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ANTI-MALARIAL DRUG AND MOSQUITO NET USE PATTERN IN PAWE SPECIAL WOREDA: A COMMUNITY BASED SURVEY

BY
SEID MUSSA AHMED (B.Pharm)

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List of abbreviations

AADAC	Alberta Alcohol and Drug Abuse Commission
ACT	Artemisinin-based combination therapy
AHS	Alberta Health Services
AL	Artemether-lumefantrine
AMREF	African Medical and Research Foundation
AOR	Adjusted odds ratio
Asl	Above sea level
BGR	Beneshangul-Gumuz Region
BGRHB	Beneshangul-Gumuz Regional Health Bureau
CDC	US Center for Disease Control and Prevention
CI	Confidence interval
COR	Crude odds ratio
CSA	Central Statistical Agency of Ethiopia
DALYS	Disability adjusted life years
DDT	Di chloro diphenyl trichloro ethane
EC	Ethiopian calendar
EDHS	Ethiopian Demographic and Health Survey
ETB	Ethiopian birr
FGD	Focus Group Discussion
Fig	Figure
GNP	Gross National Product
HEW	Health-Extension Workers
HH	Household
IRS	Indoor residual spraying
ITNS	Insecticide treated bed nets
KII	Key informant interview
Kms	Killo meters
LLIN	Long-lasting insecticidal net

Summary

Background: Malaria is a major public health problem and the leading communicable disease in Ethiopia. Interruption of contact between humans and mosquitoes through the use of insecticide-treated bed nets (ITNs) is a promising approach to protect people from malaria infection.

Treatment failures and mortality due to malaria has risen in recent years, probably due to increasing resistance to anti-malarial medicines. Improper drug storage and rampant self-medication are some of the factors that may contribute to an increase in the development of drug resistance by malaria parasites towards anti-malarials.

Study objective: To assess the utilization pattern of anti-malarial drugs, and mosquito net coverage in Pawe special Woreda, Beneshangul-Gumuz National Regional State.

Methodology: The study was conducted in Pawe Special Woreda, Beneshangul-Gumuz Regional State between August and September 2008. Both quantitative and qualitative methods were employed in the data collection. Qualitative methods employed include focus group discussions and key-informant interviews. The quantitative method used is a community based cross-sectional household survey. The study utilized a trained interviewer administered questionnaire for data collection. Data was collected primarily from mothers. Quantitative data was entered using EPI-Info software Version 6.04 and analyzed by SPSS version 11 statistical packages. Qualitative data were analysed through thematic content analysis in an attempt to answer key questions of the study.

Results: Perceived malaria prevalence was found to be 6.1%. Sixty nine, (38.8%) of those with reported malaria/symptom complexes in the last two weeks preceding the interview date self-medicated themselves with anti-malarials. Households with a family size of less than or equal to 5 persons (OR=0.47, CI=0.25, 0.90, P=0.02) were less likely to self-care with anti-malarials than those with a family size of more than 5 persons.

1. INTRODUCTION

Malaria is a global major disease caused by infection with any of four species of the protozoan parasite *Plasmodium* (i.e., *P. falciparum*, *P. vivax*, *P. ovale*, *P. malariae*) (Desai and Parise, 2002), but one, *Plasmodium falciparum*, accounts for the majority of instances of morbidity and mortality (White, 2004).

Anopheles arabiensis, a member of the *An. gambiae* complex, is the primary malaria vector, with *An. funestus, An. pharoensis* and *An. nili*, as secondary vectors (PMI, 2008).

Malaria continues to be one of the most important and devastating infectious diseases in developing areas of the world (CDC, 2007). Its transmission occurs in more than 100 countries. Regions include Africa, Asia, Islands of the South, West, and Central Pacific Ocean, Latin America, certain Caribbean Islands, and Turkey (NEHC, 2000). Around 3.2 billion people are at risk of malaria each year, with around 500 million people proceeding to clinical disease, and 2-3 million deaths occurring. Over 90% of these deaths occur in Sub-Saharan Africa (SSA) (Barry, 2005).

Malaria has been a major challenge to both public health and socio-economic development particularly in countries of SSA (Deressa, 2004). It is endemic in 42 of the 46 countries of the WHO African region and ranks in the top five causes of illness and death (WHO, 2004). In the 30 seconds it takes to read this sentence and the next, malaria will kill another African child (AMREF, 2005). The burden of morbidity and mortality is biased towards young children, not yet immune to clinical symptoms, and pregnant women where parasites are sequestered in the placenta (Barry, 2005).

In Ethiopia, malaria epidemics generally occur immediately after the long rains in September to November and in some places also after the short-lived shower rains in March to May (Ramos et al., 2003). Malaria is a major public health problem & the leading communicable disease in Ethiopia. It has been consistently reported as one of the three leading causes of morbidity and

mortality in the past years (MOH, 2004) accounting for approximately 30% of the overall DALYs lost. About 75% of the country is malarious with about 68% of the total population of 73 million living in areas at risk of malaria (PMI, 2008).

P. falciparum and *P. vivax* are the two dominant parasite species with relative frequencies of 60% and 40% respectively. This proportion varies from place to place and from season to season. Moreover, the biological diversity of *P. falciparum* and its ability to develop resistance to a number of anti-malarial drugs has been a major challenge in malaria chemotherapy (MOH, 2004).

Improper drug storage and rampant self-medication are some of the factors that may contribute to an increase in the development of drug resistance by malaria parasites towards anti-malarials (Temu et al., 2006). Inappropriate self-medication results in wastage of resources, increases resistance of pathogens, and generally entails serious health hazards such as adverse reaction & prolonged suffering (Worku and G/Mariam, 2003).

Insecticide treated mosquito nets (ITNs) have received serious attention and have raised renewed interest to serve as tools in malaria control. In Africa, the use of this control strategy has been proved to be cost effective means for the control of malaria. Ethiopia has adopted the use of ITNs as one of its vector control strategies primarily in selected malarious areas with the view to a gradual scaling-up of the intervention (Jima et al., 2005).

The determination of reported malaria, the extent of anti-malarial drug hoarding, self-medication with anti-malarials, and mosquito net coverage and also the development of intervention measures requires detailed information regarding each of these issues. Therefore, this study is intended to elicit basic information for planning appropriate interventions-to minimize anti-malarial drug hoarding and rampant self-medication, and also to improve mosquito net coverage and use.

2. ITERATURE REVIEW

2.1. Overview

2.1.1. History of the disease

Malaria is a life-threatening disease caused by the *Plasmodium* parasite. It was previously thought to come from fetid marshes, hence the name *male aria*, from the Italian, 'bad air'. During the past 100 years, an estimated 150-300 million people have died from malaria. This translates to 2-5% of all deaths globally in the 20th century having malaria-related causes (WEF, 2006).

It is now generally held that malaria arose in our primate ancestors in Africa and evolved with humans, spreading with human migrations first throughout the tropics, subtropics, and temperate regions of the Old World and then to the New World with explorers, missionaries, and slaves (Cox, 2002).

Although the disease has been eradicated in most of North America and Europe, malaria persists in many developing countries, primarily in Sub-Saharan Africa (SSA), Latin America and Asia (WEF, 2006).

2.1.2. Biology of the malaria parasite and vector

Malaria is transmitted through the bite of an infected female Anopheles mosquito (Oberlander & Elverdan, 2000; Lo Re III and Gluckman, 2003) and it is caused by the protozoan parasite *Plasmodium* (WHO, 2007[e]) which spends its life cycle both in humans and certain species of mosquitoes (WHO, 2002). The Four species of *Plasmodium* that cause malaria in humans are *P. falciparum*, *P. vivax*, *P. malariae* and *P. ovale* (Desai and Parise, 2002; Lo Re III and Gluckman, 2003). Similar parasites are common in monkeys and apes (Cox, 2002). *P. falciparum* and *P. vivax* are the two most common types of malaria (WEF, 2006) and of these, *Plasmodium falciparum* is the most important in most parts of the tropics, being responsible for most severe illnesses and deaths (White, 2004; WHO, 2002). Occasional infections with monkey malaria parasites, such as *P. knowlesi,* also occur (WHO, 2006).

Malaria parasites are transmitted by anophelines (genus *Anopheles*) only, which bite mainly between sunset and sunrise, but not all anophelines are vectors of malaria (Dash et al., 2007; WHO, 2002; WHO, 2005[a]). *Anopheles arabiensis*, a member of the *An. gambiae* complex, is the primary malaria vector, with *An. funestus, An. pharoensis* and *An. nili*, as secondary vectors (PMI, 2008). Only female anopheline mosquitoes bite and take up blood. Male *Anopheles* mosquitoes feed on plant juices and nectar, rather than blood, and therefore cannot transmit malaria (WHO, 2002).

In nature, malaria parasites spread by infecting successively two types of hosts: humans and female *Anopheles* mosquitoes (CDC, 2004). When an infected mosquito takes a blood meal during its feeding period between dusk and dawn, it injects sporozoites of Plasmodium from its salivary glands into the bloodstream of the host (Lo Re III and Gluckman, 2003). The sporozoites are transported via the blood to the liver where they invade hepatocytes, an obligatory venue for schizogony. The fully differentiated schizonts rupture and release thousands of merozoites (Krzych and Schwenk, 2005). These Merozoites invade erythrocytes, differentiate into trophozoites, and divide to become blood schizonts. In the blood, successive broods of parasites grow inside the red cells and destroy them, releasing daughter parasites ("merozoites") that continue the cycle by invading other red cells (CDC, 2004; Lo Re III and Gluckman, 2003). The blood stage parasites are those that cause the symptoms of malaria. When certain forms of blood stage parasites ("gametocytes") are picked up by a female *Anopheles* mosquito during a blood meal, they start another, different cycle of growth and multiplication in the mosquito. After 10-18 days, the parasites are found (as "sporozoites") in the mosquito's salivary glands. When the *Anopheles* mosquito takes a blood meal on another human, the sporozoites are injected with the mosquito's saliva and start another human infection when they parasitize the liver cells. Thus the mosquito carries the disease from one human to another (acting as a "vector"). Differently from the human host, the mosquito vector does not suffer from the presence of the parasites (CDC, 2004).

2.1.3. Burden of malaria

An estimated 3 billion people, almost half of the world's population, live in areas where malaria transmission occurs (UNICEF, 2007). Malaria is endemic in 109 countries and territories in tropical and subtropical regions, but there are substantial geographic disparities in the disease burden. Africa has the largest number of people living in areas with a high risk of malaria, followed by the South-East Asia Region (WHO, 2008). Children under the age of five years and pregnant women bear the major burden of the disease as a result of immature and weakened immunity respectively (AMREF, 2005). Because of the particular risk, pregnant mothers and children are priority targets for malaria control strategies (WEF, 2006).

Malaria is the most important parasitic disease in the world (AMREF, 2005) and it remains one of the major determinants of ill health in many countries of Africa, Asia and Latin America (MOH, 2002). Currently, it is one of the major tropical diseases adversely affecting the health of the peoples and the economic development of many developing countries, particularly in SSA (Deressa et al., 2006). Malaria remains one of the main global health problems of our time (Deressa et al., 2007[a]), which is responsible for 4% of global deaths (Gonzalez et al., 2000). The annual clinical cases are in the magnitude of 350 to 500 million (Oberlander & Elverdan, 2000; Deressa et al., 2006; MOH, 2002; WEF, 2006), causing more than 1 million deaths per year (Davis et al., 2006; MOH, 2002; UNICEF, 2007; Wiseman et al., 2007; Deressa et al., 2007[b]; Abuaku et al., 2005), with about 90% of the deaths (Deressa et al., 2007[c]) and 60% of cases (WHO, 2007) believed to occur in SSA (Deressa et al., 2007[a]). Major factors that contribute to this high mortality from malaria in Africa include poor access to health services, low quality of health services, and the increased resistance of malaria parasites to affordable first-line drugs such as chloroquine and sulphadoxine-pyrimethamine (Ndugwa et al., 2008). Young African children infected with *P. falciparum* account for over 75% of the more than 1 million deaths from malaria that occur worldwide each year (WHO, 2005[b]).

The economic burden of malaria to the country, the family and the individual is immense (WHO, 2005[b]). In tropical Africa the total cost of malaria in terms of health care, treatment and lost productivity is estimated to be over US$ 1800 million a year (Yeboah-Antwi et al., 2001) and it

represents 20% to 50% of all consultations in health centres and is the greatest cause of mortality in hospitals (Diallo et al., 2001). It has been estimated that it causes a reduction of 1.3% in the annual per capita economic growth rate of malaria endemic countries and the long term impact of this is a reduction of the GNP by more than a half. The economic effects of malaria are especially noticeable in rural areas where malaria strikes at the time of the year when there is greatest need for agricultural work (WHO, 2005[b]).

The burden of malaria in Africa continues to be extremely high, despite the existence of effective interventions to curb the mortality and morbidity of the disease (Teklehaimanot et al., 2007). Ethiopia, like other SSA countries, shares the intolerable burden of malaria (Deressa et al., 2006). Malaria has become a leading public health problem in the country. Almost 75% of the country is malarious with about 68% of the total population of 73 million living in areas at risk of malaria (CSA and ORC Macro, 2006). Approximately 9.5 million cases of malaria were reported annually from 2001-2005 (range 8.4–11.5 million), with an annual average of 487,984 laboratory confirmed cases over the same period, range 392,419 to 591,442. Annual malaria mortality is about 70,000. Overall, malaria accounts for up to 17% of outpatient consultations, 15% of admissions, and 29% of in-patient deaths (PMI, 2008).

The economic impact of malaria is far greater than for any other communicable disease. Ethiopia's economy is based on agriculture and peak malaria transmission coincides both with the planting and the harvesting season. Historically, malaria has forced people to heavily inhabit the less agriculturally productive highlands. In Ethiopia, malaria is highly seasonal with great variation from year to year–generally leaving the population with little protective immunity (PMI, 2008).

Like most other parts of Ethiopia, malaria is endemic in Beneshangul-Gumuz Region (BGR). According to available reports, almost all (99%) of the Beneshangul Gumuz Region (BGR) is malarious. The Beneshangul Gumuz Regional Health Bureau (BGRHB) has attempted to increase the communities' knowledge, and to develop desirable attitude and practices regarding malaria and its preventive measures, particularly use of insecticide treated nets (ITNs). BGRHB

records reveal that about 10 focal outbreaks of malaria occur each year in the six epidemic prone woredas (one of which is pawe) in the region and the major cause of the outbreaks was reported to be *P. falciparum* (Legesse et al., 2007).

2.2. Malaria control

The main objective of the malaria prevention and control program in Ethiopia is to reduce morbidity and prevent mortality by applying intervention strategies that are suited to the local epidemiological situation of the disease. Early diagnosis and prompt treatment is one of the main strategies in malaria prevention and control (MOH, 2004).

Perceptions about malaria illness, particularly households' perceived susceptibility and beliefs about the seriousness of malaria are important preceding factors for decisions to take preventive and curative actions against malaria. The understanding of the possible causes, modes of transmission, and individuals' preference and decision about adoption of preventive and control measures vary from community to community and among individual households (Legesse et al., 2007).

Several studies have described a two-fold increase in deaths due to malaria during the 1980s and 1990s because of the emergence of the chloroquine resistance. However, recent publications have documented a decline in malaria morbidity and mortality trends attributed to the increased access to artemisinin-based combination therapies and widespread use of insecticide-treated nets (Gardella et al., 2008).

Attempts to control malaria have usually followed one of three approaches: eliminating the parasite by administering anti-malarials, eradicating the carrier mosquito or reducing man-vector contact so as to cut an important link in the lifecycle of the parasite (Okafor and Amzat, 2007). And in addition to these, promotion of health education and communication, and conducting monitoring and evaluation are very important (Teklehaimanot, 2007).

2.2.1 Prevention

The type and application of malaria prevention and control interventions is determined by the transmission characteristics of the disease in different parts of the country (MOH, 2004; MOH, 2008). The risk of malaria infection varies widely according to geographic region (Chen et al., 2006; Mabaso et al., 2006), season and year in Africa (Mabaso et al., 2006). In Ethiopia the cold zone, which covers areas higher than 2,500 meters (m) above sea level, has a mean annual temperature of 10–15^{O}C. This highland area is considered free of local malaria transmission. The midland area, ranging in altitude from 1,500–2,500m with a mean annual temperature between 15–20^{O}C, has diverse malaria transmission patterns. In the hot lowland zone, located in areas below 1,500m above sea level, where the mean annual temperature varies from 20–25^{O}C, malaria transmission is endemic, and its intensity and duration are mainly dictated by the amount and duration of rainfall. In the midland zone, where temperature is a determining factor, malaria transmission often occurs in areas below 2,000m, while areas between 2,000 and 2,500m may become affected during epidemics (MOH, 2008).

Vector control remains the most generally effective measures to prevent malaria transmission (WHO, 2005[b]). The objective of vector control in malaria control programme is to reduce levels of transmission, thus reducing malaria morbidity and mortality (MOH, 2002). Interruption of contact between humans and mosquitoes through the use of insecticide-treated bed nets (ITNs) is a promising approach. Sleeping under an untreated mosquito net provides a physical barrier against mosquitoes–but mosquitoes can still bite if there is a small hole or tear in the net or if any part of the body is touching the net. Treating nets with a suitable insecticide increases the level of protection: the insecticide kills or repels mosquitoes before they can enter the net or bite the person sleeping under the net. Insecticide treatment of nets provides personal protection for all those who sleep under them even when coverage is low (WHO, 2005[a]). Currently, insecticide treated mosquito nets (ITNs) have received serious attention and have raised renewed interest to serve as tools in malaria control. In Africa, the use of this control strategy has been proved to be cost effective means for the control of malaria, especially among children under 5 years of age and pregnant women (Jimma et al., 2005).

Ethiopia has adopted the use of ITNs as one of its vector control strategies primarily in selected malarious areas with the view to a gradual scaling-up of the intervention. The use of mosquito nets is, however, limited and there are a number of possible explanations for this low coverage. These may be due to absence of a sustainable mechanism for the distribution of ITNS, lack of cultural exposure to the use of mosquito nets, lack of awareness, low acceptance by the community, and concerns regarding its high cost (Jimma et al., 2005).

Only about 6 percent of households in Ethiopia own a mosquito net whether treated or untreated. The percentage of households having more than one net is about 1 percent. Five percent of households own at least one ever-treated net. Regarding Benishangul-Gumuz regional state, 15.4 percent of households had at least one bed nets (whether treated or untreated), and only 2.3% of households possess more than one (CSA and ORC Macro, 2006).

In some areas, malaria transmitted by vectors that rest indoors can be prevented or controlled by indoor residual spraying with DDT or Malathion, as per WHO recommendations, is one of the major malaria vector control interventions (WHO, 2002; WHO, 2005[a]; CSA and ORC Macro, 2006).

Eliminating breeding sites and killing larvae, pupae and adult mosquitoes will help to reduce the number and longevity of vectors (WHO, 2002). In areas where it is a viable option, larval control must be carried out thoroughly if it is to have an impact (WHO, 2005[a]).

2.2.2 Malaria treatment & trends in Ethiopia

Malaria is a curable disease and not an inevitable burden. Effective medicines are available (WHO, 2005[b]). The first and foremost malaria control strategy promoted by the World Health Organization (WHO) and adopted by most African countries emphasizes the need for treatment of malaria episodes with an efficacious drug within 24 hours after onset of symptoms (Hetzel et al., 2006).

During decades, chloroquine, a 4-aminoquinoline, was largely used for treatment and prophylaxis of acute malaria with an amazing impact on malaria control (Krettli, 2001). Chloroquine resistance, which first appeared in East Africa in the late 1970s, has now spread throughout most of the continent, and resistance to sulfadoxine–pyrimethamine (Fansidar) has followed rapidly (Collins, 2000). *P.falciparum* is now highly resistant to chloroquine in most malaria-affected areas (White, 2004).

