

# **FACTORS INFLUENCING MALARIA TREATMENT AND PATIENT ADHERENCE TO ANTIMALARIAL DRUGS IN SOUTHERN ETHIOPIA**

K.D. Gidebo, D Litt et Phil  
Wolaita Sodo University

T.R. Mavundla, D Cur, RN  
University of South Africa  
Corresponding author: mavuntr@unisa.ac.za

T.E. Masango, PhD, RN  
University of South Africa

## **ABSTRACT**

In Ethiopia the health system is underdeveloped and much of the rural population has limited access to modern health services. The Ethiopian government introduced the Health Extension Programme which is a community-based health care delivery system aimed at accessing essential health services such as malaria treatment through its health extension workers (HEWs). The objective of this study was to evaluate factors influencing the malaria treatment practice of HEWs and patient adherence to antimalarial drugs. A qualitative research design that is explorative and descriptive was used. Data were collected by means of in-depth individual interviews among 20 HEWs and 7 focus-group discussions with patients treated for malaria. Data were analysed thematically. Four themes emerged from the data, namely: (1) health facility-related factors, (2) HEW-related factors, (3) patient-related factors, and (4) community-related factors. Improving the availability of essential resources such as rapid diagnostic test (RDT) kits and antimalarial drugs, improving the community's perception of antimalarial drug effectiveness and adequately educating patients on how to take antimalarial drugs can improve the malaria treatment practice of the HEWs and patient adherence to antimalarial drugs.

**Keywords:** adherence, antimalarial drugs, community health workers, health extension workers, malaria, qualitative research

## **INTRODUCTION**

One of the factors that aggravate the problem of controlling malaria in Africa is inadequate access to antimalarial drugs (WHO, 2004). The quality of malaria treatment is also affected by the availability of diagnostic facilities, the type of health facility, the level of training of health workers, and the availability of medical supplies (Boonstra, Lindback,

Khulumani, Ngome & Fugeh, 2002.). Besides the access problem, inappropriate use of antimalarial drugs by health workers and patients affect the quality of malaria treatment. Patient load in the health facility is also a factor influencing malaria treatment practice by the health workers (Meremikwu et al, 2007).

The Ethiopian health system is underdeveloped and much of the rural population has limited access to modern health services. As such, the Ethiopian government introduced the Health Extension Programme which is a community-based health-care delivery system aimed at improving access of essential health services such as malaria treatment through its health extension workers (HEWs) (Argaw, 2007:7).

This was done because malaria is the leading cause of morbidity and mortality in Ethiopia (WHO, 2010:43). The main contributing factors for malaria's high prevalence in Ethiopia are: geographical situation (tropical), low health service coverage for the prevention and control of malaria, inadequate resources (both professionals and material) for malaria treatment and control, and inadequate awareness of the community of malaria prevention and control (Jima et al, 2010:8). Three intervention strategies – ie early diagnosis and prompt treatment, vector control and epidemic prevention and control – were implemented to tackle the high mortality and morbidity rate in Ethiopia (EFMOH, 2010:5). Among other things, the following activities were mainly implemented to accomplish intervention strategies: training of adequate human resources, including HEWs for malaria treatment and prevention; strengthening community participation to enhance prevention measures such as avoiding malaria breeding areas; and expanding malaria diagnosis and treatment at community level through HEWs.

HEWs are community health workers who have been trained for one year at undergraduate level. The involvement of HEWs in prescribing and dispensing antimalarial drugs is shown to have improved community access to antimalarial drugs. However, the factors influencing the HEWs' malaria treatment practice in the community had not been investigated in Ethiopia; hence this study was conducted by the researcher.

