REVIEW OF RESEARCH

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MALARIA STATUS IN MAHARASHTRA

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AIM AND OBJECTIVES:

Temperature, humidity, and precipitation can affect the proximal causes of vector born diseases, particularly the survival and replication of pathogens in the environment,.

Causes then determine infectious disease hazards. One such threat is influence of climate change on vector production and malaria transmission in **Maharashtra.**

An increased number of malaria cases have been reported in **Maharashtra state, India.** Between January and May 2010, a total of 25,775 cases were reported, compared to 16,149 during the same period of 2009. According to media reports, the majority of cases have occurred in the city of Mumbai.

In 2010, from 1 January to 5 August, the HPA Malaria Reference Laboratory has received reports of a total of 87 cases of imported malaria in travelers arriving. One infection was due to *Plasmodium falciparum*, the remainder was due to *P. vivax*. Where a destination was specified, 10 had visited Mumbai. The majority of cases (55) were reported during June and July; five of which specified Mumbai as the destination. During the whole of 2009, 99 cases of malaria imported from India were reported, 20 of which specified Mumbai as the destination. Eighty six were due to *P.vivax* infection, and 13 due to *P. falciparum*.

The recent increase in cases has coincided with the monsoon season which began in June in **Maharashtra**

Malaria Control Program me is being implemented in the State since 1953. The mile stones of the program me are as under-

1953	National Malaria Control Programme (NMCP)
1958	National Malaria Eradication Program me (NMEP)
1977	Modified Plan of Operation (MPO)
1979	Multipurpose Worker Scheme (MPW Scheme)
1995	Implementation of Malaria Action Plan-1995 (MAP - 95)
1997	Launching of World Bank Assisted Enhanced Malaria Control Project in tribal districts of the State. (EMCP)
2000	National Anti Malaria Program me (NAMP)
2004	National Vector Borne Disease Control Programme (NVBDCP)

Material and Method:

1. Blood smear collection is important: I have collected the blood of malaria patients and send to the laboratory for further Investigations.

Blood smear collection is necessary to have parasite confirmation, especially in view of the fact that large areas in the country have predominant infection with *P.falciparum*. There are some areas with poor therapeutic efficacy of the chloroquine or sulfadoxine-Pyremethamine against *P.falciparum*. In these areas, treatments are done with alternative drug regimen for *P.falciparum* cases on microscopic confirmation of the diagnosis. Indiscriminate use of second line drugs like (Artesunate-Sulfadoxine combination therapy (ACT) under the presumptive treatment is always disastrous and precipitates the multi drug resistant strains of *P.falciparum*.

2. Smears for transmission to laboratory, besides replenishing of micro slides and or drugs, wherever necessary.

3. Rapid Fever Survey: In case of an epidemic outbreak, every village in the suspected epidemic zone is covered in a short duration by deploying additional man power. House to house visits are undertaken and all fever cases are screened by taking blood smears. These blood smears are to be examined at the earliest preferably at a temporary field laboratory at the village level.

4. Mass survey: As an alternative to Rapid Fever Survey, mass survey of the entire population is carried out in the suspected epidemic zone. Here all the population irrespective of age, sex or fever status is screened by taking blood smear. Especially children included in survey.

To carry out these special surveys, it is always advantageous to establish field laboratories, the peripheral staff also involved with me from the neighboring PHC areas to collect blood smears so as to cover the entire population as quickly as possible. This work is over in 7 to 10 days. All persons whose blood smears are collected given presumptive treatment or mass radical treatment. Blood smears collected I have sent to the laboratory and it examined within 24 hours.

The blood smears collected have examined expeditiously. Under the current situation, in most of the places, there is considerable time lag between collection and examination of blood smears due to inadequate facilities. The laboratory for malaria microscopy should be decentralized and brought as near to the community as possible. All efforts should be made to reduce the time lag between blood smear collection and examination by utilizing existing facilities available both in public & private sectors, annual blood smears examination rate and its validity.

