

Original Research Article**Response to fever and malaria at household level in a rural area of Assam**

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Early Diagnosis and complete treatment of malaria is a key to control of malaria morbidity and mortality. This community based cross-sectional study was carried out in a rural area of Assam, Northeast India, to assess the response to fever at household level with focus on suspected malaria among 300 respondents out of which 150 were tribal and 150 non-tribal respondents. Results showed that 38 (25.3%) tribal and 45 (30%) non-tribal respondents would avail treatment from government health facilities for suspected malaria. Only 18 (12%) tribal and 11 (7.3%) non-tribal respondents had awareness and showed urgency to seek malaria treatment as early as 24 hours after the onset of suspected fever. Also 8 (5.3%) of the tribal and 3 (2%) of the non-tribal respondents reported the use of traditional medicine for fever in their household. Utilization of government health services is not still a priority among the rural community with many factors influencing their care-seeking behaviour which should be dealt with. Awareness and accessibility among the rural communities about new services like rapid diagnostic test for rapid malaria diagnosis is required in view of the poor malaria surveillance in the study area along with health education about importance of early malaria diagnosis and treatment.

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1. Introduction

Malaria continues to be a major cause for fever related mortality and morbidity in India. This is attributed to financial and technical constraints which are common to all states, but the operational difficulties are much more acute in the Northeastern region of India with poor malaria control activities in terms of malaria surveillance and vector control measures.¹⁻⁴ The North Eastern region accounts for nearly 10.5% of Plasmodium falciparum malaria and 20% of

deaths in India of which 50% are from Assam. World Health Organization (WHO) states that these data however are not the true number of malaria burden due to poor malaria reporting and available data may only be taken as trends.⁵ Another report states that around 90% of death due to malaria was in rural areas and 86% were not in any health-care facility.⁶

Kamrup District of Assam has 42% population at risk for malaria and contributes 60% of the cases from the state. Annual Blood Examination Rate

(ABER) is 6.7% which is below the programme target of 10% and Slide Positivity Rate (SPR) is 2.44% which is below 5% to declare it as a high risk zone but it has Pf % of 88% which makes it a malaria endemic high risk zone. Moreover it shares inter state border with Meghalaya in the south west which is also a very high endemic state and contributes for 5% malaria deaths, 10% of the cases and 14% of Plasmodium falciparum cases of total malaria burden in Assam.³ The recent malaria epidemics in Assam are attributed to poor malaria surveillance activities.² The community participation has become an important component in implementing health programmes. Malaria control programme success too depends upon community awareness and proper treatment seeking behaviour. Therefore, this study was undertaken to find out response to fever and suspected malaria at household level among the tribal and non-tribal communities residing in a known malaria endemic rural area of Assam and to identify scope for improvement in their response to current care seeking practices.

2. Materials and Methods

A community based cross-sectional study was undertaken from June 2005 to May 2006 in Rani Community Development Block, Kamrup District, Assam, Northeast India. The study area has a population of approximately 86500 as per 2001 census with 96 villages and 18% tribal population. A baseline data on malaria prevalence was collected from government health records but it was found to be very less due to absence of malaria surveillance in the area for more than 5 years. Therefore, considering expected frequency as 50% by Epi Info Software Version 7 sample size was calculated to be 300 (95% confidence level and 5.65% confidence limits).

As it was a time bound and single handed study, to get a representative population from both the tribal and non-tribal communities a 2 stage sampling was applied. Stratification of villages was done in two stages: (i) based on tribal or non-

tribal population and (ii) proximity to atleast one public health centre (preferably within 5 kms). This stratification was done based on WHO recommendation for malaria situation analysis⁷ and the National Vector Borne Disease Control Programme (NVBDCP) Household Survey and Health Facility Survey method.⁸ From the sampling frame of number of households and total population in each village, households were selected by Proportionate Probability Stratified (PPS) Random Sampling technique. Finally, 8 tribal and 8 non-tribal villages were selected. Data were collected in a pre-tested and pre-designed proforma, preferably from primary care giver of the family to assess their course of action at household level for suspected malaria, preferred source of treatment, waiting time from onset of fever until seeking early diagnosis of suspected malaria and management at household level. There were 21 fever cases identified in the households visited taking 6 months recall period in the study. Response of the 21 suspected malaria cases were reviewed and assessment of further management in terms of curative treatment received, source of treatment, blood test, diagnosis of malaria and treatment compliance was done at the end of this study. Data were analyzed for proportions and Chi-square test.

