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MALARIA-RELATED HEALTH-SEEKING BEHAVIOUR AND CHALLENGES FOR CARE PROVIDERS IN RURAL ETHIOPIA: IMPLICATIONS FOR CONTROL

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Summary. A range of activities are currently underway to improve access to malaria prevention and control interventions. As disease control strategies change over time, it is crucial to understand the health-seeking behaviour and the local socio-cultural context in which the changes in interventions operate. This paper reflects on how people in an area of seasonal malaria perceive the causes and transmission of the disease, and what prevention and treatment measures they practise to cope with the disease. It also highlights some of the challenges of malaria treatment for health care providers. The study was undertaken in 2003 in Adami Tulu District in south-central Ethiopia, where malaria is a major health problem. Pre-tested structured questionnaires and focus group discussions were conducted among men and women. Malaria, locally known as *busa*, was perceived as the most important cause of ill health in the area. Respondent's perception and knowledge about the cause and transmission of the disease were relatively high. The newly introduced insecticide-treated nets were not popular in the area, and only 6·4% of households possessed at least one. The results showed that patients use multiple sources of health care for malaria treatment. Public health facilities, private clinics and community health workers were the main providers of malaria treatment. Despite higher treatment costs, people preferred to use private health care providers for malaria treatment due to the higher perceived quality of care they offer. In conclusion, effort in the prevention and control of malaria should be intensified through addressing not only public facilities, but also the private sector and community-based control interventions. Appropriate and relevant information on malaria should be disseminated to the local community. The authors propose the provision of effective antimalarial drugs and malaria prevention tools such as subsidized or free insecticide-treated nets.

Introduction

Malaria is the leading cause of morbidity and mortality in Ethiopia (MOH, 2004/2005, 2005/2006), where the number of people estimated to be residing in

malarious areas increased from 17·7 million in 1965 to more than 53 million (68% of the population) in 2005 (Deressa *et al*., 2006). This increase in the population in malaria-endemic areas has major implications for malaria control interventions in the country. Malaria transmission in Ethiopia is seasonal and large scale epidemics are very frequent (Abeku *et al*., 2003; Adhanom *et al*., 2006). Of the four species of *Plasmodia* infecting humans, *Plasmodium falciparum* (about 60%) and *Plasmodium vivax* (40%) are the two most commonly encountered malaria parasites in the country (MOH, 2005/2006; Adhanom *et al*., 2006).

Ethiopia is characterized by a predominantly rural population (85%). As a result, the country's current health policy aims to strengthen the decentralized health care system through the primary health care approach, and emphasizes health promotion and disease prevention (Transitional Government of Ethiopia, 1993, 1995). Backed by the policy, the number of health centres and hospitals has increased from 382 and 110 in 2000 to 635 and 138 in 2005, respectively (MOH, 2005/2006). The policy also emphasizes the expansion of private and non-governmental health care facilities. The number of private clinics has increased from 541 in 1996 (MOH, 1998/1999) to 1784 in 2005 (MOH, 2005/2006).

Recently, the Ministry of Health (MOH) introduced an innovative community-based health service delivery system targeting the rural community through a health service extension programme deploying health extension workers offering essential preventive health interventions to villages (MOH, 2004a). The deployment of these workers should provide the opportunity to expand malaria control interventions to more remote rural areas of the country.

Diagnosis and treatment of malaria at public health facilities was the primary focus in Ethiopia until the early 1990s. However, community-based malaria control interventions using community health workers (CHWs) and mother co-ordinators have been adopted in the country since the 1990s to improve community access to early diagnosis and prompt treatment, resulting in the decentralization of previously facility-based malaria treatment at the village level (Ghebreyesus *et al*., 2000; Kidane & Morrow, 2000; MOH national five-year strategic plan unpublished document, 2001; MOH national five-year strategic plan unpublished document, 2006). Today, malaria control strategies are closer to the community at large, and most first-line antimalarial treatments are provided both by the public and private sectors as well as community-based strategies.

In addition, the previously vertical malaria control programme is fully integrated into the general health delivery system and the responsibility for controlling malaria has been devolved to the decentralized health care system since 1993. Important steps have also been taken to implement insecticide-treated nets (ITNs) as one of the main malaria control strategies in Ethiopia (MOH, 2004b). The national malaria control programme planned to achieve 60% coverage of households at risk of malaria with at least one ITN by the end of 2005. In 2005, however, coverage was estimated at 24% with at least one net per household in malarious localities of the country, although geographical variations are high (MOH national five-year strategic plan unpublished document, 2006).

As described above, a range of activities and interventions are currently underway to improve access and equity to preventive as well as curative health services in

Ethiopia. The coverage of health services and community-based malaria control interventions through CHWs and ITNs has been improved over the last decade. However, the effectiveness of these interventions is dependent on the perceptions and practices of the local community, demanding the understanding of the local socio-cultural context in which the changes in health service delivery and implementation of new disease control programmes are operating. Changes in the health care delivery system might not necessarily be followed by changes in behaviour or knowledge about disease causation and prevention among the population.

As control strategies and approaches change over time, prior understanding of the local context is very important, as the success of malaria control depends on the understanding of the socio-cultural factors that play a role in local treatment and prevention practices (Agyepong, 1992; Ahorlu *et al*., 1997; Williams & Jones, 2004). Several studies have documented health-seeking behaviour for malaria and highlighted the importance of people's perceptions about malaria and their practices with regard to the available prevention and treatment options (McCombie, 1996; Ahorlu *et al*., 1997; Muela *et al.,* 1998; Agyepong & Manderson, 1999; Nuwaha, 2002; Williams & Jones, 2004). Based on cultural, social and economic factors, it is currently recognized that people in different settings hold a variety of beliefs and practices about the cause, transmission, recognition, treatment and prevention of malaria (Ahorlu *et al*., 1997). Understanding these factors is critical for designing appropriate malaria prevention and control strategies.

