JIMMA UNIVERSITY

COLLEGE OF PUBLIC HEALTH AND MEDICAL SCIENCES

DEPARTMENT OF POPULATION AND FAMILY HEALTH

UTILIZATION OF INSECTICIDE TREATED BED NET AMONG PREGNANT WOMEN ATTENDING ANTENATAL CARE AT PUBLIC HEALTH FACILITIES IN ARBA MINCH TOWN, SNNPR, ETHIOPIA

BY

MESFIN MAMO (BSc)

A THESIS SUBMITTED TO DEPARTMENT OF POPULATION AND FAMILY HEALTH, COLLEGE OF PUBLIC HEALTH AND MEDICAL SCIENCES, JIMMA UNIVERSITY IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR MASTERS OF PUBLIC HEALTH IN REPRODUCTIVE HEALTH (MPH)

MAY, 2011

JIMMA, ETHIOPIA

UTILIZATION OF INSECTICIDE TREATED BED NET AMONG PREGNANT WOMEN ATTENDING ANTENATAL CARE AT PUBLIC HEALTH FACILITIES IN ARBA MINCH TOWN, SNNPR, ETHIOPIA

BY

MESFIN MAMO (BSc)

Advisors: **1st Abebe Gebremariam (Professor)**

2nd Bitiya Admassu (BSc, MPH)

May, 2011

Jimma, Ethiopia

Abstract

Background: Malaria is one of the most serious public health problems in Ethiopia. Pregnant women are among the groups with high risk of malaria. Use of insecticide treated bed nets is a cost-effective method of controlling malaria. Despite this, there is low utilization of insecticide treated bed nets among pregnant women as reported in some studies conducted in some parts Ethiopia.

Objective: To describe the possession and utilization of insecticide treated nets in the prevention of malaria among pregnant women giving emphasis on determining the factors associated with its use and prevalence of peripheral parasitemiae.

Methodology: A facility based, cross-sectional quantitative study was conducted among a sample of 414 pregnant women attending antenatal clinics from February 25 to March 25, 2011. Systematic sampling technique was used to get study subjects from Arba Minch Hospital and Health Center. A pre-tested interviewer administered structured questionnaire was used to obtain information on the utilization of insecticide treated bed nets and blood sample was taken to determine the prevalence of parasitemiae. The blood sample was taken after written consent was obtained. Data were analyzed using SPSS version 16 and univariate descriptive, bivariate and multivariate logistic regressions were done.

Result: Four hundred eight pregnant women were included in this study making a response rate of 98.5%. About 259(63.5%) knew that malaria is transmissible and 230(88.8%) associated the transmission with mosquito bites. Out of the total pregnant women interviewed, 371(90.9%) own at least one insecticide treated bed net, while 143(35 %) reported to have two. Among those having at least one bed net, 278(74.9%) slept under it in the night preceding the study. The overall prevalence of malaria parasitemiae was 2.5 %. The willingness to use bed net [AOR=0.27(0.10, 0.27)] and a history of malaria attack [AOR=2.66(1.43, 4.93)] were found to be independent predictors of bed net use.

Conclusion: There is inconsistency between bed net ownership and utilization among antenatal care attendees. The prevalence of malaria parasitemiae was found to be high among the primigravidas. Therefore health education programs should focus on comprehensive knowledge on the basics of malaria, prevention and control of malaria including use of bed net. This is important to narrow the gap between ownership and utilization of bed net by pregnant women.

Acknowledgements

I would like to thank Department of Population and Family Health, College of Public Health and Medical Sciences of Jimma University for creating me such an opportunity to conduct a study on the area of my interest.

My sincere and deepest gratitude goes to my first advisor Prof. Abebe Gebremariam for his unreserved guidance and timely relevant comments throughout the preparation of this thesis. I am also strongly indebted to my second advisor Ms. Bitiya Admassu for her unreserved advice, and meticulous comments I received throughout my thesis work.

I am also grateful to the supervisors, data collectors for their devotion throughout data collection and discharging their responsibility. I also most importantly thank the study participants for their willingness to participate in this study and the managers of Arba Minch hospital and health center in creating conducive environment for the study.

My acknowledgement also goes to my whole family especially my wife W/ro Amsale Tekle for her continual encouragement and support throughout the preparation of this thesis.

Table of contents

List of tables

List of figures

Abbreviations and Acronyms

AED	Academy for Educational Development
ANC	Ante Natal Care
CSA	Central Statistics Authority
FMOH	Federal Ministry of Health
IPT	Intermittent Preventive Treatment
ITN	Insecticide Treated Net
LBW	Low Birth weight
LLIN	Long Lasting Insecticidal Net
MDGs	Millennium Development Goals
MIS	Malaria Indicator Survey
RBM	Roll Back Malaria
SNNPR	South Nations Nationalities and People's Region
SP	Sulphadoxine Pyrimethamine
SPSS	Statistical Package for Social Sciences
SSA	Sub Saharan Africa
WHO	World Health Organization

Chapter 1. Introduction

1.1. Background

Malaria is one of the world's most important killer diseases. It is responsible for around a million deaths every year, most of them in Africa (1). The malaria toll is staggering for every 40 seconds a child dies of malaria, resulting in a daily loss of more than 2,000 young lives worldwide (2). Pregnant women and their unborn babies are also at high risk. Women who have malaria become extremely weak because of anemia, they are more likely to miscarry, and their babies have low birth weights (3, 4, 5).

Malaria infection during pregnancy poses substantial risks to the mother, her fetus and the newborn. Consequences of malaria infection during pregnancy include severe anemia, placental parasitemiae and intra-uterine growth retardation. These factors contribute to low birth weight (LBW), one of the principal causes of infant mortality in the African region (4). Annually, about 19 to 25 million women in malaria endemic areas of Africa become pregnant. It was estimated that at least 1.5 million pregnant women in Sub-Saharan Africa (SSA) suffered from malaria and its adverse consequences (5).

With the inception of the global partnership to Roll Back Malaria (RBM) in October 1998, ITNs were adopted as one of the key tools for reducing the burden of malaria in areas of stable malaria transmission in Africa (6). At the Africa Summit on Roll Back Malaria in Abuja, Nigeria in April 2000, heads of state and senior representatives from 44 malaria-afflicted countries in Africa agreed to a goal of providing ITNs to at least 60% of those at risk of malaria, particularly pregnant women and children less than five years of age, by 2005 (7) . This target has also been set by the Ministry of Health and Roll Back Malaria partners in Ethiopia (8).

Since 2000, the World Health Organization (WHO) has recommended a package of interventions to prevent malaria during pregnancy and its sequelae (9). This includes the promotion of ITNs, IPTp, and effective case management of malarial illness. One of the most promising tools for malaria prevention and control during pregnancy is the use of ITNs, which reduced the risk of malaria infection, maternal anemia and low birth weight in many community-randomized trials (5).

In 2005, the World Health Assembly set targets of more than 80 percent coverage of these key interventions by 2010. Unfortunately, in most African countries, coverage of these interventions is far below the 80 percent target. Surveys in 18 African countries found that 34 percent of households owned an insecticide-treated net; 23 percent of children and 27 percent of pregnant women slept under an insecticide treated net (10).

In Ethiopia, from Net Mark 2004 survey report it was shown that, the proportion of pregnant women who slept under ITN the prior night was 6% (11). Later on (in 2008), in other study carried out in Ethiopia (in Oromia and Amhara regions) by the Net Mark Project at AED; among all households in the sample, the percent of pregnant women who slept under a net became 57% (12). From one community based cross sectional study conducted at household level in Arba Minch town and the malarious villages of Arba Minch Zuria District, the coverage for ITN was shown to be 58.8 % (8). However, still pregnant women being the highest risk group, may not be given priority and/ or their use of insecticide treated nets may be intermittent. Therefore, this study was conducted with the objective of assessing the possession and utilization of ITN among pregnant women. It was also employed to identify the factors predicting the use of ITN and its association with parasitemiae status.

1.2. Problem statements

Malaria in pregnancy is an immense public health problem (14). Approximately 50 million pregnant women are exposed to malaria each year. Pregnant women are more susceptible to malaria, placing both mother and fetus at risk of the adverse consequences (14-17). In areas of low and unstable transmission, such as in many regions in Asia and Latin America, women do not acquire substantial anti malarial immunity, and are susceptible to episodes of acute and sometimes severe malaria, and fetal and maternal death (18).

Every year at least 30 million women in malarious areas of Africa become pregnant; most of these women live in areas of relatively stable malaria transmission (19). Millions of pregnancies that occur in malaria-endemic areas of Africa are at risk of malaria infection each year. Low birth weight associated with malaria in pregnancy is estimated to result in 100 000 infant deaths in Africa each year (4, 19-20).

According to Ethiopia's Federal Ministry of Health (FMOH), in 2008/2009, malaria was a major public health problem, being the leading cause of outpatient visits, health facility admissions and in-patient deaths. Transmission in the country is generally seasonal and unstable, and hence, large-scale epidemics frequently occur particularly at higher altitudes. *Plasmodium falciparum* (about 60%) and *P. vivax* (about 40%) are the most important malaria parasites in the country (5, 21-23).

In areas with stable malaria transmission, such as in most of sub-Saharan Africa, infection with Plasmodium falciparum in pregnancy is characterized by predominantly low-grade, sometimes sub-patent, persistent or recurrent parasitemiae. These infections frequently do not result in acute symptoms yet are a substantial cause of severe maternal anemia (24) and of low birth weight (LBW) (17), and as such are a potential indirect cause of early infant mortality (25-27). Because most of these infections remain asymptomatic, and therefore undetected and untreated, prevention of malaria in pregnancy is especially important in these settings (9, 19).

By considering the impact of malaria both in the life of the mother and the fetus , the World Health Organization (WHO) has advocated a three pronged approach to malaria control in pregnancy that includes the use of insecticide-treated bed nets (ITNs), intermittent preventive treatment (IPT), and case management (treatment) (28). It has been recommended for all pregnant women in areas of stable malaria transmission to use IPTp with sulfadoxine–pyrimethamine (SP) during pregnancy. Accordingly, many countries in SSA have progressively scaled up IPT implementation towards the revised 80% of the Roll Back Malaria (RBM) targets by 2010 (4, 5, 31).

However, Ethiopia as a country has not adopted IPT as an intervention for the prevention of malaria during pregnancy because IPT in areas of unstable or seasonal malaria transmission has not been recommended by WHO (4, 5). One of the most promising tools for malaria prevention and control during pregnancy is the use of ITNs, because in many studies it has been demonstrated that wide-scale use of ITNs can reduce the risk of malaria infection, the number of clinical episodes, maternal anemia and low birth weight (4, 5, 19). Therefore promotion of ITNs use among pregnant women has become a central element of national and international efforts against malaria during pregnancy.

The strategic plan of Abuja Declaration (2000) was designed to target the protection of 60% of pregnant women with insecticide-treated bed nets (ITNs) by 2005 (30). Subsequently the Roll Back Malaria (RBM) strategic plan (2005) was redefined these targets to 80% coverage by 2010 (31). The Roll Back Malaria Partnership (RBM) recently called for universal coverage with vector control and effective drugs by 2010 (32). There has been fast, large-scale ITN deployment in some areas of Africa, but ITN use in many parts of the continent remains low (33). In areas where high ITN coverage has been achieved, there are early reports that the epidemiology of malaria in these areas is in transition (34-41), but the theoretical basis for attributing these changes to ITNs remains poorly defined.

In line with the 60% ITNs coverage among pregnant women by 2005 in malarious areas of Africa set by the Abuja Summit in 2000, the Ethiopian government agreed to put into place strategies to scale-up and achieve the targets. By the year 2001, it was only 0.46% of pregnant women sleeping under ITNs. According to world malaria report 2009; in Ethiopia, pregnant women who slept under an ITN were 1%3 and 5% in 2005 and 2007 respectively (13).

There are promising signs of changing with rapid scaling-up of ITNs coverage in many African countries including Ethiopia. The distribution of ITNs in Ethiopia primarily targets households with pregnant women and children under the age of 5 years residing in malarious areas .However the Abuja target, and the MDG 6 (80% coverage of children and pregnant women) and the five year strategic plan of Ethiopia 2006-2010 (at least 90% of pregnant women will be sleeping under ITNs by 2010) is still not achieved (42, 43).

Even though several studies have been conducted to see the utilization of ITNs in malaria prevention in the general population, there is limited information on the pregnant population in Ethiopia in general and in the study area in particular. Therefore, this study was conducted to examine the possession and use of ITNs by pregnant women. Moreover, it has assessed the factors affecting use of ITNs and determined the prevalence of peripheral parasitemiae among pregnant women through facility based cross sectional study at Arba Minch town.

Chapter 2. Literature Review

2.1. Effectiveness of ITNs in the prevention and control of malaria in pregnancy

Insecticide treated nets (ITNs) are among the most effective tools used for reducing malaria transmission and mortality. ITNs are a low cost, easily produced, and practical weapon in the fight against malaria (44). ITNs reduce human-vector contact by killing or repelling mosquitoes, with a documented effect in reducing malaria-related illness and death and improved pregnancy outcomes (4).

Impact of insecticide-treated bed nets (ITNs) on preventing malaria may be minimized if they are not used by vulnerable populations such as children and pregnant women (45).According to the Africa Malaria Report 2003, ITNs use among women in their first four pregnancies reduced LBW and premature birth by 25%. Use of ITNs by pregnant women is a fundamental part of the Strategic Framework for Africa (19, 45, 46).Therefore, if used during pregnancy in areas of stable malaria transmission; ITNs reduce the overall risk of morbidity and mortality among pregnant women and their infants. A trial in the Gambia found that, during the rainy season in villages where ITNs were used, the prevalence of malaria infection among pregnant women was lower and fewer babies were classified as premature (19,47).

Moreover, from a study done in Sudan on the Effectiveness of Communication for Behavioral Impact (COMBI) strategy in increasing utilization rate of Insecticide Treated bed Nets (ITNs) by the year 2006, it was illustrated that the use of ITNs is associated with preventing malaria not only with avoiding insects' nuisance. In that particular study, the prevalence of malaria was shown to be higher significantly in those who did not use their ITNs on daily bases than in those who used it on daily bases (48). Although the efficacy of insecticide-treated nets (ITNs) in malaria prevention in pregnancy is well documented, the low coverage of ITNs in malaria endemic countries necessitates investigation on factors that limit access to this intervention.

2.2. Use prevalence of ITNs among pregnant population

A community-based survey undertaken in four districts of Kenya on the use of intermittent presumptive treatment and insecticide treated bed nets by pregnant women in 2004, showed that, of the 1814 women surveyed, only 5% had slept under an ITN.

Women from rural areas used bed nets less than urban women (11% vs. 27%), and 41% of the bed nets used by rural women had been obtained free of charge from a research project through antenatal clinics (ANCs) (49). Another study in Kenya on the use of insecticide treated bed nets among pregnant women in 2009, showed that the majority of pregnant women attending ANC owned ITNs (75.4%) and their usage was high (70.5%) (50).

In a study in Nigeria, it was shown that (41.1%) of pregnant women have heard about ITNs, but only (10.2 %) actually sleeps inside ITNs. Prevalence of ITNs use was very low among primigravidae who were the most at risk adult population when compared to multigravidae, 37.5 % and 62.5 % respectively. The low awareness and low use prevalence of ITNs calls for education of this at risk population through ANC and the media (51).

A study on insecticide-treated bed net use among children and pregnant women across 15 countries using standardized national surveys conducted between 2003 and 2007 showed that Within ITN-owning households, many children and pregnant women are still not using them. Results also showed that, ITN use among pregnant women was more pronounced within ITN-owning households, with more than one half the countries analyzed (8/14) showing ITN use among pregnant women > 60% (45).

According to the Malaria Indicator Survey (MIS) of 2007, in Ethiopia: from 5,083 surveyed households, 65.6% owned at least one ITN. In ITN-owning households, 53.2% of all persons had slept under an ITN the prior night, including 60.1% children <5 years of age, 60.9% of women 15 - 49 years of age, and 65.7% of pregnant women (52). Furthermore from a comparative cross-sectional study conducted in Ethiopia, Kafta-Humera district, it was indicated that Net possession was higher among urban compared to rural areas. Observed net and ITN use during the preceding night by pregnant women was 52.1% and 64.7%, the same for net and ITN in rural and urban areas respectively (44). Another Community-based cross-sectional study conducted among pregnant women in the northern part of Ethiopia in Raya district showed, from 815 households surveyed, 59% owned at least one non-long lasting or long-lasting ITN (59.5% rural vs. 54.5% urban).

A total of 58.4% of 481 pregnant women from households owning at least one ITN had slept under it during the previous night. Fewer rural (56.7%) than urban women (76.2%) used ITNs. Higher educational attainment was an important predictor of ITNs use (5).

