

Home treatment of febrile children with antimalarial drugs in Togo

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In Togo, the principal strategy for preventing death from malaria in children is prompt treatment of fever with antimalarial drugs. A household survey was conducted in a rural area of south-central Togo in which information was collected from mothers on the treatment received by 507 children under 5 years of age who, according to their mothers, had recently had fever. Altogether, 20% of the children (95% confidence interval (CI): 15–25%) were seen at a health centre during their illness, while 83% (95% CI: 76–90%) were treated at home with an antimalarial drug. Of the children in the latter group, 97% received the drug on the first day of fever. In contrast, only 17% of children who attended a health centre were seen on the first day of their fever. Chloroquine, usually obtained from a street or market vendor, was used for 94% of the treatments given at home. Based on children's weights and treatment histories provided by their mothers, the median total dosage of chloroquine given at home was 12.8 mg per kg body weight — more than that recommended and known to be fully effective in Togo at the time of the survey (10 mg per kg) and less than the total dosage recommended at present (25 mg per kg). The dosage administered was considered to be inadequate for 70% of home treatments, because less than 10 mg per kg was given during the first 24 hours of treatment. In the study area, parents were the main providers of antimalarial drug treatment to children with fever and need guidance on the correct dosage of chloroquine.

In Togo, the principal strategy for preventing the deaths of children from malaria is prompt and effective treatment with antimalarial drugs.^a Antimalarial drug treatment is recommended for all children who have fever when malaria cannot be excluded promptly by microscopic examination.^a To gather information for planning the implementation of this strategy, we conducted a household survey in a rural area of south-central Togo to determine the frequency and sources of antimalarial drug treatment of children with suspected fever and the adequacy of treatment administered at home.

Materials and methods

A household survey on infant and child mortality and the use of health services was conducted in the Plateaux Region of Togo in August 1984.^b Thirty primary sampling units or clusters (villages or neighbourhoods) were chosen with probability proportional to the estimated population. Within each cluster, a starting household was selected by randomly choosing a direction at the centre of the village or neighbourhood, numbering the households lying in this direction to the edge of the settlement, and randomly choosing one of the numbered households for the first interview. Interviewers followed a next-nearest-household path until information on all live births since 15 August 1978 was obtained at 100 households within each cluster. In the follow-up survey reported here, the interviewers revisited mothers of children aged less than 5 years who had reported that their children had had fever or malaria in the preceding 2 weeks and asked in detail about the treatment received during this illness. The interviewers in the follow-up survey

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^a National Malaria Service (Togo) and the Malaria Branch, Centers for Disease Control. *Guidelines and recommendations for further development of the national antimalarial strategy in Togo*. Lomé, Togo, 1984.

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^b Ministry of Public Health, Togo, & International Health Program Office, Centers for Disease Control. *Une enquête sur la mortalité infantile (0–11 mois) et la mortalité juvénile (1–4 ans), les taux d'incidence des maladies diarrhéiques et des accès fébriles, leurs traitements et certains caractéristiques maternelles, Région Des Plateaux, République Togolaise*. Report prepared for the Ministry of Public Health, Lomé, Togo, 1985.

were Togolese women who had completed secondary school and who demonstrated proficiency at interviewing in role-playing exercises. Because of logistic constraints, the follow-up survey was limited to the 18 clusters located in Haho, Kloto and Wawa Prefectures. The estimated population of these prefectures in 1984 was 446 173.^c

"Home treatment" was defined as any treatment with an antimalarial drug that was not given during or after a visit to a health centre. ("Health centre" is taken here to include not only health centres but also dispensaries, maternity clinics, private doctor's offices, and hospitals). An antimalarial drug was considered to have been administered at home if mothers used the name of a specific antimalarial drug when referring to it or if they identified it on a tray that contained samples and the packaging of such drugs available in Togo as well as several commonly sold antipyretics and antibiotics. Children who had been treated with an antimalarial drug at home were weighed, and their mothers were asked to specify the amount given for the first dose, the total number of doses given, the number of doses given per day, and any changes in the amount of drug given per dose. The amount of drug received during the first 24 hours' treatment was estimated by multiplying the amount given for the first dose by the number of doses received per day, making adjustments for any reported changes during the first day. Standard errors of point estimates were calculated using the SESUDAAN program (1).