The emergence and rapid spread of *P. falciparum* resistance to commonly used anti-malarial drugs poses a serious challenge to the effectiveness of early diagnosis and prompt treatment as a priority strategy within the current malaria control. Effective treatment, as an intervention, depends highly on anti-malarial drugs which should be safe, effective, available, affordable and acceptable to populations at risk (WHO, 2003). Chloroquine and SP were affordable drugs at approximately US$0.10–0.20 per adult course (Yeung et al., 2004; WHO, 2004), and their safety and efficacy as oral regimens means they have generally been readily accessible (Shunmay et al., 2004; Yeung et al., 2004). As a response to the anti-malarial drug resistance situation, WHO now recommends that treatment policies for falciparum malaria in all countries experiencing resistance to monotherapies, such as chloroquine, sulfadoxine/pyrimethamine and amodiaquine, should be combination therapies(CT), preferably those containing an artemisinin derivative (WHO, 2005[b]). The rationale for using drugs in combination is well established in the treatment of tuberculosis, infection with human immunodeficiency virus, and cancer (Yeung et al., 2004). The basic tenet of combination therapy is that the probability of resistance developing simultaneously to two chemotherapeutic agents with independent mechanisms of action is extremely low, of the order of once in 10^{12} treatments. The effect of combination therapy is enhanced by the inclusion of an artemisinin derivative (Bloland et al., 2000). Artemisinin anti-malarials decrease parasite density more rapidly than other anti-malarial drugs (Lalloo et al., 2007; Bloland et al., 2000). When used alone, the short half-life of the artemisinin derivatives minimizes the period of parasite exposure to sub-therapeutic blood levels. In combination with another drug with a longer half-life, the short half-life and rapid parasite clearance time of artemisinin derivatives mean that many fewer parasites are exposed to the companion drug alone after elimination of the artemisinin component. Furthermore, exposure occurs when blood levels

of the drug close to the maximum are still present. Another benefit of artemisinin combinations is the 90% reduction in gametocyte levels in treated patients. These characteristics minimize the probability that a resistant mutant will survive therapy and may also reduce overall malaria transmission rates (Bloland et al., 2000).

Although combination therapy is accepted as the rational approach to case management in Africa (WHO, 2001), there are a number of concerns about widespread deployment of ACT, the chief one being cost. ACTs are relatively expensive (Coleman et al., 2004), currently cost more than US$1 for an adult course (although this cost is decreasing), so for them to be widely deployed as first-line therapy, substantial subsidy will be required to ensure that they are available to everyone, including those who cannot afford the market price (Yeung et al., 2004). A second concern is lack of post-marketing surveillance data on the new therapies (WHO, 2004) and thirdly, there is little or no information on the safety and efficacy of combination treatment in pregnant women and young children, which are specific high-risk groups in Africa (WHO, 2001). The fourth concern is that by deploying the artemisinin derivatives now, we risk losing our most valuable anti-malarial, a potentially catastrophic event (Yeung et al., 2004).

In Ethiopia the first-line anti-malarial drug for the treatment of malaria has been changing over the past decade. The main reason for change was the level of efficacy of the drugs. Chloroquine was the first-line anti-malarial drug for the treatment of uncomplicated malaria until 1998. However, because of the high level of failure (65%) of chloroquine for the treatment of uncomplicated falciparum malaria that was detected through a nationwide study conducted in 1997/98, the drug was replaced by SP/Fansidar (MOH, 2004; CSA and ORC Macro, 2006).

At the time of the introduction of SP/Fansidar as the first-line drug, the level of treatment failure observed was about 7%. In subsequent years, however, unpublished reports from isolated studies indicated higher treatment failure rates. As a result, a nationwide study on the therapeutic efficacy of SP/Fansidar for the treatment of uncomplicated falciparum malaria was conducted in 2003 and a mean treatment failure rate of 36% (ranging from 20-54%) was reported (MOH, 2004).

Cognizant of the high treatment failure rates of SP/fansidar and the need to shift to more effective anti-malarial drugs, the Ministry of Health-after a series of consultative meetings with experts in the field and based on WHO recommendations-decided to introduce the Artemisinin-based Combination Therapy (ACT) drug Artemether-lumefantrine in July 2004 (MOH,2004; CSA and ORC Macro, 2006). The introduction of the new ACT drug and the phasing out of the old drug was estimated to take up to two years given the limited supply of the new drug and the size of the country (CSA and ORC macro, 2005). Quinine is the second line anti-malarial drug and these drugs are supposed to be provided by health professionals (i.e. prescription drugs) (MOH, 2004).

As mentioned above, treatment failures and mortality due to malaria has risen in recent years, probably due to increasing resistance to anti-malarial medicines (WHO, 2006). The main factor that leads to the aforementioned problem is irrational use of anti-malarial drugs, such as inappropriate self-medication. Irrational use is the use of medicines in a way that is not compliant with rational use as defined below:

Rational use of drugs requires that patients receive medications appropriate to their clinical needs, in doses that meet their own individual requirements for an adequate period of time, and at the lowest cost to them and their community (Bhatnagar et al., 2003).

In the absence of a clear alarming evidence of resistance, the treatment of choice for non-falciparum malaria is a 3-day course of oral chloroquine, to which only a limited proportion of *P. vivax* strains have gained resistance (WHO, 2005[a]; Lalloo et al., 2006).

2.3. Self-medication with anti-malarials

In developing countries, most illnesses are treated by self-medication (Awad et al., 2005). It is also recognized that treatment of malaria usually starts at home and households would seek care outside if home treatment failed (Deressa, 2007[a]). The decision for self-medication may be influenced by different factors (cultural, economical, psychosocial, etc) that culminate in the utilization of various therapeutic approaches in searching for a relief (Abula and Worku, 2001). A major shortfall of self-medication is the lack of clinical evaluation of the condition by a trained medical professional, which could result in missed diagnosis and delays in timely and appropriate

treatment, which may end up in tragic consequences (Abula and Worku, 2001; Awad et al., 2005).

In addition, self-treatment of malaria is common following self-diagnosis mainly based on presumptive symptoms of malaria. Inappropriate self-medication results in wastage of resources, increases resistance of pathogens, and generally entails serious health hazards such as adverse reaction & prolonged suffering (Worku and G/Mariam, 2003). Antimicrobial resistance is a current problem world-wide particularly in developing countries, where antibiotics are often available without a prescription (Awad et al., 2005).

The type and extent of self-medication and the reasons for it may vary from country to country. In developing countries, both modern drugs and traditional medicines are commonly used for self-medication. It was also noted that prescription-only-medications could easily be obtained without prescriptions for self-medication in developing countries like Ethiopia. The use of such drugs without the knowledge of physicians can be less beneficial or even be dangerous for the patient. The efficacy and safety of most traditional medicines used in Ethiopia is not scientifically proven, and there is lack of precision in dosage by traditional healers. However, the role of traditional medicines cannot be undermined provided that large proportion of the population relay on it (Abula and Worku, 2001). According to WHO, up to 90% of the population in developing countries uses TM (traditional medicine), including medicinal plants to help meet their primary health care needs (Vanderbroek et al., 2004). Thus, an extensive research work is required to ensure its safety and efficacy (Abula and Worku, 2001).

Self-treatment of common illnesses by lay people is common in economically deprived countries (Shankar et al., 2003). In part, this arises through poor geographic access to facilities with a trained health worker, but the popularity of self-treatment is strengthened by the frequent drug shortages, long waiting times and user fees common in public health facilities (Marsh et al, 2004), previous experience of illness, economic constraints (Shankar et al., 2003) and the issue of curative stance of drugs are worth mentioning (Worku and G/Mariam, 2005). In all areas where self-treatment practices have been studied, they have been typified by the use of inappropriate

drugs and dosages (Marsh et al., 2004). In addition, self treatment of malaria is common following self diagnosis mainly based on presumptive symptoms of malaria (Awad et al., 2005). Increasing resistance to anti-malarials has been reported, and this has led to a growing concern that in future no effective remedies will be available (Oberlander and Elverdan, 2000).

The use of drugs from informal sectors such as open markets and village kiosks encourage the practice of self-medication. In order to handle unnecessary health risk and microbial resistance due to improperly obtained drugs, it is important to consider the manners of drug availability to consumers (Worku and G/Mariam, 2003).

Self-medication especially with anti-malarial drugs has been reported in various parts of Africa. A study done in Dar es Salaam, Tanzania to assess the extent of self-medication with anti-malarials found out that as higher as 71.7% of the interviewed individuals reported having treated them for a suspected malaria fever. In Harare, Zimbabwe, self-medication was reported to be common in up to 95% of the households and among them; the most common drugs found in the families were anti-malarials (Temu et al., 2006). Studies in Guatemala, Ethiopia, and Kenya found that more than 60% of individuals self-treat (usually with anti-malarials) and did not seek medical attention during the onset of symptoms (Habtetsion, 2007).

Though self-medication is difficult to eliminate, intervention can be made to discourage the rampant practice. The increasing self-medication will require more and better education of both the public and health professionals to avoid the irrational use of drugs (Worku and G/Mariam, 2005).

2.4. Drug hoarding

Drug storage at home promotes self-medication and could lead to exposure to factors that accelerates deterioration of drug quality. This behavior may also delay getting proper treatment when there is misdiagnosis. The common symptom of malaria is fever, hence most people will take drugs that will bring fever down first and if symptoms persist then anti-malarials are taken. This sometimes can be fatal especially when antipyretic drugs masked underlying disease in

children. On the other hand, the availability of anti-malarials in places other than the health facilities like retail pharmacies, drug stores and ordinary shops where over the counter dispensing is practiced have emerged contributing to the factors that promote home drug storage. Improper drug storage and rampant self-medication are some of the factors that may contribute to an increase in the development of drug resistance by malaria parasites towards anti-malarials. Home stocked drugs may lose potency due to poor storage, as a result of exposure to heat, light, humidity and air. Expired drugs pose toxicity risk as in some cases allow the active substance to undergo degradation leading to formation of toxic products. The administration of such drugs may lead to unsuccessful treatment of malaria and onset of complications such as cerebral malaria and anemia as a result of delayed appropriate treatment (Temu et al., 2006).

2.5 The rationale of the study

For there has not yet been any systematic research conducted as to the distribution and use of drugs at the community level, little is known about self-medication in the third world. Thus overall self-medication in modern pharmaceuticals seems to be a field in which information is scarce (Worku and G/Mariam, 2005).

Since studies on the prevalence of perceived malaria, the prevalence and factors associated with self-medication with anti-malarials, anti-malarial drugs hoarding and the extent of mosquito net coverage in Pawe Special Woreda are lacking, this study will fill the gap. In addition, this study will give insight about the commonly used traditional anti-malarial remedies in the study community.

It is expected that the findings generated from this study will contribute to knowledge and understanding of anti-malarial drug use and hoarding patterns at the community level, and also assesses mosquito net coverage which will be useful in developing interventions that will be undertaken to address their proper use.

3. OBJECTIVES OF THE STUDY

3.1. General Objective

To assess the utilization pattern of anti-malarial drugs, and mosquito net coverage in Pawe Special Woreda, Beneshangul-Gumuz National Regional State.

3.2. Specific Objectives

- To determine the prevalence of perceived malaria
- To determine the extent of anti-malarial drug use for self-care
- To determine the extent of anti-malarial drug hoarding at house hold level
- To assess mosquito net coverage and use

4. METHODOLOGY

4.1. Study area and population

Benishangul-Gumuz National Regional State is located in the North-Western part of Ethiopia, bordering the Sudan in the West, Amhara region in the North and North-East, and Oromia region in the South, South-East and East (JRM, 2004). The region has an estimated surface area of 49,289.46 km^2 and a population of 670,847 (CSA, 2007; CSA, 2008). Forty five percent of the population is below 15 years of age (JRM, 2004). Regarding ethnic composition: 25.9% are Berta, 21.3% Amhara, 21.1% Gumuz, 13.2% Oromo, 7.6% Shinasha, 4.2% Agew-Awi and the remaining 6.7% are from other different ethnic groups. 85.4% of the region's population lives in rural areas (CSA, 2008).

The study was conducted in Pawe special Woreda. Pawe is one of the 20 woredas in the Benishangul-Gumuz Region (CSA, 2008). It is bordered on the South and West by Metekel zone, and on the East and North by the Amhara Region (JRM, 2004). Based on figures from the 2007 Population and Housing Census, the woreda had a total population of 37,711, with male to female ratio of nearly 1:1 (CSA, 2008). The rural population accounts for 71.1% of the Woreda`s total population (CSA, 2008). The Woreda is found at an altitude of 1050-1250m a.s.l and has mainly one climatic zone, *kola* and the average temperature is 32.2°c. Pawe is situated 573 kms North-West of Addis Ababa. Among the top ten diseases in the Woreda, malaria is the leading cause of morbidity and mortality. The Woreda is comprised of 20 kebeles which are subdivided in to 48 villages (*Gottes*); of which 3 are urban and the remaining are rural.

The woreda had fifteen governmental health institutions: one hospital, twelve clinics, one health center and one health post. In addition, the woreda comprises of the following private health institutions: two medium clinics, two drug stores, five rural drug vendors and two diagnostic laboratories. Twelve of the twenty kebeles had at least one health-extension workers (HEWs). As is true in many areas, there could also be a number of unregistered drug outlets in the district.

4.2. Study design

A community based cross-sectional household survey and qualitative study were conducted in late August and early September 2008 to collect data on perceived illnesses, perceived malaria illnesses, possession and usage of mosquito net, household anti-malarial drug stockpiling and, self-medication with anti-malarials and as well as the sources of treatment.

In many populations (in Africa), the wellbeing of the family devolves on the mother (Pilkington et al., 2004) and they are the primary care givers at home (Paulander et al., 2009). In view of this, data was collected primarily from mothers in both the quantitative and qualitative part of the study.

4.3. Sample size determination

The required sample size for the study was calculated using the formula for a single population proportion (Chadha, 2006):

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

Since there is no available perceived malaria prevalence data for the study area, prevalence of perceived malaria from a study conducted in Adamitulu Jido Kombolcha Woreda of Oromia Region was used (Deressa, 2007[c]). Assuming that 14.3% of the households would have at least one perceived malaria case over the 2-weeks recall period with a 5% margin of error at 95% confidence level (so $Z\alpha/2=1.96$), the study required a minimum sample size of 433 households, considering a 15% non-response rate and a factor of 2 for the design effect.

$$n = \frac{(1.96)^2 \times 0.143 \times (1-0.143)}{(0.05)^2} = 188.3$$

Since the non-response rate is 15%; 0.15 x 188.3=28.2

Total sample size = n +15%n =188.3 + 28.2=216.5

The overall total sample size becomes: 2 x 216.5=433.

4.4. Sampling procedures

The woreda is administratively organized into 48 villages (*Gottes*), 45 rural villages and 3 towns. Fifteen rural villages and 1 town were selected by simple random sampling technique using the lottery method. The recent registration lists of households was used to determine the number of households to be selected from each study sites. The share of households for each village (town) was divided by the total number of households in a given village (town) to determine a sampling interval and then households were selected by systematic random sampling (since Pawe was a settlement area during the *Derg* regime, the houses were arranged straight to the straight). To identify the first household in each site, bottle spinning technique was used.

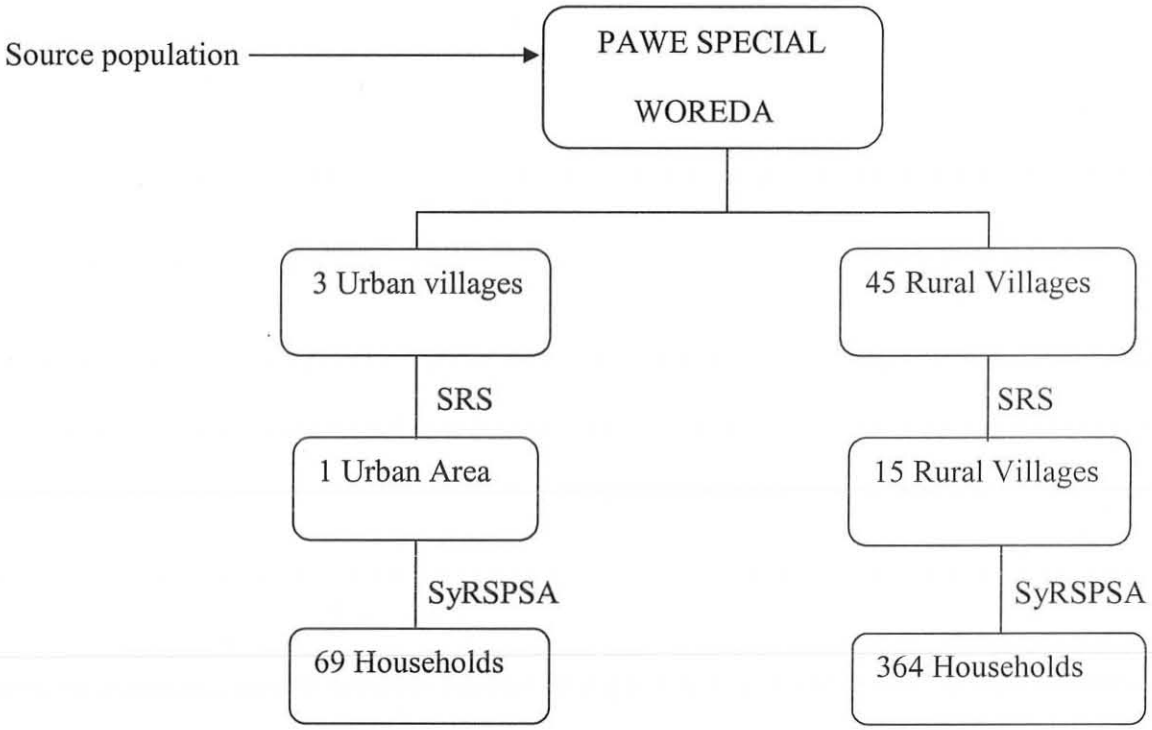

Figure 1: Schematic presentation of sampling procedure

SRS-simple random sampling

SyRSPSA-systematic random sampling, proportion to size allocation

4.5. Data collection

Data was collected using both quantitative and qualitative research methods. Data collectors assisted & supervised by trained supervisors and the principal investigator dealt with the cross-sectional survey and the principal investigator with assistants conducted the qualitative part of the study (semi-structured interviews and FGDs).

4.5.1 Quantitative study

In each household, primarily the mother was interviewed using a pre-tested interviewer administered structured questionnaire about treatment seeking behaviour for self-reported malaria illness/symptom complexes two weeks prior to the interview. The mothers were asked to list all ill members of their households and on behalf of each, asked to think about the last 14 days and indicate any one of the household members who encountered illness and from these illness episodes, those who had perceived malaria/malaria symptom complexes. A separate questionnaire was used whenever more than one person was found ill in a household. In addition to these, mothers were asked about their general knowledge of malaria, anti-malarial drugs and also if there is any anti-malarial drug hoarded and possession of mosquito nets at the time of survey.

Income was determined by asking monthly salaries for employees, average monthly profit for business people, average daily income so as to make an estimate of monthly income for daily laborers. Household income given in kind was changed into monetary value by using the local market values of the crops at the time of survey.

The questionnaire was developed first in English. The original English version was translated into Amharic for actual data collection. The Amharic version was back translated into English by another individual to check the consistency of the translation. The study units are all people in the selected households drawn from all villages using a probability proportional to size allocation.

4.5.1.1. Training and supervision

Ten enumerators who were 12th grade complete or university students and who speak Amharic were selected and trained for three days. Training was given by the principal investigator on methods of approaching, interviewing, recording and handling of the documents. The enumerators were monitored & assisted in the field by four trained supervisors and the principal investigator.

4.5.1.2. Pre-testing

The questionnaire was pre-tested for content and design in one of the neighbouring villages, called village 30, which was not selected for the study. Data collectors were exposed to practical situation before the start of actual data collection, and in the presence of principal investigator, the interviewers assessed clarity, understandability, flow and completeness of questions and the time needed to fill them. Finally, based on the pre-test, slight modifications were done.

4.5.2. Qualitative study

Qualitative research methods (key informant interviews and focused group discussions) were also employed in part as a primary data collection methods for some topics and in part for augmenting the findings of the quantitative survey and to elaborate more on the deep-rooted perceptions about malaria, anti-malarial drugs, self-medication, drug hoarding, and mosquito net possession and use etc. All the discussions of the qualitative study were held in Amharic.

The FGDs were conducted in a silent and comfortable place inside the villages, under a tree, at a time convenient to all of them and was held by the principal investigator. The three FGDs were conducted in three successive days and each was transcribed on the same day of gathering the information. Transcription of one FGD took about 2½ hours. Topic guides were developed based on the research questions to facilitate and keep the discussion on track.

