EXPLORATORY STUDY OF MALARIA SITUATION IN HANANG AND BABATI DISTRICTS AFTER REPORTED MALARIA EPIDEMIC: II. COMMUNITY PERCEPTION AND TREATMENT SEEKING AND PREVENTION FOR MALARIA

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Abstract: In May-June 1999, following a report of malaria epidemic in Babati and Hanang districts, a study was conducted in the two districts to assess people's awareness of symptoms of malaria, their malaria treatment and prevention seeking behaviour. Information was gathered by means of a semi-structured questionnaire administered to 602 randomly selected heads of household. The interview solicited the following details: peoples knowledge of malaria illness (signs and symptoms of malaria) and mortality, where they sought for health care, and methods they used to control the disease. For all those who reported that death had occurred between 1997 and 1999 in their households a verbal autopsy questionnaire was administered to parents or relatives of the deceased.

The verbal autopsy results corroborated hospital based information that there was an increase in malaria related deaths between 1997 and 1999.

Most respondents were able to mention fever, headache, joint pains and vomiting as symptoms of malaria. Convulsion on the other hand was little mentioned especially in Hanang. Health facility was the most visited place for the treatment of malaria. However, there are a number of places in the rural area that were located at more than five kilometres. Such long distances were most likely to be deterrent to health facility utilisation. With regard to antimalarial drug use chloroquine was most highly utilised. While few people owned insecticide treated nets, mosquito coils and local insecticide burning was practised.

In conclusion, it is recommended there is need of instituting an epidemic monitoring/surveillance system in order to enable the authorities concerned to forecast and contain promptly imminent malaria epidemics. Insecticide treated nets and insecticides need to be made available for people to buy through a form of system (e.g. private shops). Antimalarial drugs including new first line drug need to be promoted adequately in these areas.

Introduction

Babati and Hanang Districts have experienced malaria epidemics since malaria became established in the area in the early 1940s.[1, 2] Malaria evaluation studies conducted in Hanang District in 1984 during which Babati was still part of Hanang District [3] showed that malaria ranged from meso-endemic (unstable) in the highland to hyper-endemic (stable) in the lowland. In unstable

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malaria situation the chance of a mosquito to transmit the infection is small, thus malaria would usually occur only when the populations of vectors are large. Also, as the presence of mosquitoes without malaria parasites is common in areas of unstable malaria, small changes in environmental conditions could relatively markedly increase malaria parasite transmission (4, 5). Human population in areas of unstable malaria is inclined to possess low immunity to the disease, and this would tend to result in all age groups to suffer almost equally the disease (4, 5, 6).

Control of malaria in such areas with respect to malaria treatment and prevention require prompt and high degree of availability of the necessary drugs at health facilities, creation of home treatment and management albeit that it is inadequate, as well as community awareness creation about malaria management (4). In this regard, it would be of use to gather information on community perceptions and treatment seeking behaviour and see how it might influence the course of the epidemic and its control. This undertaking took cognisance of the fact that an individual or community may have any out of the many reasons for seeking treatment (7, 8) and that their beliefs on causes of malaria may limit the acceptance of measures aimed at its treatment and control (9).

Earlier investigation conducted in Loliondo, Ngorongoro district, Arusha Region in 1995, after a reported malaria epidemic, indicated that among the local residents there was an increasing trend of people to use modern medicine in addition to or in place of local healing practice (10). However, this apparent rise in modern health facility utilisation, was highly constrained by long distances to the nearest health facility, shortage of drugs and frequent human migrations to areas without social amenities (10). Delaying to report at health facility for treatment of uncomplicated malaria could worsen the condition of a malaria patient and even lead to development of severe malaria (11).

In May, 1999, following report of a malaria epidemic in Hanang and Babati districts an exploratory study was undertaken to identify factors that may have led to the outbreak of the epidemic (6, 12). This paper reports on the findings of a study performed over a period of 14 days on community perception of malaria and health seeking behaviour in Babati and Hanang districts.