Results

Follow-up interviews were completed on 586 of the 870 children in Haho, Kloto and Wawa Prefectures who were less than 5 years of age and who were reported to have had fever or malaria in the original survey. When contacted for reinterview, the mothers of 80 of the children stated that their children had not had fever or malaria. For children with a consistent history of fever or malaria, the reinterview completion rate was therefore 74% (586/790). The main reason for the non-completion of interviews (not recorded systematically) was the absence of mothers at the time of the interviewer's visit.

"Fever" and "malaria" were closely associated in the descriptions mothers gave of their children's illnesses. Both malaria and fever were reported for 85% (495/583; 3 answers missing) of children, fever without malaria for 12% (71/583), and malaria without fever for 3% (17/583).

The analysis of fever treatment practices was limited to the 507 children whose suspected fever had cleared at the time of the follow-up interview. The median recall period from the onset of the fever to the follow-up interview was 3 weeks (mean, 2.7 weeks;

range 0–8 weeks), while the median reported duration of fever was 3 days (mean, 3.6 days; range 0–15 days). Altogether, 20% (95% confidence interval (CI): 15–25%) of children with suspected fever were reported to have been taken to a health centre and 83% (95% CI: 76–90%) to have been treated at home with an antimalarial drug (Table 1). Only 8% (95% CI: 5–11%) were neither taken to a health centre nor treated at home with an antimalarial drug. Finally, 5% (27/505; 2 answers missing) were reportedly taken to a traditional healer.

Table 1: Frequency of visits to health centres and of treatment at home with antimalarial drugs for children during completed episodes of suspected fever, Togo, 1984

Seen at a health centre:	Antimalarial drug treatment at home:		Total
	Yes	No	
Yes	57 (11) ^a	46 (9)	103 (20)
No	363 ^b (72)	41 (8)	404 (80)
Total	420 (83)	87 (17)	507

^a Figures in parentheses are percentages.

^b The respondents for two of these children did not know whether there had been a visit to a health centre.

Home treatment of suspected fever with an antimalarial drug was prompt: mothers stated that 97% (401/414; 6 answers missing) of children treated in this way received the drug on the first day of their fever. In contrast, only 17% (16/96; 6 answers missing, 1 not remembered) of children with suspected fever who were taken to a health centre were said to have been seen on the first day of their fever.

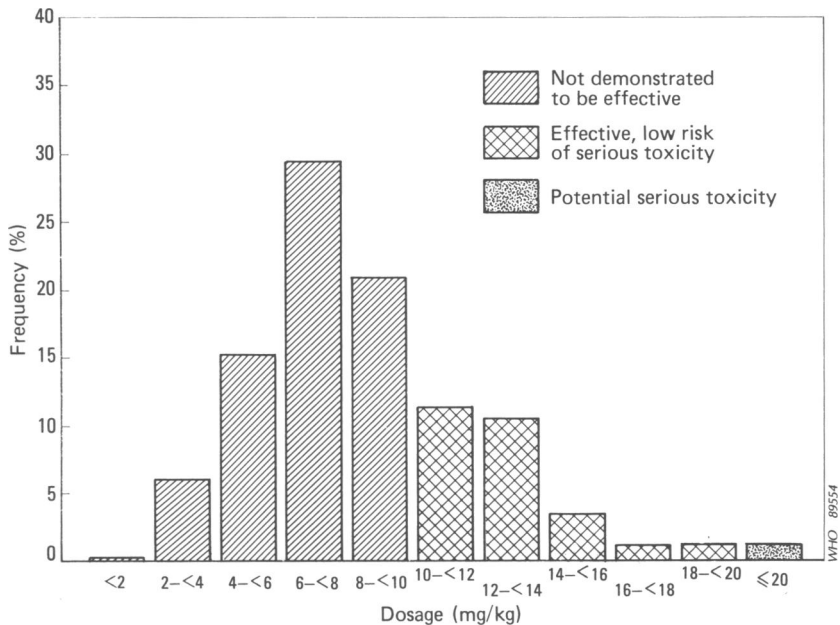
Although many antimalarial drugs are sold in Togo, chloroquine was used for 94% (395/420) of the home treatments. A single commercial preparation of chloroquine tablets (Nivaquine, available in only one form, with 100 mg of chloroquine base) accounted for 91% (383/420) of home treatments and was well known to mothers by name. Amodiaquine tablets or powder was used for 4% (17/420) of treatments, while quinine solution or tablets that contained a mixture of quinine and its derivatives were used for 1% (5/420), and tablets of sulfadoxine and pyrimethamine for 1% (3/420).

