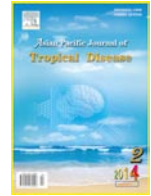




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An evaluation of National Anti-malaria Programme in a district of Karnataka, India

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ABSTRACT

Objective: To assess the implementation of ongoing National Anti-Malaria Programme, malaria surveillance and the awareness of adult responsible respondents regarding mosquito borne diseases in Raichur District.

Methods: Four clusters (three Primary Health Centers from rural area and one Health Center from urban area) were randomly selected based on annual parasite incidence of 2009 for Raichur District. All four clusters were visited and information was collected on anti-malaria activities. A number of 200 households (50 in each cluster) were visited by using random selection procedure and information was collected on knowledge and practices regarding malaria.

Results: Cluster B (rural) and C (rural) had annual blood examination rate of 20.50 and 22.00, annual parasite incidence of 5.00 and 9.80, respectively. Out of 88 fever cases were detected during the survey, only 3 (3.4%) fever cases were visited by health worker and 2 (2.3%) cases were taken blood smear for malaria diagnosis as part of passive case detections. Household survey showed that only 28.8% were aware of malaria was mosquito borne disease and 120 (60.0%) were not aware any of the diseases caused by mosquito bite.

Conclusions: The present evaluation in the Raichur District revealed lacunae in the ongoing programme.

1. Introduction

Malaria is a serious global health concern pushing around 40% of the world's population at risk of infection[1]. In India, malaria continues to be an important public health problem and major deterrent to the development of the nation. In the recent past, endemic areas have witnessed the emergence of resistance by the agent and vector to the conventional anti-malarial drugs and insecticides, which has led to the recognition of malaria as a re-emerging disease[2]. National Vector Borne Disease Control Programme has reported 1.59 million malaria cases including 0.83 million falciparum

cases and 1018 malaria deaths in 2010[3].

Indian malaria control strategy has primarily adopted indoor residual spraying (IRS) and case detection and treatment. Recently, effective tools such as insecticide treated nets (ITNs), rapid diagnostic kit (RDK) and artemisinin combination therapy were added to reduce the menace of malaria in the country[4].

In South India, Karnataka reports the highest incidence of malaria cases and it is the 5th state in the country contributing the highest malaria cases. Raichur District is considered highly malaria endemic, along with six districts contributing to more than 80% of case load of the state. The official report shows that in 1999 and 2006, these districts have witnessed the outbreak of malaria[5].

Extensive literature review revealed the dearth of information at that point of time on evaluation of ongoing national programme on malaria controlled by external agencies. In this regard, the present research was undertaken to evaluate selected components of ongoing

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malaria control activities in one of the highly endemic district of Karnataka, India.

2. Materials and methods

The current evaluation was conducted per instructions of Regional Office for Health and Family Welfare (ROHFW), Kendriya Sadana, Government of India, Bangalore as a part of evaluation by external agency for a period of 7 d. Totally four clusters, three primary health centres (PHCs) from rural area represented as A, B and C and one Health Center from urban area represented as cluster D were randomly selected based on annual parasite incidence (API) in the year 2009 for the Raichur District as per instructions of ROHFW, Bangalore, India (Figure 1). All the PHCs of the district were listed and categorized according to API such as <2.00%, 2.00%–5.00% and >5.00%. One PHC was selected randomly by lottery method from each category to get three clusters from rural area. All the wards of Raichur City were listed and one ward was selected randomly by lottery method to get one cluster from urban area (Figure 2).

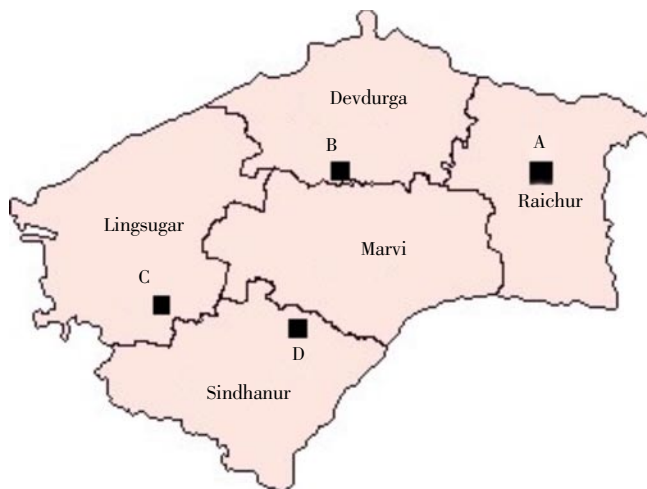


Figure 1. Map of the Raichur District showing the selected clusters.

All of the four clusters were visited and information on malaria indices was collected from malaria files. Information on anti-malaria activities such as RDK, ITNs and IRS were also collected.

In PHC, subcentres and villages coming under the jurisdiction were listed, and a subcentre and a village were selected randomly by lottery method for household survey. A total of 200 households (50 households from each cluster) were visited by using random selection procedure as adopted under coverage evaluation survey and responsible adult respondents between 18–60 years old were interviewed using structured questionnaire. Data was entered in Microsoft Excel and analysis was done using SPSS 19.0 Version.

