

Antimalarial drug utilization by women in Ethiopia: a knowledge–attitudes–practice study

H. Yeneneh,¹ T.W. Gyorkos,² L. Joseph,² J. Pickering,³ & S. Tedla⁴

A survey was undertaken between December 1991 and February 1992 to assess the knowledge, attitudes, and practices with respect to malaria of 300 women from six randomly selected rural communities in central Ethiopia. A total of 85% were able to recognize one or more of the common symptoms of the disease; however, the modes of transmission were generally misunderstood and only 23% believed that transmission could be prevented. More women preferred to obtain antimalarials from government clinics rather than from private drug shops, mission clinics, unofficial suppliers of injections, open markets, or from leftover sources. Under-5-year-olds were identified as the most malaria-vulnerable group and given priority for treatment; severity of illness was the principal determinant in seeking treatment. Decisions about treatment were generally made jointly by both parents.

Knowledge about the transmissibility of malaria decreased with increasing distance from a health unit (odds ratio: 0.48; 95% confidence interval: 0.27, 0.86). A logistic regression analysis indicated that literacy and village were the most important variables associated with knowledge about preventing malaria.

Introduction

Malaria is the most important cause of fever and morbidity in the tropics (1) and a significant source of mortality, especially among infants and young children. In sub-Saharan Africa alone, 400 million persons are at risk, and nearly all the 1 million deaths per annum from malaria in the world occur in this region (2).

Although significant resources have been, and are still, directed to the control of malaria in Ethiopia, it remains one of the top ten leading causes of both morbidity and mortality (unpublished reports, Ministry of Health, 1990). The major obstacles to its control are the resistance of the anopheline mosquito vectors and of the *Plasmodium falciparum* parasites (3). Preventing the foci of resistant *falciparum* malaria from widening requires the rational use of antimalarials (4) and the intensification of vector

control, such as source reduction through destruction of mosquito breeding sites, and avoidance of man–vector contact by using protective measures, e.g., bed nets and repellents (5). These measures call for combined individual and community participation (6). Community-based behavioural studies are one way of gaining a practical understanding of local approaches to dealing with malaria control and can be used in developing broader-based control strategies (7, 8).

The use and misuse of antimalarial drugs has been largely neglected. The few studies that have been undertaken indicate that such drugs can be obtained from a variety of sources such as government health institutions, mission clinics, local drug vendors, and open markets (9–11). Over-the-counter sales of antimalarial drugs and their use in subcurative doses, both of which foster the development of resistant strains, are widely practised (12) and are probable determinants in the occurrence of chloroquine-resistant *P. falciparum* in Ethiopia (13). An understanding of the prevention and treatment of malaria, and identification of personal modifiable risk behaviours are, therefore, important in planning approaches to preventing and controlling the disease.

Malaria affects mainly young children and pregnant women (1, 14, 15). Studies in several countries have shown that women with younger and more dependent children are more interested in health than women whose children are older and more independent (16). In Africa, as elsewhere, women have the responsibility for providing nursing and health care for their children (17).

¹ Fellow, McGill Ethiopia Community Health Project, Department of Epidemiology and Biostatistics, McGill University, Montreal, Quebec, Canada; and Department of Community Health and Institute of Pathobiology, Addis Ababa University, Addis Ababa, Ethiopia. Currently: General Manager, National Research Institute of Health, P.O. Box 1242, Addis Ababa, Ethiopia; requests for reprints should be sent to this address.

² Assistant Professor, Department of Epidemiology and Biostatistics, McGill University; and Division of Clinical Epidemiology, Montreal General Hospital, Montreal, Quebec, Canada.

³ Médecin Conseil, Département de Santé communautaire, Montreal General Hospital, Montreal, Quebec, Canada.

⁴ Director, Institute of Pathobiology, Addis Ababa University, Addis Ababa, Ethiopia.

Most rural Ethiopian children's main (and often only) contact with medical care is through their mothers. The adequate prevention and treatment of malaria among children therefore requires a firm understanding of the mother's knowledge, attitudes, and practices with regard to the disease. Mothers were targeted in the present study because they are more likely to seek and use antimalarial treatment and are the principal motivators and participants in household-based preventive actions.

Materials and methods

Women from a random sample of households were interviewed about their antimalarial drug use. Comparisons were also made across communities to evaluate variability in the determinants of antimalarial drug utilization. Before the study began, ethical approval was sought and obtained from the Ethical Committee of the Department of Epidemiology and Biostatistics, McGill University, and the interviews were based on the free and informed consent of the study participants.

