> <td>/----/</td> </tr> <tr> <td>3. Clearing of vegetation in shaded areas</td> <td>1</td> <td>2</td> <td>/----/</td> </tr> </table>		Yes	No		1. Filling	1	2	/----/	2. Drainage	1	2	/----/	3. Clearing of vegetation in shaded areas	1	2	/----/
	Yes	No																
1. Filling	1	2	/----/															
2. Drainage	1	2	/----/															
3. Clearing of vegetation in shaded areas	1	2	/----/															



## Translated Questionnaire to local language ( Oromifa)

### I. Gaafii haala Hawwaassa fi ummaata

Lakk	Gaafii	Carra Filannoo	Koodii
001	Saalii gaafatamaa malidha?	1.Dhiira 2.Dhaalaa	/-----/
002	Ummurin kee Meeqa? <b>Iddoo duwwaa irraatti haagutamu</b>	.....	
003	Haali fuudha/heeruma	1. Hin fuune/heerumne 2. Fuudhera/heerumtetti 3. Walihiktetti 4. jala kan du`e/dute	/-----/
004	Qomoon kee malidha?	1.Oromoo 2.Amaara 3.Tigiree 4.Guragee 99.kan biroo .....	/...../
005	Ammantaan kee malidha?	1.Islaama 2. Ortodooksii 3.protestanitii 99.kan biroo.....	/-----/
006	Maatii meeqa qabida? <b>iddoo baana irraatti barreessi</b>	.....	
007	<b>Gaaliin ji`a tokko keessaatti argatu meeqa?</b>	1.Qarshii 100 gadi 2.Qarshii 100-500 3.Qarshii 500 oli	/...../

## I .Gaafii haala Hawwaassa fi ummaata ....

Sr. No	Questions	Alternative answers	Code
008	Dalagaan/hojiin kee malidha?	1. Qonnaan Bullaa 2.Haadha mana 3. hojjeettaa guyyaa 4. daldalaa 5.Barataa 6.kan hojii hin qabine 7. Hojjeeta mootummaa 99. kan biroo-----	/-----/
009	Debiin gaafii 8 qonnaan bulaa yoo ta`e bal`in lafa Heektaraan meqa?	_____	

## II. Beekumsa ,ilaalchaaf Shaakkala waa`ee dhukkuba Busaa irraatti

010	waa`ee Busaa dhagesse beekt	1. eeyyee 2. hin koo		/-----/
011	Mallaattoo Busaa beekta/	1.Dhagina gubaa/nafa oo`issaa 2.Bowwoo 3.Romi` isisaa/hoolachisaa 4.Dheebochisaa 5.Dhagina caabsaa 6.Ballaqamisissaa/Hoqqisissaa 7.gara kassaa 99.kan biroo Ibsa: deebin tokko olii ni danda`ama		/-----/ /-----/ /-----/ /-----/
012	Busaan rakkoo fayyaatti jete ni yaadayii?	1. eeyyee 2. hin koo		/-----/
013	Atti ykn maatiin kee yoomu Busaadhan qabamtaan eessa deemitu?		eeyyee      hinkoo	
	1. Hospitaala	1	2	/-----/
	2. Buufata Fayyaa	1	2	/-----/
	3. Keela fayyaa/Kilinika	1	2	/-----/
	4. kilinika dhuunfaa	1	2	/-----/
	5. mana qoricha dhuunfaa	1	2	
	6. Suuqii qoricha irraan bitta	1	2	/-----/
	7. Abba Qoricha aaddaa	1	2	
	8. qoricha mana keessaatti haafe	1	2	/-----/