Materials and Methods

Study Areas

The study was conducted in Babati and Hanang districts, in Arusha Region at an altitude of 800-2500m above sea level, with weather as described elsewhere (6). The villages covered in Babati District include Gichameda (Magugu Ward), Nakwa (Riroda Ward), Nangara (Babati Ward) and Himiti (Singe Ward), while those in Hanang District were Gidahababieg (Gidahababieg Ward), Bassotu Ziwani (Bassotu Ward), Endasak (Endasak Ward), and Balangdalalu (Balangdalalu Ward). Wards for the study were selected after reviewing the hospital records to identify areas from which most patients came. Then one village was chosen from each ward by simple random sampling to make a total of 4 villages for each district.

Study Population

Ethnically, the people in the two districts are mainly Wairaqw, Wagorowa, Wambugwe and Wabarbaig. Demographic characteristics indicate that Babati district had a 1998 projected population of 288,429 people, 3.3% annual rate of increase, and 49,321 (17.1%) children under five years of age. Figures for Hanang district are a 1998 population projection of 157,577 people, at 3.3% annual rate of increase, and 29, 949 (19.0%) children under five years (13). The occupations of the people in the two districts are such that 89.0% (527/592) are subsistence farmers (14).

Community-based Information on Malaria Mortality for 1997 to 1999, Knowledge, Treatment Seeking and Prevention of Malaria

Community based information was gathered by means of a semi-structured questionnaire administered to 602 randomly selected heads of household. The interview solicited the following details: peoples knowledge of malaria illness (signs and symptoms of malaria) and mortality, where they sought for health care, and methods they used to control the disease. They were also asked how they felt malaria epidemics could be properly managed and eventually controlled in their respective areas. For all those who reported that death had occurred between 1997 and 1999 a verbal autopsy questionnaire was administered to parents or relatives of the deceased (15, 16, 17, 18,19).

The verbal autopsy interview sought to establish the symptoms of the illness, if death occurred at home or at health facility and whether the deceased had been in the village one month prior to death. Three doctors were subsequently requested to independently appraise the verbal autopsies. If two doctors agreed on the possible cause of death, that was taken as the probable cause of death (15).

Data Analysis

All data were recorded in pre-coded forms and entered in the computer and then validated by using EPI-Info 6.04b. Data analysis was carried out using the same program. Where necessary, comparison was made between Babati and Hanang Districts to establish if there

were any significant observed differences in the levels of various aspects used as indicators in this study.

Results

Verbal Autopsy Derived Information on Malaria Mortality for the Period 1997 to 1999

From a total of 602 heads of household interviewed for both districts, 56 deaths were reported to have occurred between 1997 and 1999. The results show that malaria was the main cause of death at 75% (42/56), whereby 64% (27/42) and 35.7% (15/42) were reported in Babati and Hanang districts respectively. By relating the reported deaths to the years in which they occurred, an increasing rate emerges. Correspondingly, the deaths for 1997, 1998, and 1999 were 60% (12/20), 78.9% (15/19) and 88.2% (15/17) of the total obtained from verbal autopsy interviews. Considering the deceased by age-groups shows that in Babati there were proportionately more deaths among the underfives whereas in Hanang such feature evened out markedly swelling the 5-9 years age-group as shown in Table 1.

Table 1: *Number and Age Group of the Deceased from Verbal Autopsy*

AGE GROUP	BABATI	HANANG
< 4 years	9 (33.3%)	4 (26.7%)
5-9 years	2 (7.4%)	4(26.7%)
Over10 years	16 (59.3%)	7 (46.7%)
Total	**27**	**15**

Awareness of Symptoms of Malaria

From pooled data for both Babati and Hanang districts various malaria symptoms most commonly pointed out were: Fever 89.8% (535/596), headache 80.7% (486/602), joint pain 65.7% (395/601) and vomiting 50.2% (299/297). Convulsion was heard from only 16.9% (101/598) of the respondents. Table 2 shows responses on symptoms of malaria by district. It is curious to note that in Hanang district a consistently higher, occasionally statistically significant number of respondents indicated knowledge of the most common malaria symptoms than in Babati. That notwithstanding, most respondents correctly mentioned more than one symptom of malaria.

