EPIDEMIOLOGICAL SITUATION OF MALARIA IN SOUTH EAST ASIA WITH FOCUS ON INDIA

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ABSTRACT

Malaria contributes a most stimulating chapter in the annals of biological parasitism. At present the disease is endemic in 91 countries with about 40% of world population at risk. Among all infections malaria continues to be one of the biggest contributors to disease burden in terms of morbidity, suffering and deaths specially in Africa. By lowering the productivity it is closely linked to poverty and contributes significantly to stunting social and economic development.

We, in South East Asia, are living in paradoxical situation, on one side we spent large sums and energy to control/eradicate malaria and on the other hand we simultaneously create malariogenic conditions in the process of development efforts eg. irrigation canals, water supply scheme and urbanisation.

The disease is endemic in all the seven countries of South East Asia with P.f.% ranging from 2.47% in Nepal to 55% in Pakistan. In India although the total number of cases are almost static in last 10 years however the P.f. cases are on increasing trend.

The malaria in tribal area is further posing a great threat. Annually 0.2% of the population suffers with malaria. However it is 1.5% in tribal area and 60% of deaths due to malaria are reported from tribal area. In 1984 there were 24% cases of *P. falciparum* malaria out of them 57% were in tribal area however in 1995 the total cases increased to 36% and P.f. proportion to 75%. Technical side the chloroquine resistance and insecticidal resistance are also spreading in new area which also complicate the disease epidemiology.

The migration of population, deforestation, inadequate resources increase in epidemic potential and neglect of epidemiology are other important factors responsible for changing epidemiological pattern of malaria.

KEY WORDS - Epidemiology, Malaria, South East Asia

THE PROBLEM

The malaria eradication campaign was launched in post war period with the intension to eradicate malaria mainly based on residual DDT spray. In 1974 malaria was eradicated from 37 countries mainly of Europe and America. The response to eradication programme was either complete success or collapse. The resurgence of malaria started immediately and in 1970's India reported massive resurgence.

By 1975 it was clear that "Malaria is still widespread. In many areas, antimalaria opera-

tions were beset by administrative, organisational, personnel, operational & financial difficulties. In addition there were technical problems such as insecticidal resistance, the behaviour pattern of some mosquitoes and drug resistance in parasite as well as population movements & other factors".

For malaria, WHO's division of CTD classifies the world into four zones (1,2).

—Areas where there was never malaria or malaria was eradicated without specific measures. (27% of the world's population).

—Areas where the eradication campaign of the 1960s was successful and success has since been maintained (31%).

—Areas where malaria was resurged after earlier reduction. (33%)

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—Area where endemic malaria has never substantially changed (9%)

The last group represents tropical group of Africa where 90% of clinical cases occurs. Outside Africa some two thirds of remaining 10% cases occurs in just three countries - Brazil, India and Srilanka.

SOUTH EAST ASIA

It is estimated that 1.2 billion people live in malarious areas and 23.6 million new cases and 40000 deaths occurred in the region in 1995. The region represents 8% of total disease burden on proportion of global estimates and 30% of drug resistant cases.

For Myanmar, malaria is a major public health problem, while for other countries, intense malaria transmission occurs only in some parts. e.g. Bangladesh, India, Indonesia, Nepal, Thailand, Srilanka. Drug resistance P.f. is reported in all endemic countries in the region but with different trends of prevalence. Resistance to chloroquine in Indonesia, Thailand (border areas) and Myanmar is highly prevalent.

MALARIA IN SAARC COUNTRIES (3)

As far as Malariometric indices are concerned Bhutan has highest ABER, API & SFR while P.F. % is highest in Pakistan and Bangladesh (Table-1).

MALARIA SITUATION IN INDIA (4)

Before independence, malaria was a major public health problem. In the thirties about a third of population suffered from disease and of these at least 10 lakh persons died each year as direct effect of malaria. In 1945 every year 7.5 crore people used to suffer from malaria and of these about 8 lakh people died each year.

In 1953 NMCP was started and based on its remarkable success NMEP was launched in 1958. The result was spectacular in 1965 there was only 100,000 cases and nil deaths. Thus malaria came to vanishing point and was very close to eradication. However due to various reasons the resurgence occurred and reached to peak in 1976 when 64 lakh cases and 59 deaths were reported.