In the past, regions of intense malaria transmission have received great attention from public health and malaria researchers due to the overwhelming burden of the disease in these areas (Agyepong, 1992; Agyepong & Manderson, 1994; Ahorlu *et al*., 1997; Nyamongo, 2002; Williams & Jones, 2004). Recently, however, there has been an increased recognition about malaria perceptions and practices of the community, particularly their treatment-seeking behaviours in areas of seasonal transmission frequently exposed to malaria epidemics in Africa (Espino *et al*., 1997; Tanner & Vlassoff, 1998; Nuwaha, 2002; Guyatt & Snow, 2004).

Thus, given the constantly changing disease control strategies under a given epidemiological setting, it is crucial to examine the factors that influence interventions. This paper portrays the findings of a study conducted from October to November 2003 (peak malaria transmission) in Adami Tulu District characterized by epidemic patterns in south-central Ethiopia. It aims to explain how people perceive the causes and transmission of malaria, how they understand the available antimalarials and their sources, and how they practise measures of prevention and treatment to cope with the disease. Finally, it highlights some of the challenges of malaria treatment at health care providers' level in the area.

Methods

Study area and population

A community-based cross-sectional survey was conducted between October and November 2003 in the rural communities of Adami Tulu District in Oromia Regional State, south-central Ethiopia. Adami Tulu Jiddo Kombolcha is the full name of the district, but it is often shortened as Adami Tulu District. Located about 160 km

south-east of Addis Ababa, Zeway Town is the administrative capital of the district. With an estimated 27,000 children under five years of age (18·5%), the district had a population of about 145,000 in 2002, according to projections from the 1994 Ethiopian Census (CSA, 1998). About 71% of the population is rural, consisting of peasants who mainly depend on subsistence agriculture and livestock herding for food and as a source of income. *Tef* (*Eragrostis tef*), maize, haricot bean, pepper, wheat and barley are the main crops grown. The district is mainly inhabited by Oromo people, speaking the *Afan Oromo* language.

Malaria transmission in Adami Tulu District follows its rainfall patterns (with heavy and long rains from June to August and short rains from March to April). The major transmission occurs from September to December with a minor one from April to May. The district is characterized by seasonal malaria with a frequent occurrence of epidemics (Mengesha *et al.*, 1998). In 2003, malaria was the leading cause of outpatient consultations (10%) among public health facilities (District Health Office, unpublished data, 2003). In the same year, of 18,312 blood samples examined at the nearby Malaria Control Laboratory (MCL) in Zeway Town from self-presenting patients, 43% (n=7864) were positive for malaria. *P. falciparum* constituted 72·2% of the infections, and the rest were due to *P. vivax* (26·9%) and mixed infections (0·9%) of both species.

The district had two health centres, three health stations, one MCL, three health posts, fifteen private clinics, thirteen drug shops (rural drug vendors), 34 CHWs, and one missionary clinic. At the time of the study, the public health facilities in the district were run by one health officer, eighteen nurses, twelve health assistants, five laboratory technicians and five malaria control technicians. There was no hospital in the district and the nearest were Butajira Hospital in the west and Shashemene in the south, about 50 km and 100 km away from Zeway Town, respectively. The health centre and a malaria control centre organized in the District Health Office (DHO) are the two major public health facilities responsible for case management of malaria, vector control activities and malaria epidemic control in the district.

The Rural Community Health Training Programme (RCHTP) undertaken in the district is also a major undergraduate medical training component of the Medical Faculty of the Addis Ababa University. This district was specifically selected for the study because of the availability of the RCHTP, MCL and a health centre in Zeway Town, coupled with its higher vulnerability to malaria epidemics.

Sample selection

The district is administratively organized into 62 rural and four urban *kebeles*. The *kebele* is the smallest administrative unit in Ethiopia, with a population of about 1000 to 3000. Based on geographical homogeneity, all rural *kebeles* in the district were stratified into three strata with the assistance of the DHO malaria control experts. Each stratum was assumed to include *kebeles* located in similar geographical areas and with a similar history of malaria problem. In total, twelve *kebeles* were selected (four per stratum) by random sampling.

The *kebele* was selected as the sampling unit, because the number of households was relatively high allowing an adequate sample size to be obtained, and it was also

simple to approach the community using the existing government structure. Sample size calculations were made assuming 50% of households to have at least one perceived malaria patient over a two-week recall period, a 4% margin of error at 95% confidence level, a design effect of three, and a non-response rate of 15%. Sample size calculations were done using Epi Info software version 6·04d (CDC, Atlanta, GA, USA), finally leading to a minimum sample size of 2070 households. This sample size was distributed across the selected *kebeles* with a probability proportional to size. All households in the selected *kebeles* were included in the survey by house-to-house visits. A household was defined as a group of people including husband, wife, their children or others living together in the same house.

Data collection

Data collection took place from October to November 2003 during the peak malaria transmission season using quantitative and qualitative methods including focus group discussions (FGDs) and in-depth interviews. In each visited household, the head of the household (or spouse) or a representative was interviewed using a pre-tested interviewer-administered structured questionnaire. The following thematic areas were explored: socioeconomic and demographic characteristics of the respondents and their households, knowledge, attitudes and practices related to malaria prevention and treatment; incidence of malaria among the household members during the two weeks prior to the survey; and treatment-seeking practices.

The survey team consisted of twelve 10th or 12th grade graduate local interviewers recruited from the study *kebeles*, two supervisors from the DHO, a local guide man and the principal investigator (first author). Five days training were given on how to use and administer data collection instruments. The interviewers administered the questionnaires in the local *Afan Oromo* language. In the study area, the local term for malaria is *busa*. The principal investigator and two health workers from the DHO supervised the data collection process.

Focus group discussions were held separately with men and women, with 8–12 participants in each group, to explore information on knowledge, perceptions and practices of the community about malaria and patterns of health-seeking behaviour using an interview guide. Participants were selected from the study *kebeles* selected for the quantitative household survey. Study participants in three of the FGDs were mothers of children under five years of age, while participants in four of the FGDs were men with at least one child. In-depth interviews with key informants were also conducted to get detailed information on attitudes, beliefs and opinions about malaria in the community. In addition, interviews were conducted with people identified to have had malaria in the preceding two weeks to collect information on recognition and choices of treatment for malaria.