Table 2: *Knowledge of Malaria Signs and Symptoms Among Those Interviewed in Babati and Hanang Districts*

SIGN AND SYMPTOM	BABATI	HANANG	CRUDE ODDS RATIO[a]	P-VALUE[b]
Fever				
Yes	266 (89.1%)	269(91.5%)	0.69 (0.39-1.21)	0.17
No	36 (10.9%)	25 (8.5%)		
Headache				
Yes	233 (75.6%)	253 (86.1%)	0.50 (0.32-0.78)	0.001
No	75 (24.4%)	41(13.9%)		
Joint pain				
Yes	191 (62.2%)	204 (69.4%)	0.75(0.51-1.03)	0.06
No	116 (37.8%)	90 (30.6%)		
Vomiting				
Yes	141 (46.7%)	158 (53.7%)	0.75 (0.54-1.03)	0.08
No	161 (53.3%)	136 (46.3)		
Loss of appetite				
Yes	107 (34.7%)	142 (48.3%)	0.57 (0.41-0.80)	<0.001
No	201 (65.3%)	152 (51.7%)		
Body weakness				
Yes	107 (35.0%)	142 (48.3%)	0.58 (0.41-0.81)	<0.001
No	199 (65%)	152 (51.7%)		
Convulsion				
Yes	77 (25.3%)	24 (8.2%)	1.96 (1.27-3.04)	<0.01
No	227 (64.7%)	270 (91.8%)		
Diarrhoea				
Yes	83 (27.8%)	62 (21.2%)	1.42 (0.96-2.11)	0.068
No	216 (72.2%)	229 (78.8%)		
Abdominal pain				
Yes	44 (14.4%)	62 (21.2%)	0.63 (0.4-0.98)	0.03
No	262 (85.6%)	231 (78.8%)		

Key

[a] 95% confidence interval in brackets

[b] Probability value for odds ratio

Seeking Treatment for Malaria

Treatment is recognised to be a sequential process that involves several stages.[20] These include occurrence of the symptoms, the detection of that symptom, the definition of the symptom as a medical problem, the decision to seek care, and actually seeking care.[20] Table 3 shows where people went for treatment following identification of malaria symptom. Most respondents in either district seek treatment of malaria from the hospital (dispensary, health centre, and hospital). Traditional healing appears to be little utilised.

Table 3: *Household Treatment Seeking Process in Relation to Malaria in Babati and Hanang Districts*

SOURCE OF HEALTH CARE	BABATI			HANANG		
	No. Using	%	Total Respondents	No. Using	%	Total Respondents
Hospital	262	85.6%	306	252	86.6%	291
Pharmacy	18	5.9%	306	26	8.9%	291
Retail shops	17	5.6%	306	12	4.1%	291
Traditional healers	9	2.9%	306	1	0.3%	291

It is generally acknowledged that there is a difference between actual distance (in km) and what people of different cultures perceive as reachable (9). Despite such divergence in perspective a question on distance to nearest health facility was asked in order to obtain peoples opinion on distribution of health facilities. The response to that question indicated that in Babati and Hanang districts 30.8% (95/308) and 85% (250/294) respecting had health facility within five kilometres. In other words, in Hanang it was 13 times as easy to reach a health facility as it was in Babati ($p<0.0001$). Distinction, however, was not made between government and private health facility in this regard.