2.3. Factors affecting utilization of ITNs during pregnancy

In a study conducted in Nigeria on ITNs utilization among pregnant women attending ANC, it was shown that, the main factor affecting the use of the commodity was unavailability of ITNs. Other factors included belief of the women on the effectiveness of the commodity, level of education, marital status and family sizes of respondents (53).According to other study in Nigeria on perceptions on the use of insecticide treated nets in implications for preventing malaria in pregnancy, factors affecting use of ITNs include its high cost, perceptions of chemicals used to treat them as having dangerous effects on pregnancy, low utilization of antenatal care, husband's lack of interest in malaria prevention and perceptions that adolescent girls are at low risk of getting malaria (54).

In one study conducted in Ethiopia, lack of access to ITNs (68.3%) and the perception that nets could not prevent malaria (27%) were the main reasons for non-ownership and use of nets (2).In other study conducted in Ethiopia particularly in Oromia and Amhara regional states, the most common reasons for ITN non-use identified through the qualitative component of the study were: there are few mosquitoes around or malaria is not a serious problem; the ITN is no longer effective; ITN is in poor condition; the ITN is being saved (55).

2.4. Prevalence of peripheral parasitemiae in pregnancy

Malaria during pregnancy is a major cause of fetal and maternal morbidity and mortality. In malaria-endemic areas, the condition may remain asymptomatic but is still associated with complications. In a study in Nigeria, from 125 pregnant women tested, 73 had microscopic Plasmodium parasitemiae, giving a prevalence of 58.4%. Asymptomatic malaria parasitemiae was more common in primigravidae, in the second trimester and in the younger age group. The prevalence of Plasmodium parasitemiae in pregnant Nigerian women is still very high nearly a decade after Roll Back Malaria (56).

A hospital-based descriptive study conducted at the maternity clinic of a rural hospital in Mozambique revealed that, in 77.4% of pregnant women had symptoms suggestive of malaria; 23% were in the first trimester. Malaria parasitemiae was confirmed in 26.9% of visits. Symptoms suggestive of malaria were very frequent among pregnant women attending a rural maternity clinic in an area of stable malaria transmission. However, less than a third of them were Parasitaemic (57).

A study which was done in Solomon Islands, shows that, among the 106 subjects, 19 (18%) women had malaria parasites present on blood film at enrollment: 15 (14.8%) had *P. falciparum* and 4 (3.8%) had *P. vivax.* The prevalence of both malaria parasitemiae and *P. falciparum* parasitemiae was > 2-fold higher among primigravidae than among multigravidae [31%] versus 14%].Among the 106 current pregnancies, encompassing 625 months of pregnancy, 39 cases of symptomatic malaria were reported by the mother as having been confirmed by blood film examination, giving an incidence of 0.71 cases/person year (58).

According to the Malaria Indicator Survey (MIS) of 2007, in Ethiopia: Among 7,167 surveyed individuals of all ages, parasitemiae as estimated by microscopy was 1.0% (95% CI 0.5 - 1.5), with 0.7% and 0.3% due to Plasmodium falciparum and Plasmodium vivax, respectively (52). In one study conducted in Nigeria, the overall prevalence was found to be 9%. It was also indicated that pregnant women in the age group of 15-20 had the highest prevalence of 16% and closely followed by 15.2% in 21-24 year age group. Women in their first trimester recorded 13.3% as against 10.2 and 3.8 for second and third trimester. It was also identified that Primigravidae had the prevalence of 12.9 % as against 7.2% for multigravidae (59).

2.5. Conceptual Frame Work

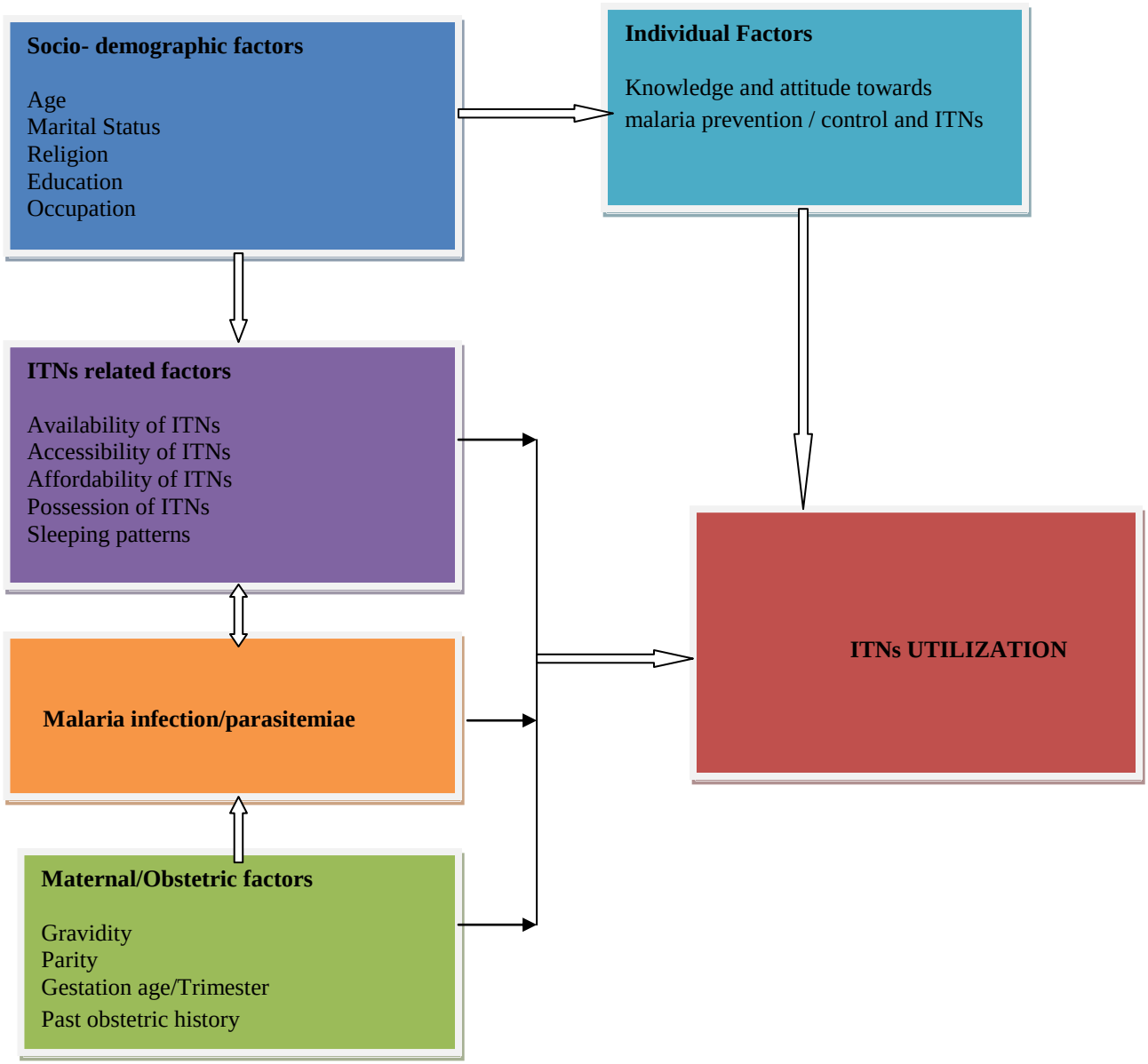

Figure 1. A conceptual frame work for ITN utilization among pregnant women

2.6. Significance of the study

As it has been stated in the statement of the problem, pregnant women are the most vulnerable group for malaria. The use of ITNs is one of the most effective ways of preventing malaria in pregnancy; however, significant numbers of pregnant women are not still sleeping under ITNs. Discrepancies between possession and utilization in the general population including pregnant women have been elicited by studies carried out in different African countries (8). In SSA, few studies assessed the use of ITNs by pregnant women (5), and very few data are available on the use of ITNs and factors influencing it among pregnant women in Ethiopia. Particularly there is no study done and documented evidence on ITN possession, utilization and the status of malaria (peripheral parasitemiae) among pregnant women in the study locality. Therefore, in this study, the utilization of ITN by pregnant mothers and factors affecting it were assessed. Accordingly the findings of this study can help us to identify the existing gap and to promote proper utilization of this newly adopted malaria control strategy(ITNs) among pregnant women so that they can protect themselves, their fetus and their newborns from malaria and its devastating complications. The information obtained from this study will also have an important contribution in the implementation of the program focusing on malaria prevention and control during pregnancy at the local level.

Chapter 3. Objectives

3.1. General objective

To investigate the situation of malaria and malaria related facts among pregnant women attending ANC in public health facilities of Arba Minch town, SNNPR, Ethiopia.

3.2. Specific objectives

- To assess possession and utilization of ITNs by pregnant women
- To determine the prevalence of malaria parasitemiae among pregnant women
- To assess knowledge and attitude towards malaria prevention/control
- To identify factors that are associated with the use of ITNs by pregnant women

Chapter 4. Methods and Materials

4.1. Study area and period

According to the report of the Regional Health Bureau, more than 65% of the total population of the region is at risk of malaria. As the annual report of the region indicates there were 3,406,568 malaria cases, 53,795 admissions and 4,397 malaria deaths in the region in the past years (61, 62).

Arba Minch, the capital of Gammo Gofa zone, is located at 505 km from Addis Ababa and 275 km south west of Awassa. It is a town in the zone with a total population of 74,989.of these, 37448(50%) are females. The total area of the town is estimated at about 1095 hectares and it lies at an altitude of 1300 meters above sea level, its average temperature is 29°C and the average annual rainfall is 900 mm. The town is defined as a malarious area according to the strategy developed by Ethiopia's FMOH and is targeted to receive key malaria control interventions, including ITNs. There is a continuous malaria transmission with the peak of malaria incidence following the main rainfall season (July - September). However, most of the time the town has no clearly defined rainfall season (52). It is structured in to four main & 15 mini- kebeles. There are 11 private clinics, 14 private drug vendors, and public health facilities such as 1 hospital, 1 health center and 1 clinic in the town. MCH services are provided mainly by two of the public health facilities. The study was conducted among pregnant women attending ANC in the MCH units of Arba Minch hospital and health centre from February 25-March25, 2011.

4.2. Study design

A facility based, cross-sectional study design was conducted.

4.3. Population

4.3.1. Source population

The Source population for the study was all pregnant women attending ANC at Arba Minch hospital and health center during the study period.

4.3.2. Study population

Pregnant women selected from the source population (ANC attendees) at Arba Minch hospital and health center.

4.4. Inclusion and Exclusion criteria

Inclusion Criteria:

All currently pregnant women attending ANC clinic for the first time (new visits for the study but not for the ANC follow up) during the study period and those who were volunteered for the study.

Exclusion criteria:

Pregnant women who had previously visited the clinic during the study period (to avoid repetition) and those seriously ill and unable to respond effectively were excluded from the study.

4.5. Sample size determination

The Sample size was determined by using single population proportion formula by considering the proportion of women using ITNs to be 57% (12), adding non-response rate of 10%, the required sample size was

$$\mathbf{n} = \frac{Z\alpha/_2^2\, p(1-p)}{d^2} = \frac{(1.96)^2 . 0.57(1-0.57)}{(0.05)^2}$$

$$= \mathbf{376}$$

Assumptions of sample size determination

The level of confidence, $\alpha = 0.05$ (95%) to conclude the prevalence of ITNs use by pregnant mothers.

P = 57 %: considering the prevalence of ITNs use among pregnant women to be 57% (12).

d = the degree of precision (margin of error) = 0.05 (5%)

Non response rate = 10 %

n = 376 +38(10% non response rate) = 414

Total sample size = 414 pregnant women attending ANC

4.6. Sampling procedure

The study was conducted in two of the Government health facilities, namely, Arba Minch hospital and health center. The calculated sample was distributed among the health facilities based on proportionate to size allocation. The subjects were proportionately selected from the health facilities based on their average ANC attendants for the previous one year in each of the facilities. A sampling interval (K=2) was determined for each health facilities. The first pregnant woman to be interviewed was selected by lottery method. Then the rest study subjects were selected through systematic sampling by incorporating every other pregnant women visiting ANC unit.

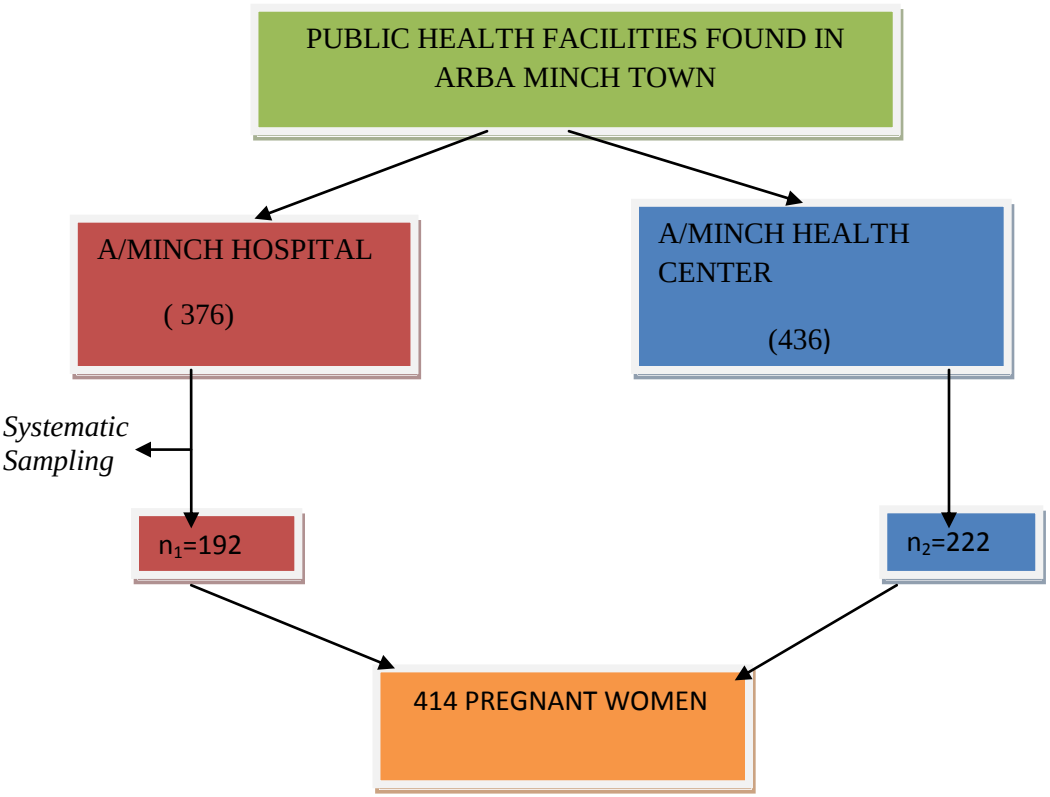

Figure 2. Schematic presentation of the sampling technique

4.10. Study Variables

Dependent variables (Outcome variable): Utilization of ITNs

Independent variables (Explanatory variables): Socio-demographic factors (age, gender, marital status, educational status, monthly income, household owning of radio), sleeping pattern, individual factors (knowledge, attitude towards malaria and TNs) and obstetric factors (gravidity, parity, gestation age).

4.7. Method of data collection

Administration of Questionnaire:

A structured interviewer administered questionnaire was used to elicit information from the women. The questionnaire was initially prepared in English then translated in to Amharic language by an individual who had good ability of both languages then again translated back to English to check for any inconsistencies. The variables in the questionnaire were adapted from previous studies and literatures (63, 64).The questionnaire was used after pre-tested among 20 pregnant women (5% of the sample). The pretesting was done on February 26, 2011 at ANC setting in one of the health institutions which is not part of the main study unit. Four data collectors and two supervisors working in the respective health facilities were recruited. The data collectors (facilitators) were nurses working in the MCH units of both facilities and able to communicate with the respondents using both Amharic and "*Gammugna"* languages. Supervisors were heath officers from both health facilities. Training was given for data collectors including two laboratory technicians and supervisors for one day by the principal investigator to make them familiar with the data collection tool and give them an insight about the objective of the study. Principal investigator and supervisors involved in assisting and coordinating the data collectors during data collection process. The interview was conducted before the start of the routine antenatal service and each mother was interviewed privately and assured on the confidentiality of the interview. The antenatal follow-up cards of the interviewed mothers were marked to avoid repetition.

Parasitological examination of malaria:

After administering the questionnaire, a peripheral blood sample was collected from each woman whether symptomatic or not and measured directly at the time of ANC visit. Blood smears were taken under aseptic technique from finger pricking and tested for malaria parasites in thin blood films/microscopic examination/ by two experienced laboratory technicians. The blood samples were obtained from the sampled women after securing informed written consent. The laboratory technicians were blinded to avoid professional bias and to maintain confidentiality.