## **PROBLEM STATEMENT**

The Ethiopian government expanded its health-care system to village level through involvement of HEWs in order to increase the accessibility of malaria treatment to the community. But simply making antimalarial drugs accessible was not enough to treat malaria effectively. The treatment must also be used appropriately by health-care providers and be fully adhered to by patients in order to ensure high cure rates and to reduce the resistance of malaria parasites to antimalarial drugs (WHO, 2006:12; WHO, 2010:6). HEWs play an important role in making antimalarial drugs accessible to the community and in implementing early diagnosis and prompt treatment (Barnabas, 2009). As a result, factors influencing HEWs' compliance to malaria treatment guidelines and patient adherence had to be evaluated.

## **PURPOSE OF THE STUDY**

The purpose of this study was to evaluate the factors influencing the malaria treatment practice of HEWs and patient adherence to antimalarial drugs in the Damot Gale district (southern Ethiopia).

## **DEFINITIONS OF KEY CONCEPTS**

Health extension workers (HEWs) are community-level health workers trained for one year at an undergraduate level to deliver preventive, promotive and curative health services, such as treatment of uncomplicated malaria (EFMOH, 2003:28).

The Collins English Dictionary (Makins, 1991:18) defines adherence as ‘to follow closely or exactly adhere to the rules’. In this study, adherence refers to the extent to which patients take antimalarial medications as prescribed by HEWs.

The WHO (2010:13) defines uncomplicated malaria as ‘symptomatic malaria without signs of severity or evidence (clinical or laboratory) of vital organ dysfunction. The signs and symptoms of uncomplicated malaria are non-specific. Malaria is, therefore, suspected clinically mostly on the basis of fever or a history of fever’.

## **RESEARCH METHODOLOGY**

A qualitative, explorative, descriptive and contextual research design was used to conduct the study.

### **Population and sample size**

The research population was drawn from HEWs working in health posts in the Damot Gale district, southern Ethiopia and malaria patients treated by HEWs in the district. The total number of the health posts in the study area was 31. The researcher collected data from 20 HEWs who were from 20 health posts. Each health post employed two female HEWs. A HEW who was available at the health post at the time of the researcher’s visit and who was not overloaded with work activities was included in the study. Three patients, who were treated for malaria in a one-week period prior to data collection, were selected from the patient registration book in each health post to participate in focus group discussions (FGDs). The selection of patients was based on the accessibility of patients for the researcher to conduct FGDs. Accordingly, those patients nearest to the health post were selected. In total, 59 treated malaria patients participated in 7 FGDs and each group consisted of 8 to 10 patients treated for malaria.

### Data collection

Data were obtained through multiple data sources, which included individual interviews, FGDs, patient record analysis and field notes. In-depth individual interviews were conducted with HEWs, whilst FGDs were held with treated malaria patients. In addition to both in-depth individual interviews and FGDs, the quality of treatment in each selected health post was assessed from patient registration books. Those patients who completed antimalarial treatment prior to data collection were included in the FGD. Data were collected until there was a redundancy of information in the form of data saturation. A total of 20 HEWs were involved in in-depth interviews. In addition to in-depth individual interviews, the researcher conducted seven FGDs, which consisted of four male and three female groups. The number of FGDs was determined through data saturation. All of the FGD participants were patients who had been treated with antimalarial drugs by HEWs and had completed the duration of treatment.

### MEASURES FOR ENSURING TRUSTWORTHINESS

Guba's model for trustworthiness was used to ensure the validity and reliability of this research study (Lincoln & Guba, 1985). The four criteria for trustworthiness are: credibility, transferability, dependability and conformability. The truth value was ensured by applying the strategy of credibility, and applicability was ensured by applying strategies of transferability. Consistency was ensured by strategies of dependability and neutrality by strategies of conformability. See table 1 for the application of the model for trustworthiness in this research.

**Table 1: Measure for ensuring trustworthiness**

Strategy	Criteria	Applicability
Credibility	Prolonged engagement	The researchers spent an adequate period of time in the study area with HEWs and malaria-treated patients.
	Triangulation	Data collection was done in various qualitative methods, namely: interviews, document analysis and FGD methods.
	Peer debriefing	An independent expert in qualitative research coded the data.
	Member check	Research was constantly checked with the informants and literature control was performed.
Transferability	Dense description	A comprehensive description of research methods used in this study was given, including illustrative direct quotes.