Use of Antimalarial Drugs

With respect to antimalarial drug use, Table 4 shows that in Babati district chloroquine was widely used followed by quinine, Fansidar, camoquine, metakelfin, and local herbs. The different brands of chloroquine reported include homaquine and malaraquine. The various local herbs mentioned as being used against malaria include *mwarobaini, mjohoro, mlungulungu, lodwa,* and *sokonoi.* In Hanang district the trend of antimalarial drug use was much the same as that for Babati except that only one brand of chloroquine, malaraquine, was mentioned. As for the use of local herbs for malaria treatment in Hanang district, *mlungulungu, lodwa, sokonoi, and mfafarie* were mentioned as being used for such purposes.

Table 4: *Antimalarial Drug Use in Babati and Hanang Districts*

TYPE OF ANTIMALARIAL DRUG	BABATI			HANANG		
	No. Using	%	Total Respondents	No. Using	%	Total Respondents
Chloroquine (tabs)	235	62.7%	375	272	74.9%	363
Chloroquine injection	4	1.1%	375	3	0.8%	363
Fansidar	23	6.1%	375	33	9.1%	363
Metakelfin	8	2.1%	375	3	0.8%	363
Quinine	83	22.1%	375	44	12.1%	363
Camoquine (amodiaquine)	11	2.9%	375	3	0.8%	363
Septrin	2	0.5%	375	1	0.2%	363
Paludrine	1	0.3%	375	-		
Local herbs	8	2.1%	375	4	1.1%	363

Knowledge of Malaria Transmission

The householders were asked to tell how a person got malaria, and if in their area malaria was seasonal or all the year round. In Babati and Hanang districts, 93% (293/312) and 81.8% (270/330) of respondents said mosquitoes transmitted malaria through biting. Most of the remaining ones did not know how malaria is transmitted, and this was more so in Hanang district than in Babati district. With regard to the trend of malaria transmission, 78.1% (235/301) and 91.1% (266/292) of the respondents in Babati and Hanang districts aptly indicated that malaria was seasonal.

Personal Protection Against Malaria

Table 5 depicts that the use of any type of bednets is much higher than any other protective measure whereby it reaches 52.3% (161/308) and 38.1% (112/294) in Babati and Hanang respectively. Conversely, however, the use of insecticide treated bednets was as little as 13.7% (22/161) and 9.2% (10/109) in Babati and Hanang respectively.

Table 5: *Personal Protective Measures Against Malaria in Babati and Hanang Districts*

PROTECTIVE MEASURES	BABATI			HANANG		
	No. Using	%	Total Respondents	No. Using	%	Total Respondents
Sleep under bednet	161	52.3%	308	112	38.1%	294
Bednet impregnated	22	13.7%	161	10	9.2%	109
Mosquito coils	73	23.8%	307	59	20.1%	293
Mosquito sprays	8	2.7%	300	24	8.2%	292
Local insecticides	63	21.1%	299	68	23.3%	292
Indoor fire	70	26.5%	264	74	27.1%	273

Local people's opinions on how to control malaria epidemics in Babati and Hanang districts

In both districts (Table 6) the mostly mentioned ways of controlling malaria epidemics included among others availability of insecticide treated nets or insecticides for net treatment, and subsidised drugs. In Hanang district the community health fund (CHF) fee of Tsh. 10,000/= was mentioned as being prohibitive for non-members to seek health care from the government health facilities.

Table 6: *Suggested Ways of Controlling Malaria Epidemics in Babati and Hanang*

Methods for Malaria Epidemics Control	BABATI			HANANG		
	No.	%	Total Respondents	No.	%	Total Respondents
1. Insecticide treated nets or insecticides for nets are needed	152	35.9%	423	141	29.7%	475
2. More subsidised drugs are needed. (*In Hanang CHF* was thought to be too prohibitive*)	74	17.5%	423	92	19.4%	475
3. To use prophylaxis	66	15.6%	423	80	16.8%	475
4. Insecticide spraying by government	30	7.1%	423	55	11.6%	475
5. To get a nearby dispensary/hospital	23	5.4%	423	40	8.4%	475
6. Government to bring subsidised nets	21	5.0%	423	10	2.1%	475
7. Keeping environment clean and free of water pools	21	5.0%	423	11	2.3%	475
8. Education on proper use of drugs is needed	11	2.6%	423	8	1.6%	475
9 Government to provide social services	11	2.6%	423	15	3.2%	475

* CHF is Community Health Fund of Tsh. 10,000/= family per year.