The key-informant interviews were conducted at different quiet places within the villages thought to be conducive to the respondents. One key-informant interview took an average of 54.5 minutes and the transcription of the information collected was done on the same day of the data collection

and took about 1½ hour. In this case too, appropriate topic guides were developed to facilitate and keep the interview on track. All of the KIIs were handled by the principal investigator.

4.6. Study Variables

4.6.1. Independent

A. Socio-demographic variables such as age, sex, marital status, family size, occupation, religion, ethnicity, residence locality, & educational status etc.

B. Anti-malarial drug related variables

- Knowledge of: malaria symptoms, medication for malaria, the consequences of non-adherence to anti-malarial medication, advantages of obtaining drugs from legal sources etc.
- Knowledge about commonly used drugs for self-care

C. Knowledge about mosquito nets (benefit, utilization, prioritization in case of shortage etc.)

4.6.2. Dependent

- Perceived malaria
- Self-medication with anti-malarial drugs
- Anti-malarial drug hoarding
- Mosquito net possession
- Use of traditional medicines for malaria treatment

4.7. Data processing and analysis

After the collection of all the necessary data, it was coded on pre-arranged coding sheet. Quantitative data entry and analysis was done using EPI-Info Version 6.04 and SPSS version 11 statistical packages, respectively. Tables and graphs are used to present frequencies of pertinent findings. The association between the independent and dependent variables was measured and tested using Odds Ratio and 95 % CI. The relative contribution of each selected variables to the outcome of interest was assessed using logistic regression.

Qualitative data were analyzed through thematic content analysis in an attempt to answer the key questions of the study.

4.8. Data quality management

Every day at the end of the interview, the questionnaires were reviewed and checked by the principal investigator for completeness, accuracy and consistency of the data before receiving the documents from each enumerator and corrective measures were taken. Close supervision of the data collection process and repeated visits by the principal investigator were made in the absence of respondents during interview.

After the quantitative data was entered and cleaned, 5% of the data was double entered for validation and then analyzed using SPSS version 13 software. The quality of the data was kept high from the very beginning by the thorough training of the data collectors.

Besides, the fact that all the discussions of the qualitative part were held by the principal investigator contributed significantly in keeping the quality of the data high.

4.9. Operational definitions

Bimbii (Tinign): group of night time flying insects reproduced and lived in garbage and swampy areas which includes mosquitoes.

Birdd: a febrile illness which is characterized by a feeling of chills, generalized body weakness, pain-particularly chest pain and coughing. Generally, it is characterized by pneumonia like symptoms.

Drug retail outlet: a licensed pharmacy, drug shop, or rural drug vendor that sells drugs to the public

Household: was defined as a group of people including husband, wife, children or others living together sharing the same house.

Kebele: the lowest administrative unit with a population of 1000 to 3000, further subdivided in to villages (*Gottes*).

Metata: a cheese well mixed with many spices such as *Zingiber oficinale (Zingible), Alium sativum (nech shinkurt), Brassica nigra (senafitch), Lipidium sativum (feto), Ruta chalpensis (tena-adam), Aframomum melegueta (korerima), Coriandrum sativum* (*Coriander*) etc. and then kept for seven years in cool dry place.

Mich: a febrile illness which is believed to be caused by excessive sunlight and manifested by swelling and/or formation of sore on part the human body.

Mothers: a caregiver woman who is sixteen years of age and above and stays much of her time with and is responsible to give daily care for children and other members of the family in the sampled household was labeled as a mother and included as respondent in the study.

"Other sources" (of treatment): treatment of malaria/symptom complexes with modern anti-malarial drugs at home which may be obtained by the following means: left overs from a previous visit to a formal health provider, purchased and kept at home, borrowed/shared from relatives and/or neighbours etc.

Self-medication: taking modern drugs at home without any consultation with a health professional. It includes taking drugs bought from the retail sector (rural drug vendors, drug stores and pharmacies), and by using drugs obtained from "other sources" of treatment.

Village/*Gotte*: a small sub-component of kebele which usually consists of people very related in in one way or the other, and with a population of usually less than 1000.

Woreda: the lower level government administrative unit subdivided in to kebeles, and serves as the basic unit of planning.

4.10. Ethical considerations

First, ethical clearance was obtained from the Ethics Review Committee of the School of Pharmacy, Addis Ababa University. Then an official letter of cooperation written from the Department of Pharmaceutics was delivered to Pawe Special Woreda Health Office.

After a thorough discussion with head of woreda health office, a letter of agreement and cooperation was written to each study village/*kebele*. Similarly, each *kebele* council was approached and briefed on the purpose of the study. Then the study community was also asked for verbal consent after telling them the purpose of the study and the right of answering or rejecting to answer any of the questions. Informed consent was obtained from study participants. Privacy was maintained during the interview and information was reassured by excluding names from the interview. Moreover, whenever sick individual(s) was(were) found in a household, counseling was given so that the individual(s) could visit the nearby health facility for a medical help.

Before starting the discussions of the qualitative study, participants were informed about the purpose of the study and (group) consent was sought. Later on, the procedures of the discussion were explained and the confidentiality of the information given was notified.

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5.1.1. Socio-demographic characteristics of the respondents

Among the 433 visited households in 15 rural villages and 1 urban area, data wa 432(99.8%) households. With respect to residence, the majority, 363(84%) v villages and the remaining 69(16%) were from urban areas.

In terms of marital status, 313(72.5%) of the respondents were married, 6 widowed, 36(8.3%) were divorced, and 22(5.1%) were single. The median age of was 25 years and the mean (±SD) age was 34.7(±12.98) years.

As depicted in Table 1, 278(64.4%) of the respondents were unable to read and v had attended class in the primary education, 37(8.5%) had gone through interme above (Grades 7+), 33(7.6%) were able to read and write and 8(1.9%) were able t

As far as household family size is concerned, 321(74.3%) households had a fa than or equal to 5 persons and 111(25.7%) had more than 5 persons. The averag size was 4.5(±1.85) people.

With regard to household monthly income, 95(22%) households had a monthly than or equal to 112.5 ETB (Ethiopian birr), 86(19.9%) had from 112.5-300.0 had from 300.0-495.8 ETB, 86(19.9%) had from 495.8-901.7 ETB and 86(1 901.7-5062.5 ETB.

Most of the study participants, 336(77.8%) were from Amhara ethnic grou Kambata and Agew ethnic groups each comprising of 32(7.4%). Hadiya, Tig constituted 18(4.2%), 7(1.6%) and 6(1.4%) of the total, respectively.

Concerning the religion of the respondents, 285(66.0%) were followers of Orthodox Christianity followed by Islam 96(22.2%). Protestant and Catholic constituted 44(10.2%) and 7(1.6%), respectively.

The farmers accounted more than three fourth of the study participants, 337(78%). This was followed by housewives 55(12.7%).

With regard to the educational status of the spouse, from the 313 married respondents, the husbands of 148(47.4%) were unable to read and write, while 62(19.9%) have attended class somewhere in the primary grades, 45(14.4%) had gone through intermediate or secondary school, 41(13.1%) were able to read and write, 12(3.8%) were able to read only, while only 3(0.96%) had attended post secondary school.

Table 1: Socio-demographic characteristics of respondents of cross-sectional survey, Pawe Special Woreda, North-West Ethiopia, August 2008(N=432).

Characteristics	Frequency	Percentage
Age Group		
<20	37	8.6
20-29	142	32.9
30-39	106	24.5
40-49	74	17.1
>49	73	16.9
Ethnicity		
Amhara	336	77.8
Kambata	32	7.4
Agew	32	7.4
Hadiya	18	4.2
Tigrie	7	1.6
Oromo	6	1.4
Marital status		
Married	313	72.5
Widowed	61	14.1
Divorced	36	8.3
Single	22	5.1
Religion		
Orthodox	285	66.0
Muslim	96	22.2
Protestant	44	10.2
Catholic	7	1.6
Educational status		
Illiterate	278	64.4
Read only	8	1.9
Read and write	33	7.6
Grades 1-6	76	17.6
Grades 7+	37	8.5
Occupation		
Farmer	337	78.0
House wife	55	12.7
Merchant	15	3.5
Government employee	8	1.9
Student	8	1.9
Daily labourer	7	1.6
Others	2	0.4
Family size		
≤5	321	74.3
>5	111	25.7
HH monthly income		
<112.5 ETB	95	22.0
112.5-300.0 ETB	86	19.9
300.0-495.8 ETB	79	18.3
495.8-901.7 ETB	86	19.9
901.7-5062.5 ETB	86	19.9

With regard to the possession of information sources (radio and TV) of households, 256(56.9%) had a radio, 12(2.8%) had a television.

5.1.2 Reported illnesses

The household survey covered a total population of 1943, residing in 432 households. 165(38.2%) of the respondents had at least one of their household members who had been ill in the past two weeks preceding the interview date. Accordingly, illness episodes were reported for 209(10.8%) individuals and some households reported more than one ill person. The average age (±SD) of persons with reported illnesses was 27.3(±19.2) years with male to female ratio of 1:1.13. Concerning ill persons' status in the HH, Children 95(45.5%) predominated followed by mothers 68(32.5%) and husband 39(18.7%) (Table 2).

Table 2: Reported illnesses by different socio-demographic variables, Pawe Special Woreda, North-West Ethiopia, August, 2008(N=209).

Characteristics	Frequency	Percentage
Number of ill Persons Per HH		
One	134	81.2
Two	19	11.5
Three	11	6.7
Four	1	0.6
Sex of the ill persons		
Male	98	51.1
Female	111	48.9
Age of the ill persons		
<5	31	14.8
5-9	14	6.7
10-14	11	5.3
≥15	153	73.2
Ill persons' status in the HH		
"Child"	95	45.5
The mother	68	32.5
The Husband	39	18.7
Others	7	3.3

In those households where ill individuals were found, many illnesses/symptom complexes were reported, among which the top five were fever 128(61.2%) followed by malaria 119(56.9%), headache 107(51.2%), loss of appetite 82(39.2%) and chills 78(37.3%) (Table 3).

Table 3: Reported illnesses, Pawe Special Woreda, North-West Ethiopia, August 2008 (N=209).

Reported Illness	Frequency	Percentage*
Fever	128	61.2
Malaria	119	56.9
Head ache	107	51.2
Loss of appetite	82	39.2
Chills	78	37.3
Vomiting	63	30.1
Joint pain	58	27.8
Shivering	54	25.8
"*Birdd*"	16	7.7
Spasm	14	6.7
Rheumatoid arthritis	14	6.7
Diarrhea	10	4.8
Typhoid	5	2.4
Asthmatic	4	1.9
Heart diseases	4	1.9
Colds & Coughing	4	1.9
Others	18	8.6

* Sum of percentages may exceed 100% because of multiple responses.

5.1.3 Perceived malaria illness

Malaria illness was reported by 119(6.1%) of individuals among 1943 people assessed during 14 days prior to the interview date. The proportion of reported malaria was higher for females 66(55.5%) than males 53(44.5%). Most of the reported malaria occurred in "children" 55(46.2%) followed by mothers 42(35.3%) and the husband 18(15.1%).

The mean (±SD) and median ages for the reported malaria cases were 25.3(±18.7) and 22 years, respectively, with a range of 1 month–67 years. The majority of them were greater than or equal to 15 years old 84(70.6%), in comparison with those less than 15 years-old 35(29.4%) (Table 4).

Table 4: Distribution of reported malaria illness among study participants, Pawe Special Woreda, North-West Ethiopia, August 2008 (N =119).

Variables	Frequency	Percentage
Sex		
Male	53	44.5
Female	66	55.5
Age		
<5	24	20.2
5-9	6	5.0
10-14	5	4.2
≥15	84	70.6
Patient's status in the HH		
"Child"	55	46.2
Mother	42	35.3
Husband	18	15.1
Others	4	3.4

5.1.4 Knowledge about malaria: cause, transmission, signs & symptoms, prevention and diagnosis.

Knowledge about the cause of malaria

Two hundred and sixty two (60.6%) respondents said that malaria is caused by mosquitoes. 242 (56%) believed that lack of basic sanitation around houses causes malaria and 17(3.9%) had no idea about the cause of malaria. Other causes frequently mentioned were failure to keep personal hygiene, hunger, cold weather, *mich*, cloudy weather and excessive work load by 149(34.5%), 83(19.2%), 51(11.2%), 31(7.2%), 27(6.3%), 7(1.6%) of the respondents respectively. In addition, 5(1.2%) of the respondents answered evil spirits as the cause of malaria.

Knowledge about malaria transmission

Only 118(27.3%) of the respondents believed that malaria could be transmitted from person to person. Among these, 83(70.3%) referred mosquito bite as the means of malaria transmission from person to person. On the other hand, considerable number of them cited breathing 19(16.1%), sleeping together with infected person 18(15.3 %), physical contact with infected person 14(11.9%), mother to child (placenta) 11(9.3%), touching sweat 7(5.9), flies 6(5.1%) and infected blood donation 5(4.2%) as means where by malaria is transmitted.

Spring (*Tsedey),* followed by summer (*kiremt*), were recognized by 345(79.9%) and 95(22%) of the study participants, respectively, as the major seasons in which malaria transmission hits the highest point. Winter (*Bega*) and Autumn (*Belg)* were also mentioned by 13(3%) and 8(1.9%) respondents respectively.

Knowledge about signs and symptoms of malaria

As shown in table 5, knowledge about signs and symptoms of malaria was relatively high and almost all of the respondents, 430(99.5%), knew at least one of the common symptoms of malaria; namely, fever, chills & shivering, headache, vomiting, loss of appetite, thirst, muscle, back and joint pain.

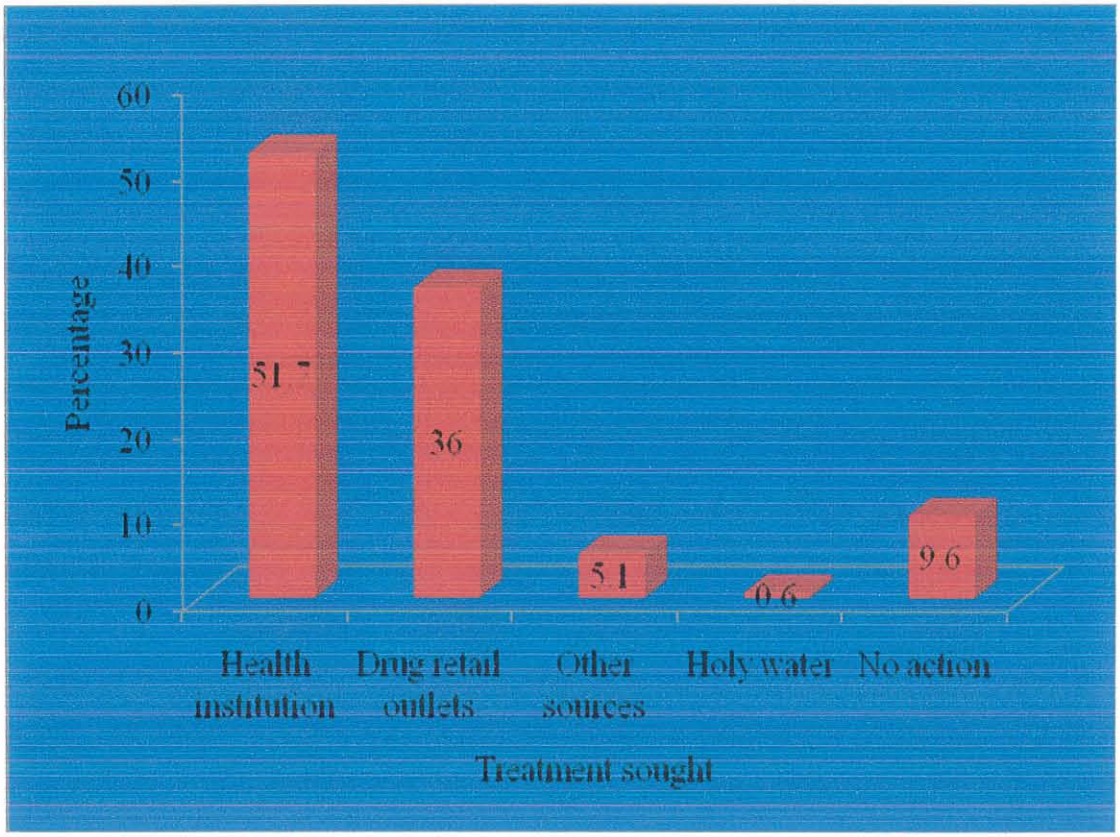
Knowledge about malaria prevention

From a total of 432 respondents, only 380(88%) considered malaria as a preventable disease. Among these, bed net utilization, 325(75.2%) and draining areas of water nearby house, 278(64.4%) were mentioned by most of the respondents. Significant number of them also believed that blocking mosquito entry holes using local materials, smoking (by burning cow dung or leaves), closing windows & doors early, spraying insecticide inside the house as malaria prevention methods (Table 5).

Knowledge about the vulnerability to malaria

A large proportion of the respondents, 400(92.6%), believed that malaria could potentially attack people of all age groups and both sexes. However, very few respondents 31(7.2%) believed that certain groups are exempted (not vulnerable to malaria) and 1(0.2%) of the respondents did not know whether malaria could potentially attack people of all age group and sex. From those which perceived that certain groups are exempted, 21(67.7%) said children less than 15 years of age, 7(22.6%) said people of more than 65 years, 6(19.4%) said people within the age range of 15-65 years, 3(9.7%) said pregnant women and 4(12.9%), though they are sure that certain groups are exempted, they were unable to name the groups. Some respondents cited more than one "exempted groups."

home treatment, the main reasons being thinking that the illness was minor. Some patients 5(2.8%) sought treatment from two sources (Fig. 3).



* Sum of percentages may exceed 100% because of multiple responses.

Figure 3: Actions taken against reported malaria/symptom complexes, Pawe special woreda, North-West Ethiopia, August 2008 (N = 178).

5.1.5.1 Self-medication practices

Out of 178 persons with reported malaria/related symptoms, 69(38.8%) self-medicated themselves with anti-malarial drugs obtained either from private drug retail outlets or from "other sources." In short, out of the 209 ill people, 69(33%) self-medicated with anti-malarial drugs.

From the 69 reported malaria/symptom complexes that self-medicated themselves, 29(42%) took Chloroquine, 26(37.7%) took Coartem, 14(20.3%) took Fansidar and 7(10.1%) took Quinine. 10(15.6%) individuals had taken antibiotics along with anti-malarials (Table 6).

Table 6: Anti-malarials used for Self-medication practices, Pawe Special Woreda, North-West Ethiopia, August 2008 (N = 69)

Drug	Frequency	percentage*
Chloroquine	29	42
Coartem	26	37.7
Fansidar	14	20.3
Quinine	7	10.1

* Sum of percentages may exceed 100% because of multiple responses.

Factors associated with self-medication

The effect of different variables on self-medication practice was assessed using both bivariate and multivariate analysis. Households with a family size of less than or equal to 5 persons were found less likely to practice self-medication with anti-malarials (OR=0.47, CI=0.25, 0.90). Gender, age of ill person, ill persons' status in the household, household monthly income, and the care takers belief that malaria can be cured by modern drugs were not associated with self-medication with anti-malarials (Table 7).

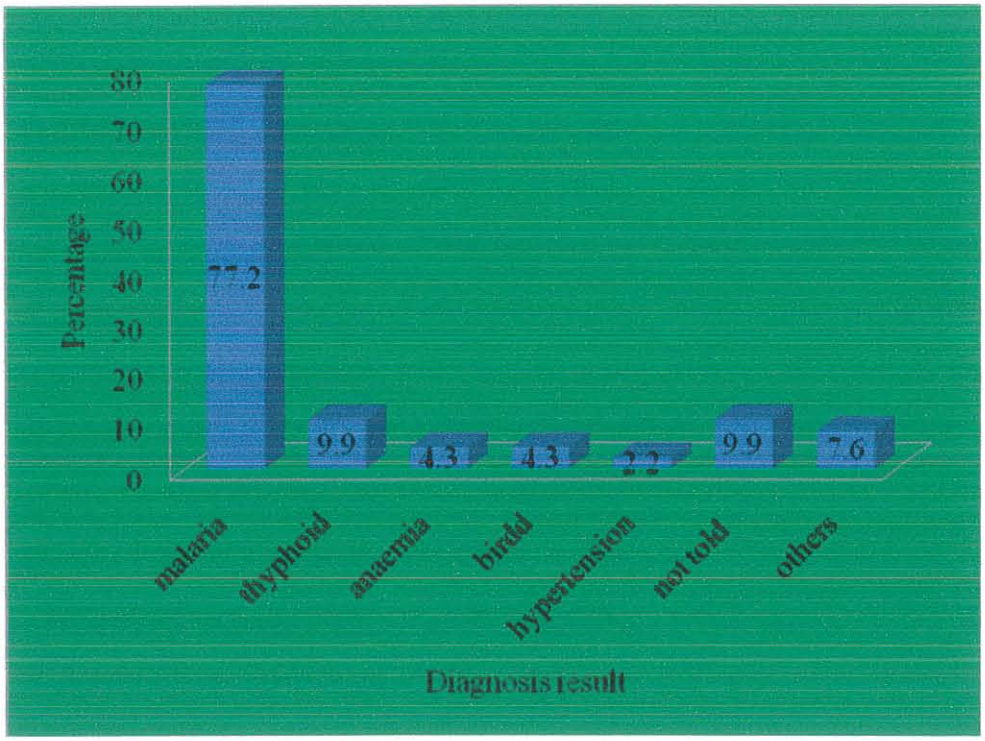
Table 7: Factors associated with self-medication with anti-malarials, Pawe Special Woreda, North-West Ethiopia, August 2008 (N=209).