		9. Qoricha aaddaa manatti gargaramuu 99. kan biroo-----	1	2	/----/ /----/ /----/
014	Akka yaada keetti Busaan	1.dhukkuba kan birootiin tokkuma 2. dhukkuba cimaadha 3.yeroodhan yoo hin yaalamine dhukkuba cimaadha 88. yaada hin qabu			/-----/
015	Qoricha farra busaa yeroo amn beektayyi?	1.CQ/kilorokinii 2.SP/Fansidarii 3.PQ 4.QN/Kuwinninii 5.Coartem/Ko`artemii 88. hin beeku	eeyyee 1 1 1 1 1	hinkoo 2 2 2 2 2	/----/ /----/ /----/
016	Dhukkubni busaa namatti ni darba miti ta`e gaafii 18 titti darbi No sk Q018)?	1.eeyyee 2.hin koo 88. hin beeku			/----/
017	Gaafii 16f deebin eeyyee yoo ta karran ittin darbu malidha?	1. Yoo bookeen nama cinninte 2. Qomaan walituquudhan 3. haafuran 4. Tisisaan 5. Haadha gara da`imatti 6. Dhiiga walikeennudhan 99. kan biroo -----	eeyyee 1 1 1 1 1	hinkoo 2 2 2 2 2	/----/ /----/ /----/ /----/ /----/
018	Raamoon Busaa qomoo kamdh	1. Bacteria /Baakteriyaa 2. Protozoa ( <i>Plasmodium</i> )/Protozuwaa 3. Virus/vayireesii 4. Amoeba/Amebaa 88. No idea/Yaada hin qabu			/-----/
	Wantoot biro kan dhukkuba bu		eeyyee	hin koo	

019	wajjin walqabatu malfa jete ya	1. Qora	1	2	/----/
		2. qileensa duumesa`aa	1	2	/----/
		3. Bookaa/Rooba	1	2	/----/
		4. Maqa Booqoolo nyaachuu	1	2	/----/
		5. Haadha gara da`imatti	1	2	/----/
		6. Koosii	1	2	/----/
		88. hin beeku			

### III. Hubannoo waa`ee Bookee busaa, Hubannoo fi Shaakkalii tarsimoo ittisaaf to`annoo Busaa.

			Yes	No	
020	Yeroo bay`ee bokeen eessaatti walihorti?	1. bakka bishaan itti kufametti 2. Bishaan dhangala`aa 3. Waste material / wantoota qulqullina hin qabine 99. kan biroo -----	1 1 1	2 2 2	/----/ /----/ /----/
021	Yeroo baay`ee bookeen yeroo akkamitti na ciininti	1. guyyaa 2. Halikan 88. hin beeku			/----/
022	Guyya guyyaa bookeen eessaatti qubatti	1. Biqqiltuu qulqullina hin qabinne irraatti 2. Mana keessaatti 99. kan biroo ----- 88. hin beeku			/----/
023	Busaa ittun ni danda`ama yyi (yoo deebi koo ta`e gara gaafi 026 darbi)?	1. eeyyee 2. hin koo 88. Ihin beeku			/----/
024	Gaafii 026f deebiin yoo eeyyee ta`e toftaan of irra dhowwitun waldha?	1. Qoricha fudhachudhan 2. Keemikalaan mana biffisissudhan 3. Bishaan dhangalassudhan 4. biqqiltuu. Boosona ciirudhan 5. Saphaana bookeetti fayyaadamudhan 6. Fumigation/aara aarsudhan 7. Aerosol (mobile) /Qillensaratti biiffudhan 8. yeroodhan ballibalaaf Maskootii cuufudhan 99. kan biroo -----	eeyyee 1 1 1 1 1 1 1 1	hin koo 2 2 2 2 2 2 2 2	/----/ /----/ /----/ /----/ /----/ /----/ /----/ /----/
025	Tofitaa gaafii 24 irraa jiruu maalif filaate/	1. salphaatti wan argamuuf 2. bu`an isaa gaarii wan ta`ef 3. baasiin isaa xiqqoo wan ta`ef 99. kan biroo-----			/----/