Participants involved in the FGDs and in-depth interviews were permanent residents with a good knowledge of the area, and approached through discussions with community leaders. The FGDs and interviews were held in *Afan Oromo* and moderated by the principal investigator and assisted by a note-taker from the DHO and village co-ordinators. Each session of the FGD lasted between 1 and 1½ hours. In addition to note-taking, the proceedings of each session were recorded using a tape recorder.

Data analysis

Quantitative data were entered into Epi Info software version 6·04d and transferred to SPSS version 11 (SPSS, Chicago, IL, USA) statistical software package for analysis. Frequencies, proportions and means were used for the descriptive analysis of the data. Qualitative data were transcribed and analysed after data collection along major themes of the research. Verbatim transcriptions in *Afan Oromo* were made for all tape-recorded FGDs and in-depth interviews, and finally used for analysis, interpretation and comparison with the quantitative data. To avoid loss of information, frequent comparisons were made between the transcripts in *Afan Oromo* and the English version during analysis. Although the focus group sessions were analysed as single interviews, verbatim transcriptions were also made for all individual participant responses. Some quotes from the qualitative data that best explain the context of malaria in the community were identified and are presented by the respondents' own words in parallel with the quantitative information to give more insight into the perceptions and practices of the community.

Ethical clearance and informed consent

The study was reviewed and approved by the Ethical Committee of the Faculty of Medicine at Addis Ababa University. Written permission was obtained from Oromia Regional State Health Bureau and Adami Tulu District Administration Office. Verbal informed consent was obtained from each individual participant after explaining the purpose of the study in the local language. Before commencement of data collection, all the CHWs in the district were equipped with adequate stocks of antimalarial drugs from the DHO. Data collectors were also trained by the district malaria control experts on how to recognize the common signs and symptoms of uncomplicated and complicated malaria, and how to provide treatment to uncomplicated malaria patients with the then first-line antimalarial drug, sulfadoxine pyrimethamine (MOH, 1999), and finally, to refer those patients with severe conditions.

Results

Socio-demographic characteristics of the respondents

In total, 2253 households were visited in twelve *kebeles*. However, 29 (1·3%) houses were vacant, and appropriate respondents were unavailable in 27 (1·2%) households after three visits due to travel or work in the field. Only two eligible households refused to participate. In general, 2195 households participated in the study, representing a response rate of 97%. From the total surveyed households, a total of 12,225 people were enumerated (50·4% females and 49·6% males), with 18·4% children under five years of age. The average size of the surveyed households was 5·6 people. The socio-demographic characteristics of the respondents are presented in Table 1. The majority of the respondents were males (66·2%). The respondents were aged between 16 and 85 years, with about 57% between 25 and 44 years of age. The mean (± SD) age was 38·6 (± 14·4) years and the median was 35. About 74% of the

Table 1. Socio-demographic profile of the survey participants, Adami Tulu District, 2003

Characteristics	*n* (%)		
	Males	Females	Total
Age in years			
15–24	180 (12·38)	103 (13·90)	283 (12·9)
25–34	464 (31·91)	210 (28·34)	674 (30·7)
35–44	333 (22·90)	233 (31·44)	566 (25·8)
45–54	208 (14·30)	115 (15·52)	323 (14·7)
55–64	133 (9·15)	52 (7·02)	185 (8·4)
≥65	136 (9·35)	28 (3·78)	164 (7·5)
Status in household			
Head	1359 (93·47)	269 (36·30)	1628 (74·2)
Wife of head	0 (0)	393 (53·04)	393 (17·9)
Representative	95 (6·53)	79 (10·66)	174 (7·9)
Marital status			
Married	1422 (97·80)	619 (83·54)	2041 (93·0)
Never married (single)	19 (1·31)	4 (0·54)	23 (1·0)
Divorced or separated	2 (0·14)	7 (0·94)	9 (0·4)
Widow/widowed	11 (0·76)	111 (14·98)	122 (5·6)
Religion			
Muslim	1405 (96·63)	715 (96·49)	2120 (96·6)
Orthodox Christian	15 (1·03)	5 (0·67)	20 (0·9)
Protestant Christian	29 (1·99)	18 (2·43)	47 (2·1)
Other	5 (0·34)	3 (0·40)	8 (0·4)
Ethnicity			
Oromo	1415 (97·32)	717 (96·76)	2132 (97·1)
Siltie	35 (2·41)	14 (1·89)	49 (2·2)
Guragie	4 (0·28)	2 (0·27)	6 (0·3)
Other	6 (0·41)	2 (0·27)	8 (0·4)
Educational status			
No education	802 (55·16)	684 (92·31)	1486 (67·7)
Read only	56 (3·85)	11 (1·48)	67 (3·1)
Read and write	38 (2·61)	5 (0·67)	43 (2·0)
Elementary (1–6)	446 (30·67)	39 (5·26)	485 (22·1)
Junior (7–8)	63 (4·33)	2 (0·27)	65 (3·0)
Secondary (9–12) and above	49 (3·37)	0 (0)	49 (2·2)
Occupation			
Farmer	1349 (92·78)	157 (21·19)	1506 (68·6)
Housewife	0 (0)	571 (77·06)	571 (26·0)
Student	86 (5·91)	6 (0·81)	92 (4·2%)
Civil servant	9 (0·62)	0 (0)	9 (0·4)
Other	10 (0·69)	7 (0·94)	17 (0·8)
N	1454 (100)	741 (100)	2195 (100)

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respondents were heads of households. Table 1 also shows that most of the respondents (93%) were married. The predominant religion was Islam (96·6%), and the majority (97·1%) were from the Oromo ethnic group. During this survey, a significant number of the respondents had no education at all (67·7%), while 22·1% had attained elementary education. Being a farmer and housewife constituted 68·6% and 26% of the occupations, respectively.