Dependability	Dependability audit	An independent expert coded the data.
	Dense description	A comprehensive description of methods was given, including illustrative direct quotes.
	Code-recode procedure	A consensus discussion between the researcher and the independent expert was held to identify final themes and categories.
Conformability	Conformability audit	Audit by independent expert researcher.

### **Ethical considerations**

Ethical clearance was obtained from the University of South Africa's Health Studies Research Ethics Committee. The supporting letter was obtained from the Southern Ethiopia Regional Health Bureau, Wolaita Zone Health Department, and Damot Gale district health office. HEWs signed consent forms and malaria-treated patients provided oral consent after the researcher explained the purpose and the procedures of the study. The information on the consent forms included the purpose of the study and data collection methods. The participants were also informed that they were free to withdraw from interviews or FGDs at any time. Confidentiality was ensured by removing all names and addresses of participants from the data collecting tools.

### **DATA ANALYSIS AND DISCUSSION**

The data analysis process followed Tesch's (1990) steps, as cited in Creswell (2009:184). The steps of data analysis as described by Tesch include: reading and understanding the transcripts, writing down the emerging ideas, creating codes, regrouping codes, creating categories and themes. Four themes and eight categories emerged during data analysis. See table 2 for a description of all the themes and categories identified in this study.

### **Biographic data**

Twenty HEWs working at 20 health posts participated in this study. All of the HEWs in the study area as well as in all health posts in the country were female. The average age of HEWs who participated in the study was 24 years, with ages ranging from 23 to 27. Among the 20 HEWs who participated in the study, 70 percent (n=14) were in the 23 to 24 age group. The majority (75%, n=15) of HEWs who participated in the study were unmarried. Most (95%, n=19) HEWs had one year of training after completing Grade 10 (10+1), while only one HEW reported an education level of one year of training after completing Grade 12 (12+1). Half of the HEWs (50%, n=10) had served the community for three to five years.

A total of 59 patients treated for malaria participated in FGDs. Twenty-four females participated in 3 groups and 35 males participated in 4 FGDs. The average age of the focus group discussants in the study was 39 years with an age range of 18 to 62 years. About 31 percent (n=18) of the FGD participants were in the age group 21 to 30 years. The majority (78%, n=46) of the FGD participants were married. About 46 percent (n=27) of focus group participants were not educated.

## **FACTORS INFLUENCING MALARIA TREATMENT PRACTICE OF HEWS AND PATIENT ADHERENCE**

Four themes and eight categories emerged from the data obtained from both individual interviews with HEWs and FGDs with patients namely, health facility-related factors, HEW-related factors, patient-related factors and community-related factors (table 2).

**Table 2: Factors influencing malaria treatment practice of HEWs and patient adherence**

<b>Themes</b>	<b>Categories</b>
Health facility-related factors	Availability of diagnostic materials/RDTs Availability of antimalarial drugs Availability of clean water
Community-related factors	Community perception to antimalarial drugs
HEW-related factors	
Patient-related factors	Patient pressure to obtain Coartem Workload of patients Forgetfulness Fear of adverse effects of antimalarial drugs

### **Health facility-related factors**

The health facility-related factors that influenced the malaria treatment practice of the HEWs mentioned by the study participants were the: availability of diagnostic materials/rapid diagnostic tests (RDTs), availability of antimalarial drugs, and availability of clean water.

