

## Malaria Control - An Over View in India

Mahendra Panda and A. Mohapatra

### INTRODUCTION

*“Without our realizing it, medicine has carried us into the social sphere, there to meet up with the great problems of our time. Let us be well aware that we are not concerned here with the treatment of a patient by means of medicinal remedies and the adjustment of his home environment. No, we are dealing with the entire culture of a million and a half of our fellow citizens who have been physically and morally degraded.”* Rudolf Virchow, 1848

Malaria exists in 100 countries but is mainly confined to poorer tropical areas of Africa, Asia and Latin America. More than 90% of malaria cases and the great majority of malaria deaths occur in tropical Africa. *Plasmodium falciparum* (Pf) is the main cause of severe clinical malaria and death. (WHO-TDR-2000 Report). One of the main components of WHO's current malaria control strategy is on early recognition and prompt treatment of malaria. Rapid identification of malaria and adequate treatment are essential for preventing irreversible complications, by which most deaths can be avoided. But it has been found that even in areas with good access to health care, it is common for malaria patients to present at the health facility late or not at all, hence the effectiveness of any malaria control strategy is decreased with the less-active and less-informed participation of the intended beneficiaries in the community<sup>1,2</sup>. Spreading of disease is more fatal because people do not understand the route of transmission of malaria, and its prevention because of ignorance as well as less or no community education efforts related to the role of disease-carrying mosquitoes, and their preferred breeding habitats and feeding behaviors. Also it has been found that only bed-nets or other incentives may not protect people from malaria unless people are aware about the disease and the vector habits properly<sup>4</sup>. Women in particular are critical targets groups of malaria threats because of their work habits and ignorance towards vectors causing malaria and less-informed and participation in the vector control programs in the locality<sup>3</sup>. The areas where malaria is most prevalent are often the poorest regions of

the world. Families now spend considerable portions of their disposable income on health care, often for malaria treatment. However, families who use low-tech, relatively low-cost bednets do better overall<sup>5</sup>. Family members can be more productive, have fewer bouts of illness, and do not have to spend hard earned money on a variety of prevention methods and treatments. The results provide ample economic justification for malaria control<sup>6</sup>. As with other public health programs and control methods, governments and donor agencies contribute to the costs<sup>5</sup>. With these significant results, additional donor support is needed to ensure the results are implemented quickly and reach the children who need it most. It has been suggested that nets can be made more affordable to individual households through changes in trade policies, encouraging local mass production, providing community credit, and other financial schemes. For indoor house spraying, DDT generally remains the cheapest insecticide to apply, but the cost differences are no longer as great as they once were applied. As synthetic pyrethroids have come down in price, the price of DDT is now going up. In addition, the market for DDT is shrinking, and only three known producers remain (India, China, and Mexico—the latter is now phasing out its production). The price of synthetic pyrethroid can be expected to go down as demand increases. A 1999 cost comparison by the U.S. Environmental Protection Agency shows that indoor house spraying with pyrethroid insecticides is becoming competitive with DDT spraying. Estimated product cost per house treated with DDT ranges from US\$1.60 - \$4.27, with equivalent costs for synthetic pyrethroid in similar ranges: permethrin, \$2.10 - \$8.40; cyfluthrin, \$3.30 - \$7.73; lambda-cyhalothrin, \$3.76 - \$7.52; and deltamethrin, \$4.00 - \$8.00. Between 1955 and 1969, armed with DDT and other insecticides and the affordable drug chloroquine, WHO carried out a Global Malaria Eradication Campaign. As a result, the disease has disappeared from previously malarious areas that are home to 35% of the world's population. It has been eradicated from all developed endemic countries. Large areas of subtropical Asia and Latin America were freed

or practically freed from the disease. It recognized that malaria problems varied enormously from country to country, from area to area and even within different groups of the population, and that control efforts must be adapted accordingly, if they were to succeed. *P. falciparum* malaria is the cause of all the mortality and most of the morbidity in malaria. It can present with atypical features, it can cause dramatic complications and to add to the woes, treatment may be rendered difficult by resistance to antimalarial drugs. Treatment of *P. falciparum* malaria therefore is different from that of other types of malaria. It depends on the severity of infection, status of the host and drug sensitivity pattern in the locality. In view of these, seriousness of the problem and synergistic toxicity of antimalarial drugs, the drugs should be properly chosen right at the start of the treatment. Changing the drugs or adding of drugs halfway through the treatment only complicates the issue and adds to the adverse effects of treatment<sup>4</sup>.