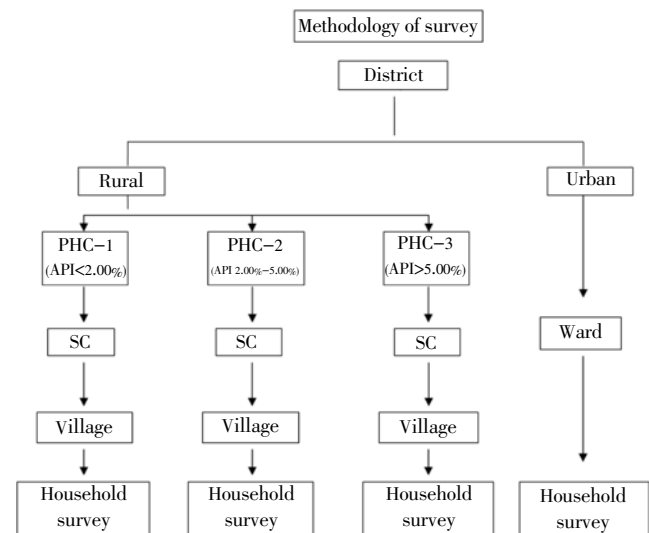


Figure 2. Random selection of four clusters by lottery method.

3. Results

The present evaluation observed that clusters B and C had annual blood examination rate (ABER) of 20.50% and 22.00%, API of 5.00% and 9.80%, and slide positivity rates (SPR) were 2.50% and 4.50%, respectively. Cluster A and D had ABER of 8.60% and 3.40%, API of 0.05% and 0.02%, and SPR of 0.06% and 0.09%, respectively. Cluster B and C has API > 5.00% indicating high endemicity. In all the clusters, positive cases were treated and given radical treatment. Follow up of the cases after treatment was done in cluster A and D but in cluster B and C follow up was inadequate (Table 1).

Table 1

Distribution of clusters according to malarionetric indices.

Malarionetric indices	A (rural)	B (rural)	C (rural)	D (urban)
ABER (%)	8.60	20.50	22.00	3.40
API (%)	0.05	5.00	9.80	0.02
SPR (%)	0.06	2.50	4.50	0.09
Slide vivax rate (%)	0.06	2.12	3.65	0.09
Slide falciparum rate (%)	–	0.30	0.81	–
Annual blood smears collected (n)	7885	6328	6755	1156
Annual blood smears examined (n)	7885	6328	6755	1156
Positive cases (n)	5	156	302	1
Cases received radical treatment (n)	3	156	302	1
Cases received follow up after treatment (n)	3	–	51	1

Eighty eight fever cases were detected during house to house survey. And there were 46 (52.3%) females and 42 (47.7%) males. Majority [60 (68.2%)] of the fever cases were <20 years old (Table 2). Only 3 (3.4%) cases were visited and collected blood smear for examination by health workers as a part of active case detection (ACD), which indicated poor ACD. Twenty two (25.0%) fever cases went to government health facilities for treatment, but only 2 (2.3%) cases were collected blood smears as a part of passive case

detection (PCD). The evaluation revealed poor active and PCD activities. Majority [65 (73.9%)] visited private clinics/hospital for treatment of fever.

Table 2

Age and sex distribution of fever cases. *n* (%).

Age (years)	Male	Female	Total
1–10	25 (59.5)	15 (32.6)	40 (45.5)
11–20	7 (16.7)	13 (28.2)	20 (22.7)
21–30	2 (4.8)	3 (6.5)	5 (5.7)
31–40	2 (4.8)	6 (13.0)	8 (9.0)
41–50	2 (4.8)	5 (10.9)	7 (8.0)
51–60	3 (7.1)	2 (4.4)	5 (5.7)
>60	1 (2.3)	2 (4.4)	3 (3.4)
Total	42 (100.0)	46 (100.0)	88 (100.0)

The current study observed that 72 (36.0%), 16 (8.0%), 3 (1.5%), and 7 (3.5%) were aware of malaria, dengue, filaria and chikungunya fever caused by mosquito bite, respectively. It was interesting to note that the remaining 120 (60.0%) were not aware of any of the diseases caused by mosquito (Table 3).

Table 3

Distribution of responsible adult respondents according to awareness of diseases caused by bite of mosquitoes (*n*=200). *n* (%).

Mosquito borne diseases	Male	Female	Total
Aware			
Malaria	30 (46.9)	42 (30.9)	72 (36.0)
Dengue	3 (4.7)	13 (9.5)	16 (8.0)
Filaria	–	3 (2.2)	3 (1.5)
Chikungunya fever	1 (1.5)	6 (4.4)	7 (3.5)
Not aware	62 (96.9)	38 (27.9)	120 (60.0)

The data was collected by multiple responses.