Malaria surveillance presumes that every malaria case will present itself with symptoms of fever at some point of time during the course of infection. Therefore, if all fever cases occurring in the community are kept under surveillance over a period of time and their blood smears are examined for malaria parasite, the total malaria parasite load can be examined. However there are some exceptions. Some of the malaria patients who give history of fever during the past fortnight but do not have the fever at the time of blood smear collection may not show microscopically detected parasitaemia in the peripheral blood. On the other hand some febrile persons can be positive for malaria parasite.

DISCUSSION:

The present paper study showed the gender and age wise, distribution of malaria cases, clinical presentation of the patients and the treatment modality , surveys in slum areas in different places in different districts in Maharashtra , actual treatment and remedies from medical practitioners, Doctors , pathologists for the malaria patients used during the study period—2009-2011. The study also looked at the number of patients presenting with cerebral malaria, subdural hematoma, liver and spleen enlargement (Splenomegaly), amongst the study group population.

All patients who attended the hospital for various ailments (including OPD and indoor patients) were considered as the hospital population during the study period of 2009- 2011. Peripheral blood was collected and examined for malaria parasite, of any of the patients who had clinical features suggestive of malaria history of fever with chills and rigors, enlargement of spleen, secondary anemia, etc. Both thick and thin

blood films were prepared and stained by Ramnowski's method. Leishman's stain was used for slide preparation and reporting was done by the hospital pathologist. The detailed records of positive slide prepared by principal investigator with the help of pathology laboratories have been maintained along with slides and pathological reports .Medical records of all those who were positive for malaria parasite and blood report showing Hb ,TLC,) , DLC (Polymorph nuclear, lymphocytes Eiosinophils, Monocytes), ESR were maintained. The species of the parasite and also the stages in which the parasite were seen also noted. Slide positive rate (SPR), and slide Falsiparum rate (SfR) was calculated using the standard formulae.

Asymptomatic carriers of malaria were conducted 40-50%of the total examined in different study areas. Gametocyte density was more in symptomatic cases as compared to that of symptomatic carriers. Blood sample drawn from asymptomatic gametocyte carriers were fed to Anopheles in different batches. Two out of twenty samples from asymptomatic carriers showed development of malaria parasites in the vector. On the other hand ten out of twenty nine samples showed development of parasite in the mosquitoes. A total of 600 patients attended in hospitals, slum areas, villages for various ailments during the study period and of these 400 patients who had clinical history suggestive of malaria were examined for malaria parasites. Out of the 400 slides examined, 49 slides were positive for malaria parasites 49 are *P. vivax* 46 *P. vivax* malaria patients had gametocytes in their peripheral blood. Age and gender wise distribution of study group malaria positive patients are shown in Table 1 and Fig.1. Of the 49 patients tested for positive malaria parasites, 24 were males and 25 were females. Males are more exposed to the risk of acquiring malaria because of the outdoor life they lead. Secondly, females in India are usually better clothed than males.

The mean age of study group is30.54 years with 35.27% of patients belonging to 20to 40 years age group and the mean age of malaria positive patients is 30.75 years with 40.9% patients in the same years age group. About two patients presented with clinical features suggestive of cerebral malaria. One patient presented Splenomegaly; one patient presented the subdural hematoma during my research project.

Land scope epidemiology emphasizes that climate and land scape circumscribes the distribution of mosquitoes- borne diseases while whether affects the things, duration and intensity of outbreaks. The mosquitoes are sensitive to temperature, rainfall; high humidity and healthy vegetation are excellent conditions and habitat for mosquito's activities for carrying the disease to people. The indicated characteristics can be provided by operational weather.

The result showed that the role of symptomatic gamete carriers has to be established in the transmission of malaria.

For settings where patients with severe malaria present regularly and it is no possible to refer them rapidly to facilities, a basic package for initial treatment could be made available, supported by training and supervision.

The contents of basic package for management of severe malaria at PHCs/ CHCs in malaria endemic areas should include:

(i) A parenteral antimalarial
(ii) Aparenteral antibiotic
(iii) An effective oral antimalarial
(iv) A rectal anticonvulsant
(v) Intravenous fluid

TREATMENT OF SEVERE AND COMPLICATED MALARIA:

Semiconscious or comatose patients of severe *P.falciparum* infection should be treated with Quinine. It is the drug choice also for pregnant women and infants.