A total of 71 people participated in seven FGDs ($n=58$) and in-depth (eight case studies and five key informants) interviews. The mean age was 36 years and the median 30 years (range 15–90 years). Most participants were married (91·5%), and almost all (96%) were followers of Islam. A little less than half (49·3%) had no education, and 54·9% and 40·8% were farmers and housewives, respectively.

Local perceptions of causes and transmission of malaria

Malaria was recognized as a widespread and serious disease, the perceived effects of which differed with different respondents. The local vernacular for malaria is *busa*. To avoid confusion, the terms *busa* and malaria are used interchangeably in this paper. The most frequently reported symptoms for *busa* were fever (87%), shivering and chills (88%) and headache (67·1%). While the above signs and symptoms were commonly felt as mandatory, other symptoms of *busa* were mentioned with relatively low frequency; these included back pain (40%), loss of appetite (38·4%), body/joint pain (12·3%), vomiting (10·3%) and unconsciousness (10·2%).

Almost all participants in the FGDs and in-depth interviews mentioned fever, high temperature, shivering, headache, thirst, loss of appetite, vomiting and joint pain as the main symptoms of malaria. There is a strong perception that malaria is recognized if one or more of these symptoms were manifested by a patient.

Respondents' perception and knowledge with regard to the cause and transmission of malaria seemed to be generally high. The question of whether malaria could be transmitted from one person to another was posed, and 79·8% replied 'yes', while 8·9% said 'no' and the remaining 11·3% did not know whether the disease could be transmitted from one person to another. Although none of the respondents mentioned the malaria parasite as a cause of the disease, 63·4% mentioned mosquito bites as the cause of malaria. Some respondents, however, believed that malaria could be acquired in other ways, such as by sleeping with a person who has the disease (27·4%), through breathing (12·8%), by drinking dirty water (0·2%), or by being exposed to the cold (0·2%) or the bad smells of swampy areas (0·3%).

When asked the question of how one gets *busa*, most FGD and in-depth interview participants gave 'mosquito bite' as the cause. Some participants had other answers such as 'drinking contaminated water', 'hunger' or 'exposure to cold'. Skipping meals or working when hungry was another perceived cause that could lead to malaria. Others believed that malaria is caused by fasting or when people do not get breakfast or food on time. Most people perceived that malaria occurs primarily after the summer rainy season between September and December. Some of the FGD and in-depth interview participants related malaria to the *Birra* (relatively dry) season of the year (September to November), during which more food is available. They associated malaria with eating maize (*eshet*). *Eshet* is a young green maize corn

Table 2. Frequency of the usual use of different malaria preventive methods by households, Adami Tulu District, 2003

Method of malaria prevention (n=2195)	Frequency	Percentage
Did not use any method of prevention	750	34·2
Block mosquito entry holes using local materials	582	26·5
Drain areas of water nearby house	560	25·5
Close doors and windows in the evenings	499	22·7
Burn cow dung or leaves	448	20·4
Kill mosquitoes in the house mechanically	345	15·7
Use spray or other objects to kill mosquitoes (aerosol)	144	6·6
Use mosquito nets	141	6·4

usually eaten fried. It is mainly available during *Birra,* and it is during this time that malaria coincides with the abundance of *eshet*.

> Malaria is more common during *Birra*. During this time, it is caused by mosquitoes. When mosquito bites us, it causes malaria. This time there is *eshet.* Eating *eshet* will cause malaria. (Mother)

The abundance of mosquitoes in the community was a main concern. Most FGD and in-depth interview participants mentioned that although mosquitoes were present throughout the year, their density increased during and after the months of the rainy season. The presence of mosquitoes was attributed to the presence of stagnant waters around the houses and other water-holding materials which collect water after rain. They argued that during the summer, rainwater collects everywhere, and the water in the rivers and streams overflows leading to floods. The respondents also added that mosquitoes rest and breed on the water and 'this is why there are a lot of mosquitoes nearby water bodies'. During the rainy season, people believed that there was a relatively low level of malaria transmission compared with the following months.

> Malaria is rampant starting from August. It then continues and affects many people until November. (Father)

> Malaria affects people during the months of September to December. I think mosquitoes breed on the water during this time and are distributed to the surrounding villages. (Father)

Perceptions and practices about malaria prevention

Respondents had several opinions about ways to prevent malaria. About 75% of them believed that malaria could be prevented, while 14·4% held the view that it could not be prevented. A significant proportion of the respondents (10·5%) were not sure whether malaria could be prevented or not. A number of different methods were found to be used to protect themselves or their families from malaria. Table 2 summarizes the proportion of respondents who reported their usual use of different preventive methods against mosquito biting.

Quite a large percentage (34·2%) of households were found not to be using any method of malaria prevention. About 47% of respondents reported having sprayed

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the interior walls of their dwelling against mosquitoes with chemical (DDT) by the DHO Malaria Control Team during the summer preceding the survey. Some respondents in the focus groups complained that indoor residual spraying was interrupted in their respective localities and explained that the condition of malaria had became worsen since then. The majority of the respondents in the FGDs and in-depth interviews believed that malaria could be prevented especially through using indoor house spraying. Preventive measures, such as destroying the mosquito breeding sites around the home areas, were mentioned. As one respondent in the mothers FGDs puts it:

> It is possible to prevent malaria. If we clean the water or mosquito breeding sites in our surroundings, malaria will not attack us. (Mother)

More than half (59·7%) of the respondents said that they had heard of mosquito nets. This study assessed the sources of information about mosquito nets and found that respondents heard about the nets mainly from health workers including CHWs (74·1%), friends and neighbours (16·6%), the mass media (7·8%) or other sources (2·4%). Of the respondents interviewed (n=1310), protection against mosquito bites was cited as the main purpose of using mosquito nets (84·4%), followed by responses such as killing of mosquitoes (70·4%), protection from malaria (51·5%) and 'did not know' (1·8%). Ownership of at least one mosquito net was reported only in 6·4% (n=141) of households.