### **Availability of diagnostic materials/RDTs**

Some of the HEWs stated that there was a shortage of RDTs and this influenced the quality of malaria diagnosis at the health posts. This is what HEWs had to say about this issue:

Sometimes there is a shortage of RDT. As a result of this, we diagnose the patient using signs and symptoms only. We cannot be accurate in treating a patient only using signs and symptoms. (HEW at health post 1)

Most of the HEWs indicated that free malaria diagnosis and a high number of negative results caused a shortage of RDTs:

The big problem in malaria treatment here in health posts is a shortage of RDT. Due to the fact that diagnosis of malaria in health posts is free to all, most people come to health posts when they experience fever. We test many people using RDT and most of them become negative. That causes the shortage of RDT. (HEW at health post 3)

HEWs indicated that at least three positive RDTs are required for one dose of Coartem.

### **Availability of antimalarial drugs**

Some of the HEWs reported that there was a shortage of one of antimalarial drugs (Coartem or chloroquine) at least once a month. They indicated that chloroquine shortages occur more frequently than Coartem shortages and this pushed them to use Coartem for treatment of *Plasmodium vivax* malaria-positive patients. This is what they had to say about the shortage of drugs: ‘we don’t have a problem of coartem but there is shortage of chloroquine’ (HEW at health post 4) and

We treat *Plasmodium vivax* positive patients with coartem due to the shortage of chloroquine. But it is clearly indicated in the guideline that *plasmodium vivax* should be treated only using chloroquine. (HEW at health post 2)

Most of the patients treated for malaria indicated that the shortage of drugs at health posts was the main problem that interfered with malaria control: ‘now the health post is near to us, malaria treatment is accessible to us and HEWs also visit us frequently but a big problem is a shortage of drugs in the health post’ (HEW at health post 6).

A shortage of antimalarial drugs causes the non-adherence of health workers to antimalarial drug prescription (Wasunna, Zurovac, Goodman & Snow, 2008). Rowe, Savigny, Lanata and Victoria (2005:1027) argue that the availability of resources such as drugs is one of the factors that influence the performance of health workers. The HEWs also mentioned that the shortage of antimalarial drugs affected patient adherence. Some HEWs indicated that: ‘patients do not complete antimalarial drugs during the shortage of drugs in the health post’ (HEWs at health post 2); ‘[a]fter taking 2 or 3 doses they keep the remaining drugs for future use’ (HEWs at health post 5); and ‘[t]he adult patients usually share their drugs with their children when there is shortage of drugs in [the] health post, both the adults and children would take fewer doses than required’ (HEW at Health post 10).

The patients treated for malaria also explained that a shortage of antimalarial drugs at health posts was the main factor influencing their adherence to the prescribed use of antimalarial drugs. The following statement was made by one of the participants:

The HEWs diagnosed malaria and gave me 24 tablets of Coartem. After I started using the drugs, my children also got malaria, but there was no coartem at the health post. I shared with two of my children the antimalarial drugs given to me. The HEWs told me not to share drugs with another person but I could not leave my children with malaria. I know that malaria is a killing disease (female discussant at FGD site 1).

In a study conducted by the Addis Continental Institute of Public Health (2009:51) among both health workers and the community, findings also indicate a shortage of antimalarial drugs. Kokwaro, Mwai and Nzila (2007:81) are of the view that the shortage and cost of drugs is one of the factors that influence patient adherence to drugs.

### **Availability of clean water**

All of the HEWs knew about the importance of administering the first dose at the health post. HEWs indicated that the administration of the first dose at the health post helped them to show the patients how to take antimalarial drugs. But the shortage of clean water influenced the performance of most of the HEWs. Most HEWs indicated: ‘We administer the first dose in the health post when we have water. But sometimes we don’t have water and we give the drugs with adequate advice to the patients to take at home’ (HEWs at health post 7).

This finding is supported by Conteh, Stevens & Wiseman (2007) who concur that water shortage is a significant factor affecting first dose administration at a health facility.

### **Community-related factors**

Besides individual patient-related factors which influence HEWs’ malaria treatment practice, the HEWs mentioned that there were community-related factors (the community’s perception of antimalarial drugs) that affect the HEWs’ compliance to malaria treatment guidelines.