4.8. Data quality assurance

To assure the quality of the data high emphasis was given in designing data collection instrument for its simplicity and consistency. It was pretested and used after minor amendments incorporated within the final questionnaire. Training was given for data collectors and supervisors before data collection. Regular supervision was done throughout the data collection period. The collected data were reviewed and checked for completeness and relevance by the supervisors and principal investigator each day. The assurance of data was also maintained during data coding, entry, cleaning and analysis.

4.9. Methods of Data analysis

Data was entered, cleaned (explored) for outliers, missed values and missed variables and analyzed using SPSS version 16 statistical packages for windows. Different frequency tables and descriptive summaries were used to describe the study population in relation to socio-demographic and other variables. Bivariate logistic regression was performed to assess the strength of association between each major independent variable and the outcome variables. Then those variables that showed significant association with the outcome variable were included in a single model and multivariable logistic regression was performed. Finally only those independent variables that maintain their association with outcome variables in a regression model were used to construct the final model. Odds ratio with 95% confidence interval was used to report the strength of association.

4.11. Operational Definitions

Insecticide- Treated Nets (ITNs): - A net or screen dipped in an insecticide for protection against mosquito bite during sleeping.

Untreated Nets: - Nets to be treated with insecticide before use.

Long-lasting Insecticidal Net: - a net that require no further treatment during its expected life span of 4-5 years.

Knowledge on malaria and ITN: - assessment of what the individual knows about malaria, its prevention and whether that knowledge is right or wrong. Respondents are considered as having adequate knowledge (knowledgeable) about malaria if they respond correctly for half of the questions regarding the transmission and prevention methods including use of ITN.

Attitude towards malaria and ITN: - assessment of the predisposition to respond in a favorable or unfavorable manner towards malaria. 10 items of 5 point likert scale (ranges from strongly agree to strongly disagree) was used to evaluate the respondents attitude towards malaria preventive measures including ITNs. The respondents were evaluated for the whole items to say low, moderate and high attitude towards malaria and if the individual gets less than the whole item mean score classified as low attitude, if it is between 50% and 80% considered as moderate attitude and above 80% as high attitude towards malaria.

Possession: - Proportion of women who own at least one ITN during the time of survey.

Utilization: - Proportion of pregnant women who slept under ITN the night prior to the study.

4.12. Ethical considerations

Ethical clearance was confirmed from ethical committee of Jimma University, College of Public Health and Medical Sciences. Permission paper was obtained from different concerned authorities and offices of Arba Minch town after discussion of the purpose of the study. Similarly written informed consent was obtained from each study subjects for both the interview and the collection of blood sample while their right to refuse was also respected. The informed consent was obtained after discussing the importance of the study and the procedure how the blood sample would be collected. The cost for blood film examination was charged by the current study. Because of financial constraint the cost for the treatment of those pregnant women with positive result for malaria parasite was not covered by this study rather a chain was created through which they can access the treatment from the health facilities with their own money. Confidentiality was maintained by omitting their personal identification and using coding system**.**

4.13. Dissemination and utilization of results

The final result of this study will be submitted and presented to Department of Population and Family Health, College of Public Health and Medical Sciences, Jimma University. It will also be disseminated to Federal Ministry of Health, Regional Health Bureau, Gammo Goffa Zone Health Department, local institutions and other concerned bodies through reports and publication on national and international peer reviewed journals.

Chapter 5: Result

5.1. Socio-demographic and economic characteristics of study participants

A total of 408 pregnant women participated in the study, yielding a response rate of 98.5 %. Majority, (86 %) of clients were urban by residence. The age of the studied subjects ranged from 15 to 42 years with mean (±SD) age of 24.3(±5.2) years and median of 24 years. Two hundred fifteen (52.7 %) of the study participants were in the age group of 15-24. Most (98 %) of the respondents were currently married, 236 (57.8 %) were Gammo by ethnicity and 56.4% were housewives. More than three fourth (86%) of the study participants can at least read and write. Around 200 (49.0%) of the respondents were Protestants by religion. The average family size was 3.3 (SD of 1.7, Range of 1-10). Twenty seven percent had income less than Birr 500, 61.5 % earn greater than Birr 500 and the remaining 45(11%) didn't know their income (Table 1).

Table 1. Socio-demographic and economic characteristics of pregnant women attending ANC at Arba Minch Hospital and Health Center, March, 2011.

Variables (*n*= 408)	Frequency	Percent
Place of residence		
Urban	351	86.0
Semi-urban	27	6.6
Rural	30	7.4
Age in years		
15-24	215	52.7
25-34	171	41.9
35 and above	22	5.4
Ethnicity		
Gammo	236	57.8
Amhara	49	12.0
Wolaita	46	11.3
Others (Goffa, Zeise, Konso, Derashe, Oromo)	77	18.9
Marital status		
Married	400	98.0
Widowed /divorced	7	1.7
Single	1	0.2
Religion		
Protestant	200	49.0
Orthodox	191	46.8
Muslims	17	4.2

Variables	Frequency	Percent
Educational status		
Illiterate	55	13.5
Can read and write	10	2.5
Elementary (1-6 grade)	74	18.1
Secondary (7-10/12 grade)	199	48.8
College and above	70	17.2
Occupation		
Housewife	230	56.4
Government employee	84	20.6
Merchant	40	9.8
Daily laborer	27	6.6
Student	24	5.9
Tela or drink seller	3	0.7
Monthly income(ETB)		
<200	13	3.2
200-500	99	24.3
>500	251	61.5
Do not know	45	11.0
Family size		
< 4	327	80.1
4-6	56	13.7
>6	25	6.1
Possession of radio/TV		
Yes	326	80
No	82	20

5.2. Obstetric characteristics

One hundred and seventy nine (44 %) of the pregnant women were primigravidae; whereas 229(56 %) were multigravidae. A total of 246(60.3%) of the respondents were in their third trimester of gestation, 130 (31.9%) in their second, and only 32(7.8%) were in their first (figure 3). Those having a history of abortion were 53(13%). Out of these, 44(83.0%) had experienced once in their life and the rest 9(17%) had it twice and more (figure 3).

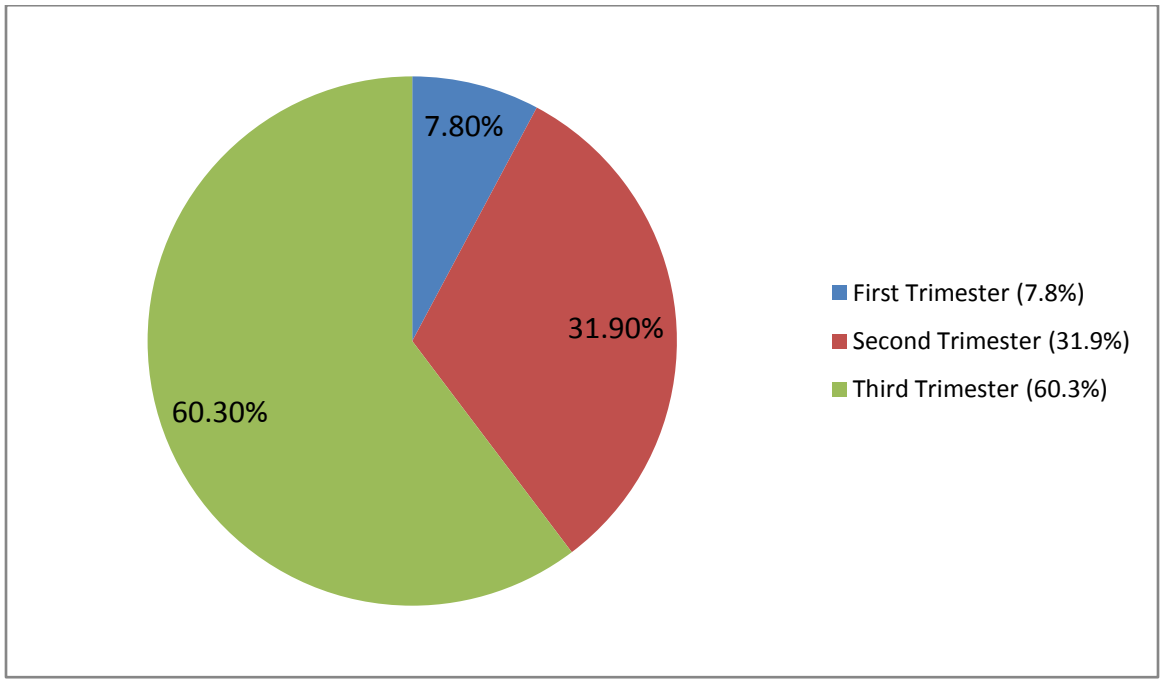

Figure 3. The gestation age of pregnant women attending ANC, Arba Minch Hospital and Health Center, March, 2011.

5.3. Sleeping pattern of pregnant women

Regarding to their sleeping pattern, most 353(86.5%) of them were sleeping with their husbands, and 6.4 %, 2.5%, 4.7% with their <5 children, older children and other family members, respectively. Out of seventy six pregnant women sleeping outdoors, 58 (76.3 %) were sleeping during hot weather, 11(14.5%) during dry season and 7(9.2 %) at any time.

5.4. Knowledge, attitude and practice on malaria

Majority of the pregnant women (96.3%) heard of the disease malaria. Of the three hundred sixty one (88.5%) who claimed to know about causes of malaria, 279 (77.3%), 146(40.4%) ,78(21.6%), 25(6.9%),19(5.2%) reported mosquito bite, poor sanitation, exposure to rain, cold weather and eating young sugar cane as a cause of malaria respectively. Almost all respondents recognized that malaria is a serious health problem in their village and 259(63.5 %) knew that it is a transmissible disease.

A total of 230(88.8%) said that malaria is transmitted by the bite of mosquitoes from person to person, 60(23.1%) of respondents reported that malaria is transmitted through air borne and 22(8.5 %) by a physical contact with a malaria patient. Around 291(71.3%) of the respondents knew that mosquito bites mostly at night and 358(87.7%) of them mentioned that mosquito breeds most during rainy season.

Almost all of them knew at least one symptom of malaria. Most (89.3%) of them mentioned fever as the main symptom; followed by 302 (78.6%) chills and rigors, 284(73.9%) headache, 141(36.7%) generalized ache, 100(26.0%) convulsion, 90(23.4%) loss of consciousness, 9(2.3%) others (big abdominal mass, vomiting). More than two third (70.1 %) of the respondents knew at least one complication of malaria during pregnancy. Two hundred twenty three (78.0%) of the respondents mentioned spontaneous abortion as a complication of malaria, and 146(51.0%), 104(36.4%), 87(30.4%), 61(21.3%) also reported severe maternal anemia, still birth, premature delivery and low birth weight respectively (Table 2).

Table 2. Perceived causes, symptoms and knowledge on transmission of malaria among ANC attendees at Arba Minch hospital and Health Center, March, 2011.

Variables	Frequency	Percentage
Heard about malaria (n=408)	393	96.3
Knows the cause of malaria (n=408)		
Yes	361	88.5
No	47	11.5
Causes of malaria mentioned (n=361)		
Mosquito bites	279	77.3
Poor sanitation	147	40.4
Exposure to rain	78	21.6
Cold weather	25	6.9
Others(Due to getting hungry, evil spirit, God/Allah)	35	9.6
Knows that malaria is transmissible (n=408)		
Yes	259	63.5
No	149	36.5
Modes of transmission mentioned (n=259)		
Mosquito bites	230	88.8
Air borne	60	23.1
Contact with infected person	22	8.5

Variables	Frequency	Percent
Season mosquito bites most (n=408)		
Dry season	17	4.2
Rainy season	358	87.7
All year round	8	2.0
Do not know	25	6.1
Time mosquito bites most (n=408)		
Morning	3	0.7
Evening	75	18.4
Night	291	71.3
All time	21	5.1
Do not know	18	4.4
Knows at least one symptom of malaria (n=408)		
Yes	384	94.1
No	24	5.9
Common symptoms of malaria mentioned (n=384)		
Fever	343	89.3
Chills/rigor/shivering	302	78.6
Headache	284	73.9
Generalized ache	141	36.7
Convulsion	100	26.0
Loss of consciousness	90	23.4
Others (Big mass in the abdomen, vomiting)	9	2.3
Knows the complication of malaria in pregnancy		
Yes	286	70.1
No	122	29.9
Common complications mentioned (n=286)		
Spontaneous abortion	223	78.0
Severe maternal anemia	146	51.0
Still births	104	36.4
Premature delivery	87	30.4
Low birth weight	61	21.3
Cerebral malaria	67	23.4
Puerperal pyrexia	44	15.4
Others (Neonatal death, poor appetite)	23	8.6

NB: Percents add up more than 100 due to multiple responses

As to the knowledge of prevention of malaria, almost all knew that malaria is a preventable disease and around 385(94.4%) of them knew at least one method of prevention. The common methods of prevention mentioned were, use of insecticide treated bed net 366(95.0%), environmental sanitation 211(54.8%), indoor residual spraying142 (36.8%) and taking anti malaria medication 120(31.1%). In this study, 77.7 % of the subjects had received malaria education messages from different sources. Over three quarter (80.4 %) received messages on malaria from health professionals and almost half (48.9 %) from mass media.

Off all (408) the women, 381(93.4 %) reported having heard about ITN and the commonest source of information about ITN being health institution 215(56.4%), followed by health extension workers 184(48.2%). Three hundred ninety nine (97.8%) reported that ITN has a benefit in the prevention of malaria. About 326 (81.7%) mentioned that ITNs prevents from malaria, 252(63.1%) from mosquito bites and131 (32.8%) from nuisance. A total of 394 (96.6%) of them believe that it has a benefit in preventing malaria. Generally, 139(34.1%) had adequate knowledge while 269(65.9%) had inadequate knowledge on the cause, symptom and transmission and prevention of malaria including ITN.

Around 116(29.5%) of the respondents had moderate attitude towards malaria preventive measures including ITNS while 277(70.5%) had high. Regarding to the current practice of the respondents on prevention of malaria, around 377(92.4%) of the subjects reported to use at least one method of prevention. The common methods mentioned were, use of mosquito bed nets 349(92.5%), environmental management 147(38.9%), and using indoor residual spraying 39(10.3%) (Table3).

Table 3. Knowledge, attitude and current practice on the prevention and control of malaria among ANC attendees at Arba Minch Hospital and Health center, March, 2011

Variables	Frequency	Percentage
Knows at least one method of prevention of malaria (n= 408)		
Yes	385	94.4
No	23	5.6
Methods of prevention mentioned (n= 385)		
Mosquito bed nets	366	95.0
Environmental sanitation	211	54.8
Smoke	49	12.7
Indoor residual spraying	142	36.8
Taking anti malaria medication	120	31.1
Use Nothing	5	1.3
Heard general malaria education message		
Yes	317	77.7
No	91	22.3
Sources for malaria message (n=317)		
Mass media (Radio)	155	48.9
Health professionals	255	80.4
Schools	53	16.7
Friends	40	12.6
Others (Posters, leaflets, magazines, government officials)	46	14.5
Heard about ITNs (n= 408)		
Yes	381	93.4
No	27	6.6
Sources of information about ITNs (n=381)		
Health institutions	215	56.4
Mass media	80	20.9
Health extension workers/professionals	184	48.2
Friends	34	8.9
Knows the benefit of ITNs (n=408)		
Yes	399	97.8
No	9	2.2
General knowledge about malaria		
Adequate	139	34.1
Inadequate	269	65.9
Attitude on malaria prevention including ITN (n=393)		
Moderate attitude	116	29.5
High attitude	277	70.5

Variables	Frequency	Percent
Benefits of ITNs mentioned (n= 399)		
Prevents mosquito bites	252	63.1
Prevents nuisance	131	32.8
Prevents malaria	326	81.7
Gives warmth	34	8.5
Believes that ITNs prevents malaria (n=408)		
Yes	394	96.6
No	14	3.4
Currently practicing preventive methods (n=408)		
Yes	377	92.4
No	31	7.6
Practice on prevention mentioned (n=377)		
Mosquito bed net use	349	92.5
Environmental sanitation	147	38.9
Insecticidal spraying	39	10.3
Use nothing	3	0.73

NB: Percents add up more than 100 due to multiple responses

5.5. Ownership and utilization of insecticide treated bed nets by pregnant women

Out of the total study subjects, 386(94.6) pregnant women had at least one bed net and 371(90.9%) owned at least one ITN, thus making the coverage for any bed net and for ITN 94.6% and 90.9% respectively. However, coverage with at least two bed nets of any type and ITNs was 232(56.9%) and 143(35.0 %) respectively. The overall bed nets identified by this study were 746 of which 72.0% were ITNs .

From the total net owners, 280(72.5%) had nets that needed re-impregnation and the remaining 106 (27.5%) were long lastingly treated nets. A total of 326(87.9%) of respondents knew that their ITNs should be retreated and 350 (94.0%) perceived that ITNs is more effective than untreated bed nets whereas 46(12.4%) said that they do not know the benefit of ITNs .Out of three hundred seventy one (90.9%) pregnant women who owned ITNs, 334 (90.0%) obtained their ITN freely from health institutions,15(0.4 %) bought from health institution while 22(0.6%)got from other sources (market/shop) by payment .