026	waa`ee saphaana bookee haanga yoonnaa dhaggesee beektayyi,deebbin yoo hinkoo ta gaafii 45 darbi?	1. eeyyee 2. hin koo	/----/
027	Yoo deebiin gaafii 026 eeyyee ta`e kaayyoo Saphaana) maalidha?	1. Bookeen akka hin ciinnine dhoowwa 2. Illibisa biro irra eega 3. hirba gaarii argachudhaaf 4. oo`a argachudhaf 99. kan biroo -----	/----/
028	Gaafii 026 informeshinii eessa argate?	1.Oggeessa fayyaa irraa 2.Radiyyoo irraa 3.televizniina irraa 4.walga`l ganda irraa 5.olaatti argudhan/olaa dhaga`udhan 6.Namoota Saphaanatti gargaraman irraa 99.raga bakka birootti.....	/-----/
029	Radiyyoo qabidayyii	1.eeyyee 2.hin koo	/-----/
030	Maatiin kee Saphaana Bookee qabayyi?	1. eeyyee 2. hin koo	/----/
031	Deebiin gaafii 030 yoo eeyyee ta`e meeqa qabidu?	-----	/----/
032	Saphaana kana/kannen akkamitti argata?	1. Miti-mootummaa irraa tolaan 2. Mootummaa irraa tolaan 3. Miti-mootummaa irraa bittaaadhan 4. Mootummaa irraa bittaaadhan 99. kan biro.....	/----/
033	Halkaan darbe maatiin keessaan itti fayyaadaman jiruyyi? Gaafii 033 deebbin h ta`e gara gaafii 035 darbaa?	1.eeyyee 2.hin koo	/-----/
034	Yoo gaafii 033 deebiin eeyyee ta`e, eenyutu fayyaadama?	1. Ijoolee waggaa 5 gadii 2. Ijoolee waggaa 5-10 jiran 3. Abba warra fi haadha mana 4. Namoota kan biroo miseensa maatii ta`an	/----/
035	Yoo gaafii 033 deebiin hinkoo ta`e, malif?	1.fanisudhaaf hin mijattu wan ta`ef 2.dhukkuba ittissu isa irraatti ammanta dhabuu 3.Halkaan darbe bookeen wan hin tureef 4.Qileensi wan oo`uf 5. Keemikalaan wanta hin cuuphaminnef 6. micaame wanta tureef 88. akkataa itti fayyaadan wanta hin beekneef	/-----/

		99. kan biro.....																								
036	Saphaana isa kam badbadu?	1.Rectangular and white/Addii ta`e kan fixxee 4 qabu 2. Rectangular and blue/Magarisa ta`e kan fixxee 4 qabu 3.Conical and white/ Addii ta`e kan fixxee tokko qabu 4.Conical and Blue/ Magarisa ta`e kan fixxee tokko qabu 5. Rectangular and black/ Guuracha ta`e kan fixxee 4 qabu 6. Conical and Black / Guuracha ta`e kan fixxee tokko qabu	/-----/																							
037	Ginnoon mana keessan mali irra hojjetan?	1.Qorqqoroo 2.Ciitaa	/-----/																							
038	Gandi keessaan kaaroora biiffaa mana keessaaniif qabayyi?( deebin miti yoo ta`e 040tti darbi	1. eeyyee 2. hin koo 88.hin beeku	/-----/																							
039	Yeroo baay`ee keemikala farra bookee busaa fayyaadantan malidha?	1. DDT 2. Malathion 3. Deltamethrine 99.. kan biroo 88. yaada hin qabu <b>Ibsa: deebiin tokko oli ni danda`ama</b>	/-----/ /-----/ /-----/																							
040	Gaafii lack. 039, deebin 1-3 yoo ta`e, isaa kannen keessa kam filaata?	1. DDT 2. Malathion 3. Deltamethrine 99.. kan biroo 88. yaada hin qabu	/-----/																							
041	Gaafii lakk 040 irra jiruuf, maliif filaate?	1. Foolii hin qabu wan ta`ef 2. Ilibisoota hunduma wanta ajjessuuf 3.Hallu hin qabu wan ta`ef 99.kan biroo..... 88.hin beeku <b>Ibsa: deebiin tokko oli ta`u ni danda`a.</b>	/-----/ /-----/ /-----/																							
042	Ji`oota 6`n darban keessa mana keessaan keessaani xallaltani jirtu?	1.eeyyee 2.hin koo <b>Ibsa: keessa mana ilaali</b>	/-----/																							
043	Naannoo mana jireenya keessaanitti iddo hormata bookee jirayyi?	1. eeyyee 2. hin koo																								
044	Jira yoo ta`e, mana keessaan irraa hanga fagaata?	-----km/ or.....meter																								
045	Bookee to`achudhaaf hojiin eegumsa fayyannoo hirmanaa ummaatatiin hojjeetamu jirayyi?	1. eeyyee 2. hin koo	/----/																							
046	Gaafii 045 fi deebiin eeyyee yoo ta`e maliif hojjeetama?	<table border="0"> <tr> <td></td> <td>eeyyee</td> <td>hin koo</td> <td></td> </tr> <tr> <td>1. boolla duuchuu</td> <td>1</td> <td>2</td> <td>/----/</td> </tr> <tr> <td>2. Bishaan dhangalassuu</td> <td>1</td> <td>2</td> <td>/----/</td> </tr> <tr> <td>3. Biqqiltuu adda adda ciraan qulliquleessuu</td> <td>1</td> <td>2</td> <td>/----/</td> </tr> <tr> <td>4. Lafa qotaan diririssuu</td> <td>1</td> <td>2</td> <td></td> </tr> <tr> <td>99. kan biroo-----</td> <td></td> <td></td> <td>/----/</td> </tr> </table>		eeyyee	hin koo		1. boolla duuchuu	1	2	/----/	2. Bishaan dhangalassuu	1	2	/----/	3. Biqqiltuu adda adda ciraan qulliquleessuu	1	2	/----/	4. Lafa qotaan diririssuu	1	2		99. kan biroo-----			/----/
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4. Lafa qotaan diririssuu	1	2																								
99. kan biroo-----			/----/																							
047	Hojiiwaan to`annoo weerara irratti hirma beekittuyyi? ( hin koo yoo ta`e gaafii 049tti darbi)?	1.eeyyee 2. hinkoo	/----/																							