Variables	Self-medication		Crude OR (95% CI)	Adjusted OR (95% CI)
	Yes	No		
Sex of Patients				
Male	36	62	1.37(0.77, 2.45)	1.30(0.71, 2.40)
Female	33	78	1	1
Age of ill persons				
<5	9	22	0.84(0.36, 1.96)	0.72(0.29, 1.76)
5-9	6	8	1.55(0.51, 4.69)	1.15(0.35, 3.79)
10-14	4	7	1.18(0.33, 4.21)	0.79(0.20, 3.06)
≥ 15	50	103	1	1
HH income				
<112.5 ETB	13	31	0.56(0.17, 1.84)	0.66(0.19, 2.28)
112.5-300.0 ETB	10	32	0.44(0.16, 1.23)	0.55(0.19, 1.61)
300.0-495.8 ETB	14	21	1.13(0.45, 2.81)	1.32(0.51, 3.41)
495.8-901.7 ETB	16	29	0.91(0.42, 1.98)	1.24(0.54, 2.87)
901.7-5062.5 ETB	16	27	1	1
Family size				
≤5	38	101	0.47(0.26, 0.86)*	0.47(0.25, 0.90)*
>5	31	39	1	1
Belief that malaria can be cured by modern drugs				
Yes	61	129	0.65(0.25, 1.70)	0.64(0.23, 1.77)
No	8	11	1	1

*P-value<0.05

5.1.5.2 Health institution visits

From the 178 reported malaria cases/symptom complexes, 92 sought treatment from health institutions. And from these, 71(77.2%) were diagnosed as malaria, 9(9.9%) as typhoid, 4(4.3%) as anemia, 4(4.3%) as *birdd*, 2(2.2%) hypertension and other diseases, 7(7.6%). 19(20.7%) were not told about the kind of diseases diagnosed (Fig. 4). From the 92 reported malaria/symptom complexes illnesses that were taken to health institutions, blood tests were done only for 30(32.6%) patients.



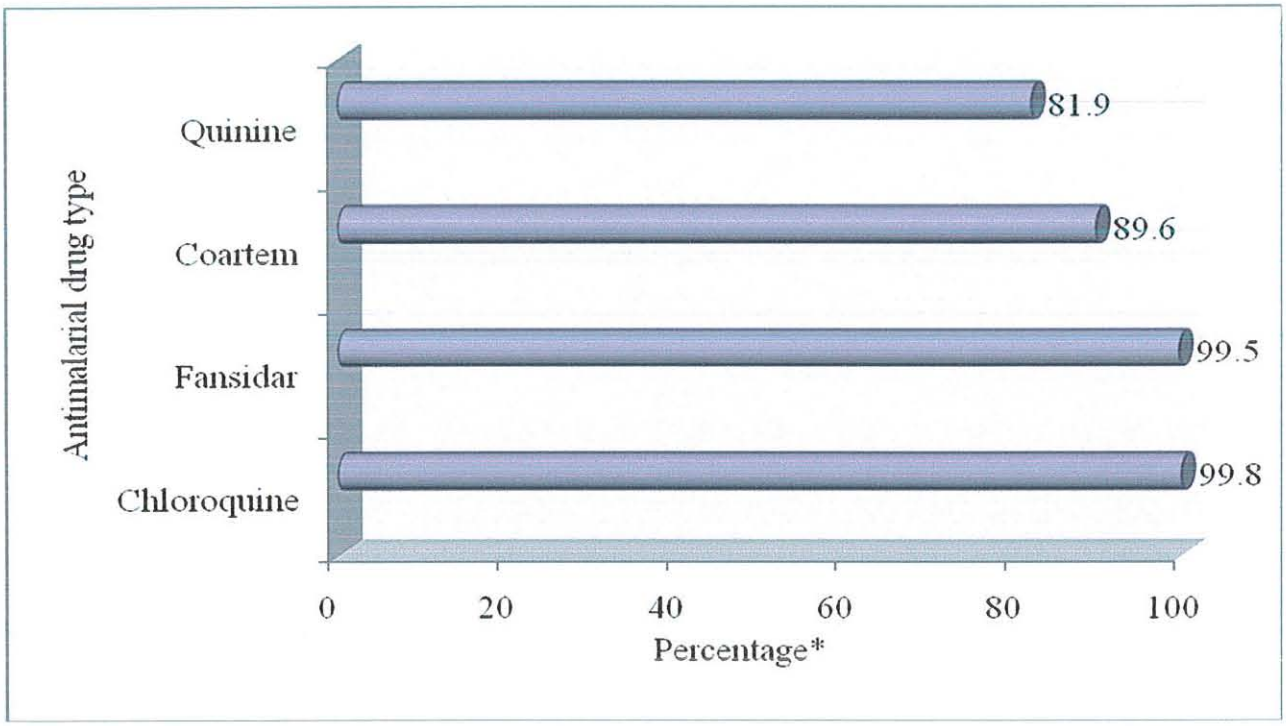
* Sum of percentages may exceed 100% because of multiple responses.

Figure 4: Diagnosis results of ill individuals who visited health institutions, Pawe Special Woreda, North-West Ethiopia, August 2008 (N=92).

5.1.6 Knowledge about malaria treatment and anti-malarial drugs

General knowledge about malaria treatment is a prerequisite to treatment seeking practices. To this effect, respondents were asked if malaria is a treatable disease by modern remedies. Accordingly, majority of the respondents, 404(93.5%), believed that malaria could be cured by modern medicines.

Regarding the knowledge of respondents about the different anti-malarial drugs, 432 (100%) of them were able to mention at least one anti-malarial drug (Fig. 5). Chloroquine 431(99.8%) and Fansidar 430(99.5%) were the two commonly known anti-malarial drugs followed by Coartem 387(89.6%) and relatively the least known drug, Quinine, was named by 354(81.9%) respondents.



*sum of percentages may exceed 100% because of multiple responses.

Figure 5: Knowledge of respondents about the names of the different anti-malarial drugs, Pawe Special Woreda, North-West Ethiopia, August 2008(N=432).

Concerning the methods people employ to identify anti-malarial drugs from others, half of the interviewed mothers 216(50%) said by looking the color of the anti-malarial drug and/or packaging, 189(43.8%) of them said by reading the label or by asking others to read the label, 63(14.6%) said by making signs on the containers or packaging, 60(13.9%) said by storing in different places and 30(6.9%) said by smelling the drug. Four (0.9%) of the caretakers do not know how to differentiate/identify anti-malarial drugs from others.

Table 8: Different methods used to differentiate anti-malarial drugs from others, Pawe Special Woreda, North-West Ethiopia, August 2008 (N= 432).

Methods	Frequency	Percentage*
Color	216	50.0
Reading the label or by asking others to read	189	43.8
Making signs on the containers (packaging)	63	14.6
By storing them in different places	60	13.9
Smell (odour)	30	6.9
Do not know	4	0.9
Other methods	8	1.9

* Sum of percentages may exceed 100% because of multiple responses.

When asked about the consequences of non-adherence to anti-malarial treatment, more than half of the respondents, 229(53%) said not being cured from the illness (risk of relapse), 87(20.1%) said death follows, 86(19.9%) said severe worsening of the disease condition, 12(2.8%) said it leads to other diseases, 10(2.3%) did not know anything about the consequences of poor adherence to anti-malarial medication and 18(4.2%) mentioned other reasons. Some respondents mentioned more than one consequences of non-adherence.

Table 9: Reported consequences of non-adherence to anti-malarial medication, Pawe Special Woreda, August 2008 (N = 432).

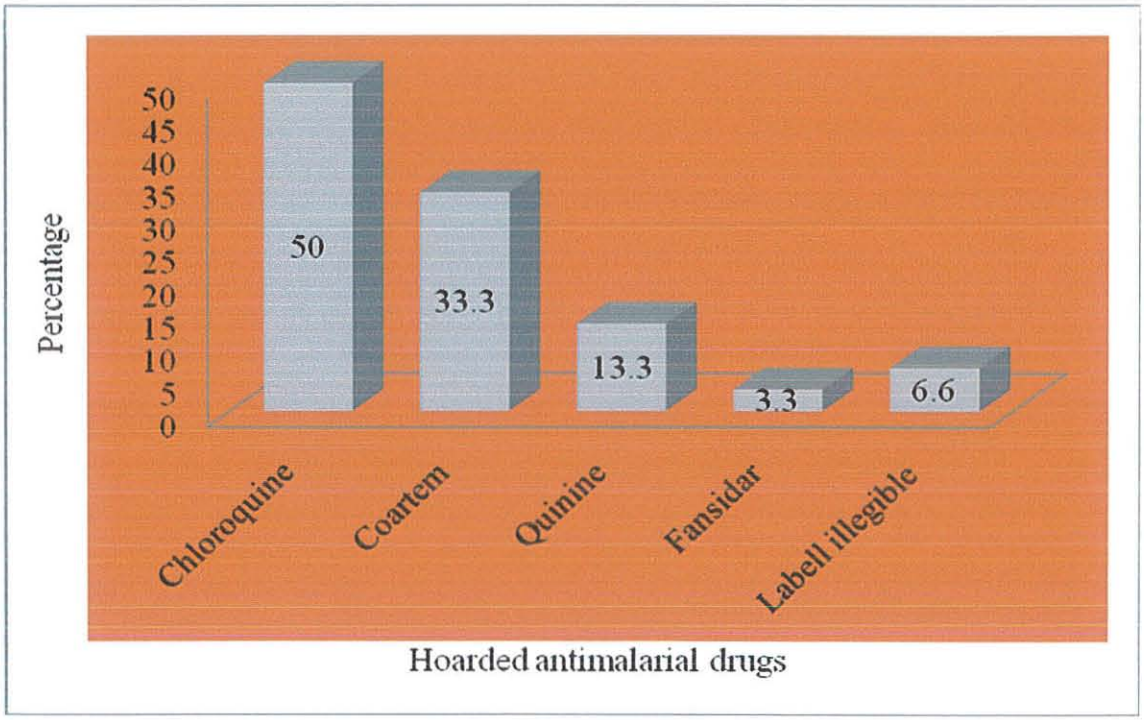
Consequences	Frequency	Percentage*
Not being cured from the illness (relapse)	229	53.0
Death	87	20.1
Severe worsening of the disease condition	86	19.9
Leads to other diseases	12	2.8
Do not know	10	2.3
Others	18	4.2

*Sum of percentages may exceed 100% because of multiple responses

In this study, almost one-twentieth, 19(4.4%) of the respondents claimed that either the mother herself or any family member has consumed alcohol while on anti-malarial treatment.

5.1.7 Anti-malarial drug hoarding

Majority of the surveyed households, 396(91.7%) did not store anti-malarial drugs. Only about 36(8.3%) of the households stockpiled anti-malarials at home. From the 36 households, six were not willing to show the kinds of drugs they stored. From those which were willing to show, relatively the most stocked anti-malarial-Chloroquine was stocked by 15(50%) of the households. 10(33.3%), 4(13.3%) and 1(3.3%) of the households had stocked Coartem, Quinine and Fansidar respectively. In 2(6.6%) households it was very difficult to identify the kind of drug stocked, as the label was illegible (Fig. 6).



* Sum percentage may exceed 100% because of multiple responses.

Figure 6: Commonly hoarded anti-malarial drugs, Pawe Special Woreda, North-West Ethiopia, August 2008 (N=30).

The different places where anti-malarials were stored were observed and it was revealed that drugs were mostly stored in untorn containers/packages in hot area 15(50%). 12(40%) of anti-malarials were stored in untorn container/package in dry area at room temperature and 3(10%) in untorn containers/packages in moist area. Only 1(3.3%) of the anti-malarial was stored without

container/package in open spaces and 1(3.3%) was stored in torn container/package in dry area, such as on the dry mud shelves.

5.1.8 Mosquito net coverage

The survey shows that 427(98.8%) respondents reported to have had at least one mosquito net in their household.

Regarding the number of mosquito nets they possess, 118(27.6%) had only one, 262(61.4%) had two, 41(9.6%) had three and only 6(1.4%) had four. Figure 7 shows the percentage of households along with the number of mosquito nets they own.

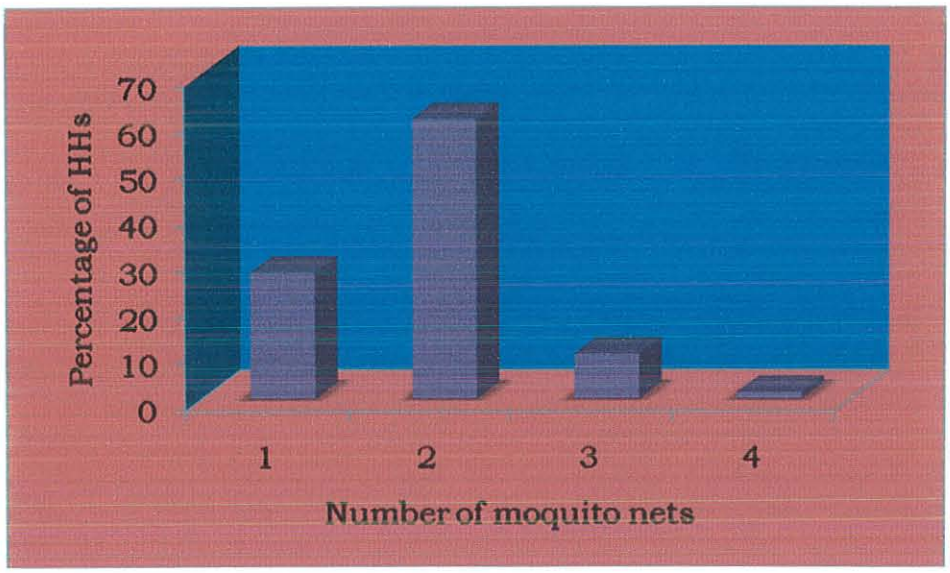


Figure 7: Mosquito net possession in Pawe Special Woreda, North-West Ethiopia, August 2008. (N=427)

Factors associated with reported possession of more than one mosquito net

In multivariate logistic regression analysis, among the socio-demographic variables, the mothers' (care givers') occupation and household family size were associated with reported possession of more than one mosquito net. Being a housewife (OR=2.96, CI=0.92, 9.59) was highly associated with possession of more than one mosquito net. Households with a family size of less than or equal to 5 persons (OR=0.05, CI=0.02, 0.17) were found to have a significantly less chance of possessing more than one mosquito net. Ethnicity, age, level of schooling, possession of

information sources (radio and television), respondents knowledge that mosquito net prevent from malaria, mosquitoes transmit malaria, and perceived that mosquito as cause of malaria, and residence place (urban or rural) were not associated with reported possession of more than one mosquito net (Table 10).

Table 10: Factors associated with possession of more than one reported mosquito net, Pawe Special Woreda, North-West Ethiopia, August 2008(N=427).

Variables	Possession of >1 mosquito net		COR (95% CI)	AOR (95% CI)
	Yes	No		
Education of the Mother				
Illiterate	198	77	1.45(0.70, 3.014)	1.46(0.62, 3.43)
Read and write/Read only	31	9	1.95(0.71, 5.33)	2.20(0.71, 6.85)
Grade 1-6	57	19	1.70(0.72, 4.00)	1.89(0.73, 4.93)
Grade 7+	23	13	1	1
Family size				
≤5	201	115	0.05(0.02, 0.16)**	0.05(0.02, 0.17)**
>5	108	3	1	1
HH Income				
<112.5 ETB	55	35	0.39(0.20, 0.76)*	0.54(0.25, 1.18)
112.5-300.0 ETB	58	28	0.51(0.25, 1.02)	0.65(0.30, 1.45)
300.0-495.8 ETB	62	17	0.90(0.42, 1.91)	0.99(0.43, 2.26)
495.8-901.7 ETB	65	21	0.76(0.37, 1.57)	1.88(0.40, 1.93)
901.7-5062.5 ETB	69	17	1	1
Radio				
Yes	185	60	1.44(0.94, 2.21)	1.17(0.72, 1.88)
No	124	58	1	1
Occupation of the mother				
Housewife	45	9	3.85(1.29, 11.46)*	2.96(0.92, 9.59)*
Merchant	10	5	1.54(0.40, 5.96)	1.19(0.26, 5.36)
Farmer	241	94	1.97(0.84, 4.65)	1.33(0.51, 3.49)
Others***	13	10	1	1
Respondents perceived that mosquito is a cause of malaria				
Yes	189	70	1.08(0.70, 1.67)	1.06(0.65, 1.74)
No	120	48	1	1
Respondents know that mosquitoes transmit malaria				
Yes	60	22	1.05(0.61, 1.81)	0.78(0.42, 1.45)
No	249	96	1	1
Respondents know that mosquito net prevents from malaria				
Yes	237	86	1.22(0.76, 1.99)	0.90(0.52, 1.54)
No	72	32	1	1

*P-value<0.05, **P-value<0.005

***Others include: civil servants, daily labourers and students

5.1.9 Use of traditional remedies to treat malaria

By interviewing mothers, information was collected on the different traditional remedies used to treat malaria. It was found that 23(5.3%) of the visited households used traditional remedies to treat malaria. The route of administration mentioned for all the traditional drugs was oral (100%) and in formulating liquid preparations, water was reported to be used as a solvent.

Medicinal Plants used to treat malaria were reported in 19(4.4%) of the households studied and the most commonly mentioned herbs were, papaya (*Carica papaya),* neem (*Azadirachta indica*), *zingible* (*Zingiber oficinale*), *damakesse* (*Ocium lamifolium*), *bisana* (*Croton macrostachys*), garlic (*Alium sativum*), lemon (*Citrus limon*), pepper (*capsicum annum*), *senafitch* (Brassica nigra). From these, the most commonly mentioned were *Carica papaya* and *Azadirachta indica*. The doses and duration of administration of herbs varied from household to household.

Animal origin traditional remedies were reported in 4(0.93%) of the households studied. All four of the households mentioned "*Metata*", a cheese well mixed with different spice species, kept for seven years and then will become a hard solid mass. Though there is difference regarding the dose, there is no difference regarding the duration of treatment. All the four respondents said the liquid dosage of "*metata*" is prepared by combining a part of it with water and taken for seven days.

5.2 Qualitative results

5.2.1 Findings of FGDs with mothers

Three FGDs, with an average 78 minutes of interesting discussion with each group, one group comprising of seven women and the other two groups comprising of eight & nine women were conducted. The FGDs were conducted with different women who were thought to represent the whole women community: rural and urban residents, young and old, from all ethnic groups and considering all religions practiced in the study area.

Figure 8: One of the FGDs sessions, Pawe Special Woreda, North-West Ethiopia, September 2008.

All participants were willing to participate in the discussion to share their views and also to be tape-recorded. The average age of participants was 39.8 years (range 25-65 years). Almost all

were housewives, married and regarding their educational status, majority of the participants were illiterate (not able to read and write), some of them were able to read and write, and a very few of them attended grades 1-8.

Results the FGDs were analyzed by thematic approach. The transcriptions of the FGDs were reviewed to classify the primary categories within the themes. Finally, four themes were selected for presentation of findings. These include knowledge about malaria, actions taken against perceived malaria/symptom complexes, knowledge about malaria treatment and anti-malarial drugs, and mosquito net possession and use.