### **Community perception of antimalarial drugs**

The HEWs revealed that the community did not perceive chloroquine to be effective for the treatment of malaria. HEWs also indicated that the community also perceived Coartem as a drug that could treat any health problem. The HEWs indicated that most of community members did not like to take chloroquine. The following statements were made by some of the HEWs:



‘most of the people in this community perceive that only coartem is an effective drug to treat malaria’; ‘they think coartem can treat any health problem related with fever’; ‘People do not like to take chloroquine’; ‘They always need coartem’; ‘When we prescribe chloroquine some of patients neither complete the dose nor don’t take it’ (HEWs at health post 9).

Most of the HEWs mentioned that the message previously given to the community was a cause for the negative perception of certain antimalarial drugs. This is what they had to say about this message:

The information given to the community previously from district affected the community’s perception. The information was ‘for any patient with fever coartem should be prescribed’ created the problem and patients understood that whenever they had fever they could take coartem to treat fever and coartem is the best drug for all the cases that are related with fever ... due to the perception that only coartem is effective for malaria treatment they do not take chloroquine when we prescribe it. (HEWs at health post 8)

This finding is supported by the study conducted by Kamat and Nyato (2010:4), which indicates that ‘people’s prior experience and perceptions significantly influence the extent to which they adhere to drugs’. Kamat and Nyato (2010) also found that the distribution of Coartem has significantly changed the community’s perception of antimalarial drugs. Wasunna et al (2008) also found that inaccurate messages affect health workers’ compliance to malaria treatment guidelines. Walter et al (2008) also found that the patient’s perception of the drug influences the patient’s adherence.

### **HEW-related factors**

Most of the HEWs counsel and provide adequate information to malaria patients during antimalarial drug dispensing, but some of the HEWs did not give patients adequate information about the consequences of not completing the drugs, what to do after vomiting and on the side effects of antimalarial drugs. The following were mentioned by some patients treated for malaria during a FGD: ‘I become well after 4 doses and I gave the remaining ‘kortom’ [Coartem] to my neighbour. I become well and I think it is not necessary to use all drugs’ (female discussant at FGD site 2). Another participant stated: ‘I gave to my daughter 1 tablet at night and immediately she vomited everything. I gave her the next dose in the morning. I don’t know what to do after vomiting’ (female discussant at FGD site 3).

Kachur et al (2004:719) in their study found that those who were dispensed antimalarial drugs with adequate information adhered more than those who did not receive adequate information. The study conducted by Beer et al (2009:771) found similar results, which indicated that information was rarely provided to patients on what to do after vomiting.

### **Patient-related factors**

The patient-related factors which influence HEWs' malaria treatment practice and patient antimalarial drug use mentioned by participants are: (1) patient pressure to obtain Coartem, (2) patient load, (3) patient forgetfulness due to workload, and (4) patient fear of adverse effects. These factors are discussed below.

#### **Patient pressure to obtain Coartem**

Most HEWs mentioned that malaria-negative patients wanted to take antimalarial drugs (Coartem) due to the perception that Coartem can treat any health problem: 'patients perceive that coartem can treat all health problems/diseases'; 'almost all of the patients do not want to hear the word negative'; 'convincing a malaria negative patient is more work load than treating malaria positive patients' (HEWs at health post 12).

All of the HEWs also indicated that patients did not like chloroquine. The following are statements from HEWs:

Almost all patients who are *Plasmodium vivax* positive do not like to take chloroquine. The guideline indicates that coartem for *Plasmodium falciparum* and chloroquine for *Plasmodium vivax*. But they don't like to take chloroquine. They like to take only coartem. They say: 'why you don't give me yellowish colour tablet [Coartem]?' (HEWs at health post 14)

Some of the HEWs indicated that due to patient pressure, they gave Coartem to *Plasmodium vivax*-positive patients. The following statement was made by some of HEWs:

We sometimes dispense coartem for *Plasmodium vivax* malaria-positive patient due to high patient demand. But coartem is not indicated in national treatment guideline for *Plasmodium vivax*. Patients sometimes refuse to go without coartem. (HEWs at health post 16)

This finding is corroborated by a study done by Wasunna et al (2008) which indicates that patient pressure to obtain certain kinds of antimalarial drugs affects the compliance of health workers during prescribing and dispensing antimalarial drugs to the patients. Rowe et al (2005:1027) also indicate that patient demand is one of the factors influencing health worker performance.