Study area and population

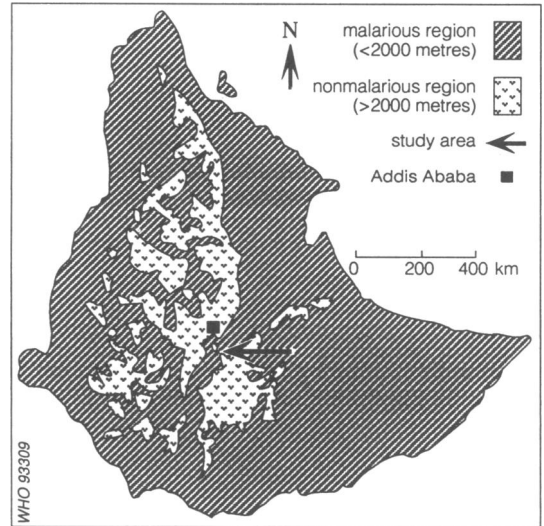
The study was carried out between November 1991 and February 1992 to cover both the peak malaria season and the period of low occurrence. Included were six rural communities (each ≥ 165 households and located within 200 km of Addis Ababa), three of which were chosen at random from 17 located within 10 km of a health station and three of which were chosen at random from six located more than 10 km from a health station (Fig. 1).

The houses in all the six communities were numbered and mapped and a census was taken. Households with children under 10 years of age provided the sampling frame for the random selection of 50 households from each community; the SAS random sampling procedure was used (18). One woman primary caregiver per household was invited to participate in the study. A questionnaire prepared in local languages was used after pretesting, and local female interviewers were trained to administer it. Most of the questions were precoded, but the open-ended questions were coded when the data had been collected. The purpose of the study and the confidentiality of the information collected were explained to the interviewees.

Data analysis

The independent variables of interest included the following demographic and social/interpersonal characteristics of each respondent: age, ethnic group,

Fig. 1. Map showing location of the six rural study communities in southern Shoa, Ethiopia. (adapted from: Zein, A.Z. & Kloos, H. Malaria. In: *The ecology of health and disease in Ethiopia*, 1st edit. Addis Ababa, EMPDA, 1988, pp. 136–150.)



religion, wealth, literacy, distance from a health unit, and the name of the village where they lived. A household's animal wealth was treated as a proxy for socioeconomic status and was defined as the cumulative sum of the estimated selling price at local markets of all animals owned by the household. The value for each animal was as follows (1 US\$ = 2.07 Ethiopian *birr*): a chicken, 10 *birr*; a goat or sheep, 70 *birr*; a donkey, 200 *birr*; a cow, 400 *birr*; and an ox, 500 *birr*. A composite score of wealth was also constructed to categorize the households into low (lowest 25%), middle (middle 50%) and high (top 25%) income groups.

The dependent variables included the following aspects about malaria: traditional and modern medical treatment; knowledge, attitudes, and practices related to its diagnosis; compliance with treatment; decision-making about obtaining treatment; knowledge about its transmissibility; and knowledge and practice about its prevention.

Bivariate and multivariate analyses of the data were carried out using EPI Info (19) and SAS (18) statistical packages.

Results

Descriptive results

The smallest study village was Tuchi Gebriel with 165 households, while Umer Wacho was the largest

with 385. Beche Gelcheno, Umer Wacho, and Korki Adi lie within 10 km of a health care centre, whereas Cheleleki/Germeji, Tuchi Gebriel, and Weyo Gebriel are more than 10 km from such a centre (Table 1).

All 300 women from the randomly selected households agreed to be interviewed. Most of the interviewees were aged 30–44 years (range, 17–60 years; mean, 33 ± 8.5 years). Most (90.3%) were married, 24 (8%) were widowed, and more than 93% were homemakers. Almost all of the spouses were farmers (98%). Only 50 of the women (16.7%) could read or write. A total of 238 (79.3%) were Christians and 62 (20.7%) were Muslims. Among those interviewed, Oromos were the predominant ethnic group (147 women; 49%), followed by Gurages (80; 26.7%); the rest were Kembata/Hadya, Amhara, Laki, Welayta, and Mareko. The proportion of literate mothers was highest among those from Umer Wacho (36%) and lowest in Korki Adi (4%).

Categorization of the households into income groups according to their animal wealth indicated that 23% of the interviewees were in the low income group; the wealth score ranged from zero (in 34 households who had no animals at all) to 37. The middle-income group (wealth score range: 40–242) constituted 52%, and the highest income group had scores in the range 248–4129. There were seven households whose wealth score was >1000.

A total of 156 households (52%) had 1–2 children, while 144 (48%) had ≥3, the maximum being 6 in a few households. The mean number of children per family was 2.43.