Knowledge about malaria: cause, transmission, signs & symptoms, prevention and diagnosis

Though the extent of emphasis among discussants varied, all of the women involved in FGDs knew malaria called "*weba*" by the local language and all recognized malaria as a major health problem in the study area followed by typhoid and tuberculosis (TB). The perception was that nearly everyone in the community has already experienced malaria episodes. One of the FGD participants said:

> "*Here in Pawe we are husband and wife with malaria*" i.e. to show the severity and endemic nature of malaria in the study area.

There were interesting variations in the perception about the cause of malaria within the FGD participants. Some put the cause of malaria as something that follows when people fail to keep their personal and environmental hygiene, like lack of personal cleanliness, formation of swampy areas and accumulation of dirt around houses etc. Others said eating food contaminated by "*tinign*" as the cause of malaria: a participant in one of the FGDs stated that:

> "*When immature children eat food contaminated with "tinign", they will be infected by malaria. Adults will not eat such foods as they are very aware of the consequences!*"

Most participants understood malaria as a diseases caused by "*bimbii*" (group of night time flying insects reproduced and lived in garbage and swampy areas). When a "*bimbii*" bites people, it causes the disease. Asked if all "*bimbiis*" cause malaria, the FGD discussants said no. As one mother said:

"Not all "bimbiis" cause malaria; it is only Mosquito, which is differentiated from other bimbiis by having larger size and "four legs," that transmits malaria."

And another made the following comment:

"If these all shouting "bimbiis" were causing malaria, no one would have survived here in pawe."

Most of the participants in the FGDs were able to recognize that malaria is transmitted through mosquitoes. However, there were interesting variations among participants in the perceptions about how mosquito transmits malaria. One mother explained that:

"Mosquitoes carry the "malaria" from toilets and put it on the food in the home and when we eat that, we will be infected."

Smell of sesame plant was also associated with malaria infection by few participants, one mother demonstrated this idea:

"We are infected by malaria during weeding and harvesting of sesame. Oh! It is a bad crop as its smell attracts mosquitoes."

With regard to the peak transmission season of malaria, most of the participants believed that it gets peak during the time of weeding and harvesting. One mother stated:

"Mosquito bite and malaria illnesses are very common from late August to November."

Almost all participants demonstrated good knowledge of the signs and symptoms of malaria. The signs and symptoms participants associated with uncomplicated malaria include fever, joint and muscle pain, sweating, vomiting, head ache, thirst, loss of appetite, weakness, chills and shivering. For severe malaria, they mentioned unconsciousness, convulsion and excessive weakness as the major symptoms. All of those who took part in the discussion noted that there is huge difference between vomiting due to malaria and other diseases like typhoid since the color of the vomit due to malaria is yellowish or yellowish green. An old mother who participated in one of the FGDs highlighted this and said:

"The vomit due to malaria is yellowish-green in color but the vomit due to other diseases, for example due to typhoid is white and full of froth but there is no froth in malaria vomit."

Most participants reported that 'farcifarum' (=falciparum) malaria is very dangerous and leads to unconsciousness if treatment is not sought immediately. One participant narrated that:

"There is continuous diarrhea and vomiting in 'good' types of malaria illnesses but the one without such symptoms is a very dangerous type of malaria called farcibarum (=falciparum), it immediately rises to your head and kills you within a short period of time."

The study revealed that the Pawe community largely believed malaria is preventable. And mosquito nets, draining stagnant water around home, keeping personal and environmental hygiene were mentioned as important methods of prevention.

The majority of the FGD participants showed their preference to bed nets instead of insecticidal aerosols for mosquito bite prevention. A young discussant stated that:

"The latter is used for shorter period of time and cost wise it needs 'huge' investment, but the former can be used for a year or more."

All of the FGD participants mentioned chemical spraying (i.e. IRS) as a means of malaria prevention. However, some participants expressed their discontent with this method as it is tedious. One participant elaborated that:

"It is very beneficial since it kills almost every small insect including mosquitoes but I did not let my house to be sprayed as it is tiresome to move in and out household utensils/materials."

Some of the participants in all the FGDs underlined eating better foods as an important method of malaria prevention and they justified this by saying it is mainly the poor that usually get attacked by malaria since they do not get quality food. One woman stated that:

"It is only hunger that leads to malaria infection and the only prevention method is eating better foods & keeping your body."

In contrary to the above participants views about malaria prevention, a very few FGD participants expressed that faith in God prevents from malaria. One woman admitted that:

"Though we have mosquito nets, my family do not use it; our God will not sleep, He always guards us-He will guard us throughout the whole night from mosquito bite."

Majority of those who participated in the FGDs stated that certain groups of population such as pregnant women, children, elderly, nursing mothers and malnourished people are susceptible to malaria infection. Particularly, most of the FGD participants stressed that malaria in children and pregnant women is considered to be a serious problem in the community and the general consensus among the participants was that it kills children fast if care is not sought promptly. It was highlighted by the following quote from a mother who participated in one of the FGDs:

"Malaria is a major health problem in children because they play while they are ill till they fall down and once they fall down it is very difficult for them to recover."

Self-medication against perceived malaria/symptom complexes

Self-medication practice for perceived malaria/symptom complexes was mentioned by some of the FGD participants. The use of anti-malarial drugs bought from private drug retail outlets was reported to be the major source, and commonly used drugs mentioned were Chloroquine, Coartem and Paracetamol. In one of the FGDs, a mother said:

"If any of my family member's body is hot, the first thing we do is to give him/her Coartem & Chloroquine, bought from pharmacy: Coartem-four tablets per day for six days and Chloroquine for three days-each four tablets in the first two days and two on the third day."

However, as indicated above many discussants lacked adequate knowledge of the correct dosage.

Self-medication can be seen as a first step in the attempt to solve a health problem. It is mainly after self-medication failed to solve the perceived malaria/symptom complex illness that an ill individual is taken to the health care facility. One participant from the urban area admitted that:

> *"If any of my family members is febrile or has malaria illness, I will buy Chloroquine from the private pharmacy for the febrile or malaria ill individual and Paracetamol if there is head ache. If improvement is not seen, I will take the individual to the hospital."*

In relation to non-compliance with a clinician's prescription, a negative assessment of a drug's efficacy is the most frequently cited reason for deciding to abandon treatment and to start what they believed to be effective. One of the FGD partakers described:

> "*The nurse in our clinic prescribed Coartem, and I took them, but I didn't get any better. Then I bought and took Quinine that cured me soon.*"

Regarding hoarding of anti-malarials most of the FGD participants did not hoard, but some said they stockpiled anti-malarials for different reasons. Frequent episodes of illness, to save time (for plowing or harvesting), distance from the source of anti-malarial drugs etc. were given as the main reason for hoarding of anti-malarials at household. Some respondents relied on the fact that they had previous experience with similar ailments therefore giving them the confidence to self-medicate. A woman stated that:

> *"When I and my family members got sick, I used to give them anti-malarial drugs bought and kept at home without going to the clinic which is situated around three-four kilometers away."* And another participant further elaborated this as: *"Instead of going to the town during farming or harvesting time, we purchase and keep the drugs in case someone becomes ill."*

Knowledge about malaria treatment and anti-malarial drugs

FGD participants were asked to mention the commonly used anti-malarial drugs. Accordingly, almost all the participants were able to mention Chloroquine, Fansidar, Coartem and Quinine. In order to assess whether they could be able to identify the different anti-malarial drugs, samples of the packages of Coartem, Chloroquine, Fansidar and Quinine were shown to the participants.

"Chloroquine once per day for three consecutive days, Fansidar all the three tablets at once."

However, most of the participants did not know the appropriate dose of the newly introduced anti-malarial drug-Coartem: some say four tablets per day for six days, others say four tablets twice per day for three days etc. An old mother in one of the FGDs elaborated this as:

"I was given Coartem before a week; I took four tablets (all once) per day for six days."

Almost all the participants explained that Coartem was very effective and that they were satisfied with it. A mother was particularly impressed with the rapid improvement observed in the health of the ill following administration of the Coartem and she said:

"Whenever sick persons are given the drug, the persons recover promptly and by the second day of use many of the sick persons were active and healthy."

Although majority of the participants have acknowledged Coartem, few have doubts over its efficacy. Even though Fansidar is prohibited for the treatment of malaria based on the country's malaria treatment guideline, some of the FGD participants claimed to use it for the treatment of malaria. Their main reason was lack of confidence in the efficacy of the newly introduced drug, Coartem-from their experience. Since it is not prescribed for malaria treatment in government institutions, they claim to get it by purchasing from private drug retail outlets. One mother said:

"My son was ill before some days & I took him to the clinic in our kebele & was given coartem but did not show improvement. I went to the nearby town and bought Fansidar and Chloroquine from the drug retail outlets and felt better within two days of treatment initiation."

Concerning the perception about the efficacy of anti-malarials, some participants associate efficacy with taste: bitter or sour or other non-sweet tasting drugs were perceived to be more effective than other medications. One mother lamented that:

"Coartem is not effective, even it is not bitter and if so how do I expect it to cure my malaria illness?!"

from sugar!" And another said that: "*Forget about shops, drug prices are even costly in drug retail outlets, and shops will exploit us more.*"

Mosquito net coverage and use

Most of the FGD participants recognized the importance of using mosquito nets for the prevention of malaria. However, few participants said the chemical used for impregnating mosquito nets might pose health hazards like allergy to skin and others complained of the hotness. One FGD participant said:

"Bed nets are not appropriate to use in Pawe as the weather is hot and using nets can be too hot to sleep under."

According to most FGD participants, there is shortage of mosquito nets in Pawe. In relation to this one mother said:

"My family size is ten, we have only two mosquito nets: one is being used by myself and my husband and the other by our two youngest children. Six of our sons & daughters do not have any!"

In households where there is shortage of mosquito net, as to the number of sleeping sites, most of the mothers said that they would give priority to "susceptible groups" such as pregnant women, children, the elderly and nursing mothers. Repeatedly, most stressed the first two to be priorities but some in contrary would give preference to themselves (wife & husband). One mother said:

"*Unless I am safe, how can I think about my kids?!*"

The other problem associated with mosquito net use mentioned by most of the participants in the three FGDs is lack of chemical for retreatment. One of the participants said:

"Some years back we used to wash the nets and get retreated every six months, but now this is not practiced because there is no chemical in the clinic since 1998 E.C. and we haven't used it ever since as it could not prevent from mosquito bite."

Though a majority of the FGD participants recognized that they are at risk of malaria infection throughout the year, particularly in the peak transmission season, they did not use mosquito net throughout the year except these peak transmission months (late August to November i.e. after the rainy season) thinking that the infection rate at other times is minimal. A participant in one of the FGDs admitted that:

> *"It is the malaria that we know that may infect us and new malaria is not expected out of this risky period. The former malaria is what we are accustomed to and can be easily cured by taking anti-malarials and so we do not worry about hanging mosquito nets every day."*

5.2.2. Findings of key informants' interviews

Key-informant interviews were conducted with opinion leaders, religious leaders, elderly and concerned bodies related to malaria prevention and control activities at different levels in the woreda including senior nurses (clinic heads), health extension workers, Matron of Pawe Hospital, Head of Pawe Hospital Pharmacy Department, Medical Director of Pawe Hospital, Head of Pawe Special Woreda Health Bureau, Head of Pawe Special Woreda Pharmacy Department and Head of *Felege Selam* Health Center-the only health center in the woreda. All were interviewed after the necessary verbal consent was obtained.

All of the KIIs were handled by the principal investigator and the results were analyzed by thematic approach

Knowledge about malaria

Although almost all "uneducated" KIs explained their community to have confidence in the efficacy of modern anti-malarial drugs for malaria treatment, and mosquito nets for malaria prevention, few claimed to have a different understanding about the prevention methods of malaria. One KI religious leader indicated that:

> *"In our community there is a belief that eating or holding garlic all the time as a helpful measure to prevent malaria since the mosquito will not come in contact with a person if there is smell of garlic."*

Most of the KIs, including nurses and health extension workers, had similar opinions about the diagnosis of malaria, i.e.,

> *"Patients have belief that malaria could easily be recognized by signs & symptoms only."*
> A KI, Matron of Pawe Hospital, who has worked in the area for more than ten years, further explained that: *"Even when patients are negative after blood test, they will argue to get anti-malarials by comparing the signs & symptoms of the present illness with what they experienced during their previous malaria illness."*

Actions taken against perceived malaria/symptom complexes

The prevailing treatment practice for perceived malaria/symptom complexes mentioned by part of the KIs was the use of anti-malarial drugs bought from private drug retail outlets. A KI nurse working at Pawe hospital reported:

> *"Many of the parents first treat themselves and/or their children with medicines bought from private drug retail outlets. They come to the health institutions when the illness is not responding to the drugs already used."*

With regard to the source of anti-malarial drugs used by the community, part of the KIs said health institutions and others said drug retail outlets. An elderly man stated his own experience that:

> *"I usually get sick of malaria every one or two years and I will not be cured unless I take Fansidar. Thanks to my money, I will buy from private drug retail outlets."*

Knowledge about malaria treatment and anti-malarial drugs

One of the key informants, the woreda health bureau head, was asked if there is any form of expired/illegally obtained anti-malarial drug distribution and he stated that:

> "*There were reports about such issues, but when we inspect private drug retail outlets we got nothing, most probably they hide such drugs during inspection.*" This was corroborated by one senior nurse working at Pawe hospital and explained what he encountered as: "*Sometimes when we order patients to buy Quinine intravenous injection*

or other drugs from private drug retail outlets, they will come with expired drugs; imagine what the consequence will be if they were to self-medicate themselves or their family members!"

Treatment failure after medicating with coartem has become questioning for few of the key-informants. Head of Pawe Special Woreda Pharmacy Department reported that:

"There were reports from the community that the drug is not efficacious to treat malaria. Many patients are positive after completing treatment. Even I myself did not have the confidence to say coartem is effective. To say resistance has developed, it is introduced nearly (before five years); I don't know the reason. In short coartem is a drug that should be further studied."

With regard to the decision of the Federal Ministry of Health of Ethiopia (FMOH) to introduce Coartem in 2004 and prohibit Fansidar for the treatment of malaria, most of the health professional key-informants mentioned development of drug resistance. In contrary to this, a very few health professionals do not have the reason behind the change and even some have a different belief as explained by one nurse who has worked in the area for five years as:

"The reason for the treatment regimen change was shortage of Fansidar for the HIV/AIDS patients." He strengthened further his comment by saying: *"A letter was sent from the woreda health office to the clinic where I am working to return all the fansidar in our hand to be used for the HIV/AIDS patients and this clearly indicates the shortage of the drug for HIV/AIDS patients. I think this is the main reason behind the policy change."*

Mosquito net possession and use

Based on the information obtained from the Woreda Health Office, long lasting insecticidal nets (LLINs) (nets that do not require re-treatment) were distributed for the inhabitants and distribution was based on family size.

In door residual spraying (IRS) has played as key strategies for reducing the mosquito vector. However, many KIs confirmed that IRS in Pawe community is rarely practiced since 2006. An elderly key informant from a remote rural area testified this:

"Indoor residual spraying is often conducted when malaria becomes epidemic."

The challenges to IRS as reported by the head of the woreda health office were found to be shortage of chemicals and budget constraints. He revealed that:

"*Mostly we face shortage of chemicals and even when chemicals (DDT) are available, we may not have the budget to carry out the spraying. Now we are spraying on rotation basis and part of the population may not have access to IRS up to four years.*"

6. DISCUSSION

The study was population based and the aim was to determine the prevalence of perceived malaria, treatment-seeking behaviour for reported malaria illness/symptom complexes and about anti-malarial drug hoarding at household level in an area of seasonal malaria transmission in rural Ethiopia. Furthermore, it aimed to determine the coverage and use of mosquito nets in the area, and factors influencing its possession and usage. The study discovered essential information about factors associated with self-medication with anti-malarials, anti-malarial drug hoarding and possession of mosquito nets among the study population.

A number of malaria-related symptoms particularly fever, shivering, chills, loss of appetite, headache, vomiting and joint pain were considered and presented as symptom complexes, which taken together may approximate a clinical diagnosis of malaria, although using these symptoms, particularly fever, as a proxy for malaria appears to be neither sensitive nor specific when compared to parasitologically confirmed diagnosis (Font et al., 2001; Deressa et al., 2007[a]). Nevertheless, fever along with other symptom complexes serves as a proxy for malaria both at household level for home management of malaria and peripheral health facilities where diagnosis is made presumptively upon the presence or history of fever and other symptom complexes. However, a recent change of first-line treatment of malaria to artemisinin-based combination therapies (ACTs) in many countries of SSA has highlighted the potential cost implications of malaria over diagnosis based upon clinical signs and symptoms. Use of a rapid diagnostic test would help in identifying malaria parasites especially in areas with seasonal malaria transmission where presumptive diagnosis of the disease may be inaccurate but the magnitude of asymptomatic carriers is assumed to be low (Deressa et al., 2007[a]).

In the present study area, laboratory tests were unavailable at peripheral public health facilities such as clinics and health posts. At health center and hospital levels, malaria diagnosis through blood smear examination is usually recommended, but there are occasions that these facilities might not provide blood testing services due to patient overload or shortage of supplies.

The present study revealed that the prevalence of perceived malaria was 6.1%, which was lower than the report from Adamitulu Jido Kombolcha Woreda in central Ethiopia and other studies done in Kenya and Papa New Guinea (Deressa et al., 2007[c]; Yé et al., 2007; Pluess et al., 2009). The main reasons for this difference may be the fact that the present study was conducted on the eve of a high malaria transmission season in the area, and its sensitivity might not be high considering the transmission season. In addition to this, nowadays the Ethiopian government is focusing on prevention of malaria. Because of this, there is huge distribution of mosquito nets, relatively better access to IRS in comparison with olden days and better environmental hygiene keeping practices (e.g. removal of mosquito breeding sites). All these may partly explain the decrease in the reported malaria illness. Moreover, the variation in the study areas and methodology might partly explain the disparity in the reported rates of malaria illness episodes.

The decline in perceived malaria is also substantiated by a decline in the number of malaria cases year by year in Pawe as evidenced by reports from the woreda. The number of malaria cases in Pawe were 44094, 27162, 23985 and 15063 in 2004/05, 2005/06, 2006/07 and 2007/08 respectively (unpublished report from Pawe Special Woreda Health Office). This vividly indicates that there is a step decline in the rate of malaria infection during the past four years. Though the impact of malaria is declining, it is still the number one cause of morbidity in the study area in each of the respective four years. The decline in the malaria infection trend was also explained by FGDs & KIIs participants.

In the present study, higher number malaria episodes were reported in females than in males. This might be due to the fact that mostly in Ethiopian culture, particularly in such remote and undeveloped" regions, males are favored in most aspects and in this case too, males in general and male children in particular, may be given priority to use the different malaria prevention methods, including mosquito nets. Moreover, females may not get appropriate treatment on time in comparison with males. These factors all may have contributed their effect for the higher number of reported malaria cases in females.

More malaria cases were also reported in "children" than in mothers and husbands. This might be due to the fact that since there is report of mosquito net shortage and priority is given for

"youngest children" and the couples (husband and wife) in such cases, as reported by FGDs & KIIs participants; it is expected that particularly "elder children" may not have the chance to sleep under mosquito nets. Because of this, there is high chance that "children" will be exposed to mosquito bite and then to malaria infection.

Although the association of malaria with mosquitoes is widespread in these communities, other causal factors of malaria such as traditional beliefs like evil spirit, hunger, *mich,* cold weather, cloudy weather, and excessive work load were frequently suggested. Such misconceptions have also been reported from other studies in Ethiopia (Jimma et al., 2005; Legesse et al., 2007). The same beliefs, particularly hunger were also mentioned by many FGD participants in the present study. The awareness on the relationship between mosquitoes and malaria transmission in the study community is highly important for the possession and utilization of mosquito nets and other prevention methods. It is speculated that knowledge of this association predicts high mosquito net and other prevention methods use, which in turn decreases malaria infection.