The working definitions for this study are given as follows:

1. Malaria case: A person having symptoms of suspected malaria or laboratory diagnosed. For this study all among fever cases either with suspected malaria or diagnosed later on, both were considered for understanding the care seeking behaviour that may influence malaria control from the programme point of view where there is now provision of curative treatment in malaria endemic areas.
2. Prompt treatment seeking: When the suspected malaria cases visited a health facility within or after 24 hours of onset of symptom (fever) was taken as (desirable)

early or prompt care seeking and also diagnosed malaria cases receiving radical treatment on the same day of diagnosis.

3. Delay: Visiting a health facility later than 48 hours was taken as delay for this study which is also prescribed in the revised programme guideline in Strategic Action Plan for Malaria Control in India, 2007-2012.¹ Considering the seriousness of Plasmodium falciparum infection, this time limit was thought to be desirable.

In the 300 households visited a total of not less than 1500 individuals were covered. The health facilities available in the block are 3 Primary Health Centres/ Community Health Centres, 27 Sub Centres, out of which 22 are functional and one state dispensary. There were 32 Fever Treatment Depots (FTD) in the study area, mostly non-functional because of lack of trained health worker. There were 118 Drug Distribution Centers (DDC) functioning through the local trained volunteers, mostly school teachers, but these are phased out by 2005. Few pharmacies and private practitioners in the locality were also an important source of procuring modern treatment.

3. Results

The socio-demographic profile of the head of 300 households visited is presented in Table 1. According to the per-capita income, 18.3% of the households live below poverty line (income less than Rs.228.90 per capita per month at 1993-94 prices) and majority were tribal. Occupation was mainly cultivation (51.2%) and daily wage earners (41.3%) among tribals whereas the non-tribals were businessman (40.7%) and cultivators (31.3%). Overall literacy rate was 67.5% among the tribal respondents and 72.8% among the non-tribal respondents.

The awareness that malaria is a common cause of fever in their area was present in 85 (56.7%) of the

tribal and 14 (9.4%) of the non-tribal head of the household. Malaria perceived more as a health problem among the tribal than the nontribal respondents and this was found to be statistically significant ($X^2=76$, $df=1$, $p< 0.001$). Only 26 (17.3%) tribal and 45 (30%) non-tribal respondents believed that timely treatment of malaria cases can help reduce malaria problem in the community and this was statistically significant ($X^2=6.67$, $df=1$, $p<0.05$)

Results showed that only 38 (25.3%) of the tribal and 45 (30%) non-tribal households preferred to visit government health facilities as their first choice for treatment of fever suspected malaria. The most preferred source was a local pharmacy by 57 (38%) tribal and 55(36.7%) non-tribal respondents (Table 2). None mentioned about previous DDCs and FTDs during that time as source for malaria treatment.

Table 3 shows the reasons why 108 (72%) tribal and 95 (63.3%) non-tribal households did not prefer services from government health facilities. Availability of doctor for limited hours during the day was mentioned by 68 (63%) tribal and 45 (47.4%) non-tribal households while another 45 (41.7%) of the tribal and 32 (33.7%) of the non-tribal households didn't prefer because of lack of blood testing facility and 37 (34.2%) of tribal and 25 (26.3%) of the non-tribal households did not prefer because of lack of free medicine during earlier visits. They seek other places where medicines can be easily purchased. Distant location of the public health facility was a major cause among 45 (41.7%) tribal households but not among the non-tribals where only 10 (10.5%) non-tribals implicated it as a factor.