#### MALARIA SITUATION IN INDIA

Malaria has been a problem in India for centuries. Details of this disease can be found even in the ancient Indian medical literature like the 'Charaka Samhita'. In the 30's there was no aspect of life in the country that was not affected by malaria. The economic loss due to the loss of man-days due to malaria was estimated to be at Rs. 10,000 million per year in 1935. The annual incidence of malaria was estimated at around 75 million cases in 1953 with about 8 lakhs deaths annually (Table 1). Table 1 shows a detail epidemiological picture of malaria situation in India year wise. Malaria has now staged a dramatic comeback in India after its near eradication in the early and mid sixties.

For the first time to combat the menace of malaria, the Govt. of India had launched the National Malaria Control Programme in April 1953. The programme proved highly successful and within five years the incidence of malaria had been dropped to 2 million. Encouraged by this, the programme the central government started the National Malaria Eradication Programme (NMEP) in 1958. By 1961 the incidence dropped to a mere 50,00 cases a year. But since then the programme suffered repeated setbacks due to technical, operational and administrative reasons and the cases started rising again.

**Table 1: Incidence of malaria in India**

Year	Total cases	<i>P. falciparum</i>	Deaths
1947	75 million	-	8,00,000
1961	49151	-	-
1965	99667	-	-
1976	6.47 million	0.75 million	59
1984	2.18 million	0.65 million	247
1985	1.86 million	0.54 million	213
1986	1.79 million	0.64 million	323
1987	1.66 million	0.62 million	188
1988	1.85 million	0.68 million	209
1989	2.05 million	0.76 million	268
1990	2.02 million	0.75 million	353
1991	2.12 million	0.92 million	421
1992	2.13 million	0.88 million	422
1993	2.21 million	0.85 million	354
1994	2.51 million	0.99 million	1122
1995	2.93 million	1.14 million	1151
1996	3.04 million	1.18 million	1010
1997	2.57 million	0.99 million	874
1998	2.09 million	0.91 million	648
1999	2.28 million	1.14 million	1048
2000	2.02 million	1.05 million	931
2001 (P)	1.97 million	0.94 million	928

Source:- NMEP, DGHS-India

Early set backs of malaria control programme in India is coincided with DDT shortages. Later in the 1960s and 1970s malaria resurgence was the result of technical, financial and operational problems (Table 2).

In the late 1960s malaria cases in urban areas started to multiply, and upsurge of malaria was widespread. As a result in 1976, the National Malaria Eradication Programme (NMEP), recorded highest since resurgence, 6.45 million cases. The implementation of urban malaria scheme (UMS) in 1971-72 and the modified plan of operation (MPO) in 1977 improved the malaria situation for 5-6 years. Malaria cases were reduced to about 2 million. The impact was mainly on vivax malaria. Easy availability of drugs under the MPO prevented deaths due to malaria and reduced morbidity, a peculiar feature of malaria during the resurgence. The Plasmodium falciparum containment programme (PfCP) launched in 1977 to contain the spread of falciparum malaria reduced falciparum malaria in the areas where the containment programme was operated but its general spread could not be contained. *P. falciparum* showed a steady upward trend during the 1970s and thereafter. Rising trend of malaria was facilitated by developments in various sectors to improve the national economy

**Table 2: Malaria control programme in India**

1946:	India started using DDT
1953:	NMCP is started
1958:	NMCP re-named as the NMEP
1959:	The first time vector resistance is first detected in India (in Gujarat)
1965:	Malaria begins to re-emerge
1976:	Peak of malaria cases in reemergence period
1977:	India starts MPO and Pf. PC
1985:	Only 2 million annual cases of malaria in India
1991:	Peak of <i>P. falciparum</i> cases
1992:	NMEP is renamed as National Anti Malaria Programme –NAMP
1994:	Large scale epidemics, primarily in North-eastern India, Haryana and Rajasthan.
1995:	Programme strategy reviewed and recommended area specific approach in vector control strategy.
1997:	EMCP programme started with World Bank assistance.