Mosquito nets did not seem to be popular in the community, as this malaria control strategy was newly introduced in the area and most of the people had not heard about them or were not able to use them. However, the information on mosquito nets given by CHWs or health workers seemed to have been highly disseminated in the community:

> While sleeping in the bed, there is a material [i.e. mosquito net] which covers the bed to prevent mosquito biting. Some people are currently using it. If it covers the whole bed, mosquitoes do not bite you during the night. However, people who are currently using it are still contracting malaria. (Mother)

> There is a material called *saphana siree* [i.e. *Afan Oromo* term for mosquito net]. They [CHWs or health workers] told us that it can prevent malaria. (Mother)

> They [CHWs and health workers] said that mosquito net prevents mosquito bite while sleeping. When mosquito rests on it, it will be killed before biting a person. Although preventing mosquito bite while sleeping is difficult, people can be protected from it if they properly use a net. (Father)

Respondents in the households that had no mosquito net were asked why they did not have any. The main reasons, cited by 47·5% and 43·3%, were lack of awareness about its use and the high cost, respectively. Respondents were asked whether it was preferable to buy a mosquito net through one-off cash payment or through instalments, and 91·3% replied it would be preferable through a loan or by instalment. They were also asked to state an appropriate price for a mosquito net. A price range of Birr 10·00 to 20·00 was suggested by 64% of the respondents (1US$=8·65 Birr in 2003). The average suggested price was Birr 10·42 (US$1·20) with both median and mode of 10·00, and standard deviation of 4·16. Most of the FGDs and in-depth interview participants complained about the high cost of mosquito nets:

> The current price of a mosquito net [i.e. Birr 18·00] is very high and unaffordable. Most people have large families, and it is very difficult to protect them with one or two nets. The price should be minimized or it should be given free of charge to satisfy the demand of the community. (Father)

Knowledge of antimalarials and treatment strategies

Respondents were asked the question 'Is malaria a treatable disease?', and 88·1% replied 'yes', while 2% and 9·9% said 'no' and 'did not know', respectively. They were also asked about the best drug to cure a person with malaria. Most mentioned sulfadoxine pyrimethamine (75·2%), followed by injection (20·5%) and chloroquine (11·7%) as the major malaria treatment. However, herbal medicine (1%) and religious healing such as holy water and praying (0·6%) were also mentioned by a few respondents. About 2% of the respondents were not sure about the name of the best antimalarial drug.

Most respondents in the FGDs and interviews mentioned sulfadoxine pyrimethamine for the treatment of malaria. People in the area locally called sulfadoxine pyrimethamine 'Fansidar' or '*mecheresha*' drug (i.e. the last resort and effective antimalarial drug). It was the first-line antimalarial drug for the treatment of uncomplicated malaria at community level during the study:

> There is an antimalarial drug called *mecheresha*. There is also another white drug with a bitter taste [i.e. chloroquine]. (Mother)

> There is a *mecheresha* drug. First a white bitter drug [i.e. chloroquine] is given. If it does not work, then *mecheresa* drug is given. If the patient is a child, syrup is also administered. (Mother)

Respondents were asked which health care providers they usually visit during malaria illness. Among the alternative care providers in the area, CHWs and public and private health facilities were the most commonly sought sources of treatment for malaria. Treatment of *busa* with modern antimalarial drugs from health care providers was highly preferred to home treatment or traditional remedies. Most FGD and in-depth interview participants also reported CHW as the first source of antimalarial treatment, and indicated the next steps of visiting public or private health facilities if the disease was not cured:

> The community in this area gets antimalarial drugs from the CHWs. The government provides the drugs to the community through the CHWs. If the problem persists, we visit private clinics. (Father)

> Fansidar can also be obtained from the private clinics or drug vendors. They examine our blood sample and prescribe us Fansidar. The health posts, health stations and CHWs do not examine blood, and prescribe antimalarial drugs based on the symptoms we tell them. (Father)

Treatment-seeking patterns

Perceived malaria (or *busa*) over a two-week recall period was reported by the respondents in 14·3% (n=1748) of the total 12,225 surveyed household members. Of those, 69·9% had recovered from the illness, whilst 30·1% were febrile at the time of the interview. Of those who had recovered, 87·2% (n=1348) sought any form of treatment from various sources. No care was sought by 22·9% of those with perceived

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malaria either because of the mildness of the illness (41·4%), financial constraint (36·7%), distance to a health facility (18%), shortage of time (3·5%) or the perception that antimalarial drugs were expensive (0·5%). Among people with reported malaria, 15·9% had finger-prick blood samples drawn and microscopically examined at health facilities, 77·8% were self-diagnosed with malaria and 49·4% were symptomatically diagnosed with malaria either by health workers or CHWs.

In-depth interviews held with a man with a recent history of malaria revealed the sobering effect that malaria has on the community:

> I have been sick from *busa* for about a week. My body was chilling and shivering, I had a severe headache, and all my body was incapacitated. Although I sponged my body with water, the condition got worse. I did not eat anything. Finally, I visited a private facility and received injection, tablets and other antipyretics. I recovered two days after getting treatment. I did not work at all, and I have still not recovered completely. I had many things to do if I have not fallen down due to this illness. (Case study)

The analysis of treatment-seeking patterns was limited to patients with reported malaria who had recovered ($n=1222$) from the illness at the time of the interview. Among those in which recovery was reported, 91 patients did not seek any form of treatment owing to the mildness of the illness (50·5%) and financial problems (40·7%). Of those who sought any form of treatment or care ($n=1131$), 78·6% sought it only from one source, 17·4% sought it from two sources and 4% visited three sources for treatment of the reported malaria episode. The choice of treatment for malaria among different care providers was also witnessed by the FGD and in-depth interview participants. The choice for the majority of the people begins by visiting the nearest and cheapest care providers such as CHWs and mostly ends with more expensive health care providers such as private facilities if the illness is not cured at the initial visit:

> We take children with malaria first to CHW. If the condition does not improve there, we then take them to Zeway MCL. After laboratory investigation, however, the blood sample result mostly turned to be negative. The disease hides itself. Finally, we resort to private clinics where we get treatment. (Key informant)

Table 3 shows choices of care from different sources during initial and subsequent visits for an episode of malaria. For the first choice of treatment, the main health care providers were CHWs (45·4%), public facilities (30·2%) and private clinics (21·2%). Eighteen (1·6%) resorted to home treatment with medicines available at home or obtained from somewhere else. Among respondents who sought care from the first source of treatment, 21·4% did not recover and resorted to the second source of treatment. About 19% of the 242 patients who visited the second source of treatment switched to the third source of treatment.