It is surprising to find that a majority of the respondents could not correctly answer the transmission method of malaria as mosquito bite, although the study area is malaria endemic. In the present study, less than one-fifth (19.2%) of the study participants mentioned mosquito bites as a mode of malaria transmission. The knowledge level of respondents about the mode of malaria transmission was very low when compared to the findings in previous studies carried out in Ethiopia, and Pakistan (Legesse et al., 2007; Jimma et al., 2005; Sultana, 2001). Differences in awareness level among study participants is expected to be due to the fact that the study participants included in the present study were mainly from rural areas unlike those of the previous studies who resided mainly in urban and semi-urban areas. In addition, different interventions particularly those made to raise the awareness of the community about malaria and its control in the urban areas could be a possible explanation for the high awareness of malaria.

Self-medication with anti-malarials has been reported to be a common practice in many malaria endemic areas worldwide. This may likely have a financial undertone as well as availability and affordability of sorts of anti-malarials in drug stores. Cultural and social factors have been reported to influence treatment-seeking behavior (Oyewole and Ibidapo, 2007). This paper has

presented evidence on the types of anti-malarials used and sources of treatment for reported malaria illness/symptom complexes in an area of seasonal transmission in rural Ethiopia. In this study, from those persons who reported malaria illnesses/symptom complexes, 69(38.8%) practiced self-care with anti-malarials. Because of the general incomparability of surveys due to differences in definitions, methodology and study settings of different studies, and due to scarcity of documented data for self-medication with anti-malarials for perceived malaria illnesses/symptom complexes, it was difficult to make a comparative analysis with the results of other surveys conducted in Ethiopia or elsewhere.

Individual health-seeking behaviour is driven by perceptions about illness and so does the choice of treatment. With self-reported malaria, one would expect a high use of anti-malarial drugs both in self-treatment and at health facilities, which if wrongly treated may in turn create unnecessary drug pressure leading to resistance (Ye et al., 2008). In the present study most malaria ill people self-cared with Chloroquine 29(42%) and 26(37.7%) Coartem. This trend might be due to what they have observed from the health institutions in their locality i.e. from previous experiences in their illness. These two drugs are commonly administered together based on sign and symptom diagnosis in the peripheral health institutions as is stated in the Ethiopian malaria treatment guideline (MOH, 2004). In Pawe, as evidenced by most FGD and KII participants, some people did not follow the appropriate dosing system while taking anti-malarials. This inappropriate use will result not only in treatment failures, but also it theoretically increases the risk of drug resistance to the currently available effective anti-malarials like Coartem. Many studies done have shown that artemether–lumefantrine (Coartem) is the most effective of the anti-malarial compounds in shortening the fever and malaria parasite clearance times. However, several treatment failures have been reported. Even in those appropriately adhered patients, treatment failures have been reported as is the case in one Japanese patient and these failures are believed to be a consequence of poor bioavailability of the lumefantrine component when ingested without fatty food (Mizuno et al., 2009). In Ethiopia in general and in Pawe in particular, the residents are poor and unable to get enough fatty food while on artemether–lumefantrine treatment. If this food shortage is further enhanced by poor treatment adherence, the risk of treatment failure and anti-malarial drug resistance will be further aggravated.

transport and laboratory services. In agricultural communities, the seasonality of cash income may prevent households from seeking treatment on time. Households make a significant amount of their annual income in the busy wet season, and people are unlikely to take time off to seek treatment for themselves or to accompany an ill person to a health facility, unless an episode is perceived to be serious enough (Chuma et al., 2008). And this leads people to practice self-medication either by buying drugs or by using left over or drugs obtained by other means. This practice was particularly stressed and reported by some FGD partakers.

In developing countries, self-medication should be considered a public health problem owing to lack of appropriate medical education to patients. Although a significant number of people throughout the world practice self-medication, only very low proportion get information about medicines from sources in the community because very little appropriate information is available at this level (Abdo-Rabbo, 2003). In the present study area, as reported by FGD and KII participants, under dosing and over dosing were common which may lead to development of drug resistance. Therefore, mere knowledge of anti-malarial drug is not a guarantee by itself unless the knowledge is internalized and put in to practice correctly by caregivers and the patients. It is speculated that internalizing anti-malarial drug related knowledge predicts rational use.

Different modalities of self-medication were mentioned by most FGD and KII participants: consumption of medicines acquired without a professional prescription, shared use of medicines, non-compliance with professional prescriptions, and use of leftover medicines stored at home. Similar results were also reported by Filho et al., (2004).

Seeking care from the health facility mainly comes after the failure of care at home, or malaria patients might directly seek treatment from health care facilities without the initiation of treatment at home (Deressa et al., 2007[a]). In the present study, from those who reported malaria/symptom complexes, 92 sought treatments from health institutions and from these only 71(77.2%) were diagnosed as malaria. The remaining were diagnosed as typhoid, *birdd,* hypertension and others. Most of these diseases share one or more common symptoms with malaria. Imagine the over usage of anti-malarial drugs that may result if these patients were self-diagnosed and self-medicated with anti-malarials. From the total of 119 malaria/symptom

reported from Tigray (Habtesion, 2007). Since malaria is very endemic in Pawe and nearly everyone had experienced the disease and has taken the drugs, it is natural to expect such a high percentage of family caretakers to know or mention the names of anti-malarials that they knew and use. In most FGDs conducted in this study, participants stressed that they are well acquainted with anti-malarials as they are using them in everyday life for themselves and/or their family members.

Concerning the methods people employ to identify/differentiate anti-malarial drugs from others, half of the interviewed mothers 216(50%) said by looking the color of the anti-malarial drug and/or packaging from experience. Unless appropriate interventions are designed, since different tablets used for different ailments have almost related (pack) colour, patients may take drugs other than anti-malarials which will lead to severe disease complications and even death. Surprisingly, 30(6.9%) caretakers claim to use smell as a means of differentiating anti-malarials from others. Smell is really a very unspecific method and my again lead to drug misuse.

Though most of the respondents, 412(95.3%), are knowledgeable in one way or the other about the consequences of non-adherence to anti-mlarials i.e. not being cured from the illness (relapse), death, severe worsening of the disease condition or leads to other diseases (e.g. anemia, splenomegaly etc.), some did not have the knowledge or have unrelated beliefs about the consequences of poor-adherence to anti-mlarials which may aggravate the problem. FGD participants also reflected the same beliefs and mentioned the above consequences. The respondents understanding about the consequences of poor adherence to anti-malarials is promising. It is speculated that good knowledge of the consequences of poor-adherence to anti-malarials is related with rational use.

Many medications including anti-malarials can interact with alcohol, leading to increased risk of illness, injury, or death (AADAC, 2003). Individuals who drink alcoholic beverages should be aware that simultaneous use of alcohol and medications--both prescribed and over-the-counter--has the potential to cause problems (AHI, 2007). In this study, almost one-twentieth, 4.4%, of the respondents claim that either the mother herself or any family member has consumed alcohol

while on anti-malarial treatment. A few FGD participants also reported that drinking alcohol while on anti-malarial treatment to have a long term prophylactic effect. Unless immediate interventions are implemented, such misconceptions are dangerous as they lead to treatment failure and loss of life.

In remote areas of Ethiopia, like Pawe, private pharmacies, drug stores and rural drug vendors dispense anti-malarials over the counter without prescription. This condition favours people to buy and keep drugs at home. It is doubtful if the aforementioned drug sources give the appropriate dose, meaning that patients either do not take a required course, which leads to drug resistance or might even be overdosed resulting in unwanted toxic effects.

In the present study, it was found out that 8.3% of household hoarded anti-malarial drugs. This is similar with a study done in rural Tanzania, Bagamoyo by Temu et al., (2006). However, the present study result differs significantly from the study done in Dar es Salaam by Mnyika et al., (1995), where as much as 71.7% of households were reported to have been storing and self-caring with anti-malarials in their homes. This difference in findings may be attributed to the fact that Mnyika did the study in urban area while this study was done in remote rural area. This would mean that people living in urban areas have much more access to the drug sources, purchasing power and education level is high than those residing in rural areas.

Unlike the findings of Temu et al., (2006) where Amodiaquine and Quinine were the most stored anti-malarial drugs, in the present study it was noted that Chloroquine and Coartem were the most commonly stored anti-malarials, while Quinine & Fansidar were the least stocked. This difference in the kinds of drugs stored might be attributed to the policy difference in Tanzania and Ethiopia, since Amodaquine is not approved to be used and marketed in Ethiopia, as per the malaria treatment guideline. Coartem, relatively being expensive hence reducing the probability of storage at home in comparison with Chloroquine. To a lesser extent policy change from Fansidar as first line drug for malaria treatment (since 2004) to Coartem could have played a role in the observed decline in the amount of Fansidar stored, as people may be told in the health institutions about this policy change issue. Moreover, in comparison with Chloroquine or

Quinine, Fansidar is taken as a single dose and as a result people will prefer to take Fansidar instead of a three day treatment course of Chloroquine or a seven to ten day Quinine, thus creating a room for not finishing the treatment course; as a result these drugs were remaining and stored at home. Despite being forbidden for the treatment of malaria, Fansidar was still stockpiled and used as anti-malarial. Some people have the perception that Fansidar is more efficacious than Coartem for *P. falciparum*, as explained in the FGDs and KIIs.

With respect to different places where anti-malarials were stored in the households, it was revealed that most drugs were stored in hot areas. Since heat aggravates the degradation of drugs in to useless or some times to toxic products, these drugs if taken may not cure the patient or even may cause hazardous consequences, including death and drug resistance. Unless such issues are closely monitored, they may lead to loss of the "golden" anti-malarial drugs.

Ethiopia has adopted the use of ITNs as one of its vector control strategies (Jimma et al., 2005). To this effect level of net ownership was assessed in this study area. Overall net ownership was very high with almost all, (98.8%) of the care givers' in the surveyed households had self-reported to have at least one bed net, and most owning more than one. The total number of nets owned by households, as reported by household respondents was 789 – an average of 1.8 nets per net-owning household. At least one net ownership is better when compared with other studies done in Ethiopia (Jimma et al., 2005; Tilaye and Deressa, 2007; Legesse et al., 2007; Paulander et al., 2009). At least one net ownership per household was also found to be higher in the present study area when compared with results from studies done in other African countries such as Gambia, Senegal, Zambia and Nigeria (Wiseman et al., 2007; NetMark, 2004[a]; NetMark, 2004[c]; NetMark, 2004[b]).

Though overall bed net ownership per household was very encouraging in the study area, this study noted both differences and similarities when the average number of nets owned per household among net-owning households was compared with those identified in other studies. The finding in this study was lower than the findings in Gambia and Senegal (Wiseman et al., 2007; NetMark, 2004[a]), but was found to be similar with the findings from Nigeria (NetMark,

2004[b]). The variation in the study areas and the time of study might partly explain the disparity in the reported rates of bed net ownership per household.

With regard to the use of mosquito nets, the seasonality of malaria and mosquito abundance is very important. In surveys conducted in Ghana, net use was considerably higher in the rainy season than the dry season mainly due to the abundance of mosquitoes as nuisances and the perceived risk of malaria during the rainy season (Binka and Adonso, 1997). This is particularly true for Pawe where the transmission of malaria and abundance of mosquito population vary across the seasons of the year. When the perceived malaria risk and mosquito density is high, mosquito nets are highly used. But, when the mosquito density coupled with malaria risk is low, (i.e. during the dry season) people may not see the need of continued mosquito net use. This is what is reported in the FGDs and KIIs.

Similar to a study done in Tigray (Habtesion, 2007), children, elderly, pregnant women and nursing mothers were reported vulnerable groups for malaria infection and priority was given to these groups in case of mosquito net shortage, as reported by FGD Partakers. This is really encouraging result and a very important awareness to curb the high malaria related child mortality in Ethiopia.

As reported by many FGD and KII participants, mosquito net use in Pawe was not free of complaints. Some people were complaining of the hotness while sleeping under net. Since the weather is hot and using nets can be too hot to sleep under nets in the study area, such a complaint is natural and expected. Responsible bodies must try to distribute more mosquito nets so that the number of nets will be in such a way that not more than two people will share a single net which directly decreases suffocation and hotness; and which in turn improves the appropriate and sustained use of nets.

Concerning the factors associated with possession of more than one mosquito net, care givers' occupation and family size were associated with reported possession of more than one mosquito net.

With regard to occupation of respondents, being a housewife was significantly associated with possession of more than one mosquito net. Although the interpretation is difficult, the possible explanation might be that in comparison with those mothers which are civil servants, merchants etc., those which are housewives may not have the knowledge of family planning and/or access to family planning education, which leads to giving birth to more children. Since net distribution was based on family size, these groups of mothers will have better chance of getting more than one mosquito net during distribution.

In line with the family size based distribution issue, households with less than or equal 5 persons were found to have a significantly less chance of possessing more than one mosquito net. Particularly, this association was in accordance with what has been reported from the woreda health office, key-informants and FGD participants. Since the nets were distributed based on family size, those households with smaller family size are not expected to have higher number of mosquito nets.

The refusal of household to IRS in many parts of the world has been recorded either as due to ignorance of mosquito control or to rigid folk social beliefs that vary by degrees (Yadav et al., 2007). In the present study, some people admitted to be reluctant as far as spraying is concerned. The main reason mentioned is that spraying causes inconvenience and waste of time in shifting household goods. Unless such misconceptions are circumvented and minor inconveniencies tolerated, the malaria control strategy will be hampered.

The constructive and substantial role of traditional medicine among African societies was recognized during the post-colonial period when the Western-oriented health care system failed to effectively meet the health care needs of the African broad masses. This unquestionably shows that the populations of developing countries heavily rely on traditional medicine to cope up with their health problems. The only medical care for the people of Ethiopia in the past was traditional medicine. In traditional medical practice, different types of medicines including plants, animal products and minerals are used (Teshome-Bahiru, 2006). In the present study area, it was found that 23(5.3%) of the respondents used traditional remedies to treat malaria. The route of

7. STRENGTHS AND LIMITATIONS OF THE STUDY

This study was not conducted without a limitation. It was carried out in August, the time when malaria problem in the area is not that much high. This could lead the respondents to underestimate the risk for malaria and chance to self-medicate with anti-malarials. It could have been better to undertake such kind of studies during the peak transmission months of malaria to elucidate the heartfelt needs of the community. Nevertheless, this study provides useful information about perceived malaria, and anti-malarial drug use for self-care.

The study data was based on 15-days self-reports, and therefore was subject to reporting or recall bias and respondents may not remember the exact drug that they used for self-medication, the number of ill individuals and symptom complexes before weeks. In addition to these, limitations of the study design and the methods of data collection might create some potential for biases in this study. The cross-sectional design gives information about a certain point of time and so answers might have been varied in different malaria seasons. Data collection relied on information given by the interviewees because of this, practices such as presence and use of ITN and treatment seeking could not be verified. Not many studies conducted particularly in Ethiopia, with regard to self-medication with anti-malarials for perceived malaria/symptom complexes and about anti-malarial drug hoarding trends made it difficult in comparing results.

Not revealing the truth by the respondents was also one of the limitations of this study. Since the interviewees were not willing to show part of the anti-malarial drugs hoarded, and to report all the mosquito nets they own, this may create difference from the reality.

Despite the above limitations, the present study is the first of its kind to investigate self-medication with anti-malarials for perceived malaria/symptom complexes, and about anti-malarial drug hoarding. Considering these, the present study is vital as it had provided at least baseline information about the above critical issues. Moreover, the study included both quantitative and qualitative parts, which enabled to understand the community perceptions and knowledge in depth. This research had included the needs of the current information by

governmental and non-governmental bodies at different levels. And also respondents were represented from all residential settings; peri-urban, nearest to peri-urban and farthest rural communities of the study area.

9. RECOMMENDATIONS

Considering the complexity of behavioral and deep-rooted convictions, there are no cheap 'magic bullet' solutions for the problems highlighted above. However, the following recommendations are forwarded:

- Though reported malaria in the study place is lower in comparison with other areas, further efforts like training and distributing more health extension workers, and closely supervising them etc., must be done in order to coordinate and strengthen control activities, and then completely eradicate malarial.

- Although it would not be possible or even desirable to try to eliminate self-medication completely, it is important to find ways of using this practice to strengthen primary health care through educating consumers in how to avoid the irrational use of anti-malarial drugs. People should be informed about alternatives to self-medication, i.e. seeking qualified advice. Moreover, a proper anti-malarial drug policy and adequate flow of reliable drug information is essential.

- Communities' perceptions of different types of treatment may hinder prompt access to the most effective treatment. These findings demonstrated the need to create awareness at the community level when new drugs are introduced to the market and to inform the community and health professionals about the reasons behind the drug policy change. Awareness creation is also necessary on the consequences of drug hoarding and rampant self-medication, and further studies to investigate these practices have to be done.

- Education of health professionals, particularly those working in the private sector not to sell prescription drugs without prescription and enforcement of the law on those who transgressed the rules and laws governing the pharmaceutical sector.

- The community should be informed now and then about the nature of mosquito nets distributed, whether it is Long-lasting insecticidal net (LLIN) or the usual Insecticide-treated bed net (ITN) as

people were complaining of shortage of impregnating chemicals though the distributed net is LLIN. Besides, it is decisively important to think about relevant health education topics ahead, contextual to the local community, before bed nets are distributed at a mass level in the study area or similar other places in the future.

- Possession of ITNs in households was found not proportional to their family size. Therefore, the number of ITNs supplied to households should be increased.

- This study assessed quantitatively bed net ownership as opposed to use. These two concepts are not necessarily synonymous. People who own bed nets may not use them for the correct purpose or use them only at certain times of the year and further studies on use are recommended.

- Further studies have to be done on the dose, safety and efficacy of the traditional anti-malarial drugs used in the study community.