Shivering was the most frequently reported malaria symptom (254 cases (84.7%)), followed by headache (62.7%), fever (49.7%), thirst (47.0%), chills (45.0%), general aches (36.7%), vomiting (17.0%), diarrhoea (7.0%), and abdominal pain (2.7%). About 8.3% of the women mentioned other symptoms such as dizziness, jaundice, sweating, and miscellaneous complaints.

Table 1: Details of the rural communities studied for antimalarial drug utilization in central Ethiopia, December 1991 to February 1992

Name of village	No. of households	No. of interviewees	Distance from health unit (km)	Predominant ethnic group
Umer Wacho	385	50 (13.0) ^a	3	Gurage
Korki Adi	362	50 (13.8)	4	Oromo
Weyo Gebriel	283	50 (17.7)	15	Oromo
Beche Gelcheno	250	50 (20.0)	3	Gurage
Cheleleki/Germeji	179	50 (27.9)	11	Oromo
Tuchi Gebriel	165	50 (30.0)	13	Oromo

^a Figures in parentheses are percentages.

Malaria is known as *weba* in Amharic, and the Oromo call it *busa*. These terms are commonly used by adults and children and there were therefore no errors in comprehension among the women interviewed. The causes of malaria as understood by the women included cold cloudy weather and rains (103 (34.3%)), eating maize stalk (65 (21.7%)), mosquito bites (52 (17.3%)), and dirt and flies (29 (9.7%)). A total of 26 women (8.7%) had no idea about what caused malaria, while 4–25 women (1.3–8.3%) said that it was caused by a bad smell or wind, milk, solar heat, debility, bodily contact with a malaria patient, fatigue, cabbage, home-made beer, poor food, and young grass.

Most of the women (255 (85%)) believed that untreated malaria was fatal; and only 14% mentioned a specific clinical outcome such as debility, chronicity, abdominal distention, improvement, body swelling and skin abnormalities. Three of the women (1%) said they did not know the outcome.

On being questioned whether they knew of any child or other relation who had died of malaria, only 16 (5.7%) said yes, 15 had lost one of their children, and one had lost a distant relative.

Almost all of the women (297 (99%)) stated that they knew malaria could be treated. Of these, 283 (95.3%) said the treatment involved use of modern medicine (i.e., tablets, injections, or syrups), 4 (1.3%) said traditional medicine, and 10 (3.3%) replied both traditional and modern. Those who mentioned traditional medicine said it included use of herbs, leaves, roots, cauterization, holy water and prayers.

Although none of the interviewees mentioned the names of specific antimalarials, they were able to give a general description of them. Of the 293 women who answered modern treatment, 287 (98%) mentioned tablets as the specific form of antimalarial treatment they knew; 84 (28.7%) said injections; and 5 (1.7%) said syrup. The likelihood that the treatment the women described really was for malaria was investigated further. Of the 287 women who reported knowing that antimalarials could be in tablet form, only for 229 (79.8%) was this confirmed to be probably or very probably correct. The descriptions given of injection and syrup forms were, in all but two instances, incompatible with antimalarial drug preparations.

When asked whether malaria is transmitted from one person to another, 221 (73.7%) of the women said yes, 75 (25%) said no, and 4 (1.3%) had no idea. The women gave the following replies when asked how malaria is transmitted: the majority (142 (64.3%)) said through bodily contact with a patient; 101 (45.7%) via the respiratory route; 48 (21.7%) from utensils; 11 (5%) by flies, breast milk, or the

mere sight of a patient; and only 10 (4.5%) through mosquito bites. Asked if their children (<10 years of age) had ever had malaria, 153 (51%) of the women said yes. The time elapsed since the last episode of malaria in these children was as follows: 30.7% of cases occurred >6 months before the interview; 46.4% from 2 weeks to 6 months previously; and the remaining 22.9% within the preceding 2 weeks.

When the women were asked where they had taken their children for treatment for the most recent attack of malaria, 69 (45.1%) said to a drug shop, 52 (34%) to a government clinic, 19 (12.4%) to individuals who gave injections unofficially, 10 (6.5%) to a mission clinic, and one (0.7%) each to a traditional practitioner and the open market. One reported that leftover drugs had been used. None reported going to more than one place for treatment.

The responses to questions on whether the women had obtained antimalarials from different sources at any one time in the past and on their preferred source of antimalarials are shown in Table 2. The reasons for preferring a particular source included the following: effectiveness of treatment (250 women (83.3%)); low cost of drugs (126 (42%)); short waiting time (85 (28.3%)); and closeness to home, (59 (19.7%)). When the women were asked what source(s) of treatment they used most often (actual practice), 127 (42.3%) indicated they went to drug shops, 113 (37.7%) to government clinics, 34 (11.3%) to unofficial suppliers of injections, 18 (6%) to mission clinics, 2 to open markets, 3 to traditional healers, and 3 to other sources.