Regarding time taken to respond for seeking treatment for suspected malaria it was found that majority would like to wait for more than 24 hours. Only 18 (12%) tribal and 11 (7.3%) non-tribal households seek treatment as early as 24 hours after the onset of fever. On further

investigation on the reasons of delay it was found that most commonly delay is due to fever in a young child among 145 (96.7%) tribal and 149 (99.3%) non-tribal households and 132 (88%) tribal and 123 (82%) non-tribal households would like to wait to rule out the other causes of fever. Self-medication using antipyretics and tepid sponging only before consulting a doctor for suspected malaria was practiced by 28 (18.7%) tribal and 49 (32.7%) of the non-tribal households. Severity of an episode of fever also determined delay in 90 (60%) tribal and 78 (52%) non-tribal households who would wait for fever to subside by itself. Further, 45 (30%) tribal and 10 (6.7%) non-tribals said that although they knew early treatment was necessary they suffer the delay to make arrangements for long distance travel as there was no treatment facility available nearby. Another 36 (24%) tribal and 19 (12.7%) non-tribal respondents said that sometimes inability to afford drugs becomes a reason for delay for initiating treatment. Only 12 (8%) tribal respondents living in remote areas said that they prefer to wait for Multipurpose Workers (MPW) visit to get antimalarials whereas none in non-tribal households availed MPWs service for malaria.

To get an idea of the prevailing malaria surveillance status in the study area, house-to-house visits by MPW in 12 months recall period was enquired and it was found that only 45 (30%) tribal and 24 (16%) non-tribal had been visited atleast once (Table 4). But fortnightly visit was reported only by 2 (1.4%) in tribal and 1 (0.6%) non-tribal households. In this study 21 suspected and confirmed malaria cases were identified considering 6 months recall from the day of visit and detailed information collected in terms of services availed for malaria treatment. Also two deaths of children aged 5 and 7 years were reported in the study area due to fever related illness.

Table 5 shows the details of the 21 fever cases, majority of the fever cases were tribal (16) and

rest non-tribal (5). They were assessed for curative treatment. Total 12 fever cases sought proper malaria treatment and out of them only 2 cases received care from government health center. Also, 11 cases did blood test out of which only 5 cases only received their blood reports. However blood reports of only 3 could be verified (*Plasmodium vivax* - 2, *Plasmodium falciparum* -1) and took complete treatment and the remaining were reported negative. Only 9 out of the 12 who received antimalarials showed compliance irrespective of whether their blood was tested or not. Remaining did not pursue any further action after fever subsided within 2 days. Use of antimalarials for treatment of fever without prescription was not found in the study population. Also 8 (4%) of the tribal and 3 (2%) of the non-tribal cases reported the use of traditional medicines for initial treatment of fever at household level.

4. Discussion

The study population comprised of 18.3% population living below poverty line and 12.3% illiterate population, more among tribal than in non-tribal population (Table 1). However this value is less than the 2001 census values. The study area has 18% tribal population and 2001 census shows that 8% of total population in India is tribal and they contribute majority of the malaria burden.³

The study results showed that there is underutilization of government health facilities among both the tribal (74.7%) and non-tribal (70%) households and majority preferred other sources (Table 2). Similar reasons are cited in other studies as well.^{9,10} However, it is satisfactory in terms of seeking treatment from a qualified medical practitioner among 85 (56.7%) tribal and 92 (61.3%) non-tribal households. None of the households mentioned of Fever Treatment Depots (FTD) and Drug Distribution Centres (DDC) for availing services during this study.

Table 1: Socio-demographic profile of the respondents (N=300)

Variables		Tribal (n=150)		Non-tribal (n=150)		Total (N=300)	
		No.	%	No.	%	No.	%
Age group (in years)	19-28	15	10	9	6	24	8
	29-38	44	29.2	49	32.7	93	31
	39-48	52	34.8	52	34.8	104	34.7
	49-58	28	18.8	26	17.3	54	18
	59+	11	7.2	14	9.2	25	8.3
Sex	Male	92	61.4	108	72	200	66.7
	Female	58	38.6	42	28	100	33.3
Religion	Hindu	118	78.7	129	86	247	82.3
	Christian	32	21.3	-	-	32	10.7
	Islam	-	-	21	14	21	7
Type of family	Nuclear	78	52	108	72	186	62
	Joint	72	48	42	28	114	38
Total family members	2-3	12	8	10	6.7	22	7.3
	4-5	78	52	80	53.3	158	52.7
	6-7	42	28	42	28	84	28
	≥ 8	18	12	18	12	36	12
Per-capita per month income (in Rupees)	<228	36	24	19	12.6	55	18.3
	228-500	74	49.4	30	20	104	34.7
	501-750	23	15.4	42	28	65	21.7
	751-1000	6	4	21	14	27	9
	>1000	11	7.2	38	25.4	49	16.3
Literacy status	Illiterate	26	17.3	11	7.4	37	12.3
	Primary	56	37.3	35	23.3	91	30.3
	High School	44	29.3	57	38	101	33.8
	HSLC pass	16	10.7	21	14	37	12.3
	HS passed & above	8	5.4	26	17.3	34	11.3
Occupation\$	Cultivator	77	51.2	47	31.3	124	41.7
	Daily wage earner#	62	41.3	19	12.7	81	27
	Skilled labourer	5	3.3	2	1.3	7	2.3
	Service	26	17.3	37	24.7	63	21
	Business	10	6.6	61	40.7	71	23.3
	Others*	17	11.3	8	5.3	25	8.3