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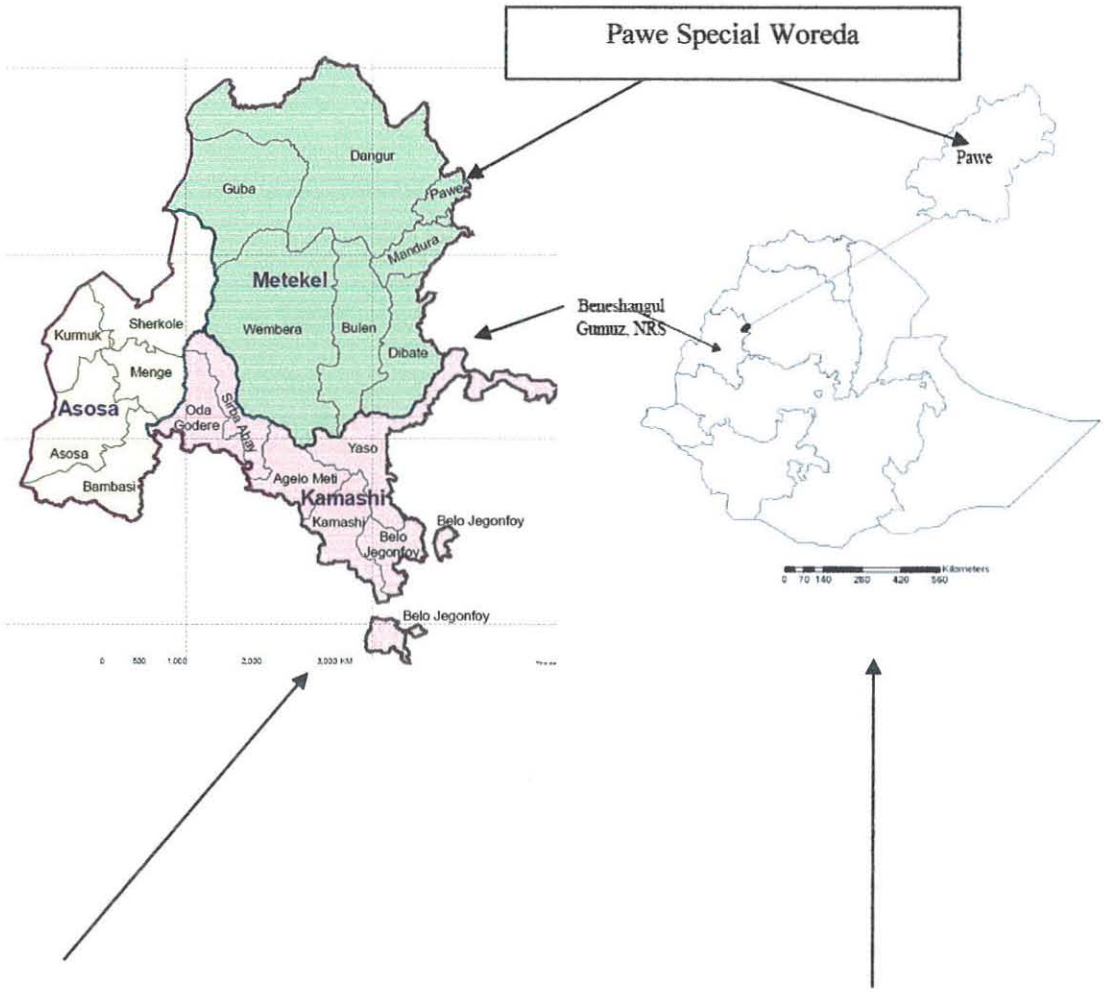
Annex 1: Map of pawe special woreda



Map of Beneshangul-Gumuz region

Map of Ethiopia

Adapted from: http://www.ethiodemographyandhealth.org/Benishangul.html

Annex 3: Structured questionnaire and data collection format

1. General Information about Household and Data Collector

- Record number_____
- Code of interviewer_____
- Date of interview_____
- Residence address of the respondent 1. urban 2.rural
- kebele_____
- House no_____

Part I: Socio-demographic characteristics of respondents				
Ser.No	Question	Response options	Coded response	Skip pattern
101	Age in years	_____years		
102	Ethnicity	Amhara 01 Kambata 02 Hadiya 03 Oromo 04 Tigre 05 Agew 06 Wolaita 07 _____Others, Specify 08	[__|__]	
103	Religion	Muslim 01 Orthodox 02 Catholic 03 Protestant 04 _____Others, specify 05	[__|__]	
104	Educational status	Illiterate 01 Read only 02 Read & write 03 Grades 1-6 04 Grades 7-8 05 Grades 9-12 06 Grades 12+ 07 Technical education 08	[__|__]	
105	Marital status	Single 01 Married 02 Divorced 03 Widowed 04 _____Others, Specify 05	[__|__]	

106	Household family size (including yourself)	(Write in numbers)_____		
107	From the total household members 107.1 107.2	Number of females (Write in numbers)_____ Number of males (Write in numbers)_____		
108	Occupation	Housewife 01 Merchant (trader) 02 Farmer 03 Government employee 04 Daily labourer 05 _____Others, specify 06	[__|__]	
109	House hold income in a month	Monthly income in birr _____ or Income in kind _____quintals per year (specify type)		
110	Educational status of spouse (for those who claim to have husband)	Illiterate 01 Read only 02 Read &write 03 Grades1-6 04 Grades 7-8 05 Grades 9-12 06 Grades 12+ 07 Technical Education 08	[__|__]	
Part II: Information sources				
201	Do you have the following properties?			
201.1	Functional Radio	Yes 01 No 02	[__|__]	
201.2	Functional Television	Yes 01 No 02	[__|__]	
Part III: Measures taken during perceived malaria illness/symptom complexes				
301	From your family members was there any ill person in the previous two weeks?	Yes 01 No 02	[__|__]	If the response is 02, skip to Q 401

302	How many of your family members?	_____(mention in numbers)		
303	For each ill person("patient"), please ask the following questions (if the number of ill persons is more than one, use another similar copy for data collection)			
303.1	Sex of the patient	Male 01 Female 02	[__|__]	
303.2	Age of the patient in years	_____(years)		
303.3	Patient's status in the family	Child(of any age group as far as he/she is a "child" in the household) 01 Servant 02 mother 03 Husband 04 _____Others, specify 05	[__|__]	

303.4	What was the illness for each individual? (Read for the respondents)			
303.4.1	Fever 01	1. Yes 2. No	[__|__]	If malaria and/or malaria symptom complexes are not mentioned, directly go to Q 401.
303.4.2	Chills 02	1. Yes 2. No	[__|__]	
303.4.3	Shivering 03	1.Yes 2. No	[__|__]	
303.4.4	Head ache 04	1. Yes 2. No	[__|__]	
303.4.5	Joint pain 05	1. Yes 2. No	[__|__]	
303.4.6	Vomiting 06	1. Yes 2. No	[__|__]	
303.4.7	Loss of appetite 07	1. Yes 2. No	[__|__]	
303.4.8	Thirst 08	1. Yes 2. No	[__|__]	
303.4.9	Malaria 09 _____(others specify, all the encountered illnesses)	1. Yes 2. No	[__|__]	
303.5	What measure was taken for the ill person(s)? *(write the respective numbers of all applicable)*	Taken to health institutions (hospital, health center, health post) 01 Medicines were given at home 02 Used drugs bought from private drug retail outlets 03 No measure was taken 04 _____Others, specify 05	[__|__] [__|__]	If the response is 04, skip to Q 303.5.2
303.5.1	If the response to question 303.5 is 01, ask the following questions:			If the response to Q 303.5 is not 01, skip to Q303.5.2

303.5.1.1	What the diagnosis result was found to be after the visit?	Specify,_____		
303.5.1.2	Was microscopic blood test done?	Yes 01 No 02	[__|__]	
303.5.2	If the response to Q 303.5 is 02, what kinds of drugs were given?	_____(specify the name of the drug)		If the response to Q 303.5 is neither 01 nor 02, skip to Q 303.5.3
303.5.2.1	Has the ill person completed the treatment?	Completed 01 Still on treatment 02	[__|__]	
303.5.3	If the response to question 303.5 is 03, what kinds of drugs were given?	_____(specify the name of the drug)		
303.5.3.1	Has the ill person completed the treatment?	Completed 01 Still on treatment 02	[__|__]	

Part-IV Questions to assess general knowledge about malaria

401	What do you think is the cause of malaria? *(write the respective numbers of all applicable)*	Lack of personal hygiene 01 Cloudy weather 02 Cold weather 03 Dirty matter 04 Bite by a mosquito 05 Hunger 06 Evil spirit 07 _____ Others, specify 08	[__|__] [__|__] [__|__] [__|__]	
402	How is it possible to know certainly that someone is infected by malaria? *(write the respective numbers of all applicable)*	By symptoms only 01 By laboratory 02 By traditional healers 03 Impossible to know 04 _____ Others, specify 05	[__|__] [__|__]	

403	What are the common signs & symptoms that you have ever noticed when you or your family member got malaria infection? *(write the respective numbers of all applicable)*	Fever 01 Chills 02 Shivering 03 Headache 04 Back pain 05 Joint pain 06 Muscle pain 07 Loss of appetite 08 Thirst 09 _____ Others, specify 10	[__|__] [__|__] [__|__] [__|__] [__|__]	
404	Can malaria be transmitted from person-to-person?	Yes 01 No 02	[__|__]	If the response is 02, skip to Q 406
405	How does it transmit? *(write the respective numbers of all applicable)*	By mosquitoes 01 By Breathing 02 By eating together 03 By flies 04 By body contact with the patient 05 Mother to child(placenta) 06 By Sleeping together with the patient 07 Blood transfusion (contaminated with malaria parasite) 08 _____ Others, specify 09	[__|__] [__|__] [__|__] [__|__] [__|__]	
406	Is malaria preventable?	Yes 01 No 02 Don't know 03	[__|__]	If the response is 02 or 03, skip to Q 408
407	What are the prevention methods that you Know? *(write the respective numbers of all applicable)*	Closing holes with different materials 01 Draining stagnant water around home 02 Closing windows &doors early in time 03 Smoke(burning cow dung or leaves) 04 House spray with insecticides 05 ITN use 06 Keeping personal and environmental hygiene 07 Didn't know any prevention method 08 _____ Others, specify 09	[__|__] [__|__] [__|__] [__|__] [__|__]	
408	Do you have any mosquito net?	Yes 01 No 02	[__|__]	If the response is 02, skip to Q 410

409	How many mosquito nets do you have?	Specify in numbers_____		
410	In a given year, when is the probability of getting malaria high? *(write the respective numbers of all applicable)*	Winter 01 Spring 02 Summer 03 Autumn 04	[__|__] [__|__]	
411	Can malaria infect people of all age group?	Yes 01 No 02	[__|__]	If the response is 01, skip to Q 413
412	Which age group is/are exempted? *(write the respective numbers of all applicable)*	children (<15 years) 01 adults (≥15-65 years) 02 elders(>65 years) 03 pregnant women 04 Non-pregnant women 05 _____ Others, specify 06	[__|__] [__|__]	
Part V: Questions to assess general knowledge about anti-malarial drugs				
501	Is malaria curable by modern medicines available in your area?	Yes 01 No 02	[__|__] [__|__]	If the response is 02, skip to Q 503
502	Please mention the anti-malarial drugs that you know? *(write the respective numbers of all applicable)*	Chloroquine 01 Quinine 02 Coartum 03 Fansidar 04 _____ Others, specify 05	[__|__] [__|__] [__|__] [__|__]	
503	What Methods do you use to differentiate/identify anti-malarial drugs from others? *(write the respective numbers of all applicable)*	Color of the drug/package 01 Smell (odour) of the drug 02 reading /letting others to read the label 03 making signs on the containers (packaging) 04 preparing a different storing place for each kind of drug 05 Don't know 06 _____Others, Specify 07	[__|__] [__|__] [__|__] [__|__]	
504	What do you think is the consequence(s) of non-adherence to anti-malarial	Specify_____		

703	If the response to question 702 is Plant product (01), please fill the following table (if the respondent did not said plant product, go to question 704)				
No	Name of the plant	Part of the plant used for treatment (leaf, root, stem, etc.)	Method of preparation	How many times is it administered per day?	For how long (how many days) is it administered?
1					
2					
3					
4					
704	If the response to question 702 is animal product(02), please fill the following table				
	Name of the animal	Part of the animal used for treatment	Method of preparation	How many times is it administered per day?	For how long (how many days) is it administered?
1					
2					
3					
4					

Finally, thank the respondent and complete the interview

Supervisors' code_____signature_____

Personal information of Key-informant interview participants

1. Date_____

2. Age_____

3. Marital Status_____

4. Religion_____

5. Educational Status_____

6. Occupation_____

7. Number of participants_____

8. Duration of Session_____

Annex 5: Verbal consent form and topic guides for key-informant interview Participants

(to be read to the key informants)

Good morning (afternoon), Thank you for your coming here

1. Introduction

My name is Seid Mussa. I am a student at AAU, School of Pharmacy.

2. Title of the study

Anti-malarial drug and mosquito net use pattern in Pawe Special Woreda: A community based survey

3. Purpose of the study:

The study will help in identifying and enhancing the knowledge and understanding of anti-malarial and mosquito net use at the community level, factors contributing to non-adherence to anti-malarial drugs, preference among anti-malarial drugs, anti-malarial drug hoarding, and mosquito net use pattern and be useful in developing interventions that will be undertaken to address the proper use of anti-malarial drugs and mosquito nets in the woreda in particular and in the region in general. The data collected could also be used by organizations involved in this area to deal with the problems associated with non-adherence and anti-malarial drug resistance and also about the misperception about malaria, anti-malarials, and bed nets which could adversely affect the outcome of malaria control program.

4. How you were identified:

You were selected to participate in Key-informant interview part of the study as the health workers at the health facility, administrative body in the woreda health office, formal village leaders etc., and the principal investigator thinking that you represent the community and you could reflect the prevalent drug and mosquito net use trends in the community. When you express your opinion or idea, you are encouraged to be honest in your view about malaria, anti-malarial drugs and mosquito net.

5. Consent for participation and tape –recording

Your presence in this session indicates that you are volunteer and agreed to participate for the discussion. Your participation in this study is completely based on your will and there is no penalty for refusing to take part. You have the right to refuse to answer any questions and end the discussion if you find it necessary to do so. For the sake of accuracy and efficiency, I will tape-record the sessions, unless there is objection.

6. Issues of Confidentiality

Please be certain that any information collected here is completely confidential. The recorded voice will be erased after transcribing the information and your name will never be used in connection with any information you provide in the results of this research.

7. Questions for Discussion

Next, I would like to hear a little about your experience or knowledge about malaria, anti-malarial drug and mosquito net use pattern at the house hold level.

- ♣ Discussion on the cause of malaria
- ♣ Discussion on the transmission of malaria, including seasonal peaks
- ♣ Discussion on the risk groups to malaria
- ♣ Discussion on the Common symptoms of malaria
- ♣ Discussion on the prevention methods of malaria
- ♣ Discussion on the ITN or mosquito net- benefit, disadvantage, usage, etc.
- ♣ Discussion on the treatment of malaria
- ♣ Discussion on the knowledge and usage practice of anti-malarial drugs (drug centered approach)
- ♣ Discussion on the sources of anti-malarial drugs and associated factors
- ♣ Discussion on the type of treatment employed in case when any family member is ill due to malaria and/or symptom complexes
- ♣ Discussion on the anti-malarial drug hoarding and associated factors
- ♣ Discussion on the types of traditional modes of treatment for malaria
- ♣ Discussion on the reason behind the decision of the MOH to change the first line anti-malarial drug for the treatment of *P.falciparum* from fansidar to coartem in 20004 (Question to be presented mainly for health professionals)

Up to now we have talked about malaria and anti-malarial drug use pattern at the house hold level. We thank you for giving us your time and for your cooperation. We do appreciate all your suggestions and ideas. At this point is there anything we forgot to ask or anything you would like to mention before we close the session?

Personal information Key-informant interview participants

1. Date_____
2. Age_____
3. Marital Status_____
4. Religion_____
5. Educational Status_____
6. Occupation_____
7. Duration of Session_____

Annex 6 :ጥናቱ ውስጥ ለመሳተፍ የፍቃደኝነት መግለጫ ቅጽ

በአዲስ አበባ ዩኒቨርሲቲ ፣ ፋርማሲ ትምህርት ቤት

ፋርማሲዩቲክስ ትምህርት ክፍል

የፋርማኮኢፒዲሚዮሎጂይ እና ሶሻል ፋርማሲ ድህረ ምረቃ ፕሮግራም

በጥናቱ የሚሳተፉት (ተጠያቂዎቹ) እናቶች ናቸው

ሰላም ነዎት? እኔ ዛሬ እዚህ የተገኘሁት በአዲስ አበባ ዩኒቨርስቲ ተማሪ የሆኑት አቶ ሰኢድ ሙሳ በቤተሰብ ደረጃ ስለ ወባ ፀረ-ወባ መድሃኒትእና ከአልጋ አጎበር አጠቃቀም ለሚሰሩት ጥናት መረጃ ለመሰብሰብ ነው ።ከዚህ ጥናት የሚገኙት ውጤቶች ከፀረ-ወባ መድሃኒትና ከአልጋ አጎበር አጠቃቀም ጋር ተያያዥ የሆኑ ችግሮችን ለመዳሰስና ችግሮቹን ለመቅረፍ ጠቃሚ የሆኑ መንገዶችን ለመቀየስ ይረዳሉ። ስለሆነም የተወሰኑ ከወባ ÷ ፀረ-ወባ መድሃኒትና ከአልጋ አጎበር ጋር የተያያዙ ጥያቄዎች እንጠይቀዎታለን፤ እዚህ ላይ ልናረጋግጥልዎት የምንወደው ነገር ለጥያቄዎቻችን የሚሰጡን መልስ ሚስጥራዊ መሆኑን ነው ምክንያቱም መጠይቁ ላይ ስምዎን አንመዘግብም። ከዚህ በተጨማሪ በጥናቱ ላለመሳተፍ መወሰን ወይም ያልፈለጉትን ጥያቄ በማንኛውም ሰዓት ያለመመለስ መብት አለዎት።

በዚህ ጥናት ውስጥ ላለመሳተፍ ቢወስኑ ምንም ችግር አይደርስብዎትም::

እዚህ ላይ ስለ ጥናቱ ሊጠይቁኝ የሚፈለጉት ጥያቄ አለ?

በጥናቱ ለመሳተፍ ይስማማሉ? _____ (እሺ ወይም እምቢ)

እሺ (1) ካሉ ..... ቀጥል

እምቢ (2) ካሉ ..... አመሰግንና አቁም

<u>ማስታወሻ</u>፡- የተጠያቂዋ ቤት ዝግ ከሆነ በሌላ ጊዜ ለመመለስ መንደሩን እና የቤት ቁጥሩን መዝግበው መጠይቁን ለተቆጣጣሪው ይመልሱ።

2ኛ ጊዜ ጉብኝት _____

3ኛ ጊዜ ጉብኝት _____

Annex 7: **መጠይቅና የመረጃ ማሰባሰቢያ ቅጽ**

1. ስለ ቤተሰብ እና መረጃ ሰብሳቢ ጠቅላላ መረጃ

- የመዝገብ ቁጥር _____
- የመረጃ ሰብሳቢው ኮድ _____
- ቃለ መጠይቅ የተካሄደበት ቀን _____
- የተጠያቂዋ መኖሪያ 1. ከተማ 2. ገጠር
- የቀበሌው (የመንደሩ) ስም_____
- የቤት ቁጥር _____

ክፍል I፡ አጠቃላይ የተጠያቂው መሰረታዊ የግል መረጃዎች				
መለ/ቁ	ጥያቄ	መልስ	ኮድ	ይታለፍ
101	እድሜዎ ስንት ነው?	_____ዓመት		
102	ብሔርዎ ምንድን ነው?	አማራ 01 ከምባታ 02 ሀድያ 03 ኦሮሞ 04 ትግሬ 05 አገው 06 ወላይታ 07 ----------ሌላ ካለ ይጠቀስ 08	[__|__]	
103	ሀይማኖትዎ ምንድን ነው?	መስሊም 01 ኦርቶዶክስ 02 ካቶሊክ 03 ፕሮቴስታንት 04 ----------ሌላ ካለ ይጠቀስ 05	[__|__]	

104	የትምህርት ደረጃዎትን ቢነግሩኝ	ማንበብና መፃፍ የሚችሉ 01 ማንበብ ብቻ የሚችሉ 02 ማንበብና መፃፍ የማይችሉ 03 1-6 ክፍል 04 7-8 ክፍል 05 9-12 ክፍል 06 12+1 እና ከዚያ በላይ 07 የሞያ ትምህርት 08	[__|__]	
105	አሁን ያለዎትን የትዳር ሁኔታ ቢነግሩኝ?	ያላገቡ 01 ባለትዳር 02 የተፋቱ 03 የትዳር ጓደኛዎ በሞት የተለየዎት 04 ----------ሌላካለ ይጠቀስ 05	[__|__]	
106	የቤተሰብ ብዛት (እርስዎን ጨምሮ)	(በቁጥር ይገለጥ)----------		
107	ከአጠቃላይ የቤተሰቡ አባል፡	107.1 የሴቶች ቁጥር ምን ያህል ነው?(በቁጥር ይገለጥ)--------- 107.2 የወንዶች ቁጥር ምን ያህል ነው?(በቁጥር ይገለጥ)---------		
108	ስራዎ ምንድን ነው?	የቤት እመቤት 01 ነጋዴ 02 ገበሬ 03 የመንግስት ሰራተኛ 04 የቀን ሰራተኛ 05 ----------ሌላ ካለ ይጠቀስ 06	[__|__]	
109	የቤተሰብዎ ገቢ በወር ምን ያህል ነው?	ወርሀዊ ገቢ ብር_____ወይም ገቢ በአይነት በአመት____		

		ኩንታል(የምርቱ አይነት ይፃፍ)		
110	የቤተሰቡን አባዎራ የትምህርት ደረጃ ቢነግሩን	ማንበብና መፃፍ የሚችሉ 01 ማንበብ ብቻ የሚችሉ 02 ማንበብና መፃፍ የማይችሉ 03 1-6 ክፍል 04 7-8 ክፍል 05 9-12 ክፍል 06 12+1 እና ከዚያ በላይ 07 የሞያ ትምህርት 08	[__|__]	ተጠያቂዋ እማወራ ከሆኑ በቀጥታ ወደ ጥያቄ ቁጥር 201 ይሂዱ

ክፍል-የቤተሰብ የመረመረጃ ምንጭዎች መጠየቂያ

መለ/ቁ	ጥያቄ	መልስ	ኮድ	ይታለፍ
201	የሚከተሉት ንብረቶች አሏችሁ?			
201.1	ሬዲዮ	አዎ 01 የለንም 02	[__|__]	
201.2	ቴሌቪዥን	አዎ 01 የለንም 02	[__|__]	