The main reasons mentioned for not having ITNs were, unavailability of the bed nets 24 (64.9%), waiting for free distribution 7(18.9%) and 6 (16.2%) others (lack of awareness about where to find it and can‘t afford to buy it and a belief that ITN does not prevent malaria (Table 4).

Table 4. Bed net ownership among ANC attendees at Arba Minch Hospital and Health Center, March, 2011.

Variables	**Frequency (n=408)**	**Percent**
Having at least one bed net	386	94.6
Owning at least one ITN	371	90.9
Having at least 2 bed nets	232	56.9
Owning at least 2 ITNs	143	35.0
Number of any bed net owned	**(n= 386)**	
One	154	39.9
Two or more	232	60.1
Number of ITNs owned	**(n=371)**	
One	228	61.5
Two or more	143	38.5
Total number of nets identified		
Any bed net	746	100
ITNs	537	72
Source of ITNs	**(n=371)**	
Health institutions freely	334	90.0
Health institutions with payment	15	4.0
Market /shops	17	4.6
Other sources	5	1.3
Reasons for not having ITNs	**(n=37)**	
Unavailability of ITNs	24	64.9
Waiting for free distribution	7	18.9
Others (can’t afford, lack of awareness ,unbelief	6	16.2

In this study, the proportion of pregnant women who reported for using their available bed nets was 371(96.1%) and the rest 15(3.9%) were not using at all the bed nets they owned. Two hundred seventy seven (74.7%) used their bed nets without interruption throughout the year, while the other 94(24.3 %) used their nets intermittently. Forty one percent of intermittent users were sleeping under bed nets during rainy seasons. Likewise close to one fourth (23.4%) of participants who used their nets intermittently reported to use after hearing mosquito buzzing and after rainy season (23.4%).

The proportion of pregnant women who slept under any type of bed net during the night preceding the study was 308 (79.7%).whereas , the proportion of respondents who slept under an ITNs during the night preceding a survey was 278(74.9%) .Hot weather condition was reported as the main reason for not using the ITN last night by 50(53.1%) of the respondents, 14(14.9%) claimed that there were no mosquitoes last night, 9 (9.6%) not suitable to hang, 5 (5.4%) don't believe that ITN prevents malaria and another 16(17.0%) reported that they do not know how to use the nets, had nets not treated and washed (Table 5).

Table 5. Bed net utilization among pregnant women attending ANC, Arba Minch Hospital and Health Center, March, 2011

Variables	Frequency	Percentage
Sleeping under the bed nets available (n=386)		
Yes	371	96.1
No	15	3.9
Regular use of any net (n=371)		
Yes	277	74.7
No	94	24.3
Times for intermittent/irregular use mentioned (n=94)		
Hearing mosquito buzzing	22	23.4
After rainy season	22	23.4
During rainy season	39	41.4
During dry season	6	0.6
As wanted	5	0.5
Last night use of any net(n=386)		
Yes	308	79.7
No	78	20.3
Last night use of ITN (n=371)		
Yes	278	74.9
No	93	25.1

Variables	Frequency	Percent
Reasons why ITN was not used(94)		
Hot weather	50	53.1
No mosquito last night	14	14.9
Not suitable to hang	9	9.6
Do not believe	5	5.4
Other (don't know how to use, not retreated, washed)	16	17.0

5.5. Malaria parasitemiae status of pregnant women

Out of all (n=408) subjects examined, 10 (2.5 %) were positive for malaria parasitemiae, both plasmodium falciparum and plasmodium vivax were identified in this study in equal proportion (figure 4). In cross tabulation, among pregnant women who slept under ITN the night prior to the study, 5(1.8%) were positive in microscopic examination for plasmodium parasite whereas 4(4.8%) were found to positive for P. parasite among those who didn't sleep under ITN. Even though the association was not statistically significant, this finding can show us that those pregnant women who used ITN had more protection against malaria parasite than those who didn't. Among those who were positive, 5(50.0%) were slept under ITN the night preceding the study (figure 4).

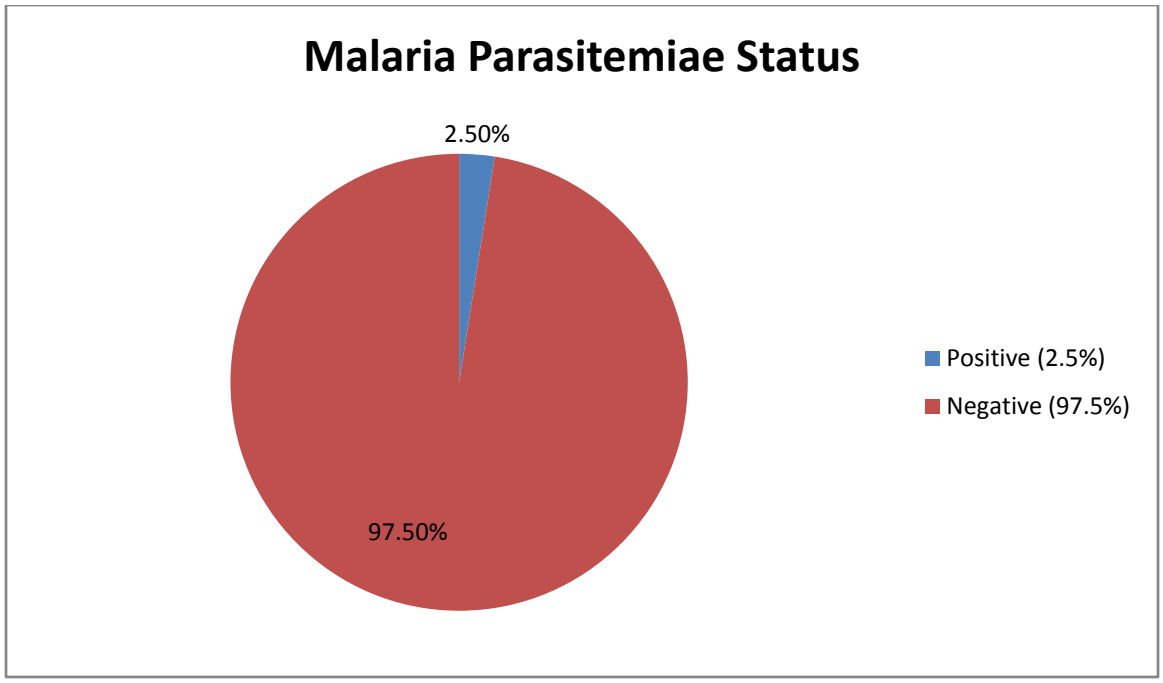

Figure 4 . Malaria parasitemiae status of pregnant women attending ANC, Arba Minch Hospital and Health Center, March, 2011.

The highest prevalence of 2.8% was observed among 15-24 years age group, closely followed by the age group 25-34 years with 2.4% and the remaining ≥ 35 years age group recorded 1.4 %. The prevalence of malaria parasitemiae in relation to the gravidity of women were 3.4 % for primigravidae, 2.8 %, 1.5% and 0 % prevalence rate recorded for second gravid, third and fourth gravid(multigravidae) respectively. As to the prevalence in relation to the gestation period of the women, those in their first trimester recorded 3(9.4 %), 5(3.8 %) and 2(0.8 %) for second and third trimester respectively as shown in figure 5.

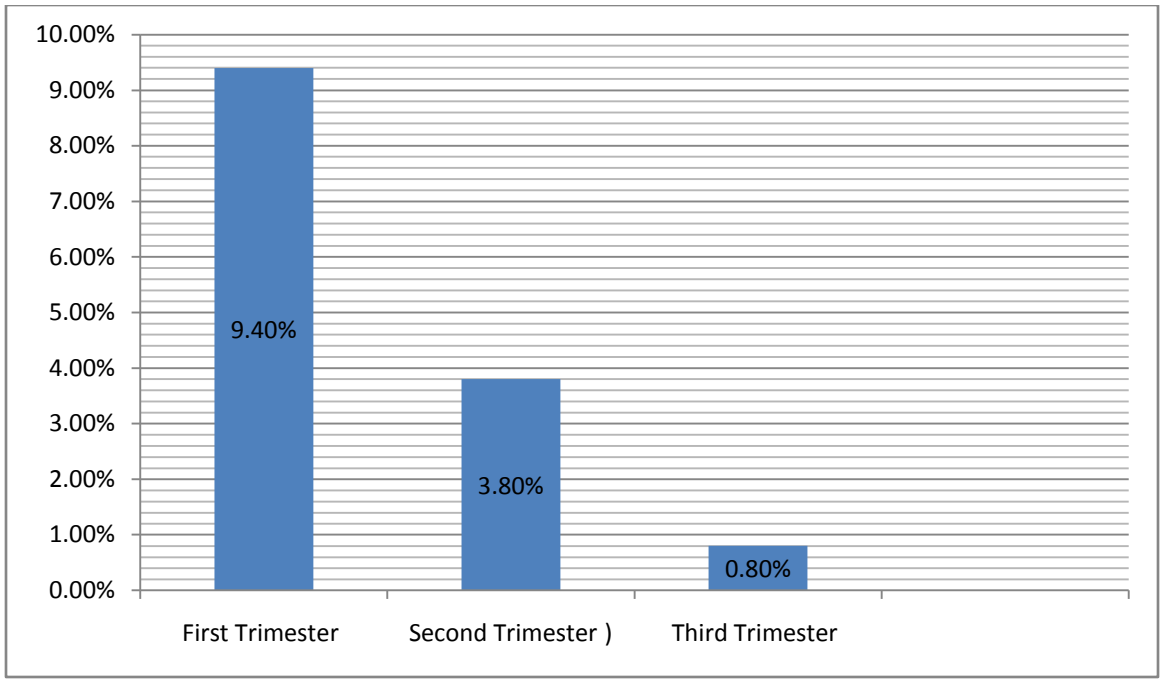

Figure 5. Prevalence of malaria parasitemiae in relation to gestation age of women attending ANC, Arba Minch Hospital and Health center, March, 201 1.

5.6. Factors affecting utilization of insecticide treated bed nets

In order to determine what factors influence the utilization of insecticide treated bed nets, socio demographic, obstetric and malaria related factors were entered in binary logistic stepwise regression. As a result ethnicity, listening radio/watching TV, associating the cause of malaria with mosquito bites, attack of malaria during the current pregnancy, malaria education message , willingness to use bed net, having source of information from health institutions and HEW's were found to have significant statistical association with ITN utilization.

Among the socio-demographic variables, only ethnicity had significant association with insecticide treated bed net utilization. Participants from Wolaita were less likely to use ITNs as compared to a woman from Goffa, Konso, Derashe and Zeise. [COR = 0.12 (0.03, 0.56)]. Those pregnant women who used to listen /watch radio /television were more likely to utilize ITN than their counter parts [COR = 7.97 (1.06, 60.16)]. The odds of ITN use was almost 2 times higher among pregnant women who associated the cause of malaria with mosquito bites [COR=1.79(1.02, 3.15)].

It was found that receiving malaria education message has a significant association with ITN utilization at a P value of 0.005. Those who had received malaria education message from mass media utilized ITN more likely than their counter parts, but this does not persist after controlling for confounders [COR= 2.17(1.27,3.71)]. Pregnant women who were unwilling to use any type of bed net at one or the other time slept under ITNs in the night preceding the study 0.3 times less than those who did [COR=0.30 (0.13, 0.72)] .Those pregnant women who had at least one attack of malaria during the current pregnancy utilized ITN 2.84 times more than those with no malaria attack [COR=2.84(1.6, 5.03)].

Study participants who didn't heard about ITNs from different sources were less likely to utilize it than those who have heard of it [COR=0.23(0.08, 0.69)]. The odds of utilizing ITN was 2.7 times more among those who heard about ITNs from health institution than those who did not, but the association does not persist after adjusting for possible confounders [COR=2.7(1.63,4.47)]. Similarly, the odds of utilizing ITNs was 1.8 times more among those who heard about ITNs from HEW's than those who did not [COR=1.83(1.12,3.0)] (Table 6).

Table 6 . Factors affecting utilization of ITNs among ANC attendees at Arba Minch Hospital and Health Center using bivariate stepwise logistic regression, March, 2011.

Variables	**Last night ITN use**		**OR (95 % CI)**
	Yes	**No**	
	No (%)	**No (%)**	**Crude OR**
Ethnicity			
Gammo	162 (58.3)	54 (58.1)	0.78 (0.43, 1.41)
Amhara	29 (10.4)	16 (17.2)	1.29 (0.58, 2.85)
Wolaita	38 (13.7)	2 (2.2)	**0.12 (0.03, 0.56)***
Others (Konso, Derashe, Zeise, Goffa)	49 (17.6)	21 (22.6)	1
Occupation her husband			
Government employ			
Farmer	99 (35.6)	33 (35.5)	1.13 (0.51, 2.54)
Merchant	16 (5.8)	12 (12.9)	2.55 (0.91, 7.13)
D laborer	47 (16.9)	22 (23.7)	1.59 (0.67,3.79)
Others	82 (29.5)	16 (17.2)	0.66 (0.27, 1.61)
	34 (12.2)	10 (10.8)	1
Listening radio /watching TV			
Yes	23 (10.4)	1 (1.4)	**7.97 (1.06,60.16)***
No	199 (89.6)	69 (98.6)	1

Variables	Last night ITN use		OR (95 % CI)
	Yes	No	
	No (%)	No (%)	Crude OR
Associating the cause of malaria with Exposure to rain			
Yes			**2.76 (1.58,4.85)***
No			1
Mosquito bites			
Yes			**1.79 (1.02,3.15)***
No			1
Sick with malaria			
Yes	35 (12.6)	27 (29.0)	**2.84 (1.61,5.03)***
No	243 (87.4)	66 (71.0)	1
Attitude towards malaria			
Moderate			
High	68 (25.3)	34 (38.2)	**0.55 (0.33,0.91)***
	201 (74.7)	55 (61.8)	1
Malaria education message			
Yes	230 (82.7)	64 (68.8)	**2.17 (1.27,3.71)***
No	48 (17.3)	29 (31.2)	1
Currently practicing any of the prevention methods			
Yes	267 (96.0)	82 (88.2)	1
No	11 (4.0)	11 (11.8)	**0.31 (0.13, 0.73)***
Willingness to use bed net at one or the other time			
Yes	255 (95.5)	71 (86.6)	1
No	12 (4.5)	11 (13.4)	**0.30 (0.13, 0.72)***
Heard about ITNs			
No	6 (2.2)	8 (8.6)	**0.23 (0.08,0.69**)*
Yes	272 (97.8)	85 (91.4)	1
Heard from Health Institutions			
Yes	166 (60.8)	31 (36.5)	**2.7 (1.63,4.47)***
No	107 (39.2)	54(63.5)	1
Heard from HEW's			
Yes	123 (45.1)	51 (60.0)	**1.83 (1.12,3.00**)*
No	150 (54.9)	34 (40.0)	1

Note: * = Statistically significant

Predictors of ITNs utilization

All variables significant in bivariate logistic regression analysis were entered together in the multivariable logistic regression model. Accordingly, ethnicity, attack of malaria during current pregnancy and willingness to use ITN were identified as independent predictors of ITN use. Participants from Wolaita were less likely to use ITNs as compared to a woman from Goffa, Konso, Derashe and Zeise ethnicities, the association is still significant after controlling for confounding factors by multivariate analysis [AOR = 0.11(0.02,0.52)]. Willingness to use ITN remained independently and significantly associated with ITNs utilization. In this analysis, those pregnant women who were unwilling to use any type of bed net at one or the other time were less likely to sleep under ITNs than those who did [AOR=0.27(0.10, 0.27)] Those Pregnant women who had at least one attack of malaria during the current pregnancy utilized ITN nearly 3 times more than those with no malaria attack [AOR = 2.66 (1.43, 4.93)]

Table 7. Multivariate Logistic regression analysis of factors associated with ITNs utilization among pregnant women attending ANC, Arba Minch Hospital and Health Center, March, 2011.