Qulnine I.V.10 mg/kg body wt. (600mg.) 8 hourly, (total 24 hour intake should not exceed 1.8 gms in an adult) till the patient regains consciousness and is able to take drugs orally. Oral Quline 600 mg TDS is to be continued for seven to ten days. When adequate facilities for management of complication arising out of Qulnine dihydrochloride 20 mg per kg body weight as infusion is given over a period of 5 hours (2 ml per

minute). If no I.V.facility is available, deep intramuscular dose of 10 mg per kg body wt. is given 8 hourly. I.M. injections produce complications which, sometimes in the long run, are crippling if proper precautions are not taken.

a. Injection Arteether :

It is available in 2 ml ampules containing 150mg. The recommended regime is 150mg / day once daily by intramuscular route for three days for adults. The dosage for children is 3 mg/kg per day IM for three days.

b. Chloroquine injection :

Chloroquine is not well tolerated specially by infants or young children. In a patient of any age it may produce low blood pressure, sudden collapse with high mortality. Parenteral administration of Chloroquine is more hazardous than parenteral administration of quinine. It should be used only when Qulnine or arteether injections are not available. It is given in doses of 3.5 mg/kg body wt 8 hourly slowly in isotonic fluid. Total 24 hour dose should not exceed 600 mg base (up to 10 mg/kg body weight). Dose of Chloroquine I.M. is 5 mg per kg body weight.

Pathological record of the Malaria parasite detected patients during the project study period 2009-2011

Gender	Age	Hb%	TLC/ cumm	ESR	Polymorpho nuclear	Lymphocyte	Eiosinophils	Monocytes	Parasite
M	10	11.0	6200	22mm/ 1st hr	39%	60%	-	1%	P. V
M	15	12.6	5000	7mm/1st hr	85%	85%	1%	-	P.F
M	35	11.2	5400	9mm/1st hr	77%	215	-	2%	PV
F	33	8.5	6200	62mm/1st hr	77%	13%	4%	6%	PV
M	30	9.8	36,900	62mm/1st hr	5%	7%	1%	-	PV
M	18	13	5200	5mm/1st hr	87%	9%	-	4%	PV
F	24	13.1	16500	45mm/1st hr	85%	13%	-	4%	PV
M	3	9.3	10800	35mm/1sthr	52%	42%	2%	4%	Pf
F	17	11.7	11800	25mm/1st hr	43%	49%	2%	6%	PV
M	62	12.6	3100	38mm/1st hr	38%	47%	5%	10%	PV
M	12	14	1100	-	37%	51%	1%	11%	PV
M	27	13	3900	8mm/1st hr	37%	56%	2%	5%	PV
F	38	12.1	1200	38mm/1st hr	80%	18%	2%	-	PV
M	13	13.2	11200	15mm/1st hr	84%	14%	-	2%	PV
M	20	9.6	4100	-	53%	37%	5%	5%	PV
F	24	12.9	7400	27mm/1st hr	59%	37%	-	4%	PV
F	21	10.6	13600	60mm/1st hr	71%	29%	-	-	PV
M	17	14.7	2500	12mm/1st hr	69%	30%	-	1%	PV
F	20	13.0	3300	14mm/1st hr	33%	49%	4%	4%	PV
M	30	8.2	5900	41mm/1st hr	66%	28%	2%	4%	PV
M	35	14.0	8500	32mm/1st hr	66%	31%	1%	2%	PV
M	74	13.5	8100	-	78%	18%	4%	-	PV
F	27	11.6	10200	33mm/1st hr	68%	29%	-	3%	PV
F	45	6.2	6500	20mm/1st hr	71%	27%	-	2%	PV
F	10	9.6	4000	7mm/1st hr	5%	11%	-	-	PV
M	50	14.9	10400	50mm/1st hr	89%	9%	-	2%	PV
F	20	12.0	5200	44mm/1st hr	87%	8%	-	5%	PV
M	38	15.8	7200	14mm/1st hr	54%	37%	7%	2%	PV
F	29	12.8	7300	38mm/1st hr	65%	32%	3%	-	PV