## 2. Qualitative Questionnaire

### Focus Group Discussion ( FGD)

Principal investigator: **Kedir Gobena** Dalecha

Recorder: **Mulugeta Dekamo**

Community Health worker: \_\_\_\_\_

### FGD guide for community Consent Form

Hello my name is \_\_\_\_\_ and I work for Oromia Regional Health Bureau. I'm here to collect information for the research conducted on malaria prevention and control. The purpose of the study is to understand the community's awareness, perception and practice towards malaria prevention and control and establish evidence and support the activities carried out to prevent and control malaria in the woreda.

Participation is based on your willingness besides; you can withdraw from the study anytime. No personal identification will be written and we assure you that whatever information you are providing will only be used for the research purpose and the data will be handled only by the research team. While we are collecting the data it is difficult to jot down everything thus we will tape record our discussion. If you need any further information about the study please contact the following person.

#### **Kedir Gobena**

Oromia Regional Health Bureau, AA

Mobile:0911393979

Are you willing to participate in the study?

Agreed \_\_\_\_\_

Not Agreed \_\_\_\_\_

Thank you

Name Data collector \_\_\_\_\_ signature \_\_\_\_\_

Date of data collection \_\_\_\_\_

**Annex 2.Focus Group Discussion guide**

No	No. Objectives/questions
<b>a</b>	<b>Identify the KAP of community regarding causes of malaria and its transmission</b>
	<p>Q1 what does the community know/say about malaria? Probe:</p> <p>A. What is the cause of malaria?</p> <p>B. How does a person get malaria? Probe for person to person transmission, other ways of transmission</p> <p>C. How does the community know when a person has malaria? Probe for symptoms that identify presence of malaria, which symptom is common</p> <p>D. Who is vulnerable to malaria? Probe for children and pregnant women</p> <p>E. Does the community think malaria as serious problem in your locality? How serious? Why? Probe if it is not considered as serious and why?</p> <p>F. What is a local name for malaria?</p>
<b>b</b>	<b>Identify behavioral determinants and perception of community regarding malaria prevention practice</b>
	<p>Q1 Can you tell us if there are any perceptions and practices in relation to malaria Prevention in your community? Probe for:</p> <p>A. Any traditional/cultural methods for prevention or</p> <p>B. Treatments for malaria</p> <p>C. What does the community do to make sure that their children or pregnant women in their household won't get malaria?</p>
<b>c</b>	<b>Identify key behavioral barriers for use of ITNs and promotion of net culture</b>
	<p>Q1. What practices exist in your community which prevent or promote the use of ITN? Probe :</p> <p>A. Does the community use ITN? Why? probe for any beliefs which prevent use of ITN</p> <p>B. Why do people in your community do not use ITN? Explain</p> <p>C. How can we make sure that these people use ITN? Probe what motivate utilization</p> <p>D. Do you think a person who doesn't use bed net at risk of getting malaria? Why? Why not?</p> <p>E. How do people use ITN commonly? Probe for what purpose, any other practices related to ITN</p> <p>F. What is the commonly used ITN brand in the community? List, do you know any other brands? Which brand do people prefer to use? why?</p> <p>G. Are there any preference for the shape and color of ITN? Probe which one is the most preferred, and why?</p>
<b>d</b>	<b>Understand the perceptions of the community about IRS and explore existing practices</b>