Of the 300 women interviewed, 281 (93.7%) said they had completed the treatment as prescribed, 14 (4.7%) said they had not, and 5 were not sure. The following reasons were given for not completing treatment: the drug had a bad taste (1 woman); the

drug was strong and dangerous (3 women); the condition improved (8 women); and others (2 women). When asked what they would do with any leftover drugs, eight women replied that they would use them later, eight that they would share them with another child, and five that they would throw them away. There were multiple responses (i.e., one respondent mentioned more than one way of dealing with leftover medicine).

The following were the reasons that prompted a mother to obtain treatment for her child: the child had high fever (98.3%), was shivering (98.0%), was unable to feed (97.0%), or was vomiting (93.0%). Diarrhoea and the child's young age influenced 62.0% and 53.7% of the women, respectively.

In 152 (50.7%) cases, the mothers themselves took their ill children for treatment, compared with the fathers in 132 (44%) cases. The rest stated that an elder brother or other relative accompanied the child.

Of the 300 women interviewed, 24 (8%) said they received treatment free, 35 (11.7%) paid 1–3 *birr*, 80 (26.7%) 4–5 *birr*, 94 (31.3%) 6–9 *birr*, 48 (16%) 10–14 *birr*, and 19 (6.3%) paid 15–20 *birr*; the average cost was 5 *birr*. These costs were for investigation and treatment only. A total of 172 (57.3%) women had no transportation expenses, while 48 (16%) spent 2–3 *birr*, and 80 (26.7%) 4–5 *birr*. Other costs were negligible.

When asked who they thought suffered most from malaria (Table 3), 43.3% of the women identified under-5-year-olds; 24.7% said pregnant women; and 8% of the respondents said adult males. The priority for treatment followed the opinion on the severity of malaria, i.e., more women (43.3%) thought children under 5 years of age should be given priority than any other group.

Table 2: Previous and preferred sources used by the women to obtain antimalarials

Source of antimalarials	No. of responses	Preferred sources:
		No. of responses
Drug shops	170 (56.7) ^a	102 (34.0)
Government clinics	139 (46.3)	145 (48.3)
Unofficial suppliers of injections	83 (27.7)	27 (9.0)
Mission clinics	25 (8.3)	20 (6.7)
Open market	13 (4.3)	2 (0.7)
Leftover drugs (home)	8 (2.7)	0
Leftover drugs (friends)	7 (2.3)	0
Traditional medicine	7 (2.3)	3 (1.0)
Others	17 (5.6)	1 (0.3)

^a Figures in parentheses are percentages.

Table 3: Opinions of the women on who suffers most from malaria and who should receive priority for treatment

Category of persons	No. of responses:	
	Suffers most	Treatment priority
Children aged <5 years	130 (43.3) ^a	130 (43.3)
Pregnant women	74 (24.7)	86 (28.7)
Men	24 (8.0)	22 (7.3)
Breast-feeding women	14 (4.7)	3 (1.0)
Children aged >5 years	11 (3.7)	12 (4.0)
Any person already ill from another cause	5 (1.7)	1 (0.3)
Other ^b	42 (14.0)	42 (14.0)

^a Figures in parentheses are percentages.

^b Includes old women, old men, anyone who contracts malaria, and those who were undecided.

A total of 232 women (77.3%) said it was not possible to avoid catching malaria; only 31 (10.3%) thought it could be avoided; and 37 (12.3%) had no idea. As methods of preventing malaria, 14 women mentioned chemoprophylaxis, 10 said insecticides, while 7 suggested cleanliness and good nutrition. Only 17 of the women had ever practised any form of personal prevention; of these, 7 had used insecticides, 6 chemoprophylaxis, and 4 mentioned other methods such as cleanliness and good nutrition.

As far as making a decision about whether a child with malaria needed treatment or not, 118 (39.3%) women said that both parents decided jointly, 99 (33%) that the father decided alone, 80 (26.7%) that the mother determined alone, while 3 grandmothers said that the decision was taken by elder brothers of the children.

A total of 50 women (16.7%) said they would take their children for treatment immediately (the same day of onset of illness), 249 (83%) that they would wait and see for a few days, while one woman said her action would depend on the availability of money; none said they would ignore the illness. When asked about how long they would treat a child with malaria, 276 (92%) women said until the drug prescribed was finished according to instructions; only 24 (8%) said they would stop when the symptoms subsided; none said they would change the treatment if there was no immediate improvement.