Variables	**Last night ITN use**		**OR (95% CI)**	
	Yes	**No**	**COR**	**AOR**
	No (%)	**No (%)**		
Ethnicity				
Gammo	162(58.3)	54 (58.1)	0.78 (0.43, 1.41)	0.72 (0.38, 1.37)
Amhara	29 (10.4)	16 (17.2)	1.29 (0.58, 2.85)	1.22 (0.52, 2.86)
Wolaita	38 (13.7)	2 (2.2)	**0.12 (0.03, 0.56)**	**0.11 (0.02, 0.52)***
Others	49 (17.6)	21 (22.6)	1	1
Sick with malaria				
Yes	35 (12.6)	27 (29.0)	**2.84 (1.61,5.03)**	**2.66 (1.43,4.93)***
No	243(87.4)	66 (71.0)	1	1
Willingness to use bed net at one or the other time				
Yes	255 95.5)	71 (86.6)	1	1
No	12 (4.5)	11 (13.4)	**0.30 (0.13, 0.72)***	**0.27 (0.10,0.72)***

Note: * = Statistically significant

Chapter 6. Discussion

In this study the situation of malaria and malaria related facts among pregnant women were investigated. Over three fourth (96.3%) of pregnant women had heard about malaria. Most (88.8%) women associated malaria with mosquito bites. Majority (63.5%) knew that malaria is transmitted from infected person to the other. This finding is nearly similar to a study conducted in Kafta-Humera District, Tigray region, which showed that 95.3% of their study subjects heard about malaria and 94.4% of them knew that mosquito transmits malaria (44). It also conforms to similar studies in other countries, as in Kenya in which about 86.9% of respondents associated malaria with mosquito bites (50). A considerable proportion of pregnant women also associated malaria with exposure to rainy and cold weather, physical contact with a malaria patient, eating young sugar cane. Similar misconceptions were observed in a study conducted in Raya, Azebo district. The correction of such misconceptions about the relationship between mosquito bite and malaria through health education messages is very critical for the success of malaria prevention and control using ITNs (5).

Ninety four percent (94.1%) of respondents reported that they knew at least one symptom of malaria. Almost ninety percent identified fever as a major symptom. Considerable proportion of respondents also identified chills/rigor (78.6%) and headache (73.9%) as the common symptoms of malaria. This finding concurs to other study findings in other part of Ethiopia (Raya Azebo district, Tigray region) and study conducted in Kafta-Humera District, Tigray region (5, 44).

The findings of this study also indicated that 70.1% of women knew at least one complication or adverse effect of malaria during pregnancy. However, more than three fourth (78.7%) did not know the most common one which is low birth weight. But, this finding is high as compared to the Nigerian report (53). This difference could be explained by differences in the study population. Generally their knowledge on the cause, symptom and transmission of malaria and ITN was relatively low, 139(34.1%) had adequate knowledge while 269(65.9%) had inadequate knowledge. Around 116(29.5%) of the respondents had moderate attitude towards malaria preventive measures including ITNS while 277(70.5%) had high.

This is more or less contrary with a study in Kenya, where Knowledge on malaria illness and ITNs was high with majority (86.9%) of pregnant women having adequate level of knowledge (50).The difference could be due to time gap and the strategies used to address the pregnant women. This study revealed that 94.4% of the respondents used at least one method of prevention of malaria. The common methods reported to be used were ITN (92.5%), environmental sanitation (38.9%), indoor residual spray (36.8%), taking anti malaria drug (31.1%) and smoke (12.7%). This is more or less in agreement in some of the methods with that of the study done in Jimma Zone, where most common methods used were, environmental sanitation (36%), bed net use (23%) and smoke 16% (65). It may be important to increase awareness with respect to different vector control measures that target both larval and adult stages of mosquitoes, and promote the use of personal protection measures including ITNs use that reduce the overall vector density.

The proportion of pregnant women having any type of bed net and ITNs was found to be 94.6% and 90.9% respectively. However, the coverage with at least two bed nets of any type and ITNs respectively was 56.9% and 35.0%. The ITNs coverage found in the current study is much more than the one on preliminary report of EDHS 2005 which is 19.7% (for those living in altitudes less than 1500mm), could be due to the intensive free distribution being done on this site and due to DHS report including both less and more risk areas together (66). Nevertheless, this is lower than the objective intended to be achieved by the end of the national five year strategic plan of Ethiopia (2006-2010), where 100% households in malarious areas will have at least one ITN by the end of the plan (23). Achieving this national goal has a great contribute to the reduction of child mortality (MDG Goal 4) and improved maternal health (MDG Goal 6). Moreover, according to the malaria indicator survey of 2007, in Ethiopia: 65.6% of respondents owned at least one ITN (52) and this is still lower than the finding of current study (52).

Among those pregnant women who had at least one bed net, 96.1 % utilized the available net at one or the other time. Out of 371 pregnant women who owned at least one bed net, 24 % of them were using their net intermittently where majority used during rainy season. The proportion of pregnant women who slept under any bed net and ITN the night before the survey was 79.7 % and 74.9% respectively. The findings are slightly higher than the findings in Kafta-Humera district which was 64.7% for both any net and ITN (44).

The explanation is likely to be time gap, the expansion of health extension program at urban setting and the newly distribution of ITNs in the study site so as to scale up the coverage. This finding is also in line with that of the study done in the northern part of Ethiopia in Raya district, where 76.2% pregnant women residing in urban area had slept under ITN the previous night (5). Similarly, in a study in Kenya, it was shown that the majority of pregnant women attending ANC owned ITNs (75.4%) and the usage was high (70.5%) (50). From this study, it was observed that there is inconsistency between ITNs possession and utilization and this was also seen in other studies (8).

Prevalence of ITNs use was lower among primigravidae who were the most at risk adult population when compared to multigravidae, 42.1 % and 58.0 % respectively. This finding was similar to that of a finding from Nigeria, where it was 37.5 % and 62.5 % respectively. The low awareness and low use of prevalence of ITNs calls for education of this at risk population through ANC and the media (51).

This study has also shown relatively low (2.5%) prevalence of malaria parasitemiae in women attending ANC as compared to a study done in Nigeria, which was 9 % and much lower than Solomon Island which was 18 % (58, 63). Only *P. falciparum* was encountered in findings of Nigeria, but this was different in this study where both *P. falciparum and P. vivax* were identified in equal proportion. These differences may be due to the techniques used to identify the parasites, seasonal differences and varying transmission pattern (63). Even though the profile of malaria parasitemiae was not significantly associated with ITNs utilization, the finding of this study showed that almost half of the pregnant women positive for malaria parasitemiae were used ITNs the night prior to the study. This might be due to improper and irregular use of ITNs. So this can be improved with intensive health education focusing on the demonstration of how to use properly.

This study again revealed that as the physical and gestation age of the pregnant women increases the prevalence of malaria parasitemiae decreases. The explanation for this is as the women gets older, their resistant to malaria becomes higher due to improvement in host immunity. In this study pregnant woman in the 15-24 year age group had the highest prevalence of 2.8 %, closely followed by 25-34 year age group with 2.4 %, which is consistent with the study in Nigeria, age group 15-20 recorded 16 % and 15.2 % in 21-25 year age group.

Women in their first trimester recorded the highest prevalence 9.4% against second 3.8% and third trimester 0.8%, which is in agreement with findings of the same study in Nigeria,1st trimester 13.3%, 2nd trimester 10.2% and 3.8% in 3rd trimester. The highest malaria prevalence was observed among primigravidae (3.4%), then second gravidae (2.8%) and multigravidae (1.5%), which accords with findings in Nigeria, primigravidae (23%), second gravidae (17%) and 11% in multigravidae (59).

Women in their first trimester had the highest prevalence and this implies that pregnant women should register early for ANC according to the standard, so that associated complications of malaria during pregnancy can be reduced. The primigravidae had higher malaria parasitemiae than the multigravidae; this is probably due to the suppressive effect of hormones on the cell mediated immunity (59). Therefore treatments and prophylaxis for malaria in pregnancy should, as a matter of concern, be free at all levels to reduce the adverse effect of malaria in pregnancy.

Even though it is difficult to explain the association, the pregnant women from Wolaita were found to be less likely to utilize ITNs. Pregnant women who had at least one attack of malaria during the current pregnancy utilized ITN almost 3 times more than their counter parts. The other factor found to be an independent predictor of ITNs utilization was expressing the willingness to use ITNs. This is consistent with the findings of a study done in Raya Azebo district (5).

Chapter 7. Conclusion and Recommendations

7.1. Conclusion

Based on the findings of this study the following conclusions were made. The proportion of pregnant women who owned insecticide treated bed net in the study area was high as compared to the results of studies conducted previously in different parts of the country and elsewhere. However, it is far lower than the national five year strategic plan of the prevention and control of malaria from 2006-2010. There is inconsistency between ITNs ownership and utilization among ANC attendees. In spite of high coverage of ITNs among pregnant women, the utilization was found to be lower than the national five year strategic plan (2006-2010) and the redefined Abuja target.

A considerable proportion of pregnant women had misconceptions on the cause and transmission of malaria such as associating malaria with exposure to rainy and cold weather, physical contact with a malaria patient, eating young sugar cane. The overall Knowledge on malaria and ITNs was relatively low, but a considerable proportion of women had high attitude towards malaria preventive measures including use of ITN. The proportion of pregnant women positive for parasitemiae was less (1.8%) among who slept under ITN as compared to those who didn't (4.3%). Experiencing malaria attack during the current pregnancy and a willingness to use ITNs were the important predictors of ITNs utilization. The prevalence of malaria parasitemiae was relatively low. The primigravidae had higher malaria parasitemiae than the multigravidae. Women in their first trimester recorded the highest prevalence than second and third trimester. Finally, there was no significant association observed between ITNs utilization and parasitemiae status among pregnant women.

7.2. Recommendations

The following recommendations are forwarded based on the findings of the study:

1. IEC/BCC programs should focus on comprehensive knowledge on malaria, prevention and control including ITNs use. This is particularly important to narrow the gap between ownership and utilization of ITNs by pregnant women.
2. Screening for malaria parasitemiae and offering prophylaxis against malaria should be areas to be addressed in preventing and controlling malaria during pregnancy.
3. The government bodies and NGO's should involve in upgrading the capacity of health professionals with special emphasis on the prevention and control of malaria in pregnancy so as to increase the knowledge of pregnant women on malaria and promote use of preventive measures including ITN.
4. Pregnant women who had inadequate knowledge and misconception about malaria/ITN need to be educated on the basics of malaria and the importance of using ITN.
5. Encouraging and motivating those pregnant women who own functional bed net to be willing to use it on a daily bases without interruption.
6. Further investigation of the factors affecting ITN use and its association with the prevention of adverse effects of malaria among pregnant women.

Chapter 8. Strengths and Limitations of the study

Strengths of the study:

- The study focused on pregnant women, the most vulnerable segment of the population.
- The study was also carried out immediately after the new distribution of nets in the town with special focus on pregnant women.

Limitations of the study

- The use of ITNs by pregnant women was assessed only for one night preceding the interview and may, therefore, not reflect the long-term pattern of ITN usage.
- To validate the data on utilization of insecticide treated bed net, doing house hold observation of the condition of nets would have been better but this was not feasible in this study since it was a facility based study.
- Because of the cross sectional nature of the study the temporal relationship between the the exposure and the outcome can't be assured.
- Selection bias can't be ruled out those ANC service utilization seen/believed to be high in Arba Minch town.

References

1. The Global Fund for AIDS, Tuberculosis and Malaria (GFATM)**.** World Malaria Day: April 2010. Available from: http://www.theglobalfund.org/en/worldmalariaday-2010. (Accessed on 22/11/2010).
2. Joas BR**,** Charles LW and Wen LK. 6th Africa malaria day: how far have we come after the Abuja Declaration? Malaria Journal. 2006; **5:**102
3. Gamble C, Ekwaru PJ, Garner P, Kuile FO. Insecticide-Treated Nets for the Prevention of Malaria in Pregnancy: A Systematic Review of Randomized Controlled Trials. PLoS Med. 2007; 4(3): e107.
4. Yartey JE .Malaria in pregnancy: Access to effective intervention in Africa. International journal of gynecology and obstetrics: the official organ of the International Federation of Gynecology and Obstetrics. 2006; 94:364- 373.
5. Belay M, Deressa W. Use of insecticide treated nets by pregnant women and associated factors in a pre- dominantly rural population in Northern Ethiopia. Trop Med Int Health. 2008; 13(10):1303-13.
6. Nabarro DN, Tayler EM, 1998. The "roll back malaria" campaign. Science 280: 2067–2068.
7. Roll Back Malaria Cabinet Project, 2000. The African Summit on Roll Back Malaria, Abuja, Nigeria. Geneva: World Health Organization.
8. Astatkie A, Feleke A. Utilization of insecticide treated nets in Arba Minch Town and the malarious villages of Arba Minch Zuria District, Southern Ethiopia. Ethiop J of Health Dev. 2009; 23 (3) : 206-215
9. World Health Organization (WHO), 2000. Live at Risk: Malaria in Pregnancy
10. The Global Fund for AIDS, Tuberculosis and Malaria (GFATM)**.** Fighting Malaria. Available from http://www.theglobalfund.org/en/malaria. (Accessed on Nov 22/2010).
11. Academy for Educational Development, Net Mark. Insecticide Treated Nets in Ethiopia. Net Mark 2004 Survey.
12. Carol Baume et al. Ethiopia bednet utilization study: why some nets owned are not used. Oct 2007; USAID, AED, Net Mark. Available from http://www.aed.org/Publications/upload/Ethio-net-utilization-report-08-18-08.pdf (accessed on 16/11/2010)

13. World Health Organization (WHO): World Malaria Report 2009. Geneva, December 2009.
14. Bernard JB**,** Marian W**,** Ulrika U, Stephanie D**,** Jenny H and Sabine G. Monitoring and Evaluation of malaria in pregnancy – developing a rational**.** Malaria Journal 2008, **7**(Suppl 1)**:**S1-S6
15. Steketee RW, Nahlen BL, Parise ME, Menendez C. The burden of malaria in pregnancy in malaria-endemic areas. Am J Trop Med Hyg.2001; 64:28–35.
16. Lindsay S, Ansell J, Selman C, Cox V, Hamilton K, et al. Effect of pregnancy on exposure to malaria mosquitoes. Lancet.2000; 355: 1972.
17. Brabin BJ (1983). An analysis of malaria in pregnancy in Africa. Bull World Health Organ 61: 1005–1016.
18. Nosten F, Rogerson SJ, Beeson JG, McGready R, Mutabingwa TK, et al. Malaria in pregnancy and the endemicity spectrum: What can we learn? Trends Parasitol.2004; 20: 425–432.
19. World Health Organization/UNICEF 2003.Africa Malaria Report 2003.
20. Meghna D, Feiko O, François N et al. Epidemiology and burden of malaria in pregnancy. The Lancet Infectious Diseases, February 2007;7(2):93-104
21. Patricia MG, Frank OR, Jeremiah N et al. Individual, household and environmental risk factors for malaria infection in Amhara, Oromia and SNNP regions of Ethiopia. Blackburn et al, Am J Trop Med Hyg, 2004; 75(4); 650-655.
22. President's malaria initiative: malaria operational plan (mop) Ethiopia fiscal year 2010.
23. FMOH; national five-year strategic plan for malaria prevention & control in Ethiopia 2006 – 2010 Addis Ababa.
24. Guyatt HL, Snow RW. The epidemiology and burden of Plasmodium falciparum-related anemia among pregnant women in sub-Saharan Africa. Am J Trop Med Hyg.2001; 64: 36–44.
25. Van Geertruyden JP, Thomas F, Erhart A, D'Alessandro U .The contribution of malaria in pregnancy to perinatal mortality. Am J Trop Med Hyg.2004; 71: 35–40.
26. Guyatt HL, Snow RW. Malaria in pregnancy as an indirect cause of infant mortality in sub-Saharan Africa. Trans R Soc Trop Med Hyg.2001 ; 95: 569–576.