The MPO was launched in 1977 as well as P.f. containment programme was launched in 112 districts. The effects were soon visible. The number of cases came down from 64.67 lakhs in 1976 to 21.82 lakhs in 1982. (table 2). Since then the situation has reached a plateau. In brief MPO except stabilising malaria cases to a level of about 20 lakh, has failed in its objectives. It should also be noted that due to inadequate surveillance, the reported figures of incidence are grossly under estimated.

POPULATION AT RISK

Leaving apart about 15 million population which is living at or above 5000 ft above mean

Table-1 : Malariometric Indices SAARC (1995)

Country	INDEX				
	ABER	API	SPR	SFR	PF%
Bangladesh	1.22	1.28	10.48	5.21	49.79
Bhutan	23.9	66.2	27.6	8.9	32.5
India	9.23	3.19	3.45	1.34	38.92
Maldives	5.08	0.07	0.15	-	-
Nepal	1.80	0.79	4.23	0.10	2.47
Pakistan	NA	NA	NA	NA	55.0*
Sri Lanka	6.1	7.9	13.0	2.1	16.3

*about

Source : WHO SEARO

NA - Not Available

Table-2 : Epidemiological Situation In India

Year	Malaria Cases (Millions)	API	PR	PF (Millions)	Deaths
1976	6.47	11.24	11.55	0.75	59
1984	2.18	3.08	3.29	0.65	247
1991	2.11	2.61	2.82	0.92	421
1992	2.13	2.58	2.69	0.88	422
1993	2.21	2.65	2.83	0.85	354
1994	2.51	2.91	3.06	0.99	1122*
1995	2.80	3.19	3.45	1.09	1061*

* Including Clinical Malaria

sea level, the whole population of country is at risk of malaria. The following groups however are more prone to suffer with malaria.

(i) Tribal population.

(ii) Infants, preschool and school children, pregnant and lactating women living in high endemic areas.

Persistence of malaria has been attributed to genetic polymorphism, socio-economic and cultural characterisation, inaccessibility of health services. The tribal population constitutes 8.08% of the country's total population according to 1991 census. As for an estimate of 1984, over 54 million tribal population are residing under different eco-epidemiological forest belt and with API more than 2 for last 3 years.

The high endemicity may be understood by the fact that in India 0.2% of the population suffers from malaria annually but in the tribal area it is 1.5%. Moreover 60% deaths due to malaria occurs in tribal population. The tribal area also represents 36% of total malaria cases in the country and 75% of P.f cases occurs in tribal areas.

Preschool children and pregnant women living in high endemic areas constitute another vul-

nerable group. According to a study in one hyper endemic tribal district Keonjhar of Orissa state revealed that nearly 6% of pregnant females and 8% of preschool children suffer from malaria at any point of time and *Plasmodium falciparum* is predominant to the tune of over 80% in pregnant women and over 85% in the preschool children. Nearly 50% of deaths in the districts occurred in women of reproductive age group (15-45).

AREAS AT RISK : Earlier the country was divided into 6 regions on the basis of incidence of malaria as area free from malaria, healthy plain area, areas with variable endemicity, endemic areas and hyperendemic areas and epidemic areas. With the overall socio-economic-eco-health change in country, malaria endemicity has been although altered in some areas eg. in Malnad areas of Karnataka which was initially in high endemic zone but at present reports very low number of malaria cases which may be attributed to the large extent to deforestation and initiation of coffee plantation.

Although the majority of malaria cases are coming from rural areas but still some malaria eco-types can be differentiated as:

(a) Forest Areas - By and large all the forest areas are highly malarious areas. Four eco-types

viz. evergreen forests deciduous wet, deciduous dry and desert forests reflect variable endemicity to malaria due to different vector combinations, vulnerability and socio-economic factors. The forests can also be classified as dense forest, open forest and scrub forest.

As per NMEP (5) estimates the population in these forest eco-types is 10.78% of total population but constitutes 15.79% of total cases and 20.90% of P.f. cases.

(b) Urban Areas - After the big achievement of malaria control in 1960 under NMEP, urban conglomerations served as a focal point for malaria dissemination and proved to be a great setback to NMEP. The Madhok community (1969) reviewed the problem in urban areas observed that 10 urban areas of AP & Tamilnadu contributed 11.2% of total malaria cases in the states. Similarly 66% of total malaria cases of West Bengal were contributed by Calcutta city itself.