under successive 5-year plans. Malaria at one time a rural disease, diversified under the pressure of developments into various ecotypes. These ecotypes have been identified as forest malaria, urban malaria, rural malaria, industrial malaria, border malaria and migration malaria; the latter cutting across boundaries of various epidemiological types. Further, malaria in the 1990s has returned with new features not witnessed during the pre-eradication days. These are the vector resistance to insecticide(s); pronounced exophilic vector behaviour; extensive vector breeding grounds created principally by the water resource development projects, urbanization and industrialization; change in parasite formula in favour of *P. falciparum*; resistance in *P. falciparum* to chloroquine and other anti-malarial drugs; and human resistance to chemical control of vectors (Table 3). Table 3 reveals a phase wise resistance as reported district wise. Malaria control has become a complex enterprise, and its management requires decentralization and approaches based on local transmission involving multi-sectoral action and community participation. Realising the difficulties in controlling/eradicating malaria, the National Malaria Eradication Programme has been now renamed as National Anti Malaria Programme. During this period of resurgence of malaria, certain states of the Union of India like Uttar Pradesh, Bihar, Karnataka, Orissa, Rajasthan, Madhya Pradesh and Pondichery are found to be worst affected, particularly with increasing incidence of *P. falciparum* infection. Most parts of India have a high trans-

mission of *P. vivax* malaria and Chloroquine resistant *P. falciparum* is reported from the North-Eastern states, Orissa of India. The high altitude states of Jammu and Kashmir, Himachal Pradesh and Sikkim are free from malaria. Malaria transmission is low or very low in areas at an altitude >2000 meters.

**Table 3: Insecticidal resistance pattern in India**

Insecticide	States	Districts	Vector
DDT	18	286	Anopheles culicifacies
	7	34	An. Stephensi
HCH	16	233	Anopheles culicifacies
	6	27	An. Stephensi
Malathion	8	71	Anopheles culicifacies
	3	8	An. Stephensi

### Reasons of Resurgence of Malaria in India

It often discussed many a times that due to lack of proper budget allocation there was a set back in the malaria control programme in India. Of course, it is right. Added to that, even in EMCP programme, it is observed that funds were allocated, but result is not satisfactory. Hence, from the experience in 7- EMCP states, it is found that there lacks timely supervision of superiors. As a result there was a lack in the RT- radical treatment, in time. i.e. the present health infrastructure has to be properly oriented towards malaria; presently malaria is not their priority disease, as it was earlier during sixties.

The second reason is people; who were not aware of details of malaria, its vector, spray components & their role in malaria control. The programme also never before emphasized to make them understand these aspects. Earlier, when malaria was controlled to a great extent was only due to a set of dedicated malaria control staff. Now that much of voluminous staff is not affordable, the growing population can be used in the community level, but to seek their participation, we have to make them understand through proper IEC, advocacy and orientation trainings.

### CONCLUSION

Since malaria is changing its facet from time to time; with the change of human factors and the natural causes, so to tackle the problem

effectively it is essential to bring about the change in the behavioural pattern among the rural population and especially among the migrant labourers etc, who are frequently traveling from one direction to another while carrying out the malaria parasite with them. The control strategy will be fruitful when people understand the problems along with the health worker and take seriousness of the problem among them selves.

#### ACKNOWLEDGEMENT

We owe our gratitude for the co-operation and help being extended by our Director Dr. S.K Kar in the initial phase of preparation of this paper.

**KEYWORDS** Malaria Situation. Control Strategy. Man-made Natural Destructions

**ABSTRACT** The present paper is an attempt to highlight the malaria situation in the context of malaria eradication programme in India. The man-made natural destructions such as concretization, water storage for future consumption, irrigation etc., sometimes shouldered the responsibility of emerging malaria in the non-endemic areas. The findings reveal the fact that besides other factors, it is essential to bring about the changes in the health seeking behaviour among the rural inhabitants and especially among the migrant laborers, who are frequently traveling from one direction to another with carrying the malaria parasite with them. The control strategy will be fruitful & it can achieve the goal when people understand the problem of disease spread and its management & can realize the seriousness of the disease, along with the Health workers. The health workers have to be oriented to malaria properly along with the community for better malaria control.

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**Authors' Address:** Dr. Amarendra Mohapatra and Mr. Mahendra Panda, Epidemiology Division, Regional Medical Research Centre (ICMR), Bhubaneswar 751 023, Orissa, India.  
E-mail: amar\_maha@rediffmail.com & panda\_mahendra@rediffmail.com