27. Marchant T, Schellenberg JA, Nathan R, Abdulla S, Mukasa O, et al. Anemia in pregnancy and infant mortality in Tanzania. Trop Med Int Health.2004; 9: 262–266.
28. World Health Organization Regional Office for Africa (2004). A strategic framework for malaria prevention and control during pregnancy in the African region. WHO/AFRO. AFR/MAL/04/01. Brazzaville (Congo): World Health Organization Regional Office for Africa.
29. Lengeler C (2004). Insecticide-treated bed nets and curtains for preventing malaria. Cochrane Data base Syst Rev 2004: CD000363.
30. David LS, Simon IH, Abdisalan MN, Robert WS. Predicting changing malaria risk after expanded insecticide treated net coverage in Africa. Trends Parasitol. 2009 November; 25(11): 511–516.
31. WHO (2005) Global Strategic Plan. Roll Back Malaria. 2005–2015,World Health Organization
32. David LS and Simon IH. Endemicity response timelines for *Plasmodium falciparum* Elimination Malaria Journal 2009, **8**:87 doi:10.1186/1475-2875-8-87
33. Noor, A.M. et al. Insecticide-treated net coverage in Africa: mapping progress in 2000-07. Lancet 2009; 373 : 58–67
34. Fegan, G.W. et al. Effect of expanded insecticide-treated bed net coverage on child survival in rural Kenya: a longitudinal study. Lancet2007; 370: 1035–1039
35. Barnes, K.I. et al. Effect of artemether-lumefantrine policy an improved vector control on malaria burden in KwaZulu-Natal, South Africa. PLoS Med.2005; 2: e330
36. Bhattarai, A. et al. Impact of artemisinin-based combination therapy and insecticide-treated nets on malaria burden in Zanzibar. PLoS Med.2007; 4: e309
37. Grabowsky, M. The billion-dollar malaria moment. Nature2008 ; 451 : 1051–1052
38. Nyarango, P.M. et al. A steep decline of malaria morbidity and mortality trends in Eritrea between 2000 and 2004: the effect of combination of control methods. Malaria J. 2006; 5: 33.
39. Okiro, E.A. et al. The decline in pediatric malaria admissions on the coast of Kenya. Malaria J.2007 ; 6 : 151
40. Otten, M. et al. Initial evidence of reduction of malaria cases and deaths in Rwanda and Ethiopia due to rapid scale-up of malaria prevention and treatment. Malaria J.2009; 8: 14

41. Teklehaimanot, H.D. et al. Malaria in Sao Tome and Principe: on the brink of elimination after three years of effective anti- malarial measures. Am. J. Trop. Med. Hyg.2009; 80:133–140
42. National five –year strategic plan for malaria prevention and control in Ethiopia 2006-2010.
43. Abdisalan MN, Viola CK, Simon JB and Robert WS. The use of insecticide treated nets by age: implications for universal coverage in Africa. BMC Public Health 2009; 9:369
44. Berhane H, MPH Thesis (unpublished), June 2006. Assessment of Insecticide Treated Nets Coverage for Malaria Control in Kafta-Humera District, Tigray: Possession vs. Use by high-risk groups.
45. Thomas PE, Joseph K, Megan L, David L, and Kate M**.** Assessment of Insecticide Treated Bed net Use among Children and Pregnant Women across 15 Countries Using Standardized National Surveys. Am. J. Trop. Med. Hyg. 2009; 80(2): 209-214.
46. Kuile T et al. Permethrin-treated bed nets reduce malaria in pregnancy in an area of intense perennial malaria transmission in western Kenya. American Journal of Tropical Medicine and Hygiene, 2003 [in press].
47. D'Alessandro U et al. The impact of a national impregnated bed net programme on the outcome of pregnancy in primigravidae in the Gambia. Transactions of the Royal Society of Tropical Medicine and Hygiene, September 1996; 90(5):487-492.
48. Ibrahim EE: Effectiveness of Communication for Behavioral Impact (COMBI) strategy in increasing utilization rate of Insecticide Treated bed Nets (ITNs) – Blue Nile State, 2006.
49. Guyatt HL, Noor AM, Ochola SA, Snow RW. Use of intermittent presumptive treatment and insecticide treated bed nets by pregnant women in four Kenyan districts. Trop Med Int Health. 2004 Feb; 9(2):255-61.
50. Njoroge FK, Kimani VN, Ongore D, and Akwale WS: Use of insecticide treated bed nets among pregnant women in Kilifi District, Kenya. East Afr Med J.2009 Jul; 86(7):314-22.
51. Adeyemi AS, Adekanle DA, Akinola SE. Use prevalence of insecticide treated mosquito bed nets among pregnant population in Oshogbo, Nigeria. Nigerian Medical Practitioner. 2007; 52 (2): 29-32

52. Jima D, Getachew A, Bilak H, Steketee RW, Emerson PM et al. Malaria indicator survey 2007, Ethiopia: coverage and use of major malaria prevention and control interventions. Malaria Journal. 2010, **9:**58 doi: 10.1186/1475-2875-9-58.
53. Wagbatsoma VA, Aigbe EE. ITN utilization among pregnant women attending ANC in Etsako West Lga, Edo State, Nigeria. Niger J Clin Pract.2010 Jun; 13(2):144-8.
54. Chukwuocha UM, Dozie INS, Onwuliri COE. Perceptions on the Use of Insecticide Treated Nets in Parts of the Imo River Basin, Nigeria: Implications for Preventing Malaria in Pregnancy**:** African Journal of Reproductive Health, March, 2010, 14(1): 117-128.
55. Baume CA, Reithinge R, Woldehanna S. Factors associated with use and non-use of mosquito nets owned in Oromia and Amhara regional states, Ethiopia. Malar J.2009 Nov 23; 8: 264.
56. Nwagha UI, Ugwu VO, Nwagha TU, Anyaehie BU. Asymptomatic Plasmodium parasitemiae in pregnant Nigerian women: almost a decade after Roll Back Malaria. Transactions of the Royal Society of Tropical Medicine and Hygiene.2009Jan; 103(1):16-20.
57. Bardaji A, Sigauque B et al. Clinical malaria in African pregnant women. Malar J.2008 Jan 30; 7(1):27.
58. Bridget A, Makiva T, Qin C, Nanhua C, Joan B, and James S. Malaria in Pregnancy in the Solomon Islands: Barriers to Prevention and Control. Am. J. Trop. Med. Hyg.2008; 78(3): 449–454.
59. Ikeh EI, Akudo SN, Uguru, VE. Prevalence of malaria parasitemiae in women attending ANC at Jos university teaching hospital, Nigeria. Afr J Clin Exper Microbiol.2005; 6(1):15.
60. Ethiopian Demography and Health, SNNPR. Available from http://www.ethiodemographyandhealth.org/SNNPR.html.
61. Yearly malaria morbidity and mortality report- SNNPR Regional health bureau. SNNPR (2005). Awassa.
62. SNNPR, Investment Expansion Main Process: Potential of Gammo Gofa. Available from (http://www.southinvest.gov.et/potentialGamoGofa.htm).(Accessed on October 13/2010).
63. Net Mark survey, October 2008- Nigeria.

64. Roll Back Malaria, World Health Organization, and UNICEF. Guidelines for core population coverage indicators for Roll Back Malaria: To be obtained from household survey, 2004.
65. Getachew S. Assessment of use of insecticide treated bed net and factors affecting Serbo town, Jimma zone. AAU, Medical Faculty Public health department, April 2005.55- 57.
66. Central Statistics Agency and ORC Macro. Ethiopian Demographic and Health Survey 2005.Central Statistics Agency and ORC Macro: Addis Ababa, Ethiopia and Calverton, Maryland, USA. September 2006.

ANNEXES

Questionnaire (English version)

Interviewer Administered Questionnaire

Questionnaire for a research on ITNs utilization and prevalence of peripheral parasitemiae among pregnant mothers attending ANC in Arba Minch town, Gammo Gofa zone SNNPR, January 2010.

Hello, my name is _____, I am one of the data collectors in this study. The study is intended to assess the utilization of mosquito net and the prevalence of peripheral parasitemiae among pregnant mothers. To attain this purpose, your honest and genuine participation by responding to the questions prepared is very important and highly appreciated.

Confidentiality and consent

If you agree with the purpose of the research and is willing, I will question you about your knowledge, attitude and practice in relation to ITNs and take blood sample to determine your parasitemiae status. Your answers are completely confidential. No one will be told what you said in connection to your name. You don't have to answer any question if you do not want to and you can stop the interview at any time. However your openness and honest answer to these questions will help us to better understand the situation and will contribute to the interventions employed to control malaria in pregnancy. In case you do not understand a question or issue, please ask me to repeat or clarify. We would greatly appreciate your help in participating in this study, would you be willing to participate?

YES ☐ NO ☐

If yes, proceed.

If no, thank and stop here**.**

Signature of the respondent _____

Signature of the interviewer _____

JIMMA UNIVERSITY

COLLEGE OF PUBLIC HEALTH AND MEDICINE

DEPARTMENT OF POPULATION AND FAMILY HEALTH

Questionnaire for a research on ITNs utilization and prevalence of peripheral parasitemiae among pregnant mothers attending ANC in Arba Minch town, Gammo Gofa zone SNNPR, February, 2011.

Interviewer's Name_____ Name of the health institution _____

Supervisor's Name_____

Date of interview_____

Questionnaire No_____

Date of Interview: Day____ Month ____

Start time of interview: _____/_____

Instruction*: Circle the response provided by the interviewee or write the appropriate answer on the space provided.*

SECTION 1: SOCIO DEMOGRAPHIC AND ECONOMIC DATA

S.No	*QUESTIONS*	*RESPONDING CATEGORIES*	*SKIP*
1.	Respondent Name	_____	
2.	Kebele	_____	
101	Age of the respondent (in completed years)	_____	

102	Place of residence of the pregnant mother under study	1. Urban 2. Semi-urban 3. Rural	
103	Marital status	1. Married 2. Single 3. Divorced 4. Separated 5. Widowed	
104	Religion of the respondent	1. Protestant 2. Orthodox 3. Muslim 4. Traditionalist 5. Others(specify) _____	
105	Level of education of the pregnant mother (last grade completed)	1. Illiterate 2. Read and write only 3. Primary (1-6) 4. Secondary (7-10/12) 5. College and above	
106	Occupation of the pregnant mother	1. Housewife 2. Merchant 3. Daily laborer 4. *Tela* or other drinks Seller 5. Government employee 6. Other(Specify)_____	
107	Occupation of the husband living with the pregnant mother	1. Government employee 2. Farmer 3. Merchant/trader 4. Daily laborer 5. Other (Specify)_____	

108	Estimated(average) monthly income of the household/family.(Birr)	_____	
109	Total number of family members	_____	
110	Total number of family members by sex and age:	1. Female (<5 years) _____ 2. Male (<5 years) _____ 3. Female (>5 years) _____ 4. Male (> 5years) _____	
111	Do you own a functioning radio/TV?	1. Yes 2. No	
112	When do you most often listen radio/watch TV?	1. In the morning 2. In the afternoon 3. In the evening 4. All day 5. Sometimes 6. Never listen	

SECTION 2: OBSTETRIC CHARACTERISTICS

S.No	*QUESTIONS*	*RESPONDING CATEGORIES*	*SKIP*
201	Number of pregnancies / gravidity	1. One 2. Two 3. Three 4. Four or more	
202	Number of births the mother has given/parity	1. Zero (P_0) 2. One (P_1) 3. Two (P_2) 4. Three or more ($P_{\geq 3}$)	
203	Gestational age in months / trimester / at the time of interview	1. 1-3 / First trimester 2. 4-6 / Second trimester 3. 7-9 / Third trimester	
204	Do you have any history of abortion?	1. Yes 2. No	
205	If yes, how many times?	1. One 2. Two 3. Three or more	

SECTION 3: SLEEPING PATTERNS

S.No	*QUESTIONS*	*RESPONDING CATEGORIES*	*SKIP*
301	Do you sometimes sleep/pass the night outside the house?	1. Yes 2. No	
302	If yes, when is it?	1. During dry seasons 2. During hot weather 3. At any time	
303	With whom do you sleep?	1. Husband 2. <5 children 3. Older children 4. Other (Specify)_____	
304	Where did you slept in your house last night?	1. In door 2. Out door	
305	At what time do you normally go to bed?	_____	

SECTION 4: MALARIA RELATED INFORMATIONS

S.N	*QUESTIONS & INSTRUCTIONS*	*RESPONSE CATEGORY*	*SKIP*
401	Have you ever heard of an illness called "malaria"?	1. Yes 2. No	

402	If yes, do you know the cause of malaria?	1. Yes 2. No	*If 2→404*
403	If yes, what is that / or what are they? (more than one response is possible)	1. Cold weather/water 2. Exposure to rain 3. Eating young sugarcane / corn/sorghum/ 4. Evil spirit 5. Mosquito bite 6. God/Allah causes it 7. Poor sanitation/dirty surroundings/garbage/ standing water 8. Other (specify)_____	
404	Can it be transmitted from one person to another?	1. Yes 2. No	
405	If yes, how?	1. Mosquito bite 2. Airborne 3. Contact with infected person 4. Other (Specify)_____	
406	During what season do mosquitoes bite the most? DO NOT PROMPT (circle all possible answers)	1. During the dry season 2. During the rainy season 3. All year round 4. Do not know 5. Other (Specify)_____	

407	At what time do mosquitoes bite the most? DO NOT PROMPT (circle all possible answers)	1. The morning 2. The afternoon 3. The evening 4. At night 5. Day and night 6. Do not know 7. Other (Specify)	
408	What signs and symptoms of malaria do you know? (more than one response is possible)	1. Fever / hot body/ temperature 2. Chills / Feeling cold/ shivering 3. Headache 4. Backache and generalized aching 5. Loss of consciousness (coma) 6. Convulsion 7. Big mass in the abdomen 8. Other (specify)_____	
409	What do you think are the severe signs/symptoms of malaria? (more than one response is possible)	1. Convulsion 2. Coma/loss of consciousness 3. Whitening of face, hand, feet, etc. 4. Other (specify)_____	
410	What are the complications of malaria during pregnancy? DO NOT PROMPT (circle all possible answers)	1. Severe maternal anemia 2. Spontaneous abortion 3. Stillbirths 4. Premature delivery 5. Low birth weight 6. Puerperal Pyrexia 7. Cerebral Malaria	

		8. Neonatal death 9. Other(specify)_____	
411	Do you think that malaria can lead to death?	1. Yes 2. No 3. I don't know	
412	Do you think that pregnant mothers are more likely to get (at risk of) malaria or affected by malaria?	1. Yes 2. No	
413	Do you know the treatments of malaria?	1. Yes 2. No	
414	If yes, what are the treatments of malaria?	1. Modern (Chloroquine, *Fansidar,* Coartem, etc.) *2.* Traditional (Herbs, *Tsebel (holy water)*, etc.) 3. Others(specify)_____	
415	Malaria is the most serious health problem of the community	1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree 6. No response	
416	Probability of a pregnant women contracting malaria in malaria endemic area is high	1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree 6. No response	

417	Malaria can cause a serious health problem on the fetus in the womb	1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree 6. No response	
418	Malaria can lead to death if not treated	1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree 6. No response	
419	Malaria can be transmitted without mosquito bite	1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree 6. No response	
420	Stagnant water and marsh area can facilitate mosquito breeding	1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree 6. No response	
421	It is possible to prevent malaria	1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree 6. No response	

422	I have the interest to know about malaria prevention and control	1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree 6. No response	
423	Utilization of ITNs is one of the best methods of malaria prevention	1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree 6. No response	
424	I have the interest to use ITNs regularly and to prevent malaria	1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree 6. No response	
425	Have you been sick with malaria in the past six months?	1. Yes 2. No	
426	If yes, how many times?	1. One 2. Two 3. Three or more	
427	Where did you seek treatment?	1. At home with modern medicine 2. At home with traditional medicine 3. At health institutions/ government / private 4. Other	

		(Specify)_____	
428	Have you seen or heard malaria education message?	1. Yes 2. No	
429	If yes, where did you get these education messages? (more than one response is possible)	1. Radio 2. Posters/leaflets 3. Friends/patterns 4. Health worker 5. Government official 6. Schools	
430	Is it possible to prevent malaria?	1. Yes 2. No 3. I don't know (Not sure)	
431	If yes, do you know how to prevent malaria? (more than one response is possible)	1. Insecticide spraying 2. Mosquito bed net (ITNs) use 3. Herb spraying 4. Taking anti malaria medication 5. Smoke 6. Environmental sanitation/Avoiding stagnant water 7. I don't know (Not sure) 8. Other (Specify)_____	
432	What are you currently doing to prevent malaria? (more than one response is possible)	1. Insecticide spraying 2. Mosquito bed net (ITNs) use 3. Herb spraying 4. Environmental sanitation/Avoiding stagnant	

		water 5. Other (Specify)_____ 6. I don't know (Not sure) 7. Nothing	

SECTION 5. ITNs RELATED INFORMATIONS

S.N	*QUESTIONS*	*RESPONSE CATEGORIES*	*SKIP*
501	Have you ever heard about ITNs?	1. Yes 2. No	*If 2 →*
502	If yes, what are your sources of information about ITNs?	1. Hospital/Health Center 2. Mass media 3. Health Extension Workers 4. Neighbors or friends	
503	Do you know the benefit of a mosquito net?	1. Yes 2. No	*If 2→*
504	If yes, what are the benefits?	1. Prevents mosquito biting so that passing safe sleep 2. Prevents the nuisance by other insects 3. Prevents malaria 4. Gives warmth 5. Other (Specify)_____	
505	Do you believe that ITNs has a benefit to prevent malaria?	1. Yes 2. No	
506	Is there a bed net in your house?	1. Yes 2. No	*If 2→512*

507	If yes, how many bed nets of any type do you own?	_____	
508	The types and number of bed nets you own are :	1. Treated (ITNs)_____ 2. Untreated _____ 3. Unidentified _____ 4. Do not know _____	
509	If you have insecticide treated bed nets (ITNs), what is the status of treatment?	1. Treated initially (before use) 2. Long lastingly treated 3. Re-treated 4. I do not know	
510	Where did you get the ITNs?	1. From health institution, freely 2. From health institution, with payment 3. Bought from market/ shop 4. From other source, freely 5. From other source, with payment	
511	Duration of possession of the ITNs. (Write the exact date if known. If not known, write the estimated month and year)	_____	
512	If you do not have ITNs, what is the reason for?	1. Unavailability 2. Inaccessibility 3. Unable to buy/can't afford 4. Waiting for free distribution 5. Because it does not prevent malaria 6. My husband does not like it 7. Lack of awareness	

		8. Other(specify) _____	
513	If your net was initially treated, do you know that it should be retreated?	1. Yes 2. No	
514	If the net had never been retreated with insecticide, why was that?	1. Was not informed about retreatment 2. Don't know the benefit of retreatment 3. Fear of toxicity 4. Lack of money 5. Service is not available nearby 6. Time was not convenient 7. Other (Specify)_____	
515	Are you sleeping under the net / using the available nets?	1. Yes 2. No	
516	If yes, how frequently are you using the nets?	1. Consistently/regularly throughout the year 2. Intermittently	
517	If you are using intermittently, at what time are you using?	1. During rainy season 2. After rainy season 7. During dry season 8. As I like 9. When hearing mosquito buzzing	
518	Last night have you slept under any type of bed nets?	1. Yes 2. No	
519	Last night have you slept under ITNs?	1. Yes 2. No	

520	If you have not slept under ITNs last night, what was the reason for?	1. Not suitable to hang the net 2. Don't believe that it prevents 3. No mosquitoes last night 4. Hot weather 5. Don't know how to use it 6. It is not retreated 7. It was washed 8. Others _____	
521	Do you think insecticide treated bed net is more effective than untreated one?	1. Yes, it is more effective 2. No. It is equally effective 3. I didn't observe the difference 4. It was more effective initially. But as the days passed, mosquitoes enter the room and bite persons and no dead mosquitoes seen even before six months 5. Other (Specify)_____	
522	How frequent do you wash the bed net in the 6 months period?	1. Only once just before retreatment 2. Twice 3. 3-5 times 4. 6 or more times 5. Never	
523	Do you know that frequent washing can reduce the efficacy of the bed net?	1. Yes 2. No	

The interview is now finished. Thank you for taking the time to answer these questions**.**

Time of end of interview: _____/_____

DECLARATION

I declare that I have asked this entire questionnaire as I have been briefed/ trained.
I declare that all the responses recorded by me in this questionnaire were given to me by the respondent whose details are on the front cover.