The main reason for switching between different health care providers was given as the failure of recovery with treatments received from the previously visited care providers. Nevertheless, there were no significant differences between the percentages of those patients who switched to the second source of care after receiving the initial treatment from CHWs (21·6%), public (20·5%) or private (23%) health care providers. Except for the outcome of the illness after treatment, this study identified no other cultural or social factors that might influence the switching behaviour of perceived malaria patients.

Table 3. First, second and third treatment choices reported for people with malaria (febrile illness), Adami Tulu District, 2003

	1st choice	2nd choice	3rd choice
Public health facility	341 (30·15%)	89 (36·78%)	23 (50%)
Community health worker (CHW)	513 (45·36%)	48 (19·83%)	9 (19·57%)
Private clinic	240 (21·22%)	94 (38·84%)	14 (30·43%)
Treatment at home	18 (1·59%)	0 (0%)	0 (0%)
Drug shop or rural drug vendor	5 (0·44%)	4 (1·65%)	0 (0%)
Traditional and herbal remedies	3 (0·27%)	6 (2·48%)	0 (0%)
Other	11 (0·97%)	1 (0·41%)	0 (0%)
Total	1131 (100%)	242 (100%)	46 (100%)

Depending on the outcome of the response to malaria illness, patients or their caretakers changed their health care sources over a period of time based on a number of factors involved in the decision-making process. Based on the switching behaviour of malaria patients, a six-step conceptual framework for treatment-seeking of malaria in Adami Tulu District was identified (Fig. 1). Access, quality of care and perceived seriousness of the illness are the main factors that influence treatment-seeking behaviour.

Costs of malaria treatment

Respondents were asked whether treatment for the reported malaria episode incurred any costs, and if so, how much they paid. Among 1131 patients who sought treatment from the first source and for whom recovery was reported at the time of the interview, 95·2% incurred treatment costs. They reported spending an average of Birr 16·33 (US$1·89) on treatment (Table 4). This figure included the cost of medication/consultation only and did not include income lost due to the illness or the cost of transport to get treatment. Considering patients who incurred transport costs (n=209), the average cost of transport to get treatment was Birr 5·95 (US$0·69). As indicated in Table 4, the average cost of malaria treatment provided by private clinics (US$2·51) is significantly higher than that of public health care providers (US$1·37) ($p$<0·0001).

Community satisfaction with health care providers

Except for the complaint of high prices, community satisfaction with the service of the private sector seems to be higher than that of the public sector:

> The payment at the private providers is very high and expensive. However, they give you maximum care. They always have sustainable supply of drugs, and give you anything that you need. (Father)

Participants in the FGDs and in-depth interviews revealed a sobering situation that indicates a high level of distrust and dissatisfaction with public health facilities in the district:

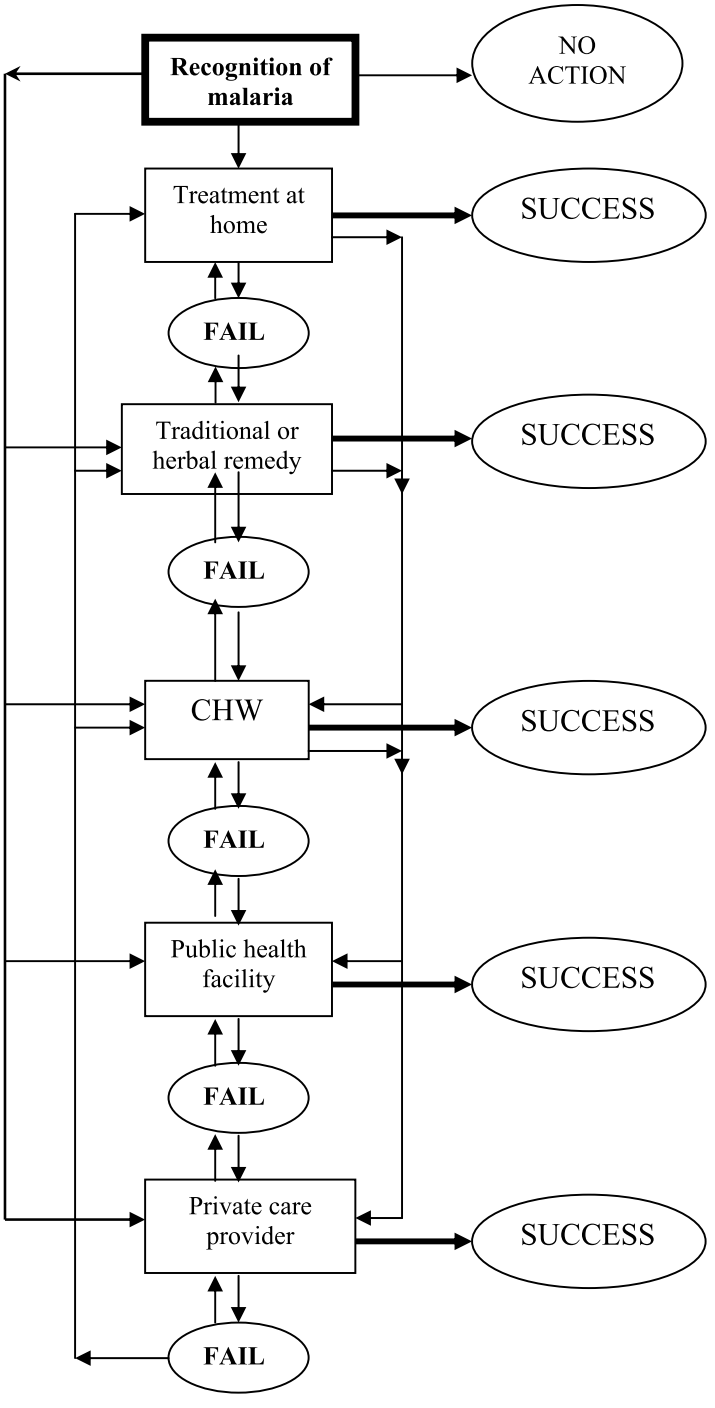

Fig. 1. Conceptual framework of treatment-seeking pattern for people with malaria (febrile illness), Adami Tulu District, 2003.