Discussion and Conclusion

The verbal autopsy interviews have demonstrated that malaria had been on the increase between 1997-1999. This observation corroborates the results from documentary review of health facility based information (6).

It is of interest that the majority of the people interviewed at household and health facility level could tell most of the symptoms of malaria. This implies that misconceptions or misdiagnosis might not be the main factors leading to increased number of malaria patients and deaths. To some extent this is supported by the fact that over 85% of the household respondents sought medical treatment at health facilities while another 11.4% went to buy medicine, from shops, whenever they or members of their families fell ill. Only a few went to traditional healers. Nonetheless, the situation whereby 85% (250/294) of respondents in Babati live beyond 5kms from the nearest health facility can be inhibitory to seeking treatment from health facilities (9). A significantly low number, 8.2% (24/294), in Babati of respondents mentioning convulsion as a sign of malaria might be depicting how less familiar the sign was to most people in Hanang. Through community based

malaria control approach, or other appropriate means it might be feasible to get such important message across to the people.

Use of generic and various brands of chloroquine was much higher than that of Fansidar and other antimalarial drugs. It was not yet established how efficacious chloroquine was, but as shown in reference 12, chloroquine resistance was very high. Most probably few people healed on chloroquine. The use of herbal medicine by a limited number of respondents still falls within the factual reality that in various malaria endemic areas such herbs are regularly used for that purpose too (21,22). The newly introduced community health fund of Tsh. 10,000/= per household per year, in Hanang, was cited at that time as being too high and non-members of that fund found it hard to get treated. However, towards the end of carrying out this study a credit system was introduced to cover individuals who wished to join the community health fund and then pay the fee after harvesting and selling their crops. Members of the fund on the other hand commended the system highly.

Personal protection efforts were made through the use of various materials. For example bednets either treated or not were considerably utilised in Babati and to a lesser extent in Hanang district. Nonetheless, insecticides for treatment of nets were not readily obtainable. These will need gradually to be distributed accordingly for those wishing to treat new nets or ones they already have. Other self-protection measures mentioned include the use of mosquito coils, local insecticide, and burning indoor fire. These might need being promoted as to a certain extent they serve to a protective purpose.

Babati and Hanang districts are characteristically malaria epidemic prone districts (8). Thus there is need of instituting an epidemic monitoring/surveillance system in order to enable the authorities concerned to forecast and contain promptly imminent malaria epidemics.

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Recommendations

1. In Babati (and perhaps in some areas in Hanang) district there is need of introducing a few more rural health facilities to reduce distance to nearest health facility close to five kilometres.
2. Health education on symptoms of severe malaria of which convulsion if part needs to be given to the people particularly in Hanang District.
3. In selling antimalarial drugs shopkeepers aptly serve a considerable proportion of the population. Accordingly, shopkeepers should be strengthened through giving them more information on appropriate drug dispensing practice and drug use as well as when to refer patient to health faciluty.
4. Although relatively few people use herbal medicines for treating malaria, it is still of interest to gather more information about the herbs used for such purposes. This would allow further research work to be performed to assess antimalarial activity of respective herbs.
5. Bednets as well as insecticides should be made available and promoted for people to buy.
6. Being epidemic prone districts Babati and Hanang needs to have intesectoral collaboration in maintaining a malaria epidemics surveillance and forecasting system. For example Department of Agriculture could provide adequate meteorological information and food status in the district. The planning/economic development and public works departments could avail information on new economic development ventures. With the health department keeping reasonably accurate records of deaths or hospital records it may be possible to study the correlation mortality and potential risk factors.

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