



## Clinical profile of Malaria cases in a tertiary care hospital in Kerala

Authors

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### Abstract

**Background:** *Urbanization in Kerala has been associated with migration of construction workers from North East India & Central India. The incidence of Malaria is on a rise in Kochi & remains a public health issue. Where Malaria was a controlled infection but for a few pocket areas, now it has up surged in a populous area of Central Kochi.*

**Objective:** *A retrospective clinical study of 100 malaria cases that had presented to Government Medical College, Ernakulam in the year 2016-2017 was carried out.*

**Results:** *Males outnumbered females in the incidence of infection. Plasmodium Vivax was the predominant form of infestation. Economically productive age group was more affected. Non Keralites were primarily affected. Thrombocytopenia was the predominant lab parameter that was deranged. There was no case fatality.*

**Conclusion:** *Plasmodium Vivax was the predominant species causing Malaria. All the patients were migrants.*

### Introduction

Malaria is globally estimated to be affecting approximately around 3.2 billion people in 95 countries. Africa carries a high share of Global malaria burden, that is 90%.<sup>1</sup>

India is the most populous country of the world with a population of more than 1.3 billion. India accounted for 6% of global malaria cases. <sup>1</sup>In 2014, India reported 1.10 million cases of malaria and 561 deaths. <sup>2</sup>Between 2010 and 2015, malaria incidence fell by 21%.<sup>1</sup>

The National framework for Malaria Elimination in India 2016-2030<sup>2</sup> aims to eliminate malaria nationally to zero indigenous cases & contribute to improved health.<sup>1</sup> However, 2017's report

revealed that the unprecedented period of success in global malaria control has stalled. As per their prediction, India is unlikely to reduce its case burden beyond 40% by 2020. A key impediment to eliminate malaria is a weak surveillance system, low funding per person at risk & resistance to insecticides.

World Malaria Day is held on 25<sup>th</sup> of April every year. This year's theme was "end Malaria for good". Maldives, Sri-Lanka achieved malaria free status in 2015 & 2016.<sup>1</sup>

Malaria in India is mainly caused by two major malarial parasites- *P. Falciparum* & *P. Vivax*. The vector is female *Anopheles* mosquito. The majority of malaria is reported from Eastern &

Central part of India. For a long time, *P. Falciparum* dominated India's case burden. A local newspaper in November 2017 had reported that now 51% of cases are *P. Vivax*.<sup>4</sup>

*P. Vivax* had a benign reputation with lesser incidence of serious complications. But over the last few decades, multiple cases of fatal *P. Vivax* malaria have been reported.<sup>5,6</sup> Its complications are severe anemia, acute respiratory distress, cerebral malaria, severe thrombocytopenia, hepatic dysfunction, metabolic acidosis and renal dysfunction. Pooled mortality was 0.1%.<sup>7</sup>

There are a number of National Elimination programmes that are implemented by the State Government which follow the national policies. National Vector Borne Disease Control Programme (NVBDCP)<sup>8</sup> provides technical & operational guidelines to the State Government & helps with the funding for control of malaria.<sup>1,2</sup>

An increasing trend of malaria is observed in towns & cities.<sup>2</sup> The proportion of urban population to total population has increased in the last few decades due to rapid urbanization. Haphazard & unplanned growth of towns has resulted in creation of slums with poor housing & unsanitary conditions. Workers from endemic areas in central India, migrate to the city for construction projects. They reside in non permanent housing structures which have areas that collect water thus facilitating breeding of mosquitoes.<sup>9</sup>

The Urban Malaria Scheme was launched in 1971. It covers a population of nearly 130.3 million vulnerable to Malaria & other mosquito borne diseases in 131 towns in 19 states & union territory. They function as part of NVBDCP. The two main schemes are to prevent deaths due to malaria & reduce transmission & morbidity.<sup>2</sup>

The two main malaria control strategies are parasite control (treatment of patient) and vector control (Larvicide use). Since 2010 WHO has recommended parasite based diagnosis for suspected case of malaria prior to starting treatment. This is a paradigm shift from

presumptive anti-malarial treatment. Rapid Diagnostic Test was introduced in 2005.<sup>1</sup>

Karnataka has the highest incidence of malaria in South India. Kerala is southern part of India.<sup>9</sup>

### Research question

What is the clinical profile of the current Malaria cases attending a tertiary care center in Kochi, Kerala?