The distribution of anti-mosquito measures according to their usage in the households has shown that majority [121 (53.1%)] households were in the habit of using untreated bed nets, followed by 35 (15.4%) coil, 24 (10.5%) liquid vaporizers and 42 (18.4%) were not using any anti-mosquito measures. IRS was undertaken in two clusters where API>2.00% by using cyfluthrin. Among 100 households surveyed, IRS was undertaken only in 19% households, and 44% households had refused IRS and 37% households were not aware of IRS in that area.

In the district, around 20 000 ITNs were distributed free of cost in 2008. There were no records available on distribution pattern *i.e.*, selection criteria used for identification of beneficiaries, percentage of coverage and re-treatment of nets with insecticides. Survey team did not find any of the household using distributed ITNs and 500 RDKs were distributed to health workers in 2006 for rapid diagnosis by Government of India. They were distributed without any proper norms and trainings on its usage. Evaluation revealed that Anganawadi workers and Accredited Social Health Activist (ASHA) workers who played a pivotal role in delivering health services at the grass root level were not involved in any anti-malaria activities.

4. Discussion

The present evaluation in Raichur District of Karnataka has shown that, cluster A has low ABER. Similarly, a study conducted in West Bengal has shown a low ABER of 3% to 4%, these figures reflected inadequate disease surveillance by the health workers[6]. The National Vector Borne Disease Control Programme and World Health Organization recommend that ABER should be at least 10% with a presumption that 10% of the population in a year will have fever at one point of time or another. Cluster D also had low ABER. In India, even though urban areas contribute 15% of the malaria cases due to an almost non-existent surveillance, it still reported low malaria incidence[7,8].

The ABER of <10% is suggestive of fragmented or inadequate disease surveillance and API should be viewed with skepticism[9]. In cluster B and C, where API were ≥5.00% had very low follow up after the radical treatment. In the light of drug-resistant strains of plasmodium and frequent occurrence of recurrent infections follow up of cases is considered as important component under the programme.

This evaluation observed that majority of the fever cases were in the age group of 1–20 years which strengthen the evidence that malaria affects mainly children and its incidence wanes away as age progresses and another important observation was poor ACD at field level and PCD among the fever cases who utilized government hospitals. This is one of the possible reasons behind the under-performance of ABER in two clusters in the survey. This could be due to lack of trained manpower in the district. It is evident that, the district manned with only 96 malaria workers in 232 subcentres and ASHA and Anganwadi workers were not involved in malaria activities. Similar finding was observed in a study conducted in Assam[10].

Recently National Rural Health Mission has promoted training of ASHA workers in the diagnosis of malaria using RDK and anti-malarial drug administration[11]. In this regard, the present ACD, PCD and ABER can be improved by involving 1214 ASHA workers and 2021 Anganawadi workers in the diagnosis and treatment of malaria in the district.

The evaluation revealed 73.9% of the fever cases took treatment from private clinics/hospitals. Similarly, a study conducted in Assam found that 72% of the fever cases preferred treatment from other than government hospital[12]. This could be due to the fact that majority of the community is unaware of the services for malaria provided in government facilities. This trend shows that a large number of patients avail medical care from private institutions which do not keep or report disease statistics to health authorities is one of the reasons for underestimation of incidence of malaria and an important reason behind the development of resistance against anti-malarials. In the programme, private sector should be involved in reporting and standardizing the case management of malaria. In

this regards, it is prudent to identify all agencies offering treatment of malaria and organize sensitization sessions on reporting and uniforming treatment guidelines for malaria.

The awareness of malaria caused by mosquito bite was poor and the majority was not aware of diseases caused by mosquito bite. These results indicate a lack of clear knowledge about the spread of the disease. Similar findings were observed in a study conducted in Ethiopia^[13]. This could be attributed to literacy level prevalent among respondents. In the present study, a total of 58.6% of the respondents were illiterate.

In this study, majority of the households were using untreated bed nets. The studies done in Orissa and Southern Ethiopia were shown similar findings^[14]. These evidences strengthen the fact that mosquito nets are the major mode of preventive measure against mosquito bites in endemic areas due to its cost-effectiveness. In 2008, ITNs were distributed haphazardly free of cost without any guidelines. A study conducted in Madhya Pradesh also found similar situation^[15].

Regarding IRS, only 17.3% of the households were covered under the programme. A study conducted by Phukan *et al.* in Assam showed IRS coverage ranged from 17%–43%^[12]. The World Health Organization recommends 85% coverage to reduce the density of infectious mosquitoes and their longevity. The effectiveness of the anti-mosquito measures can be improved by appropriate combination of ITNs/IRS intervention.

The limitation of the present evaluation was due to time constraints, few components of the programme were covered. In this regard, a well planned and systemic evaluation by external agencies covering all the aspects of programme is needed at regular intervals. This will provide evidence based information to strengthen the programme and incorporate the recommendations to formulate better controlled strategies which will go a long way in reducing the malaria burden in the district.

The present evaluation in the Raichur District revealed lacunae in the ongoing programme. All these lapses put together increase the chances of an outbreak. This situation can be minimized by improving the quality of anti-malarial activities in the district.

Conflict of interest statement

We declare that we have no conflict of interest.

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