A total of 53% of the women said that the severity of the illness was either important or very important in terms of influencing their decision to have a child treated; this was followed by cost of treatment (48%), distance (29%), and transportation (22%), while the least influential was the presence or absence of other persons in the home to take over household duties (17.6%).

When asked to assess malaria with regard to its impact on the capacity of a household to produce crops and earn their living, the women responded as follows: 186 (62%) said that it had no impact; 40 (13.3%) that it had negligible impact; 11 (3.7%) said some impact; and 63 (21%) reported that it had a serious impact.

Bivariate analysis

The data were analysed to determine whether there were any relationships between demographic and economic factors and various aspects of the women's knowledge, attitude and practice about the transmission, prevention, symptoms, and treatment of malaria.

There was no association between the number of children in the household and knowledge about whether or not malaria is a transmissible disease.

Distance from a health unit was, however, negatively associated ($P < 0.02$), i.e., as this distance increased, more people tended to believe that malaria was a nontransmissible disease. There was no significant association between ethnicity and knowledge that malaria is transmissible and this was true also for age, religion, and literacy. A larger proportion of women from Umer Wacho knew that malaria is a transmissible disease; it should be noted, however, that of the 74% of women who said that malaria can be transmitted, only 4.5% gave biologically plausible explanations.

As far as the women's knowledge about the preventability of malaria was concerned, there was no significant difference in terms of ethnicity, number of children, wealth, or distance from a health unit. However, there was a statistically significant difference between the literate and illiterate ($P < 0.01$); more of the literate women tended to believe that malaria could be prevented. This was true also for younger women ($P < 0.02$), and more Muslims believed malaria was preventable than Christians ($P < 0.02$).

When villages were compared with respect to their inhabitants' knowledge about the preventability of malaria, Korki Adi and Beche Gelcheno had the highest rates (22.0% and 14%, resp.). The difference in the level of knowledge between these two villages and the levels in the remaining four villages was statistically significant (χ^2 test = 13.9; $P = 0.0156$).

There was no difference between the answers from women who had ≤ 2 children and those with more. A similar proportion of mothers or fathers decided on whether a child should receive treatment for malaria or not. Ethnicity made a statistically significant difference — more Oromo mothers made the decision compared with the Gurage, who seemed to be dominated by the fathers; the mother's age did not influence the decision-making.

Distance from a health centre was negatively associated with who took the ill child for treatment ($P < 0.001$), i.e., more mothers tended to accompany their children to a distant health unit. Neither the mother's age nor the number of children in the household determined whether the mother or some other person took an ill child for treatment.

Compliance with the treatment prescribed was investigated by analysing, in terms of sociodemographic factors, the period over which children were made to take their medicine. Ethnicity and duration of treatment were significantly associated ($P < 0.02$); the Gurage tended to stop giving the prescribed drug when the symptoms subsided. The age of the woman, distance from a health unit, literacy, and animal ownership were not significantly associated with the duration of treatment. There was a statistically

significant difference between those who had ≤ 2 children and those with more ($P < 0.02$), the latter being more prone to stop the treatment when symptoms subsided. Also more mothers from Korki Adi tended to stop treatment when the symptoms subsided (χ^2 test = 19.16, $P = 0.0018$); however, $< 5\%$ said they would not complete the course of treatment.

The relationship between wealth, as represented by the type and number of animals owned, and the source where antimalarial treatment was sought was also examined. The sources were categorized into cheap and expensive, based on personal observation and discussion with community members. Traditional medicine (which is often administered by household members, relatives or neighbours using locally available items such as herbs, roots, leaves, etc.), government clinics, and mission clinics were classified as cheap, while drug shops, street markets and illegal suppliers of injections were expensive. The results are shown in Table 4.

Multivariate analysis

Distance from a health centre, village of residence, and ethnicity were so highly correlated that information about these variables made distance completely redundant; it therefore could not be included in the multivariate analysis.

Village of residence and literacy were significant determinants of whether or not a woman knew if malaria could be prevented. Table 5 shows the initial full model with all the independent variables. The difference in the log-likelihoods of the two models (the full and the final model with only literacy and village as the independent variables: 192.075–171.814) was given by $\chi^2 = 20.26$ (5 degrees of freedom, $P = 0.0011$).

Therefore, the final model appears to be a significantly better predictor of the outcome, i.e. knowing whether malaria is preventable or not, and the two most important determinants were village of residence and literacy.

Table 4: Relationship between wealth and the source of treatment for malaria

Income group	No. who used source of treatment: ^a	
	Cheap	Expensive
Low	30	39
Middle	78	78
High	29	46

^a See text for explanation of the categories "cheap" and "expensive"; χ^2 test = 2.79, P -value = 0.247.