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Table 4. Results of comparative analysis on the treatment costs of malaria episode during first visit to public and private clinics, Adami Tulu District, 2003

Clinic type	Sample size	Average cost (SD) in Birr[a]	Median in Birr	US$ equivalent average (SD)	*p* value
Public facilities					
Health post	115	10·73 (14·30)	7·00	1·24 (1·65)	
Health station	155	13·00 (8·79)	13·00	1·50 (1·02)	
Health centre	22	9·60 (6·10)	8·50	1·11 (0·71)	
Sub-total	292	11·89 (11·20)	10·00	1·37 (1·29)	<0·0001[b]
Private clinic	237	21·80 (15·44)	18·00	2·51 (1·78)	
Both public and private	529	16·33 (14·00)	14·00	1·89 (1·62)	

[a]US$1 = 8·65 Birr in 2003.
[b]Statistically significant; $p<0·05$.

> If you go to Zeway Health Center [i.e. public], no one cares about you even if you are at the verge of death. The health workers are impolite and frequently mistreat patients. That is why we prefer visiting private care providers which we can't really afford. (Father)

> When we go to MCL [i.e. public] in Zeway Town, there are lots of patients queuing for services. As a result, they [MCL personnel] only collect blood samples from children. For others, they simply order tablets without laboratory diagnosis. Although they give service free of charge, even for majority of those patients they examined blood sample, they declare the results as negative. When the same patient goes to a private clinic, however, he/she is treated as a malaria case. Although you pay more at private clinics, you get proper treatment. (Father)

Perceived efficacy of antimalarial drugs

The inefficacy of the currently used antimalarial drug was also very well recognized and perceived as a major concern by most FGDs and in-depth interview participants:

> We have been using antimalarial drugs from the nearby Zeway Town, but the disease has now become resistant. The current drug [i.e. sulfadoxine pyrimethamine] can't cure the disease. (Father)

> Previously malaria was immediately cured when you take Fansidar. The current malaria is, however, different. Fansidar has become ineffective. Malaria repeatedly attacks people. I and my family took Fansidar many times, but the disease recurred within two weeks. (Father)

Discussion

This study reflects the importance of understanding the local perceptions and practices of the community towards malaria prevention and control interventions. The findings highlight discrepancies between perceptions of the community about malaria and malaria control activities and health interventions carried out by health workers. Malaria has been recognized as the most important health problem in the area, indicating the importance of directing malaria control efforts based on the

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community priority problems. It is worth noting that in this study population, the word *busa* is associated with the biomedical concept of malaria.

The study has also given insight into the treatment-seeking pattern for malaria and the factors influencing this pattern. Community dissatisfaction with public health care providers, the higher treatment costs at private clinics and the perceived inefficacy of antimalarial drugs in current use were identified as the major challenges facing malaria control in Adami Tulu District. Unless relevant and appropriate measures are taken, these factors could adversely affect the effectiveness of malaria control interventions.

Residents of Adami Tulu District described the seasonality of malaria, with the disease most commonly occurring between September and December. This period is also described as the major harvesting season, during which many of the labour force get sick from malaria illness. During the rainy season, people believed that malaria transmission is low because mosquitoes are not abundant. However, the reduction in the frequency and amount of rainfall at the end of the rainy season was taken to signify the start of the malaria season. This season could be targeted for malaria control interventions, such as the supply of adequate and effective antimalarial drugs to communities residing in malarious areas, promotion of the wide-scale use of ITNs and early diagnosis and prompt treatment with effective antimalarials through health education intervention.

The present study population is quite knowledgeable about malaria transmission and most of them recognize the role of mosquitoes in transmitting the disease. Malaria control interventions, including indoor residual spraying, treatment and health education, have been carried out in the district since the inception of the Ethiopian Malaria Eradication Programme in the late 1950s. Currently, health workers in the peripheral health care facilities and village-based CHWs are the main site of health promotion activities in the district. It is therefore not surprising that the population has a good knowledge of the causes and transmission of malaria. However, as with communities in other areas (Agyepong, 1992; Ruebush *et al*., 1992; Kengeya-Kayondo *et al*., 1994; Klein *et al*., 1995; Ahorlu, *et al*., 1997), there were misconceptions about the cause of the disease. Some respondents either saw no clear link between mosquitoes and malaria, or the role of the parasite in causing malaria. However, people had good information regarding the role of mosquitoes in the transmission of malaria, since they commonly referred to mosquito bites as a cause of malaria.

The correction of misconceptions about the role of mosquitoes in malaria transmission through intensive health education is very important for malaria control, particularly for the appropriate utilization of ITNs. If the community is convinced that mosquitoes transmit malaria parasites from an infected person to healthy individuals, they might appropriately use ITNs against mosquito biting. By building on personal experiences of malaria prevention, health workers could also scale up the distribution of ITNs, particularly during the high transmission season.

Only about 6% of the surveyed households owned one or more ITNs, a figure which is very low compared with other settings in sub-Saharan Africa (WHO & UNICEF, 2005). Lack of awareness and affordability issues were identified as major barriers for possession of nets. The current free distribution of ITNs to households

in malarious areas of the country by the Ministry of Health and donors (UNICEF and WHO) is very promising, if they are effectively and appropriately utilized by the local communities.

Insecticide-treated nets were introduced in Ethiopia for the first time in 1998 through the support of WHO (Jima *et al*., 2005). The National Strategic Plan targeted a total coverage of 60% of households with at least one mosquito net per household by the year 2005 (MOH national five-year strategic plan unpublished document, 2001). To date, a total of 3·4 million ITNs have been distributed to highly malaria-affected areas through a grant from the Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM) of the country (MOH national five-year strategic plan unpublished document, 2006). It was estimated that by the end of 2006, cumulatively, a total of about 7 million ITNs would be available in the country.