At the time of the survey, the recommended treatment with chloroquine in Togo was 10 mg of the drug per kg body weight, which was shown to be effective in *in vivo* testing (2).^d Although single-dose

^c General Statistical and Accounting Service (Togo). Results of the general population census, 9–22 November 1981. Lomé, Togo.

^d National Malaria Service (Togo) and the Malaria Branch, Centers for Disease Control. Evaluation of a single oral dose of chloroquine in children in the Central Region of Togo. Atlanta, GA, USA, 1985.

Fig. 1. Chloroquine dosages administered to 370 children with suspected fever during the first 24 hours of home treatment, Togo, 1984. Dosages were calculated after weighing children and obtaining treatment histories from their mothers.



treatment was recommended, split doses given during the first 24 hours of therapy that amounted to 10 mg per kg body weight were also considered to be adequate in the analysis. The dosage received during the first 24 hours of treatment could be estimated for 370 (94%) of the 395 children who were treated at home with chloroquine (Fig. 1). The remaining 25 dosages could not be calculated because the child's weight was not obtained (9); other information was missing (8) or not remembered (3); or there was uncertainty about the size of the tablet used (5 treated with Résochine® tablets, which were available in two sizes). The mean dosage was 8.9 mg per kg (95% CI: 8.2–9.5 mg per kg), while the median dosage was 7.8 mg per kg; 70% (260/370, 95% CI: 64–77%) of the dosages were less than 10 mg per kg. Only 1% (5/370) of dosages during the first 24 hours was 20 mg per kg or greater, the level chosen to represent potentially serious toxicity. The mean dosage received during the first 24 hours of treatment by 0–1-year-olds (9.1 mg per kg, $n=264$) was not significantly different from that received by 2–4-year-olds (8.2 mg per kg, $n=106$, $P=0.17$). Also, the mean dosage given during the first

24 hours of treatment did not differ significantly by recall period. It was 9.0 mg per kg for recall periods <3 weeks and 8.8 mg per kg ($P=0.68$) for periods ≥ 3 weeks.

The total chloroquine dosage could be calculated for 354 (90%) of the children who were treated with chloroquine at home: the mean and median total dosages, respectively, were 16.6 mg per kg (95% CI: 15.1–18.0 mg/kg) and 12.8 mg per kg. Altogether, 42% (148/354) of these treatments were given as a single dose. The mean total dosages for children for recall periods of <3 weeks and ≥ 3 weeks were 16.7 mg/kg and 16.6 mg/kg, respectively. In all, 2% (6/354) of total chloroquine dosages were greater than 50 mg/kg.

Of mothers who treated their children at home with chloroquine, 64% (250/392; 3 answers missing) said that they obtained the drug from a street or market vendor. Pharmacies supplied 35% (137/392) of the treatments, while the remaining 1% (5/392) was obtained from other sources.

All mothers in the survey were asked to specify, in general, how they would prefer their children to be treated for malaria at a health centre—with pills,

syrup, or by injection. Pills or syrup was preferred by 57% (330/584; 2 answers missing), injections by 10% (60/584), while 33% (194/584) did not know or had no preference. Mothers who said they preferred pills or syrup were then asked to state their reasons for this choice. The question was open-ended and more than one answer was accepted. The most frequent response, given by 70% (230/330) of respondents, was the danger of leg paralysis following injections.