Table 5: Estimated coefficients, estimated standard errors, odds ratios, and 95% confidence intervals for the full multivariate analysis model

	Coefficient	Standard error	Odds ratio
Intercept	-0.9179	1.4345	—
Age	0.0286	0.0272	1.03 (0.97, 1.09) ^a
Literacy	1.6648	0.5384	5.28 (1.80, 15.51)
Ethnic 1	0.0363	0.7015	1.04 (0.25, 4.22)
Ethnic 2	-0.03661	0.7094	0.69 (0.17, 2.87)
Village 1	-1.6863	0.7608	0.19 (0.04, 0.85)
Village 2	-0.5147	0.8622	0.60 (0.11, 3.35)
Village 3	-1.0084	0.9017	0.36 (0.06, 2.21)
Village 4	1.0709	1.2165	2.92 (0.26, 33.24)
Village 5	1.0129	1.0672	2.75 (0.33, 23.27)
Village 6	0 ^b	—	1.00 —
Wealth	-0.0406	0.1519	0.96 (0.71, 1.30)

^a Figures in parentheses are the 95% confidence intervals.

^b Village 6 was taken as reference (in forming the dummy variable); -2 log likelihood = 151.947.

Discussion

A total of 84.7% of the women recognized at least one classic symptom of malaria, a considerably higher proportion than the 30% found for a similar population group in Kenya (20). This difference may have arisen because the Kenyan study was carried out in an area where malaria is holoendemic. Such communities may regard the disease as part of their normal life, and thus not consider it to be a health problem (21). The communities in our study were located in an area of unstable or seasonal malaria (mesoendemic) where its manifestations are not perceived as being part of their normal life. However, another Kenyan study in a similarly holoendemic area found that $> 90\%$ of the women associated malaria with specific symptoms (22). This rate may have been inflated owing to the small sample size (36 women) and also because the respondents answered "yes" or "no", in contrast to the open-ended questions used in our study. Moreover, the Kenyan study was conducted in an area where a community-based health development project had been in operation for several years (23), and the study population had therefore had a greater opportunity to learn about malaria.

The women in our study appeared to understand very little about the causes of malaria: only 17.3% implicated mosquito bites as a possible cause. Although this is lower than the level in the first Kenyan study discussed above (36.4%) (20), in both areas the level of understanding about the cause of the disease was low. The slightly higher understand-

ing in Kenya could have been due to a better educational level: 33% of the study population had completed at least primary school, whereas only 16.7% of the women in our study were literate. Interestingly in our study 34.3% of interviewees said that malaria was caused by cold/clouds/rains and 21.7% by eating maize stalks. Although these might seem inappropriate associations, the peak malaria transmission season in Ethiopia coincides with the appearance of young maize stalks just after the rainy season.

In our study, 85% of the interviewees thought that a probable outcome of untreated malaria was death, while 11.7% thought debility resulted. This contrasts with the first Kenyan study, where 35% thought that malaria did not cause any disability (20). The high proportion in our study of individuals who held that malaria was fatal could have arisen because the previous malaria epidemic (in 1988–89) caused many deaths; this coincided also with a meningitis epidemic and many of the deaths resulted from temporary misdiagnosis. The women in our study therefore had a very recent bitter memory; this was further reinforced by another milder malaria epidemic that occurred a few months before the start of interviewing. Also, when malaria is holoendemic, it is often less severe.

As was true in Kenya (20), we also found that 99% of the women knew that malaria was treatable and over 95% mentioned modern treatment; it should be noted, however, that none of the women specifically mentioned chloroquine — the most widely administered antimalarial in the study area. This is mainly because the study populations were rural and largely illiterate and had little or no inclination to know the specific names of drugs. Nevertheless, 98% of those who mentioned modern treatment stated that it consisted of tablets, whereas in Kenya the corresponding proportion was 30.5% (20). Moreover, in our study the description of the antimalarials given indicated chloroquine; injections were thought of as a form of treatment for malaria by 28% of the women, a higher proportion than in the Kenyan study (20). This preference of our population for injections is exploited by those in the private sector involved in selling drugs, who tend to administer injections for every ailment in order to attract clients. Syrups seemed to be far less familiar to our interviewees, probably because this form of antimalarial treatment is not widely employed in the area.