SIGNATURE :.....

II. Parasitological examination/diagnosis

S. NO	*QUESTIONS*	*RESPONSE CATEGORIES*	*SKIP*
1	Blood sample collected	1. Yes 2. No	
2	Thin /thick film done	1. Yes 2. No	
3	Presence of malaria parasite	1. Yes 2. No	
4	Type of parasite identified	1. P. falciparum 2. P. vivax 3. Both	

Questionnaire (Amharic version)

ሀ. በመረጃ ሰብሳቢዉ ሰዉ በኩል የሚሞላ የአማርኛ መጠይቅ

በደቡብ ብሔር ብሔረሰቦችና ሕዝቦች ክልል በጋሞ ጎፋ ዞን በአርባምንጭ ከተማ በሁለት የመንግስት ጤና ድርጅቶች የነፍሰ ጡር ምርመራ የሚከታተሉ እናቶች ላይ በፀረ-ተባይ መድሃኒት የተነከረ የአልጋ አጎበር አጠቃቀማቸዉንና በወባ በሽታ አምጪ ተሕዋስ የመጠቃታቸዉን ሁኔታ ለማጥናት የተዘጋጀ መጠይቅ የካቲት 2003 ዓ.ም.

ጤና ይስጥልኝ ፤ ስሜ _____ ይባላል። እኔ ለዚህ ጥናት መረጃ ከሚሰበስቡ ሰዎች መካከል አንዱ/ዷ ነኝ ። ይህ ጥናት ነፍሰጡር እናቶች የወባ በሽታን በመከላከል ዙርያ ያላቸዉን ግንዛቤ፤ የአልጋ አጎበር አጠቃቀም ሁኔታን እንዲሁም በወባ አምጪ ተሕዋስ የመጠቃት እድላቸዉን ለማወቅ የተዘጋጀ ነዉ። ይህንን የጥናቱን አላማ ለማሳካት የእርስዎ መልካም ፍላጎት፤ ቅንነት እዉነተኛና ተአማኝ መልሶችን ለጥያቄዎች መስጠት እጅግ በጣም አስፈላጊና ከፍተኛ የሆነ ጠቀሜታ አለዉ።

የሚስጥር አጠባበቅና የተጠያቂዉን ስምምነት ማረጋገጫ

እንግዲህ የጥናቱ አላማ ግልጽ ከሆነልዎት የወባ በሽታን በመከላከልና በመቆጣጠር ዙርያ ያለዎትን ግንዛቤና ፍላጎት በተለይም የአልጋ አጎበር አጠቃቀምዎትን በተመለከተ አንዳንድ ጥያቄዎችን ከጠየቅሆት በኋላ በደምዎ ዉስጥ የወባ አምጪ ተሕዋስ መኖር አለመኖሩን ለማወቅ የደም ናሙና እወስዳለሁ። በዚህ መጠይቅ የእርስዎ የግል • ጉዳዮችን የሚመለከቱ ጥያቄዎችን ሊጠየቁ ይችላሉ የሚሠጡት ምላሽ ግን ሙሉ በሙሉ በእኔና በእርስዎ መካከል የሚቀር ሲሆን በሚስጥር የሚጠበቁና በተናጠል የማይዘገቡ መሆኑንም ልገልጽልዎት እወዳለሁ። በእርስዎ ስም ተዛማጅነት ያለዉ መልስ ለማንም አይነገርም፤ ጥናቱም በፍቃደኝነት ላይ የተመሰረተ ስለሆነ የመሳተፍ ወይም ያለመሳተፍ መብትዎ የተጠበቀ ነዉ ። ማንኛዉንም ምላሽ ለመስጠት የማይፈልጉትን ጥያቄ አለመመለስ ይችላሉ፤ ቃለምልልሱንም በፈለጉ ጊዜ ሊያስቆሙ ይችላሉ።ሆኖም የእርስዎ ተሳትፎ የጥናቱን ግብ ለመምታት ትልቅ አስተዋጽዖ ስለሚያበረክት ጥያቄዎቹን በመመለስ እንድተባበሩኝ በትህትና እጠይቃለሁ። በቅድሚያ ለጥናቱ ምላሽ ለመስጠት ያለዎትን ፈቃደኛነት አመሰግናለሁ።

በጥናቱ ለመሳተፍ ፍቃደኛ ነዎት ?

አዎ ☐ አይደለሁም ☐

አዎ ካሉ ይቀጥሉ ፤ አይደለሁም ካሉ አመሰግነዉ ያቁሙ ።

ተጠያቂዉ ፈቃደኛ መሆኑን የሚያረጋግጥ ፊርማ _____

መረጃ ሰብሳቢዉ የተጠያቂዉ ፍቃድ መጠየቁንና መግባባቱን የሚያረጋግጥ ፊርማ _____

ቀን _____

የጅማ ዩኒቨርሲቲ

የሕብረተሰብ ጤና እና ሕክምና ኮሌጅ

የሥነ ሕዝብና ቤተሰብ ጤና ትምህርት ክፍል

በደቡብ ብሔር ብሔረሰቦችና ሕዝቦች ክልል በጋሞ ጎፋ ዞን በአርባምንጭ ከተማ በሁለት የመንግስት ጤና ድርጅቶች የነፍሰ ጡር ምርመራ የሚከታተሉ እናቶች ላይ በፀረ ተባይ መድሃኒት የተነከረ የአልጋ አጎበር አጠቃቀማቸዉንና በወባ በሽታ አምጪ ተሕዋስ የመጠቃታቸዉን ሁኔታ ለማጥናት የተዘጋጀ መጠይቅ የካቲት 2003 ዓ.ም.

የመረጃ ሰብሳቢዉ ስም_____ የጤና ድርጅት ስም _____

የተቆጣጣሪዉ ስም _____

የተሰበሰበበት ቀን_____ ቃለ መጠይቁ የተጀመረበት ሰዓት _____

የመጠይቅ ቁጥር _____

መመሪያ ፤ ለምርጫ ጥያቄዎች መልሱን አክብቡበት፤ አጫጭር መልሶች ለሚፈልጉ ጥያቄዎች መልሱን በተሰጠው ባዶ ቦታ ላይ ፃፉ፡

ክፍል አን ድ፡ መሠረታዊ የሆነ የማህበራዊ፣እኮኖሚያዊ ና የግል መረጃዎችን የሚመለከቱ ጥያቄዎች

ተ ቁ	***ጥያቄዎች***	***አማራጭ መልሶች***	***ይለፍ/ ቀጥል***
1.	ስም	_____	
2.	ቀበሌ	_____	
101	ዕድሜ	_____ (በዓመት)	

102	የመኖሪያ ቦታ / አድራሻ የት ነዉ ?	1. ከተማ 2. የገጠር ከተማ 3. ገጠር	
103	የጋብቻ ሁኔታ?	1. ያገባች 2. ያላገባች 3. የፈታች 4. ከባልዋ የተለየች 5. ባልዋ የሞተባት	
104	ሃይማኖትዎ ምንድን ነዉ?	1. ፕሮቴስታንት 2. ኦርቶዶክስ 3. እስልምና 4. ባህላዊ 5. ሌላ ካለ(ይገለጽ) _____	
105	የትምህርት ደረጃዎ እስከየት ድረስ ነዉ ?	1. ያልተማረች 2. ማንበብና መጻፍ ብቻ 3. አንደኛ ደረጃ (1-6) 4. ሁለተኛ ደረጃ (7-10/12) 5. ኮሌጅና ከዚያ በላይ	
106	የእርስዎ የሥራ ሁኔታ?	1. የቤት እመቤት 2. ነጋዴ 3. የቀን /የጉልበት ሠራተኛ 4. ጠላ /ሌሎች መጠጦችን መሸጥ 5. የመንግሥት ሠራተኛ 6. ሌላ ካለ (ይገለጽ)_____	
107	የባለቤትዎ የሥራ ሁኔታ?	1. የመንግሥት ሠራተኛ 2. ገበረ 3. ነጋዴ 4. የቀን / የጉልበት ሠራተኛ 5. ሌላ ካለ (ይገለጽ)_____	

108	የቤተሰብዎ የወር ገቢ ምን ያህል ይሆናል?	_____	
109	የቤተሰብዎ ብዛት ምን ያህል ነዉ?	_____	
110	የቤተሰብዎ ብዛት በጾታና በዕድሜ ስንት ናቸዉ ?	1. ሴት (<5ዓመት) _____ 2. ወንድ (<5 ዓመት) _____ 3. ሴት (>5ዓመት) _____ 4. ወንድ (> 5ዓመት) _____	
111	የሚያገለግል ሬድዮ/ ቴለቪዠን አለዎት ?	1. አዎ 2. የለኝም	
112	በምን ሰዓት ነዉ ሬድዮን /ቴለቪዠን የሚያዳምጡት/የሚመለከቱት	1. ጠዋት 2. ከቀትር በኃላ 3. ሲመሽ 4. ቀኑን በሙሉ 5. አልፎ አልፎ 6. ሰሚቼ አላዉቅም	

ክፍል 2: የጽንስ / የእርግዝናንና የወሊድ ሁኔታን የሚመለከቱ ጥያቀዎች

ተ ቁ	***ጥያቄዎች***	***አማራጭ መልሶች***	***ይለፍ/ቀጥል***

201	ስንት ጊዜ አርግዘዋል የአሁኑን ጨምሮ ?	1. አንድ 2. ሁለት 3. ሦስት 4. አራትና ከዚያ በላይ	
202	ከዚህ በፊት ስንት ጊዜ ወልደዋል?	1. ምንም 2. አንድ 3. ሁለት 4. ሦስትና ከዚያ በላይ	
203	የአሁኑ እርግዝና ዕድሜዉ ስንት ወር ይሆናል?	1. 1-3 ወር 2. 4-6 ወር 3. 7-9 ወር	
204	ከዚህ በፊት በነበሩት እርግዝናዎች ዉርጃ ተከስቶ ያዉቃል ?	1. አዎ 2. አልተከሰተም	
205	መልስዎ አዎ ከሆነ ስንት ጊዜ አስወርዶታል?	1. አንድ 2. ሁለት 3. ሦስትና ከዚያ በላይ	

ክፍል 3: የአተኛኘት ሁኔታን የተመለከቱ ጥያቄዎች

ተ.ቁ	ጥያቄዎች	አማራጭ መልሶች	ይለፍ/ ቀጥል
301	አንዳንድ ጊዜ ከቤት ዉጭ ይተኛሉ?	1. አዎ 2. አልተኛም	

302	መልስዎ አዎን ከሆነ መቼ ይተኛሉ?	1. በደረቃማ ወቅተ 2. በሞቃታማ ወቅት 3. በማንኛዉም ወቅት	
303	በመኝታዎ ላይ ከማን ጋር ነዉ የሚተኙት?	1. ከባል ጋር 2. ከ < 5 ዓመት ሕፃናት ጋር 3. ከ > 5ዓመት ሕፃናት ጋር 4. ሌላ ካለ (ይጠቀስ)_____	
304	ትናንት ማታ ያደሩት በቤት ዉስጥ ነበር ወይስ ከቤት ዉጭ?	1. በቤት ዉስጥ 2. ከቤት ዉጭ	
305	አዘዉትረዉ ወደ መኝታዎ የሚሄዱት በምን ሰዓት ነዉ ? (በሰዓት)	_____	

ክፍል 4: ወባ እና ወባን በመከላከልና በመቆጣጠር ዙረያ ያላቸዉን ግንዛቤና ፍላጎት የተመለከቱ ጥያቄዎች

ተ.ቁ	***ጥያቄዎች***	***አማራጭ መልሶች***	***ይለፍ/ቀጥል***
401	ስለወባ በሽታ ሰምተዉ ያዉቃሉ?	1. አዎ 2. አልሰማሁም	
402	መልስዎ አዎን ከሆነ የወባ በሽታ መንስኤዉን ያዉቃሉ?	1. አዎ 2. አላዉቅም	

403	ለጥያቄ 402 መልስዎ አዎ ከሆነ መንስኤዉ ምንድን ነዉ ? (ከአንድ በላይ መልስ ይቻላል)	1. በቀዝቃዛ የአየር ጸባይ 2. ለዝናብ በመጋለጥ 3. ያልበሰለ የሸንኮራአገዳ /በቆሎ/ማሽላ/በሙብላት 4. በከፉ መንፈስ 5. በትንኝ ንክሻ 6. በእግዚአበሔር/በአላህ/በአማልክቶች 7. በአከባቢ ንጽህና ጉድለት/በቆሻሻዎች/ባቆሬ ዉሃ 8. ሌላ ካለ (ይገለጽ)_____	
404	የወባ በሽታ ከአንድ ሰዉ ወደ ሌላ ሰዉ ይተላለፋል ?	1. አዎ 2. አይተላለፍም	
405	ለጥያቄ 404 መልስዎ አዎ ከሆነ በምን መንገድ ይተላለፋል?	1. በትንኝ ንክሻ 2. በትንፋሽ 3. ከታመመ ሰዉ ጋር በመነካካት 4. ሌላ ካለ (ይገለጽ)_____	
406	ትንኞች በአብዛኛዉ ሰዉን የሚነክሱት በምን ወቅት ነዉ? (ከአንድ በላይ መልስ ይቻላል)	1. በደረቃማ ወቅት 2. በዝናባማ ወቅት 3. ዓመቱን በሙሉ 4. አላውቅም 5. ሌላ ካለ (ይገለጽ)	
407	ትንኞች በአብዛኛዉ በምን ሰዓት ነዉ የሚነክሱት? (ከአንድ በላይ መልስ ይቻላል)	1. ጠዋት 2. ከቀትር በኋላ 3. ሲመሽ 4. በማታ 5. በቀንና በማታ 6. አላዉቅም	