Discussion

Malaria is a major cause of death among African children. An intensive malaria control programme in rural Kenya using fenitrothion sprays reduced infant mortality from 157 to 93 deaths per 1000 live births (3); and in a community-based study of mortality among children aged under 7 years in the Gambia, 14% of deaths were attributed to malaria (4).

The principal malaria control strategy recommended by the WHO Expert Committee on Malaria for countries where mortality rates for the disease are high and resources for vector control are scarce is the prompt treatment of all malaria patients with drugs (5). In countries where malaria is highly endemic, antimalarial drug treatment of all young children with fever is recommended when diagnosis cannot be based on the results of microscopy (5). Provision of treatment to such a large target group is, however, a major challenge, and in responding to it, it is important to know what role parents play in treating febrile children and to decide what role they should be encouraged to play. The frequency with which parents give antimalarial drugs to children with fever varies widely in Africa (Table 2). The present survey shows that this practice is exceptionally frequent in south-central Togo and highlights some advantages as well as one problem associated with it.

The first advantage is that home treatment greatly increases the proportion of children with fever who receive an antimalarial drug. Only 20% of the children with suspected fever were seen at a health centre; however, 83% were treated at home with an antimalarial drug, including 72% who were not seen at a health centre. The results of other studies in Africa known to us on treatment of children with fever have found utilization rates for health centres of 50% or less in rural areas (Table 2). There is therefore a widespread need for antimalarial drug treatment that is available outside of health centres.

The second advantage of home treatment is promptness. In all, 97% of parents who treated their febrile children with an antimalarial drug at home reported giving it on the first day of fever. In contrast, only 17% of children seen by a health worker were reportedly seen on the first day of fever. Promptness in

Table 2: Frequency of visits to health centres and of antimalarial drug treatment at home for children under 5 years of age with suspected fever in various African countries

	% seen at a health centre	% treated with an antimalarial drug at home
<i>Urban</i>		
Guinea (Conakry) ^a	43	51
Zaire (Kinshasa) ^b	71	not available
<i>Rural</i>		
Guinea (Dinguiraye Prefecture) ^c	6	13
Guinea (northern Dabola Prefecture) ^c	17	21
Liberia (Bomi, Cape Mount and Lower Lofa Counties) ^d	34	not available
Rwanda (national) ^e	41	8
Togo (Haho, Kloto, and Wawa Prefectures) ^f	20	83
Togo, national ^g	33	not available
Zaire, Kingandu Health Zone ^h	45-46	27
Zaire, Pai-Kongila Health Zone ⁱ	48-50	28

^a Home treatment was defined as: treatment administered at home, including that administered after a visit to a health facility. See reference 6.

^b Taylor, W.B. *Childhood mortality survey, December 1983, Kinshasa, Zaire*. Atlanta, GA, August 1984. Report prepared for the Ministry of Public Health, Zaire.

^c Home treatment was defined as: not given by a health worker or after having been seen by a health worker. See: **Ministry of Public Health, Guinea, and the International Health Program Office, Centers for Disease Control. Rapport des enquêtes rapides sur l'état nutritionnel des enfants menées dans les préfectures de Dinguiraye et de Dabola, République de Guinée, mai et septembre, 1985, et d'une enquête supplémentaire sur le traitement de la fièvre et la diarrhée chez les enfants, mai 1985 (Supplément 1, 1989)**. Atlanta, GA, 1985.

^d See: **Ministry of Public Health, Liberia, and the International Health Program Office, Centers for Disease Control. Mortality and use of health services survey, Republic of Liberia, Bomi, Cape Mount, and Lower Lofa Counties, 1984-1985**. Monrovia, 1986.

^e Home treatment was defined as: not given by a health worker or after having been seen by a health worker. See: **Ministry of Public Health, Rwanda, and the International Health Program Office, Centers for Disease Control. Enquête nationale sur le traitement de la fièvre et de la diarrhée chez les enfants de moins de 5 ans à domicile et dans les formations sanitaires, novembre 1985**. Atlanta, GA, 1986.

^f Home treatment was defined as: not given during or after a visit to a health centre. See: present study.