Consequently, the urban malaria scheme was launched in 1971 under NMEP with the aim to reduce the vector population in urban area though recurrent anti-larvel measures. The epidemiological information on 128 town having 74.2 million population under the scheme for 1988-90 is shown in Table 3

The urban malaria problem arises due to:-

- (i) Unplanned growth of township with prolific increase in slum population.
- (ii) Transmigration/floating population
- (iii) Poor water management - both water supply & water disposal.
- (iv) Poor implementation of civil-by-laws for reduction of domestic/peridomestic mosquitoes breeding places.
- (v) Case finding mechanism is either absent or very poor.

- (vi) Insufficient staff for antilarvel operation due to rapid population growth.

(c) Project areas - The developmental projects attracts a large number of labour population from endemic areas. The prolific increase in vector breeding places and increased in man mosquitoes contact favour high malaria transmission and require specific strategy.

(d) Triple insecticide resistant areas—The ubiquitous rural vector *Anopheles culicifacies* has become resistant to DDT, BHC and malathion in western belt of country. specifically in northern parts of Maharashtra and karnataka and southern parts of Gujarat besides some pocket of insecticidal resistance exists in other parts of country.

(e) Epidemic Prone Areas—North-Western plains, semiarid climatic zone with annual rainfall upto 100 mm and Indo-Gangatic plains are identified as major epidemic prone areas. During epidemic the malaria deaths in these areas outnumber the malaria deaths reported from the rest of the affected states.

THE CHALLENGES AHEAD (6)

(i) Vector Mosquitoes—the vector mosquitoes have proved to be the greatest challenge to man and outlived our advances in sciences & technology through their built-in capacity of variation and adoption to insecticides. We continue to play host to the mosquitoes though our unhealthy life styles, poor water management and negative health behaviour.

(ii) The Parasite—The *Plasmodium* specially *falciparum* has developed and is developing resistance to commonly used antimalarial thus it has not only increased its life but has also enhanced potential of man to infect mosquitoes.

Table 3 : Epidemiological Information on 128 Towns

Year	Total Malaria Cases (in '000s)	% age to total Cases of India	Total P.f. cases (in '000s)	% age to Total P.f. cases of India
1988	145	7.88	15	2.19
1989	203	10.06	29	3.89
1990*	191	11.33	19	3.39

*Provisional

(iii) **Human Life Style & Behaviour**—The change in human life style and behaviour has also been responsible for high malaria incidence like:-

(a) Creating malariogenic condition by neglecting water management in developmental and construction activities, the introduction of malaria in newly irrigated areas and urban malaria through mosquitoes breeding in the overhead tanks are examples of such conditions.

(b) Organisational & management failure in public health services eg. limited resources, lack of trained personnel, failure to use available knowledge and technology and lack/poor community participation etc.

(c) **Neglect of Epidemiology**—By not recognising the fact that epidemiology of malaria varies from state to state and within state also. Transmission of malaria is always location specific.

(d) **Neglect of Health system Research** and failure to make use of such results. The dynamics and diverse problem encountered in the control of malaria cannot be solved and merged without operational and field Research. But this has received little attention.

SOME SUGGESTIONS & RECOMMENDATIONS

- (1) Integrated approach should be developed based on local epidemiological studies, microlevel assessment of control measures with full community involvement using participatory approach and involvement of other relevant sector also.

- (2) Change the vector control strategy by accepting eco-epidemiological approach, the comprehensive plan of mosquito control should consist of naturalistic and ecological methods in order to ascertain low vector density and longevity. The water management should also be given priority consideration along with biological control of vectors.
- (3) Health education and IEC programme is to be developed to bring a change in human behaviour and life style. Although this issue is complex one but can be tackled through participatory approach by involving community in planning and implementation of programme.
- (4) Rational drug use to be promoted. We have also to ensure the adequate diagnostic and appropriate treatment facilities at PHC level.
- (5) Health system research and entomological investigations at problem district level should be promoted on highest priority and should be made integral part of control programme.
- (6) The spread of *P. Falciparum* should be monitored on priority all over the country.
- (7) An appropriate and efficient MIS should be developed.

We have to ensure that malaria becomes part of an integrated, people oriented, decentralised, empowering programme in which the community become centre to the whole control strategy.

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