\$Multiple response

#Work in quarries, logging of woods, forest clearing projects and construction work.

*Fisherman, silkworm rearing, selling household produce like betelnuts and vegetables etc, agricultural labour, income from house renting and from pension.

Table 2: First preference of health facility for seeking treatment for malaria in the studied households (N=300)

Choice of health service providers	Tribal (n=150)		Non-tribal (n=150)	
	No.	%	No.	%
Nearby pharmacist	57	38	55	36.7
Doctor at government health facility	38	25.3	45	30
Visit local private practitioner	25	16.7	32	21.3
Doctor at private health facility/ nursing homes	22	14.7	15	10
Others (quacks/traditional)	8	4	3	0.7
Total	150	100	150	100

Table 3: Reasons for not preferring government health facility for treatment among the studied households (N=300)

Reasons	Tribal (n=108)		Non-tribal (n=95)	
	No.	%	No.	%
Distant location	45	41.7	10	10.5
Lack of drug supply (has to buy medicines)	37	34.2	25	26.3
Doctor available for limited hours	68	63	45	47.4
Long waiting hours	25	23.1	24	25.3
No blood testing facility	45	41.7	32	33.7
Indifferent attitude of health personnel	10	9.2	36	37.9

* Multiple responses

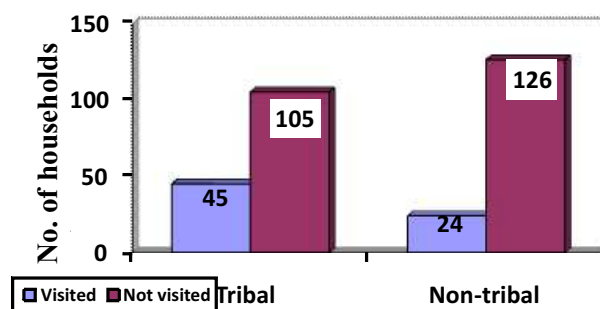


Fig. 4: Households reporting visit by a MPW in 12 months recall period

Table 5: Malaria treatment profile of the fever cases found during the study period (n=21)

Type of services sought	Response	Tribal No.	Non-tribal %	No.	%
Antimalarial received	Yes	9	56.2	3	60
	No	7	43.8	2	40
	Total	16	100	5	100
Laboratory blood test done	Yes	9	56.2	2	40
	No	7	43.8	3	60
	Total	16	100	5	100
Diagnosis reports received	Yes	4	25	1	20
	No	12	75	4	80
	Total	16	100	5	100
Source of treatment	Government health facility	2	22.2	-	-
	Private Practitioner	1	11.2	1	33.3
	Pharmacist	4	44.4	2	66.7
	Others*	2	22.2	-	-
	Total	9	100	3	100

Although DDCs were phased out by 2005, the existing FTDs established in remote and inaccessible areas will now provide malaria treatment with the help of Anganwadi Worker (AWW) and Auxiliary Nurse Midwife (ANM) where there are no malaria surveillance activities due to absence of malaria staff.^{1,8}

Majority of tribal (56.7%) compared to non-tribal (9.4%) households perceived malaria as a problem but their knowledge about importance of timely treatment of malaria cases was less (17.3%) compared to non-tribal (30%) counterparts, probably because of the higher literacy status among non-tribals (72.4%) compared to tribals (67.5%).