^g **Ministry of Public Health, Togo. Rapport d'évaluation nationale du programme élargi de vaccination, du programme de lutte contre les maladies diarrhéiques et du programme de lutte contre le paludisme**. Lomé, Togo, 1987.

^h Home treatment was defined as: given at home. See: **International Health Program Office, Centers for Disease Control. Mortality survey, Kingandu, Zaire**. Atlanta, GA, 1985. Report prepared for the Ministry of Public Health, Zaire.

ⁱ Home treatment was defined as: given at home. See: **International Health Program Office, Centers for Disease Control. Mortality survey, Pai-Kongila, Zaire**. Atlanta, GA, 1985. Report prepared for the Ministry of Public Health, Zaire.

treating malaria is important; for example, in one study, the mean duration of illness among children admitted with cerebral malaria to the Royal Victoria Hospital in Banjul, the Gambia, was only 1.8 days.⁶

Community health workers are potential providers of first-line malaria treatment outside of health centres, and the provision of antimalarial drugs as part of their job has been endorsed by a WHO Study Group (7). However, community health workers are rare in many African countries and even when they have been trained, they have not always been available for prompt consultation or been supplied regularly with antimalarial drugs (8,9).

The treatment of febrile children at home for malaria has been recommended in local health education projects in Togo, but has not been promoted as a national policy or encouraged as an alternative to treatment at health centres. Therefore, we doubt that there was widespread exaggeration by mothers of the frequency and promptness of antimalarial treatment at home in an effort to describe behaviour they thought was expected of them.

The third advantage of home treatment, as practised in Togo, is that it depends primarily on a system of distributing chloroquine by street and market vendors that is self-financing and self-managing. The vendors sell a variety of commonly used items. There was at least one vendor of chloroquine in 11 of the 13 cluster sites in Wawa and Kloto Prefectures.⁷ The vendors sold 100-mg tablets of chloroquine for US\$ 0.02 per tablet; in contrast, in pharmacies, a minimum purchase of 20 tablets was required, at a cost of US\$ 0.01 per tablet.

The main problem associated with the parental administration of chloroquine in Togo was underdosage. Chloroquine resistance was confirmed in Togo in 1988, and the dosage recommended by the National Malaria Service was changed from 10 mg per kg body weight as a single dose to 25 mg per kg given over 3 days (10 mg per kg on day 1, 10 mg per kg on day 2, and 5 mg per kg on day 3).⁸ Therefore, the degree of chloroquine underdosing associated with home treatment may be greater now than it was at the time of the survey. We do not think that increasingly incomplete recollection of chloroquine doses by mothers over

longer recall periods was a major reason for the low dosages calculated in our study, since mean dosages differed little by the length of the recall period.

To improve home treatment practices, the National Malaria Service has prepared posters for display in pharmacies which show, pictorially, the amount of chloroquine needed to treat children of different ages and weights to ensure that the dosage they receive corresponds to approximately 25 mg per kg over 3 days. Also, plans have been made to train pharmacists to play a more active role as health educators by encouraging them to provide information about correct antimalarial drug treatment. An innovative example of simplifying home chloroquine treatment has recently been provided by a trial of maternal administration of chloroquine in the Gambia. For this purpose, mothers were issued with packets of one colour for children aged 3 months to 2 years and with those of a different colour for children aged 2–9 years (10). Participating households also received wall charts explaining how to use the drugs.

Other problems are potentially associated with the administration of antimalarial drugs at home. If not corrected, underdosage with chloroquine may contribute to chloroquine resistance; overdosing also is a potential danger, although it was found to be uncommon in Togo. The administration of antimalarial drugs at home may result in children being seen later by health workers for serious problems other than malaria. Also, there are insufficient data on how successfully mothers can be taught to change dosages, dosage schedules, or drugs, as these become necessary because of increased chloroquine resistance. Finally, it is not known how efficiently mothers can function as part of a referral system which ensures that children, who do not respond to initial antimalarial treatment receive an adequate diagnostic evaluation and effective second-line treatment, if needed.