A total of 57% of the women said that in the past they had obtained antimalarials from drug shops, and 46.3% from government clinics. However, if they were given the choice, 48.3% said they would favour government clinics and 34% drug shops. Perhaps the study population was aware of the frequent unavailability of drugs in government health

institutions, which in consequence often refer them to drug shops for treatment. Also, because of cultural barriers, the rural population felt they might not receive sufficient respect at government institutions. (D.G. Carlson, unpublished data, 1991). The principal reason given by the women for their preference was, however, effectiveness of the treatment (83.3% of replies), while cost, waiting time, and distance to the health centre were stated to be of less importance. This has also been observed in other studies (24). The receipt of injections from unofficial dispensers (individuals who visit households selling drugs, including injections), which was reported by about 28% of the interviewed women, needs due consideration. These individuals are mostly untrained and unlicensed practitioners who give adulterated, underdosed treatment, which is often broad spectrum and focuses mainly on symptomatic relief. Because injections are popular, they are used to attract customers. Although occasionally some of these injections may contain chloroquine, the proper dose is probably not given, and there is no appropriate follow-up. The hazard of selective pressure for resistant falciparum malaria because of the use of the incomplete doses, the chronicity of undertreated malaria, and the risk of human immunodeficiency virus (HIV) infection are prominent. The community health agents who are trained to serve the rural population were not observed carrying out their proper role. Although this could be attributed to the social unrest at the time of our study, some of the health agents had joined the pool of illegal dispensers. The open market and leftover drugs were also used, but to a minor extent, although this is probably because of underreporting.

Almost 94% of the women said that they would complete the prescribed regimen of treatment; however, this could not be substantiated because the study was based on interview and no checks were made for compliance. The following reasons were given for not completing treatment by those who said they were noncompliant: the bad taste of the drug; the drug was too strong; and improvement of the illness, thus obviating the need for continuing treatment. It should be noted that pruritus was not mentioned as a problem by our study group, in contrast to a study in the United Republic of Tanzania, where it accounted for 94% of treatment noncompliance (25). Chloroquine-induced pruritus may not be common in Ethiopia perhaps because of genetic differences, but this needs to be investigated further. The reported high compliance in our study could also be because of the recent memory of the fatal nature of malaria: subsequently, the leftover drugs were mostly shared. It should be noted also that most mothers (84%) would wait for a few days before

seeking treatment for malaria, suggesting that they may have used traditional methods in the meantime.

Under-5-year-olds were identified by 43.3% of the women as the group that would suffer most from malaria; this proportion is similar to that found in Kenya (43.9%) (20). Pregnant women were the second most important group identified, which is justifiable on an immunological basis (15). The women interviewed believed that priority for treatment should be given to these same groups. It is worth noting that 8% said adult males suffer from malaria most, and 7% would give treatment priority to men. Although the idea that men suffered the most cannot be substantiated scientifically, giving them priority for treatment is probably related to their responsibility as breadwinners; if a man is sick, his whole family could starve.

Although about 74% of our study population said that malaria is a transmissible disease, only 4.5% said it was transmitted by mosquitos. Over 77% thought that malaria could not be prevented; this probably arises because of incorrect ideas about its transmission. Our finding contrasts with that of the Kenyan study (20), which reported that 72.2% of the study population thought malaria was preventable; this may have been due to greater malaria control activity in this study area and/or a more educated population (20, 22). In our study, the few women who said malaria could be prevented mentioned chemoprophylaxis and insecticides as the methods used. There was negligible use of personal preventive methods. None of the women considered screens and bed nets, which are being used as methods of malaria control in other African countries (26); these options were novel to them and also may not be economically feasible in our study area.

More than 90% of the women recognized high fever, shivering, poor appetite, and vomiting as the most significant signs and symptoms for seeking treatment, indicating that malaria is quite well understood as a disease and its severity is appreciated by the community. Severity of the illness was the main reason (53%) for having a child treated, which is in accord with the results of other workers on perceived severity and compliance (27). The cost of treatment was another important factor. The availability of someone to take care of other household duties was the least important factor, indicating that priority would be given to the sick irrespective of other responsibilities; however, this may also have been due to the presence of the extended family or close community system, which obviates the problem of performing other household duties.

Both parents were more frequently involved in deciding about treatment rather than unilateral decisions made by one of the parents. This appears to be

contrary to popular belief and previous observations that it is the mother who is responsible for the health of her children (16, 17). This could be due to desirability bias (i.e., interviewees might have given responses that they may not actually have meant, but which they thought were the ones expected by the investigators).

The cost of a single treatment for malaria was very high (average, 5 *birr*). Antimalarials can be obtained free from the national malaria control programme, and for less than 1 *birr* from government clinics; however, the latter were either too far from patients' homes or did not have the drug when it was needed. Other workers have reported that most government clinics often do not have drugs for a considerable proportion of the year (D.G. Carlson, unpublished data, 1991); moreover, private drug vendors sell about 80% of their drugs without the need for a prescription (28), which is attractive to their clients. The private sector, in the absence of alternatives, can therefore exploit the client population and charge up to 20 *birr* per treatment for malaria, in addition to considerable transport costs.