Factors like limited availability of doctors during the day hours, lack of blood testing facility and not getting free drugs including antipyretics and anti-malarials are few deficiencies in the government health facility as mentioned in Table 3. Community is of the opinion that after

consulting doctor at one place, going to buy medicines at another place causes them more expenditure in travelling and also wastage of time away from household responsibilities. Non-availability of facilities in interior villages, hilly areas and tribal belts and delayed referral from periphery due to difficult communication, late treatment of cases due to non-availability of drugs in interior places cause delay in diagnosis.⁴ These problems stated are all inter-related. Similar views are expressed in other studies.^{10,11} Socio-economic status was lower in most tribal households (24%) compared to non-tribal (12.6%) but the use of public health facilities was higher among non-tribal households (30%) compared to tribal households (25.3%). As distant location of the public health facility was mentioned by 41.7% of the tribals, it might be the reason for less utilization. Among the non-tribals, it was not a major contributing factor with only 10.5% mentioning it.

Majority of the tribal (88%) and non-tribal

(92.7%) households expressed that they had to wait for at least 24 hours due to various reasons. Age of the individual, severity of symptoms, season of occurrence, poor accessibility to health center and inability to buy medicines influenced their decision of initiating early treatment. Most of them were of the opinion that the delay in seeking malaria treatment in case of fever in a young child was because there are other causes of fever like measles and viral fever that are common during that season, also to avoid the expenses of medication as well as wrong treatment they would like to wait. Similar findings are reported in other studies.^{11,12,13} Treatment of fever in young children needs to be addressed in the national programme so that community and health workers are more confident in treating such cases. Partly in the new action plan blister packs for different paediatric age group has been introduced for Artemesinine Combination Therapy-Sulphamethoxazole (ACT-SP) use.¹

Also surveillance activity was almost non-existent with only 2 (1.4%) of the tribal respondents and 1 (0.6%) of non-tribal respondents reporting a fortnightly visit by MPWs. Table 4 shows the poor surveillance in the study area. Recent epidemics of malaria in Assam were due to poor surveillance.^{1,2}

The rural community is forced to use other sources for treatment and spend on malaria treatment which are otherwise provided free of cost through these health centers. Only 12 (8%) of the tribal household depend on MPWs visit for treatment and this might be due to the fact that they are illiterate and economically backward forcing them to be dependent on MPW's visit. But none of the non-tribal households depended on MPWs which might be due to lack of surveillance activities or might be due to higher literacy and economically better position in non-tribal areas.

The above issues have been addressed in the new action plan of NVBDCP where Accredited Social

Health Activist (ASHA) and ANM are trained in malaria diagnosis and administering antimalarials in areas where health facilities are not accessible. Rapid Diagnostic Test (RDT) is introduced in high risk areas where there is no facility to receive microscopy reports within 24 hours. This would prevent delay in treatment seeking.¹ The effectiveness of these centers will determine the malaria control and therefore proper functioning of the FTDs needs to be monitored. MPWs in malaria surveillance was non-existent in non-tribal areas and minimal in the tribal areas and therefore the weekly visit and identification of fever cases by ASHA and ANM will increase case detection and treatment. There was no awareness among the study population about the previous presumptive or radical treatment strategies. Now in malaria endemic areas, where all fever cases clinically suspected to be malaria will receive full 3 days course of chloroquine has simplified the treatment and will be easier to implement.^{1,2} However, as applied in Directly Observed Shortcourse (DOTS) in Tuberculosis, for malaria too awareness needs to be created in the rural community. The treatment received by the few fever cases studied as shown in Table 5 indicates that blood testing and reporting needs to be improved. Also compliance and adherence needs to be seen for complete cure.

In this study, self-medication with anti-malarials however was not found. This is encouraging as such practices are known to be associated with development of drug resistance which is currently posing a threat in malaria endemic regions, including Northeastern India.^{14,15} Although majority of the study population resorted to allopathic treatment, 4% tribal and 2% non-tribal households were also found to be using traditional medicine for initial treatment of fever at home. This value is much less compared to other studies.¹⁶ This needs to be studied further. Use of traditional medicines has decreased recently as corroborated by other studies.^{17,18}

In this study none of the households were aware of FTDs as source of treatment which means a greater awareness needs to be created among the study population about the recent services introduced. Recent assessment of the Behavioural Change Communication (BCC) during the antimalaria awareness campaign was found to be inadequate particularly in rural and tribal areas^{2,19} and these needs to be addressed so that the community is empowered to control malaria infection. This will certainly improve the care seeking practices with respect to treatment, diagnosis and compliance and thereby bring down the malaria burden in this country.

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