Administration of antimalarial drugs to febrile children by parents represents an expansion of primary health care that could have a major impact on child survival in Africa. As a policy option, it raises the question of whether the interests of child survival are best served by allowing parents to provide widespread and prompt antimalarial treatment to febrile children, when prompt consultation with a health worker is not possible, or by encouraging only the more highly supervised treatment that health workers can provide.

⁶ Miller, K.D. & White, N.J. *Foreign trip report*. Report prepared for the Centers for Disease Control, Atlanta, GA, 1985.

⁷ Deming, M.S. et al. *Le traitement du paludisme chez les enfants: rapport sur les enquêtes menées dans les préfectures de Haho, Kloto et Wawa dans le cadre du Projet CCCD*. Report prepared for the Ministry of Public Health, Lomé, Togo, 1985.

⁸ Agbo, K. et al. *Test de sensibilité in vivo du P. falciparum à la chloroquine dans les subdivisions sanitaires du Golfe du 15 au 29 février et de la Kozah du 7 au 21 mars, 1988*. Report prepared for the National Malaria Service, Lomé, Togo, 1988.

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Résumé

Traitement à domicile de la fièvre par des antipaludéens chez les enfants togolais

Au Togo, la principale stratégie de prévention de la mortalité infantile due au paludisme consiste à traiter rapidement la fièvre avec des antipaludéens. Une enquête sur la mortalité infanto-juvénile et sur le recours aux services de santé a été menée en août 1984 dans la région des plateaux, dans le centre-sud du pays, selon la technique du sondage par grappes. Des données ont été obtenues sur toutes les naissances vivantes survenues depuis le 15 août 1978 dans 100 foyers de chaque grappe. Au cours de l'enquête de suivi décrite ici, les mères des enfants de moins de 5 ans ayant signalé que leurs enfants avaient eu de la fièvre au cours des deux semaines précédentes ont été interrogées à nouveau pour déterminer la fréquence avec laquelle elles avaient conduit leurs enfants à un centre de santé, ainsi que la fréquence et la qualité des traitements antipaludéens donnés à domicile. Cette enquête a été limitée aux préfectures de Haho, Kloro et Wawa, dont la population totale, en 1984, était estimée à 446 173 habitants.

Au total, 20% des 507 enfants ayant paru fiévreux au cours de l'enquête de suivi ont été examinés dans un centre de santé pendant leur maladie (intervalle de confiance à 95% (CI): 15–25%) et 83% (CI 95%: 76–90%) ont été traités à domicile avec un antipaludéen. D'après les réponses fournies, 97% des enfants de ce dernier groupe auraient reçu le médicament dès le premier jour de fièvre. Par contre, 17% seulement (16/96) des enfants conduits dans un centre de santé ont été examinés le premier jour de fièvre.

La chloroquine a été utilisée dans 94% des cas de traitement à domicile par un antipaludéen, et 64% des mères qui ont donné de la chloroquine à leur enfant ont déclaré qu'elles l'avaient achetée à un vendeur ambulancier ou au marché. La dose médiane de chloroquine donnée à domicile a été de 12,8 mg/kg de poids corporel, soit plus que la dose recommandée et reconnue comme efficace au Togo au moment de l'enquête (10 mg/kg

de poids corporel) et moins que la dose totale recommandée actuellement (25 mg/kg de poids corporel). Toutefois, dans 70% des cas de traitement à domicile (CI 95%: 64–77%) la dose donnée pendant les premières 24 heures était inférieure à 10 mg/kg de poids corporel et donc insuffisante. Dans cette région du Togo, ce sont généralement les parents qui administrent un antipaludéen aux enfants qui ont de la fièvre, et il est important de leur donner des indications sur les quantités correctes de chloroquine à utiliser.

L'administration d'antipaludéens aux enfants par les parents en cas de fièvre est un aspect des soins de santé primaires dont l'incidence potentielle sur l'espérance de vie des enfants africains est très importante. La question qui se pose est de savoir s'il est préférable, du point de vue de la survie des enfants, de compter sur les parents pour assurer systématiquement le traitement rapide de la fièvre par des antipaludéens, lorsqu'il est impossible de consulter sans délai un agent de santé, ou s'il vaut mieux n'encourager que des formes mieux surveillées de traitement par les agents de santé.

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