### Objective

To study the clinical profile of the current Malaria cases attending a tertiary care centre in Kochi, Kerala.

### Materials & Methods

**Study Design:** This was a Retrospective case record-based study.

**Study Population:** 100 patients over age group of 12 years who were admitted with diagnosis of malaria or diagnosed in the department of internal Medicine during 2016-2017.

**Study Setting:** Department of Medicine, Government Medical College, Ernakulam which is situated in central Kochi which is the commercial hub of Kerala. The Medical College is a teaching hospital & referral care centre.

**Study period:** 3 months from 1/3/17.

### Inclusion criteria

- ❖ All inpatients tested positive for Malaria.
- ❖ Those treated in the medical college as in patient.
- ❖ Age group greater than 12 years
- ❖ Both sexes

### Exclusion criteria

- ❖ OP cases
- ❖ Patients presenting with fever but malaria smear or RDT negative, but empirically treated for malaria & responded.

### Data collection and sampling

The inpatient records of first 100 malaria confirmed cases from February 2016 to February 2017 were retrieved & scrutinized using a Proforma. Universal sampling has been followed. Patient's demographic profile, clinical findings,

investigations, treatment & complication were entered for each case.

**Data analysis:** Data was entered into Microsoft excel 2007 spread sheet & computed. Analysis was done by SPSS 16 soft ware.

#### Ethical Considerations

This study was approved by the Institutional Ethics committee of the Medical College, Kerala. It was a retrospective study & hence individual consent was not necessary.

#### Results

A total of 100 malaria inpatients were studied. All 100 patients presented with fever.

Rapid Diagnostic Test & Peripheral blood smear was done and either of them was positive. QBC was not done due to financial reasons.

**Socio-demographic profile:** It showed Plasmodium vivax was the major parasite. Out of 100 patients, 69 cases were positive for P Vivax & 13 for P. Falciparum. 18 showed a mixed malarial parasite on peripheral smear. Males (97%) outnumbered females (3 %). Predominant age group was below 40 years. All were natives of other states, mainly West Bengal & Orissa. No case of local population was seen in the study group. Incidence of malaria increased from the

month of June onwards, which is the monsoon season in the state.

**Table 1** Age & sex Distribution of study subjects

	Male	Female	Total
15-30	75	1	76
31-45	16	2	18
46-60	6	0	6
	97	3	100

Age (16-58) Mean age 27.17 sd

**Symptoms & signs:** Low grade fever was seen in 52 patients with P. Vivax & 4 cases of P Falciparum. High grade fever was seen in 17 cases of P. Vivax & 9 cases of P. Falciparum. Jaundice (Bilirubin greater than 4mg/dl) was reported in 7 patients with P. Vivax, 1 patient with P. Falciparum & 1 in mixed infection. Mild jaundice (Bilirubin greater than 2mg/dl) was seen in 24 cases. Pallor (Hb below 8g/dl) was noted in 8 cases. Splenomegaly was the most common organomegaly. 65% cases of P. Vivax had splenomegaly compared to 11% cases of P. Falciparum. In mixed infection, 24% had splenomegaly. Hepatomegaly was seen in 34 cases out of 100. Hypoglycemia was not noted to be significant.