The findings of this study have major implications for malaria control through ITNs, necessitating a strong health education programme for promoting the implementation and utilization of this newly adopted malaria control strategy. Although the efforts of health workers appear to have a significant effect on convincing and changing the community's understanding and knowledge about malaria prevention through the use of ITNs, they could also make better use of health extension workers to disseminate information about malaria prevention and control.

The study respondents reported that only 16% of those people who contracted malaria were diagnosed through microscopic blood film examination. Laboratory-based diagnostic services for malaria were available at the district health centre and MCL. There were also private clinics that could give laboratory-based diagnostic services. The remaining health care providers, public or private, treat malaria patients based on the clinical signs and symptoms of the disease. This may have an effect on the treatment-seeking pattern of the community for malaria, since people want to confirm the cause of their illness through laboratory investigations.

The most widely used method of malaria control in the study area was treatment of malaria cases with antimalarial drugs. People sought malaria treatment from a wide range of sources, including public facilities, CHWs, private clinics, and drug shop/rural drug vendors. In Adami Tulu District, both diagnostic services and antimalarial medications were provided free of charge only at the MCL located in Zeway Town. However, this service was not accessible for all local residents as it was only available in the capital town of the district. Therefore, malaria patients resort to health services rendered by private or public providers in their vicinity.

The use of different sources of care for malaria treatment in the study area was in line with the findings of many other studies on treatment-seeking behaviour for malaria and associated factors (McCombie, 1996; Nyamongo, 2002; Williams & Jones, 2004). A recent review has identified considerable variation in treatment-seeking patterns, ranging from 10 to 99% who use official health care providers and 4 to 87% who resort to self-treatment (McCombie, 1996). Studies in Kenya have also noted that most malaria patients start with self-treatment at home and look for progression of the symptoms (Nyamongo, 2002; Guyatt & Snow, 2004).

A study conducted in the low malaria endemic area of the Philippines found a similar pattern where people's first resort was self-treatment with Western medicines (Espino & Manderson, 2000). In Tanzania, a variety of factors, such as the belief in

witchcraft and traditional healing, affect compliance with biomedical treatment or cause delays in seeking treatment from an appropriate care provider (Muela *et al.*, 1998). In the present study, self-treatment as a first resort for malaria treatment was very low. Other cultural beliefs and practices that can affect treatment-seeking patterns for malaria were also not a major concern for people in the study area.

In the study area, many malaria cases are due to infections with *P. falciparum* and *P. vivax*, and the current treatment modalities are artemether lumefantrine and chloroquine, respectively (MOH, 2004c). This indicates the importance of using microscopic diagnosis for effective treatment of malaria with an appropriate antimalarial drug. This present study was conducted at a time when the clinical efficacy of sulfadoxine pyrimethamine in Ethiopia was under question (Negash *et al.,* 2005). Artemisinin-based combination therapies (ACTs) (artemether lumefantrine) have been introduced with the support of the GFATM and UNICEF (MOH, 2004c; MOH rollout plan for artemether lumefantrin, unpublished document, 2005). Artemisinin-based combination therapies are only accessible to patients through basic health facilities. However, a considerable proportion of malaria patients in Ethiopia are treated by CHWs and private providers without laboratory diagnosis. Therefore, much effort is still needed to bring the drug down to the community at the grass-roots level.

One thing that comes out very clearly from the study findings is that the community prefers to seek medical care from private health care providers, despite the higher treatment costs, due to a higher perceived quality of care compared with the public sector. It was noted that there is a trend to seek good services despite the consequences of high treatment costs. In reality, it is unaffordable for the majority of the community, who live in abject poverty. The inefficiency of public health care providers in this study area is widely recognized. This is partly due to resource constraints in the public health sector. In addition, the low salaries and poor incentive structure in the public sector does not generally encourage health workers to deliver services efficiently; rather it negatively influences their behaviour (Lindelow & Serneels, 2006).

Lack of effective antimalarials was a major complaint. Studies have found that the most common reason for not using public health services was that they had a poor and ineffective drug supply (McCombie, 1996). Very little evidence is available on the quality of services and efficiency of private clinics in Ethiopia. Patients are generally more satisfied with drug availability and the interpersonal quality of care such as more attentive staff and short waiting time, but studies have revealed that the technical quality of many private clinics, particularly in rural areas, is perceived as inferior (Hanson *et al.*, 2004).

The MOH has to play a major role in the prevention and treatment of malaria through addressing not only public facilities but also the services provided within the private sector and community-based malaria control interventions. Public sector malaria treatment is frequently inaccessible to many patients in need, particularly those living in remote rural areas. Coverage of malaria control interventions to these groups should be expanded through the use of CHWs and health extension workers within the community. Although the quality of care provided by them may be perceived to be inferiour due to limited training, these strategies improve access for patients for early diagnosis and prompt treatment.

Even if efficient and high quality services are offered, the desired health outcome will not be achieved if the services are not timely and properly utilized by care seekers. Attempts should be made to influence the behaviour of the community through the provision of appropriate and relevant information on malaria prevention and control interventions, and providing safe and effective drugs and prevention tools such as ACTs and ITNs at subsidized cost or free of charge. Health education and promotion may take place both at the community and individual level, through channels such as mass media, schools, community meetings, vaccination campaigns and local health workers.

This study dealt with populations that are more or less socially and culturally homogeneous, where the findings can be generalized to such communities in other parts of Ethiopia. It should be stressed that the description of symptoms for *busa* as a proxy indicator for malaria was not tested against parasitological investigations, and hence the sensitivity and specificity of the local term *busa* relates to its approximation with clinical malaria, not to parasitaemia. However, the authors are of the conviction that these limitations would not have a negative effect on the conclusions of the study. The information from this study may be helpful when planning or evaluating malaria control activities, particularly at a time when ITNs and ACTs are becoming the front-line malaria control tools.

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