ክፍል-III በወባ ህመም/ /በወባ ምልክቶች ጊዜ ስለተወሰዱ እርምጃዎች መረጃ መጠየቂያ

መለ/ቁ	ጥያቄ	መልስ	ኮድ	ይታለፍ
301	ከቤተሰብዎ ውስጥ ባለፉት ሁለት ሳምንታት ውስጥ ታሞ የነበረ ሰው ነበርን?	አዎ 01 የለም 02	[__|__]	መልስዎ 02 ከሆነ በቀጥታ ወደ ጥያቄ 401 ይሂዱ
302	መልሱ አዎ ከሆነ ከቤተሰብዎ አባላት ስንቶቹ ናቸው?	በቁጥር ይገለጥ____		
303	ለእያንዳንዱ ታማሚ የሚከተለውን መረጃ ይጠይቁ፡- (ታማሚው ከአንድ በላይ ከሆነ ተመሳሳይ የሆነ ለመረጃ መሰብሰቢያ ተጨማሪ ሌላ ኮፒ ይጠቀሙ)			
303.1	የታማሚው ፆታ	ወንድ 01 ሴት 02	[__|__]	

303.5	ለህመምተኛው ምን ተደረገለት? (ከአንድ በላይ መልስ መስጠት ይቻላል)	ቤት ውስጥ መድሀኒት ተሰጠው 01 ከመድሀኒት ቤት መድሀኒት በመግዛት ተጠቀመ 02 ወደ ጤና ድርጅት (ጤና ጣቢያ፣ጤና ኬላ ፣ሆስፒታል) ተወሰደ 03 ምንም አልተደረገለትም 04 --------ሌላ ካለ ይጠቀስ 05	[__|__] [__|__]	መልስዎ 04 ከሆነ በቀጥታ ወደ ጥያቄ ቁጥር 401 ይሂዱ
303.5.1	የጥያቄ 303.5 መልስ ጤና ድርጅት ከሆነ የሚከተሉትን ጥያቄዎች ይጠይቁ :-			የጥያቄ 303.5 መልስ 03 (ጤና ድርጅት) ካልሆነ በቀጥታ ወደ ጥያቄ ቁጥር 303.5.2 ይሂዱ
303.5.1.1	ጤና ድርጅት ሄዳችሁ ህመሙ ምንድን ነው አሏችሁ?	_____ይገለጥ		
303.5.1.2	የጤና ድርጅት ከጎበኙ ከጣትዎ (ከክንድዎ) የደም ናሙና ተወስዶ በጤና ተቋሙ በደም መመርመሪያ (በማይክሮስኮፕ) ተመርምሯል?	አዎ 01 አልተመረመረም 02	[__|__]	
303.5.2	የጥያቄ 303.5 መልስ ቤት ውስጥ መድሀኒት ተሰጠው ከሆነ ምን ዓይነት መድሀኒት ተሰጠው?	_____(የመድሀኒቱ ስም ይገለጥ)		የጥያቄ 303.5 መልስ 01 ወይም 03 ካልሆነ በቀጥታ ወደ ጥያቄ ቁጥር 303.5.3 ይሂዱ
303.5.2.1	መድሀኒቱን ወስደው ጨርሰዋል ወይስ ገና	ጨርሰዋል 01 አልጨረሱም 02	[__|__]	

		ማስታወክ 06 የጡንቻ ህመም 07 የምግብ ፋላጎት ማጣት 08 ውሃ ጥም 09 --------ሌላ ካለ ይጠቀስ 10		
404	ወባ ከሰው ወደ ሰው ይተላለፋል?	አዎ 01 አይተላለፍም 02 አላውቀውም 03	[__|__]	መልስዎ 02 ወይም 03 ከሆነ በቀጥታ ወደ ጥያቄ 406 ይሂዱ
405	ወባ ከሰው ወደ ሰው እንዴት ይተላለፋል? (ከአንድ በላይ መልስ መስጠት ይቻላል)	በወባ ትንኝ በመነደፋ 01 በትንፋሽ 02 ከበሽተኛው ጋር በአንድ ላይ በመብላት 03 በዝንቦች 04 ከበሽተኛው ጋር በሚደረግ የሰውነት ንክኪት(መጨባበጥ፣ መሳሳም ወዘተ) 05 ከእናት ወደ ልጅ (በእርግዝና ጊዜ) 06 ከበሽተኛው ጋር በአንድ ላይ በመተኛት 07 የተበከለ ደም በመለገስ 08 -------ሌላ ካለ ይጠቀስ 09	[__|__] [__|__] [__|__] [__|__]	
406	ወባን መከላከል ይቻላልን?	አዎ 01 አይቻልም 02 አላውቅም 03	[__|__]	መልስዎ 02 ከሆነ በቀጥታ ወደ ጥያቄ 408 ይሂዱ

407	የትኞቹን የወባ መከላከያ ዘዴዎች ያውቃሉ? (ከአንድ በላይ መልስ መስጠት ይቻላል)	የወባ ትንኝ ወደ ቤት እንዳትገባ የቤቱን ቀዳዳዎች በተለያዩ ነገሮች በመድፈን 01 ከመኖሪያ ቤት አካባቢ ያሉ ውሃ ያቆሩ ኩሬዎችን በማድረቅ 02 የቤት በሮችንና መስኮቶችን ምሽት ላይ በጊዜ በመዝጋት 03 የክብት ኩበትን ወይም የተለያዩ እንጨቶችን ጭስ በማጨስ 04 ፀረ-ወባ ትንኝ ኬሚካል ወይም ሌሎች መንገዶችን በመጠቀም ወባ ትንኝን በመግደል 05 በፀረ-ወባ ትንኝ የተነከረ የአልጋ አጎበር በመጠቀም 06 የግልና የአካባቢ ንጽህናን በመጠበቅ 07 ምንም አይነት የወባ መከላከያ መንገድ አላውቅም 08 ---------ሌላ ካለ ጥቀስ 09	[__|__] [__|__] [__|__] [__|__]	
408	አሁን ቤትዎ ውስጥ የአልጋ አጎበር አለዎትን?	አለን 01 የለንም 02	[__|__]	መልስዎ 02 ከሆነ በቀጥታ ወደ ጥያቄ 410 ይሂዱ
409	አሁን በአጠቃላይ ቤታችሁ ውስጥ ስንት የአልጋ አጎበር አላችሁ?	(በቁጥር ይገለጥ)---------		
410	በአመቱ ውስጥ በወባ የመያዝ እድል ከፍተኛ የሚሆነው መች ነው? (ከአንድ በላይ መልስ መስጠት ይቻላል)	ከታህሳስ-የካቲት 01 ከመስከረም-ህዳር 02 ከሰኔ-ነሐሴ 03 ከመጋቢት-ግንቦት 04 አመቱን በሙሉ እንታመማለን 05	[__|__]	

503	ዘመናዊ ፀረ-ወባ መድሃኒቶችን ከሌሎች ቤትዎ ውስጥ ከሚገኙ/ሊገኙ ከሚችሉ ዘመናዊ መድሃኒቶች ለመለየት ምን አይነት መንገድ ይጠቀማሉ? (ከአንድ በላይ መልስ መስጠት ይቻላል)	በማሸጊያው ወይም በመድሀኒቱ መልክ (ከለር) 01 በሽታ 02 መያዣው ላይ የተፃፈውን በማስነበብ ወይም በማንበብ 03 ማሸጊያው (መያዣው) እቃ ላይ ምልክት በማድረግ 04 ለተለያዩ መድሃኒቶች የተለያዩ ማስቀመጫቦታዎችን በማዘጋጀት 05 አላውቀውም 06 --------ሌሎች(ይገለጡ) 07	[__|__]	
504	የፀረ-ወባ መድሀኒትን በስርዓቱ (በተገቢው ሁኔታ) አለመውሰድ ምን ችግር ያመጣል ብለው ያስባሉ?	_____(ይገለጥ)	[__|__] [__|__]	
505	እርስዎ ወይም የቤተሰብዎ አባል ታመው በነበሩበት ጊዜ የፀረ-ወባ መድሃኒቶችን በአልኮል መጠጦች (ጠላ፣አረቄ፣ቢራ ወዘተ) ውጠው ወይም ወስደው ያውቃሉ?	አዎ 01 አላውቅም 02	[__|__]	

ክፍል-VI: በቤት ውስጥ የጸረ-ወባ መድሃኒት ማከማቸትን ለማወቅ የቀረቡ ጥያቄዎች

601	አሁን በዚህ ሰዓት ቤትዎ ውስጥ ፀረ-ወባ መድሀኒት አለ?	አዎ 01 የለም 02	[__|__]	መልስዎ 02 ከሆነ በቀጥታ ወደ ጥያቄ 701 ይሂዱ
602	ፀረ-ወባ መድሃኒቱን ሊያሳዩኝ ይችላሉን?	አዎ 01 አይቻልም 02	[__|__]	መልስዎ 02 ከሆነ በቀጥታ ወደ ጥያቄ 701 ይሂዱ
603	የፀረ-ወባ መድሃኒቶቹን	---------- (ሌብሉ የማይነበብ		

እርስዎ እዚህ ቦታ ከላይ ለተገለጸው ጉዳይ እንዲገኙልኝ በጠየቅኩዎ መሰረት እዚህ ቦታ መገኘትዎ በውይይቱ ለመሳተፍ ፈቃደኛ መሆንዎንና መስማማትዎን ያሳያል።

የእርስዎ በዚህ ውይይት ለመሳተፍ መወሰን በእርስዎ ፈቃደኝነት ላይ ብቻ የተመሰረተ ከመሆኑም በላይ ላለመሳተፍ ቢወስኑም ምንም የሚደርስብዎት ችግር የለም። በፈለጉበት ጊዜ ከፈለጉና መስሎ ከታየዎት ውይይቱን ማቋረጥ ይችላሉ።

ተቃውሞ ከሌለ ለጥንቃቄና ስራን ለማቀላጠፍ ሲባል ውይይቱን ቴፕ እንዲቀዳ (እንዲቀረጽ) እደርጋለሁ።

7.የቡድን ተሳትፎ ውይይት ጠቃሚነቱ

በዚህ ውይይት ስህተት ወይም ትክክል የሚባል መልስ የለም። ማንኛውም ተሳታፊ የመሰለውን፣ የሚያውቀውን እና የሚያደርገውን ነገር መናገር ይችላል።

በዚህ ውይይት ማንኛውም ተሳታፊ ነፃነት እንዲሰማውና በነጻነት እንዲያወራ ያስፈልጋል። ማናችሁም እዚህ የተገኛችሁ የውይይቱ ተሳታፊዎች ሁሉ ስለ እያንዳንዱ የውይይት ርእስ የመሰለውን የሚያውቀውንና የሚያደርገውን ሃሳብ እንዲሰጥ ይበረታታል።

እያንዳንዱ ተሳታፊ ሃሳቡን ሲገልጥ ስለ ወባ፣ ፀረ-ወባ መድሃኒት እና ስለ አልጋ አጎበር አጠቃቀም እውነታኛውን ነገር እንድትገልጹልን እናሳስባለን። በውይይቱ ጊዜ የምትሰጡት ሃሳብ ተሳታፊዎች በሚሰጡት አስተያየት ሳይሆን ከላይ በገለጽኩላችሁ የውይይት አላማዎች ላይ እንድታተኩሩ እጠይቃለሁ።

8.እርስ በርስ መተዋወቅ

ከዚህ በመቀጠል እያንዳንዱ የውይይቱ ተሳታፊ እራሱን እንዲያስተዋውቅ እጠይቃለሁ።

9.የመወያያ ጥያቄዎች

ውይይቱ የሚያነጥነው በሚከተሉት ሃሳቦች (ጥያቄዎች) ላይ ነው።

- እዚህ አካባቢ ወባ ዋና የጤና ችግር ነውን?
- የወባ መንስኤ ፣መተላለፊያ መንገዶችና ወባ የሚበዛባቸው ወቅቶች
- ለወባ ተጋላጭና ተጠቂ የሆኑ የህብረተሰብ ክፍሎች
- የወባ ዋና ዋና ምልክቶች
- የወባ መከላከያ መንገዶች
- የአልጋ አጎበር፡- ጥቅሙ፣ ጉዳቱ፣ አጠቃቀም ወዘተ
- የወባ ህክምና

XXX

Annex 9: <u>በቃለመጠይቅ ለመሳተፍ የፍቃደኝነት መግለጫ ና የመወያያ ሃሳቦች</u>

ሰላም ዋላችሁ/አደራችሁ እዚህ ስላተገኙልኝ አመሰግናለሁ

1.መግቢያ

እኔ ሰኢድ መሳ እባላለሁ በአዲስ አበባ ዩኒቨርስቲ ፋርማሲ ት/ቤት ተማሪ ነኝ፡፡

2.የውይይቱ ርዕስ

በፖዊ ልዩ ወረዳ በቤተሰብ ደረጃ የፀረ-ወባ መድሃኒትና የአልጋ አጎበርን አጠቃቀም ምን እንደሚመስል መዳሰስ

3.የጥናቱ አላማ

ይህ ውይይት በቤተሰብ ደረጃ ስለ ወባ በሽታ ጠቅላላ ግንዛቤን፣ የፀረ- ወባ በሽታ መድሃኒት አጠቃቀምን፣ አመራረጥን፣ መድሃቱን በአግባቡ ካለመውሰድ ጋ ተያያዥ የሆኑ ጉዳዮችን እንዲሁም የአልጋ አጎበር አጠቃቀምን እና ከአልጋ አጎበር ጋ የተያያዙ ችግሮችን ለመዳሰስ ና ጠቃሚ የሆኑ ከዚህ ውይይት የተሰበሰቡ መረጃዎች እነዚህን ችግሮች ለማስተካከል ይቻል ዘንድ ጠቃሚ የማሻሻያ መንገዶችን ለወረዳው አልፎም ለክልሉ ለመቀየስ ይረዳል፡፡

ከዚህ ውይይት የሚገኘው መረጃ ከላይ የተገለጹትን ችግሮች ለማቃለል ለሚሰሩ ድርጅቶችም ጠቀሜታው የጎላ ነው፡፡

4.እርስዎ በቃለመጠይቁ እንዲሳተፉ እንዴት እንደተመረጡ

እርስዎ በዚህ ጥናት ውስጥ በቃለ መጠይቁ እንዲሳተፉ የተመረጡት በጤና ተቋም ውስጥ በጤና ባለሙያነት ስለሚሰሩ፣በወረደው ጤና ቢሮ በኃላፊነት ስለሚሰሩ፣ የሃገር ሽማግሌ ወዘተ. ስለሆኑ ጥናቱን የሚያካሂደው ግለሰብ እርስዎ ማህበረሰቡን ያውቃሉ ብሎ ስለገመተና በማህበረሰቡ ውስጥ ያለውን የመድሃኒትና የአልጋ አጎበር አጠቃቀም ልማድ እዚህም ይነግሩኛል ብሎ በማሰብ ነው፡፡

5.ሚስጥር ስለመጠበቅ

እርግጠኛ ሆኜ የምንገርዎት ነገር ቢኖር እርስዎ እዚህ የሚነግሩኝ ሀሳብ ሁሉ ሚስጥራዊ ሆኖ ይያዛል፡፡ ከዚህ በተጨማሪም የተቀረጸው ድምጽ ሀሳቡን (ፍሬ ነገሩን) ወደ ወረቀት በእርጋታ ከገለበጥኩ በኋላ፣ የተቀረጸው ድምጽ በመሉ ይደመሰሳል (እንዲጠፋ ይደረጋል)፡፡ ሌላው ላረጋግጥሎት የምወደው ነገር ስምዎ ካወሩኝ(ከገለጡ ልኝ) ሃሳብ ጋር ተያያዥ ሆኖ ከዚህ ጥናት ውጤት ጋር አይገለጽም፡፡

6.በቃለመጠይቁ ለመሳተፉና ድምጽ ለመቅረጽ ስምምነት

እርስዎ እዚህ ቦታ ከላይ ለተገለጸው ጉዳይ እንዲገኙልኝ በጠየቅኩዎ መሰረት እዚህ ቦታ መገኘትዎ በቃለመጠይቁ ለመሳተፍ ፍቃደኛ መሆንዎንና መስማማትዎን ያሳያል።

የእርስዎ በዚህ ቃለመጠይቅ ለመሳተፍ መወሰን በእርስዎ ፍቃደኝነት ላይ የተመሰረተ ከመሆኑም በላይ ላለመሳተፍ ቢወስኑ ምንም የሚደርስቦት ችግር የለም። በፈለጉበት ጊዜ መስሎ ከታይዎት ውይይቱን ማቋረጥ ይችላሉ።

ተቃውሞ ከሌለዎት ለጥንቃቄ እና ሥራን ለማቀላጠፍ ሲባል ቃለመጠይቁን በቴፕ እንዲቀዳ (እንዲቀረጽ) አደርጋለሁ።

7.በቃለ መጠይቁ ጊዜ የሚነሱ ጥያቄዎች

ቃለ መጠይቁ የሚያጠነጥነው በሚከተሉት ሀሳቦች ላይ ነው።

- እዚህ አካባቢ ወባ ዋና የጤና ችግር ነውን?
- የወባ መንስኤ፣ መተላለፊያ መንገዶች እና ወባ የሚበዛባቸው ወቅቶች
- ለወባ ተጋላጭ እና ተጠቂ የሆኑ የህብረተሰብ ክፍሎች
- የወባ ዋና ዋና ምልክቶች
- የወባ መከላከያ መንገዶች
- የአልጋ አጎበር ጥቅሙ ፣ጉዳቱ፣ አጠቃቀም ወዘተ.
- የወባ ህክምና
- ስለዘመናዊ የወባ መድሃቶች ጠቅላላ እውቀት (መድሃኒቶችን በማሳየት)
- የጸረ-ወባ መድኃኒቶችን ከየት እንደሚያገኙዋቸውና ተያያዥ የሆኑ ጉዳዮች
- ወባ ነው ተብሎ የሚገመት በሽታ ወይም የወባ ምልክቶች ሲታዩ የሚወሰዱ እርምጃዎች ወይም ህክምና
- የፀረ-ወባ መድሃኒትን ቤት ውስጥ ገዝቶ ሰው ሲታመም ለመስጠት ማስቀመጥ (ማከማቸት) እና ተያያዥ ጉዳዮች
- ባህላዊ ፀረ-ወባ መድሃኒቶች

- እኤአ በ2004 የጤና ጥበቃ ሚኒስቴ ለፋርሲፋርም ወባ ህክምና የሚው ል አዲስ መድሃኒት (ኳርተም የሚባል) በፋንሲደር ምትክ ጥቅም ላይ እንዲውል ማድረጉ ይታወቃል። ለመሆኑ ለለውጡ ምክንያቱ ምን ነበር?(በተለይ ለጤና ባለሙያዎች የሚቀርብ የመወያያ ጥያቄ)

እስካሁን ስለወባ፣ ፀረ-ወባ መድሃኒት፣ ስለ አልጋ አጎበር አጠቃቀም ወዘተ ተወያይተናል። ጊዜዎትን መስዋእት አድርገው እዚህ ተገኝተው ለሰጡኝ አስተያየት እና ጥቆማ እንዲሁም ላደረጉልኝ ትብብር

በጣም አመሰግናሁ። እዚህ ላይ ቃለ መጠይቃችንን ከማጠናቀቃችን በፊት ይኸ ቀረ የሚሉት ካለ ሊያነሱትና ልንነጋገርበት እንችላል።

<u>የቃለ መጠይቅ ተሳታፊዎች የግልና ሌሎች አስፈላጊ መረጃዎች</u>

ቀን_____

እድሜ_____

የጋብቻ ሁኔታ_____

ሀይማኖት_____

የት/ት ደረጃ_____

ስራ_____

ቃለ መጠይቁ የፈጀው ጊዜ_____

በጣም አመሰግናሁ። እዚህ ላይ ቃለ መጠይቃችንን ከማጠናቀቃችን በፊት ይኸ ቀረ የሚሉት ካለ ሊያነሱትና ልንነጋገርበት እንችላል።

<u>የቃለ መጠይቅ ተሳታፊዎች የግልና ሌሎች አስፈላጊ መረጃዎች</u>

ቀን_____

እድሜ_____

የጋብቻ ሁኔታ_____

ሀይማኖት_____

የት/ት ደረጃ_____

ስራ_____

ቃለ መጠይቁ የፈጀው ጊዜ_____

DECLARATION

ıdersigned, declare that this thesis is my original work and has not been presented for a
n any other university.

Name: Seid Mussa Ahmed

Signature: _____

sis has been submitted for examination with my approval as university advisor

Teferi Gedif (PhD)

re: _____

Place and date of submission: Addis Ababa, Ethiopia

July 2009