		7. ሌላ ካለ (ይገለጽ)	
408	የወባ በሽታ ምልክቶችን ያዉቃሉ?	1. አዎ 2. አላዉቅም	
409	ለጥያቄ 408 መልስዎ አዎ ሆነ እነዚህ ምልክቶች የትኞቹ ናቸዉ?	1. ትኩሳት 2. ብርድ ብርድ ማለት/ማንቀጥቀጥ 3. ራስምታት 4. የጀርባ ሕመም እና ጠቅላላ ሰዉነት መቆረጣጠም 5. ራስን መሳት 6. መንዘፍዘፍ 7. የሆድ እብጠት 8. ሌላ ካለ (ይጠቀስ)_____	
410	በእርግዝና ወቅት በወባ በሽታ ምክንያት የሚከሰቱ አስከፊ የጤና ችግሮች ምንድን ናቸዉ?	1. በእናት ላይ የሚታይ አስከፊ የሆነ የደም ማነስ 2. ዉርጃ 3. የጽንስ መሞት 4. ያለጊዜዉ መዉለድ 5. ክብደቱ አነስተኛ የሆነ ህፃን መዉለድ 6. ከወሊድ በኃላ ትኩሳት 7. የአንጎል በወባ መጎዳት 8. ከተወለደ በኃላ በአንድ ወር ዉስጥ መሞት 9. ሌላ ካለ(ይገለጽ)_____	
411	የወባ በሽታ ለሕይወት ህልፈት/ለሞት ሊያደርስ እንደሚችል ያዉቃሉ?	1. አዎ 2. አያደርስም 3. አላዉቅም	
412	ነፍሰጡር እናቶች በወባ በሽታ የመያዝ እድላቸዉ ከፍተኛ ነዉ ብለዉ ያስባሉ ?	1. አዎ 2. አላስብም	
413	ለወባ በሽታ ህክምና የሚያገለግሉ መድሃኒቶችን ያዉቃሉ?	1. አዎ 2. አላዉቅም	
414	ለጥያቄ 413 መልሰዎ አዎ ከሆነ መድሃኒቶቹ የትኞቹ ናቸዉ?	1. ዘመናዊ መድሃኒቶች (ክሎሮኪዊን፣ኮአርተምና ሌሎችም.) 2. ባህላዊ መድሃኒቶች (ቅጠላቅጠሎች፣ ጠበል (ቅዱሰ ዉሃ))	

		3. ሌላ ካለ(ይጠቀስ)_____	
415	የወባ በሽታ በአከባቢያችሁ ያለ አስከፊ የጤና ችግር ነዉ	1. በጣም አልስማማም 2. አልስማማም 3. አልቃወምም አልስማማም 4. እስማማለሁ 5. በጣም እስማማለሁ 6. አላዉቀዉም	
416	በወባማ አከባቢ የሚገኙ ነፍሰጡር እናቶች በወባ የመጠቃት እድላቸዉ ከፊተኛ ነዉ	1. በጣም አልስማማም 2. አልስማማም 3. አልቃወምም አልስማማም 4. እስማማለሁ 5. በጣም እስማማለሁ 6. አላዉቀዉም	
417	የወባ በሽታ በማህፀን ዉስጥ ባለዉ ጽንስ ላይ አስከፊ የጤና ችግር ሊያስከትል ይችላል	1. በጣም አልስማማም 2. አልስማማም 3. አልቃወምም አልስማማም 4. እስማማለሁ 5. በጣም እስማማለሁ 6. አላዉቀዉም	
418	ወባን በጊዜዉ ካልታከሙት ለሞት ሊያደርስ ይችላል	1. በጣም አልስማማም 2. አልስማማም 3. አልቃወምም አልስማማም 4. እስማማለሁ 5. በጣም እስማማለሁ 6. አላዉቀዉም	
419	የወባ በሽታ ከትንኝ ንክሻ ዉጭ በሌላ መንገድም ይተላለፋል	1. በጣም አልስማማም 2. አልስማማም 3. አልቃወምም አልስማማም 4. እስማማለሁ 5. በጣም እስማማለሁ 6. አላዉቀዉም	
420	ያቆሩ ዉሃዎችና ረግረጋማ ቦታዎች ለወባ ትንኝ መራቢት አመቺ ሁኔታን ይፈጥራሉ	1. በጣም አልስማማም 2. አልስማማም 3. አልቃወምም አልስማማም 4. እስማማለሁ 5. በጣም እስማማለሁ 6. አላዉቀዉም	

421	የወባ በሽታን መከላከል ይቻላል	1. በጣም አልስማማም 2. አልስማማም 3. አልቃወምም አልስማማም 4. እስማማለሁ 5. በጣም እስማማለሁ 6. አላዉቀዉም	
422	የወባ በሽታን መከላከልንና መቆጣጠርን አሰመልክቶ የማወቅ/ የመማር ፍላጎት አለኝ	1. በጣም አልስማማም 2. አልስማማም 3. አልቃወምም አልስማማም 4. እስማማለሁ 5. በጣም እስማማለሁ 6. አላዉቀዉም	
423	በፀረ-ተባይ መድሃኒት የተነከረ የአልጋ አጎበር ሁልጊዜ መጠቀም በትንኝ ንክሻ የሚተላላፈዉን የወባ በሽታ ለመከላከል የሚጠቅም አማራጭ ዘዴ ነዉ<	1. በጣም አልስማማም 2. አልስማማም 3. አልቃወምም አልስማማም 4. እስማማለሁ 5. በጣም እስማማለሁ 6. አላዉቀዉም	
424	በፀረ-ተባይ መድሃኒት የተነከረ የአልጋ አጎበር ሁልጊዜ የመጠቀም ና የወባ በሽታን የመከላከል ፍላጎት አለኝ	1. በጣም አልስማማም 2. አልስማማም 3. አልቃወምም አልስማማም 4. እስማማለሁ 5. በጣም እስማማለሁ 6. አላዉቀዉም	
425	በአሁኑ እርግዝና ላይ ሆነዉ በወባ በሽታ ታመዉ ያዉቃሉ?	1. አዎ 2. አልታመምኩም	
426	ለጥያቄ 425 መልስዎ አዎ ከሆነ ስንት ጊዜ ታመዋል?	1. አንድ 2. ሁለት 3. ሦስትና ከዚያ በላይ	
427	በወባ ሲታመሙ የህክምና አገልግሎት ከየት ነዉ የሚያገኙት?	1. ከቤት በዘመናዊ መደሃኒቶች 2. ከቤት በባህላዊ መድሃኒቶች 3. ከጤና ድርጅቶች/የግል/የመንግሥት 4. ሌላ ካለ (ይገለጽ)_____	
428	ወባን በተመለከተ የጤና ትምህርት/መረጃ አግኝተዉ ያዉቃሉ?	1. አዎ 2. አላገኘሁትም	

429	ለጥያቄ 428 መልስዎ አዎ ከሆነ ከየት ነበር ያገኙት?	1. ከሬድዮ 2. ከሚለጠፉ/በራሪ ከሆኑ ወረቀቶች/መጽሔቶች 3. ከጓደኛ 4. ከጤና ባለሙያ 5. ከመንግሥት ባለሥልጣናት 6. ከትምህርት ቤት	
430	ወባን መከላከል ይቻላል?	1. አዎ 2. አይቻልም 3. አላዉቅም	
431	ለጥያቄ 430 መልስዎ አዎ ከሆነ እንዴት ነዉ ወባን መከላከል የሚቻለዉ?	1. ፀረ-ተባይ መድሃኒት በመርጨት 2. የአልጋ አጎበር በመጠቀም 3. ለወባ ህክምና የሚዉሉ መድሃኒቶችን በመጠቀም 4. በማጨስ 5. የአከባቢ ንጽህና በመጠበቅ/ያቆሩ ዉሃዎችን በማፋሰስ 6. ምንም አላዉቅም 7. ሌላ ካለ (ይገለጽ)_____	
432	እርስዎ በአሁን ጊዜ ወባን ለመከላከል ምን እያደረጉ ነዉ ? (ከአንድ በላይ መልስ ይቻላል)	1. ፀረ-ተባይ መድሃኒት መርጨት 2. የአልጋ አጎበር መጠቀም 3. የአከባቢ ንጽህና መጠበቅ/ያቆሩ ዉሃዎችን ማፍሰስ 4. ምንም አላደርግም 5. አላዉቅም 6. ሌላ ካለ (ይገለጽ)_____	

ክፍል 5. በፀረ-ተባይ መድሃኒት የተነከረ የአልጋ አጎበርን የተመለከቱ ጥያቄዎች

ተ.ቁ	*ጥያቄዎች*	*አማራጭ መልሶች*	*ይቀጥል/ይለፍ*
501	በፀረ-ተባይ መድሃኒት ስለተነከረ የአልጋ አጎበር ሰምተዉ ያዉቃሉ?	1. አዎ 2. አልሰማሁም	
502	ለጥያቄ 501 መልስዎ አዎ ከሆነ ከየት ነበር የሰሙት?	1. ከሆስፒታል/ከጤና ጣቢያr 2. ከመገናኛ ብዙሃን 3. ከጤና ኤክስቴንሽን ሠራተኞች 4. ከጎረበት/ጓደኛ	
503	የአልጋ አጎበርን ጥቅም ያዉቁታል?	1. አዎ 2. አላዉቅም	
504	ለጥያቄ 503 መልስዎ አዎ ከሆነ እነዚህ ጥቅሞች ምንድን ናቸዉ?	3. በትንኝ መነከስን ስለሚከለክል መልካም እንቅልፍን ይሰጣል 4. በተባዮች ድምጽ ከመረበሽ ይከላከላል 5. ወባን ይከላከላል 6. ሙቀትን ይሰጣል 7. ሌላ ካለ (ይገለጽ)_____	
505	በፀረ-ተባይ መድሃኒት የተነከረ የአልጋ አጎበር መጠቀም ከወባ በሽታ ይከላከላል ብለዉ ያምናሉ?	1. አዎ 2. አላምንም	
506	በቤትዎ ዉስጥ የአልጋ አጎበር አልዎት?	1. አዎ 2. የለኝም	

507	ለጥያቄ 506 መልስዎ አዎ ከሆነ ስንት ናቸዉ? (ማንኛዉም አይነት አጎበር ይካተት)	_____	
508	በየአይነቱ ስንት የአልጋ አጎበር አልዎት?	1. በፀረ-ተባይ መድሃኒት የተነከረ የአልጋ አጎበር _____ 2. በፀረ-ተባይ መድሃኒት ያልተነከረ የአልጋ አጎበር ___ 3. አይነቱ ያልተለየ የአልጋ አጎበር_____ 4. አላዉቅም _____	
509	በፀረ-ተባይ መድሃኒት የተነከረ የአልጋ አጎበር ካልዎት በመድሃኒት የመነከሩ ሁኔታ እንዴት ነዉ ?	1. ለመጀመሪያ ጊዜ ተነክሮአል (ጥቅም ላይ ሳይዉል) 2. ለዘለቄታዉ ተነክሮአል / የመጠቀም ዘመኑ አስከያልቅ ድረስ ድጋሚ መነከር የማያስፈልገዉ 3. በድጋሚ ተነክሮአል 4. አላዉቅም	
510	በፀረ- ተባይ መድሃኒት የተነከረዉን የአልጋ አጎበር ያገኙት ከየት ነዉ?	1. ከጤና ድርጅት፤ በነፃ 2. ከጤና ድርጅት፤ በግዢ 3. ከገበያ/ ከሱቅ፤ በግዢ 4. ከሌላ ቦታ፤ በነፃ 5. ከሌላ ቦታ በግዢ	
511	በፀረ-ተባይ መድሃኒት የተነከረዉን የአልጋ አጎበር ያገኙበት ጊዜ መቼ ነበር? (ትክክለኛዉን ጊዜ ካስታወሱ በቀን በወርና በዓመተ ምህረት ይጥቀሱ)	_____	

512	በፀረ- ተባይ መድሃኒት የተነከረዉ የአልጋ አጎበር ከለልዎት ምክንያቱ ምንድን ነዉ?	1. በቅርበት አለማግኘት 2. መግዛት አለመቻል 3. የነፃ ስርጭትን በመጠባበቅ 4. ወባን ስለማይከላከል 5. ባለበቴ ስለማይፈልግ 6. ግንዛቤዉ ስላልነበረኝ 7. ሌላ ካለ(ይገለጽ) _____	
513	የአልጋ አጎበርዎ ለመጀመሪያ ጊዜ ብቻ በፀረ-ተባይ መድሃኒት ተነክሮ እነደሆነ በድጋሚ መነከር እንዳለበት ያዉቃሉ?	1. አዎ 2. አላዉቅም	
514	የአልጋ አጎበርዎ በድጋሚ ያልተነከረ ከሆነ ምክንያቱ ምንድን ነዉ?	1. በድጋሚ መነከር እንዳለበት አልተነገረኝም 2. በድጋሚ የመንከሩን ጥቅም አላወቅሁም ነበር 3. እንዳይመርዘኝ ስለፈራሁት 4. የገንዘብ እጥረት ስለነበረኝ 5. አገልግሎቱን በቅርበት ስላላገኘሁት 6. ጊዜዉ አመቺ ስላልነበረ 7. ለለዘለቄታዉ የተነከረ ስለሆነ / የመጠቀም ዘመኑ አስከያልቅ ድረስ ድጋሚ መነከር የማያስፈልገዉ 8. ሌላ ካለ (ይገለጥ)_____	
515	የአልጋ አጎበርዎን እየተጠቀሙት ነዉ?	1. አዎ 2. አልጠቀመዉም	
516	ለጥያቄ 515 መልስዎ አዎ ከሆነ ባለማቋረጥ ዓመቱን በሙሉ ነዉ ወይስ እያቆራረጡ አልፎ አልፎ ነዉ የሚጠቀሙት?	1. ባለማቋረጥ ዓመቱን በሙሉ 2. እያቆራረጡ አልፎ አልፎ	
517	እያቆራረጡ አልፎ አልፎ ከሆነ የሚጠቀሙት መቼ ነዉ የሚጠቀሙት?	ነ. በዝናባማ ወቅት 2. ከዝናባማ ወቅት በኋላ 3. በደረቃማ ወቅት 4. በፈለጉበት ጊዜ	

		5. ትንኞች በብዛት በሚኖሩበትና ድምጻቸዉ ሲሰማ	
518	ትናንት ማታ በየትኛዉም አይነት የአልጋ አጎበር ሥር ተኝተዉ ነበር?	1. አዎ 2. አልተኛሁም	
519	ትናንት ማታ በፀረ-ተባይ መድሃኒት በተነከረ የአልጋ አጎበር ሥር ተኝተዉ ነበር?	1. አዎ 2. አልተኛሁም	
520	ትናንት ማታ በፀረ-ተባይ መድሃኒት በተነከረ የአልጋ አጎበር ሥር ያልተኙ እንደሆነ ምክንያቱ ምንድን ነዉ?	1. ለመስቀል አመቺ ስላልነበረ 2. ወባን ይከላከላል ብዬ ስለማላምን 3. ትናንት ማታ የወባ ትንኞች ስላልነበሩ 4. ሞቃታማ ወቅት ስለነበረ 5. እንዴት መጠቀም እንዳለብኝ ስላላወቅሁ 6. በድጋሚ ስላልተነከረ 7. ታጥቦ ስለነበር 8. ሌላ ካለ _____	
521	በፀረ-ተባይ መድሃኒት የተነከረዉ ካልተነከረዉ የአልጋ አጎበር የተሻለ የሚከላከል ይመስልዎታል?	1. አዎ 2. አይመስለኝም 3. ልዩነቱን አልተመለከትሁትም 4. መጀመሪያ የተሻለ ይከላከላል በኋላ ግን ቀኑ እየገፉ ሲሄድ ይቀንሳል 5. ሌላ ካለ (ይጠቀስ)_____	
522	በስድስት ወር ጊዜ ዉስጥ ስንት ጊዜ ነበር የአልጋ አጎበርዎን ያጠቡት ?	1. አንድ ጊዜ ብቻ 2. ሁለት ጊዜ ብቻ 3. 3-5 ጊዜ 4. 6 እና ከዚያ በላይ 5. ፈጽሞ ታጥቦ አያዉቅም	
523	በተደጋጋሚ ማጠብ በፀረ-ተባይ መድሃኒት የተነከረዉን የአልጋ አጎበር የመከላከል አቅም እንደሚቀንስ ያዉቃሉ?	3. አዎ 4. አላዉቅም	

መጠይቁ እዚህ ላይ አብቅቷል ፤ጊዜዎን ሰዉተዉ ስለተባበሩኝ በጣም አመሰግናለሁ፡፡

ቃለምልልሱ የተጠናቀቀበት ሰዓት _____

ለ. የደም ናሙና ምርመራና ዉጤትን የተመለከቱ ጉዳዮች

ተ.ቁ	ጥያቄዎች	አማራጭ መልሶች
1	የወባ አምጪ ተሕዋስ መኖሩን ለማረጋገጥ የደም ናሙና ተወስዷል ?	1. አዎ 2. አልተወሰደም
2	በተወሰደዉ የደም ናሙና ዉስጥ የወባ አምጪ ተሕዋስ መኖሩን ለማረጋገጥ ምርመራ ተደርጓል?	1. አዎ 2. አልተደረገም
3	በተደረገዉ ምርመራ የወባ አምጪ ተሕዋስ ተገኝቷል?	1. አዎ 2. አልተገኘም
4	በተደረገዉ ምርመራ የተገኘዉ የወባ አምጪ ተሕዋስ ምን አይነት ነዉ?	1. ፕላስሞዲየም ፋልሲፓረም 2. ፕላስሞዲየም ቫይቫክስ 3. ሁለቱም አይነት