	<p>Q1. How do you see the perception and practice of the community to wards IRS? Probe :</p> <p>A. Has any one sprayed the interior wall of your house with IRS?</p> <p>B. Who sprayed the interior wall of your house? If not why? How do people see its use?</p> <p>C. Are there people who refuse to spray their house? If yes why?</p> <p>D. How often does your house sprayed with IRS? Why?</p> <p>E. Have you heard of any health hazards which are believed to be caused by IRS? probe for these side effects</p> <p>F. Do people re-plaster their house after the interior walls of the house being sprayed against mosquito? If yes why? Do you think it is appropriate? What is the problem doing so?</p>
<b>e</b>	<b>Identify and prioritize appropriate communication channels/media for malaria prevention and control messages</b>
	<p>Q1. Where does the community get information about malaria? Probe :</p> <p>A. Who provide the information? Probe for health workers, HEWs or other</p> <p>B. Which one is the most preferred source of information about malaria? Why? Probe for different media, radio, TV, Posters, Billboards, road signs, community meetings, etc...</p> <p>C. Any special program that a community preferred to attend or listen?</p> <p>D. The most trusted source of information, why?</p> <p>E. When is the appropriate time for the community to receive information about malaria? Probe for time of a day and specific days in a week</p>
<b>f</b>	<b>Explore barriers to early treatment seeking behavior and sources of treatment for malaria</b>
	<p>Q1. What are the barriers or promoting factors for early treatment seeking? Probe:</p> <p>A. How does a community know when a child has malaria? Probe for symptoms</p> <p>B. How does the community identify presence of fever?</p> <p>C. What does the community use to cure malaria? List for treatment options used by the community, Probe for self medication before going to health facility, preference</p> <p>D. How soon a child is taken to health facility when malaria is suspected? Probe for immediately, within 24 hours, when it gets serious</p> <p>E. Why do people delay to seek for medical care after they suspect malaria?</p> <p>F. Are there any reasons for not seeking for medical care in the community? Probe for cost, preference, attitude of health worker, poor health seeking waiting time</p> <p>G. Where do people get malaria drugs? How do they use it? Probe for drug compliance</p>

**Annex:4. List of malarious kebeles in Sshashemene Woreda.**  
**Table---Shashemene rural woreda malarious villages list**

Sr.no	Name of malarious villa	No of HHs	Covered by L	Covered by II	Selected for the	Number of HHs all for the study	Selection in
1	Alache Harabate	1891	no	no			
2	Alelu Ilu	2036	no	Yes			
3	Bishan Guracha	1108	yes	Yes	Yes	144	Every 8hhs
4	Buchana Deneba	1184	yes	Yes			
5	Bura Borama	1206	yes	Yes	Yes	157	
6	Bute Filicha	1677	no	No			
7	Chabi Dida Gnata	1139	yes	Yes			
8	Chafa Guta	538	yes	Yes			
9	Chulule Habara	828	yes	Yes	Yes	0	
10	Daleti Chalalaka	715	yes	Yes	Yes	0	
11	Fagi Goba	1823	yes	Yes			
12	Fagi Gole	1936	no	Yes			
13	Hagugata Kuni	1572	no	Yes			
14	Hawasho Danku	1809	no	no			
15	Ilala Korke	1865	no	no			
16	Jalo Dida	886	no	yes			
17	Karara Filicha	1957	no	yes			
18	Kore Borojota	728	yes	yes			
19	Kore Rogicha	1070	yes	yes			
20	Kubi Guta	1079	no	yes			
21	Meja Dema	1182	yes	yes	Yes	153	
22	O`inne Chafo	1889	yes	yes			
23	Obenso Jalo	921	no	yes			
24	Tatesa Dadesa	1601	yes	Yes			
25	Toga	679	yes	yes	Yes	88	
	<b>Total</b>	<b>33319</b>				<b>542</b>	

**=60=**

**Annex 6: Map of West Arsi Zone (malarious and non-malarious woredas) 2001 EFY**