#### **Patient workload**

Besides patient pressure to take Coartem, HEWs indicated that patient load during the epidemic and high malaria season affected the quality of malaria diagnosis at the health

post. Most HEWs mentioned concerns similar to the following: ‘During malaria season and malaria epidemic the patient load is high. Therefore, during this time we don’t check malaria with RDT in all of the patients due to time constraints and RDT shortage’ (HEWs at health post 13).

Meremikwu et al (2007) found that in those health facilities with a high load of patients, the compliance to treatment guidelines is minimal. Wasunna et al (2008) also found that the work load of health workers affects the quality of care in rural health facilities.

### **Forgetfulness**

Some of the HEWs indicated that forgetting the time to take drugs due to workload was one of the factors influencing malaria patients’ adherence. The following was mentioned by some of the HEWs: ‘Most of the time women are busy with dinner preparations at night in rural areas. Therefore, they forget to take night antimalarial drug dose’ (HEWs at health post 7).

Forgetting the correct dosage is one of the reasons for decreasing patient adherence (Beer et al 2009:769). Unni (2008:181) also supports the findings of this study by revealing that forgetfulness is one of four major reasons for non-adherence to taking medication.

### **Fear of adverse effects of antimalarial drugs**

Some patients treated for malaria mentioned the fear of side effects associated with antimalarial drugs as a factor that influenced their use of these drugs. Some of HEWs also indicated that malaria patients complained of abdominal pains and fever immediately after the first dose of Coartem. The following statement was made by a malaria-treated patient:

I took the first 4 tablets of Coartem with water and there was no problem. But when I took the second dose of Coartem it caused me abdominal pain/Gomppa Mishuwa and I postponed the next dose for 1 day because of fear of pain. (61-year-old male discussant at FGD site 4)

Most of the patients also indicated that when they take drugs on an empty stomach the abdominal pains increase; when they do not have food they postpone taking the drug due to fear of such side effects. Some patients and HEWs also mentioned that immediately after taking Coartem, fever (‘bollaa tuggyaa’) increased. The worsening of fever in children after Coartem administration was also one of findings revealed by Kamat and Nyato (2010:5) in a Tanzanian population. In support of these findings Kokwaro et al (2007:79) also reveal that gastrointestinal reactions and abdominal pains are side effects of Coartem. The World Health Organisation (2003:55) also indicates that the adverse effects of drugs are one of the factors affecting patient adherence.

## CONCLUSION

The main gaps/problems in the malaria treatment practice of the HEWs identified in this study were related to resource shortages, the HEWs' capacity in the management of antimalarial drugs and counselling of patients, and the community or patient perception of antimalarial drugs. Improving the availability of essential resources (RDTs and antimalarial drugs) at health posts, improving the community's perception of antimalarial drug effectiveness and adequately educating patients on how to take antimalarial drugs can improve the malaria treatment practice of the HEWs and patient adherence to antimalarial drugs.

## RECOMMENDATIONS

The following recommendations will improve malaria treatment practice by HEWs in order to enhance the adherence of patients to antimalarial drugs: improve the availability of essential resources (RDTs and antimalarial drugs) at the health post, improve the community's perception of antimalarial drug effectiveness, and adequately educate patients on how to take antimalarial drugs.

## ACKNOWLEDGEMENT

This research was funded by an African Doctoral Dissertation Research Fellowship award offered by the African Population and Health Research Centre in partnership with the International Development Research Centre and the University of South Africa.

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