The majority of individuals in the study area did not consider that the impact of malaria was serious, perhaps because of the national malaria control programme, which carries out surveillance activities and conducts mass treatment and spraying if the prevalence of malaria exceeds 5%.

Young age and literacy among the women were positively associated with knowledge about the preventability of malaria, which could indicate that younger mothers may have received health information at school. In a study in West Africa, older age and the presence of more children in the family were positively associated with knowledge about preventing malaria, which was attributed to greater contact with health institutions (29). This sharply contrasts with our findings.

In our study, those women with more than two children were more likely to stop treatment when the symptoms subsided, perhaps because they wanted to use the remaining drugs for their other children.

The differences between various villages with respect to knowledge about malaria should be further investigated. A multivariate analysis indicated that residing in a particular village and literacy were the two most important factors that affected a woman's knowledge about whether or not malaria is preventable. Presumably this arose because of other factors, such as the occurrence of a malaria epidemic in one village and not in another, which brought the residents into closer contact with malaria control workers, or having more children going to school in such a village, thus exposing the mothers to more ideas about health through their children. Distance from a

health unit might also be a factor, since it was highly correlated with the villages.

Recommendations

Most mothers waited for a few days before taking an ill child to a health unit, perhaps because drugs were not available in their village. An attempt should be made to make antimalarials more available to households in endemic rural regions; this could be achieved by using community health services, which unfortunately were not functional at the time of our study. Employing trained traditional birth attendants in community-based treatment activities could be a viable solution, since they are less likely to leave their villages or engage in illegal treatment business; they are also more likely to understand the problems of women and children and have a better rapport with mothers.

The Ministry of Health and the National Organization for Control of Malaria and other Vector-borne Diseases should develop and promote targeted health education material for malaria-endemic rural populations. Knowledge about malaria is poor in the study area despite activities to control the disease there for at least 20 years. This could indicate lack of appropriate communication between the care providers and the community; information about the transmission and prevention of malaria has to be provided in ways that are sensitive to the target population, without the use of scientific terms. Community health assistants and trained traditional birth attendants should be incorporated into the strategy; this should be seen as a first step towards full community participation in malaria control activities. Promotion of literacy is a vital component of community-based approaches in the fight against all communicable diseases.

Further studies should be carried out on: objective assessment of treatment compliance by following up cases; comparative studies of urban and rural communities to permit targeting of appropriate control measures; the quality of malaria care provided by health services; antimalarial drug procurement, distribution and administration; development of culturally appropriate personal preventive measures against vectors; and community participation in preventing and treating malaria.

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Résumé

Utilisation des antipaludiques par les femmes en Ethiopie: résultat d'une étude sur les connaissances/attitudes/pratiques

L'article décrit une enquête sur l'utilisation des antipaludiques réalisée auprès de 300 femmes des zones rurales du centre de l'Ethiopie. Les résultats indiquent une bonne connaissance des symptômes du paludisme et de son traitement. En revanche, la transmission de la maladie et sa prévention sont très mal connues.

Les principaux lieux d'achat des médicaments sont l'échoppe du pharmacien, puis le dispensaire public. Les médicaments proviennent également de fournisseurs non officiels de médicaments injectables, de dispensaires tenus par des religieux, ou du marché; il peut aussi s'agir de restes de médicaments trouvés à la maison ou chez des amis. Le coût d'un traitement antipaludique complet dans les échoppes et chez les fournisseurs non officiels est élevé (jusqu'à cinq fois le coût du même traitement dans les dispensaires publics), mais accepté du fait de l'accès plus facile — ou jugé tel — à ces fournisseurs et aussi du fait qu'ils disposent plus souvent des médicaments voulus. Ce coût élevé peut conduire ceux qui n'ont pas les moyens de se procurer un traitement complet du paludisme à ne prendre que des doses insuffisantes.

Les deux principaux facteurs associés aux connaissances des femmes sur la prévention du paludisme sont le degré d'alphabétisation et le village de résidence. Ces résultats vont dans le sens des mesures tendant à améliorer le taux d'alphabétisation dans les communautés rurales et à favoriser l'accès des populations rurales à des sources officielles d'antipaludiques.

La possibilité d'une participation communautaire à la lutte antipaludique semble actuellement limitée en raison du faible niveau d'information de la population sur la maladie. Il serait toutefois possible d'obtenir des résultats considérables en améliorant cette information par le biais de l'alphabétisation et de l'accès facilité aux établissements de soins.

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