M	45	7.5	4800	-	57%	27%	1%	2%	PV
F	35	8.2	5900	41mm/1st hr	66%	28%	2%	4%	PV
M	26	13.2	10300	45mm/1st hr	81%	15%	-	4%	PV
F	26	11.7	19300	15mm/1st hr	90%	8%	1%	1%	PV
F	32	14.4	11900	8mm/1st hr	63%	34%	1%	2%	PV
F	32	10.2	6300	27mm/1st hr	38%	59%	2%	1%	PV
F	20	11.0	2900	17mm/1st hr	80%	19%	-	1%	PV
F	13	12.5	5100	25mm/1st hr	82%	18%	-	-	PV
F	35	-	-	-	-	-	-		PV
M	17	-	-	-	-	-	-	-	PV
F	32	-	-	-	-	-	-	-	PV
M	70	-	-	-	-	-	-	-	PF
M	97	-	-	-	-	-	-		PF
F	14	-	-	-	-	-	-	-	PF
F	35	-	-	-	-	-	-	-	PV
M	25	-	-	-	-	-	-	-	PV
M	30	-	-	-	-	-	-		PV
F	45	-	-	-	-	-	-	-	PV
G	Age	Hb	TLC	ESR	Polymorpho nuclear	Lymphocyte	Eiosinophils	Monocytes	Parasite
F	30	-	-	-	-	-	-		PV
F	25	-	-	-	-	-	-		PV

Age wise distribution of patients and malaria positive cases (according epidemiological age groups) during 2009-2011

No. of patients (Study Groups)	No. of patients (Malaria positive)	Males Age 1-20	Females Age 1-20	Males Age 21-75	Females Age 21-75
600	49	9	7	15	18

P. vivax transmission pattern is higher than the P. falsiparum during the year 2010 and 2011. A considerable degree of fluctuation was observed during peak transmission season (i.e. May to October).

SYMPTOMS AND TREATMENT:

The signs and symptoms in children are a history of high fever, plus at least one of the following:- Prostration (inability to sit), altered consciousness, Lethargy.Breathing difficulties, severe anemia, Convulsions Inability to drink / vomiting Gradually increasing headache , pain in legs and abdomen , a sensation of chills, loss of appetite, vomiting , convulsions, unconsciousness, severe pallor, jaundice with or without Splenomegaly, neck rigidity was absent in all of them and they were treated with quinine 10 mg/kg as an infusion over4to 8 h, thrice daily. The patients were monitored for, ECG and glucose Levels. There was no death amongst these patients. Of the 45 malaria positive patients one has been detected hepatomegaly, one has Splenomegaly.

All the 49 malaria positive patients received antimalarials like Chloroquine, quinine (quinolone derivative), primaquine and mefloquine as per the drug policy. Of the 49 patients, 47 patients received

treatment based on clinical features and slide positivity was confirmed later, while two patients received treatment after slide positivity confirmation. No death was reported in malaria patients.

Out of 49 cases, maximum number of cases reported in the hospitals. Malaria, a seasonal disease, in most parts of India; the maximal prevalence is from July to November. Good rainfall, relative humidity of 60% and temperature between 20 and 30^{o}C favors the spread of malaria.

Parasitological survey for the detection of symptoms carriers of malaria were conducted in the districts Jalna, Jalgaon, Buldhana, Aurangabad, Ahmednagar and Pune. Surveys were carrying out through out two years of 2009- 2011

RESULT AND CONCLUSION:

Children: Patients with prostration and / or breathing difficulties solved by Doctors if at all possible, treated with parenteral antimalarials and antibiotics. If the clinical condition permits, other patients may be treated with oral antimalarials.

- **Adults**: The same symptoms and signs in children are valid for adults, with addition of: Dark and / or limited production of urine.
- The present research is not complete yet but serves record of this project up to today shows that in Aurangabad, Pune, Ahmednagar and Jalgaon district 99 % of the infection are reported due to Plasmodium vivax. Adult are more vulnerable to disease in this area and the working group are more affected due to malaria. The malaria situation in these districts can be improved by early detection and prompt treatment and generating health awareness in the community. Mosquito control operations are needed especially before the onset of rainy season as malaria prevalence is high during the rainy season in these areas.

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