**Table 2** Clinical features of Malaria cases

Clinical		Vivax No (%)	Falciparum No (%)	Mixed No (%)	Total	P value
Fever	Low grade	52(78.8)	4(6.1)	10(15.2)	66	0.005
	High Grade	17(50)	9(26.50)	8(23.5)	34	
Pattern of Fever	Continuous	38(77)	5(11)	6(12)	49	0.001
	Intermittent	30(72)	3(7)	10(23)	43	
	Tertian	1(12.5)	5(62.5)	2(25)	8	
Splenomegaly	Yes	30(65)	5(11)	11(24)	46	0.50
	No	39(72)	8(15)	7(13)	54	
Complication	Yes	1(25)	3(37.5)	3(37.5)	7	0.01
	No	67(73)	10(11)	15(16)	92	

**Laboratory investigations:** 31 patients had anemia and 5 cases had leucopenia. Thrombocytopenia (less than 1 lakh /mm<sup>3</sup>) was the most common manifestation- 79 cases. ESR greater than 50 mm/hr seen was in 25% cases. Abnormal liver function in 7 cases.

**Table 3** shows the descriptive blood parameters of the cases  
Blood Parameters (N=100)

	Minimum	Maximum	Mean	Standard deviation
Hb	4	16	11.61	2.54
Total Count	1400	22000	5828.5	3147.44
Dc-lymphocytes	3	62	23.4	12.78
Dc-Polymorphs	26	96	64.9	16.19
Dc-Eosinophils	0	15	1.71	2.27
Platelet	2300	230000	68557	49007.9

**Table 4.**Biochemical profile of Malaria cases

Clinical		VivaxNo(%)	Falciparum No(%)	Mixed No(%)	Total	
Hemoglobin	< 12	31(65)	6(12)	11(23)	48	0.44
	>12	39(75)	6(11.5)	7(13.5)	52	
RBS	<100	32	5	7	44	0.76
	100-180	35	6	11	52	
	>180	3	1	0	4	
SGPT	<40	41	7	12	60	0.83
	40-80	27	5	5	37	
	>80	2	0	1	3	
SGOT	<40	37	6	13	56	0.45
	40-80	28	6	4	38	
	>80	5	0	1	6	
Bilirubin	<2	48	9	10	67	0.68
	2-3	21	1	2	24	
	>4	7	1	1	9	
Platelets	<100000	55	10	14	79	0.96
	>100000	14	3	4	21	

**Treatment:** All 100 pts were initiated on appropriate treatment. All but one showed good response to Chloroquine. The patient was smear positive & had persistent fever after 48 hrs of Chloroquine. This patient received Larinate kit (Pyrimethamine & Sulphadoxine) following which fever subsided & smear became negative. Thus one case of Malaria showed clinical resistance to Chloroquine. Primaquin therapy was given to all P Vivax cases- 60 cases. Interestingly Dengue antigen card test was also noted to be positive in one case. Platelet transfusion was not given in any patient.

**Complications:** were seen in 7 cases more so in P. Falciparum & mixed infection. They ranged from 1 case of cerebral malaria, severe anemia requiring blood transfusion, melaena secondary to thrombocytopenia. There were no deaths. Recurrence rate could not be determined as there was no records of previous treatment.

**Inpatient stay:** 3 days -14 days.

There was no mortality.

### Discussion

More than 100 countries in the world are malarious. Malaria has become a health concern in this region which is already home to a number of Dengue cases. This is more so in the rainy season. Economically productive age group is most affected. P. Vivax is the major parasite of concern probably due to recrudescence. Results revealed that malaria incidence was seasonal. Present results are in conformity with incidence pattern reported in different parts of India. Fever was the presenting symptom & most patients presented within one week of fever. Males were more infected. Thrombocytopenia was observed in a majority of patients (79%). However platelet transfusion was not required in any case. The risk was greatest in the mixed infections in comparison to mono-infection. Chloroquin & Primaquin was

the most commonly used combination treatment modality. All but one responded to this regime.

Concomitant infection with filariasis has been reported before but not with dengue. Whether it was a Dengue co- infection or a false positive was not determined.

To be successful, malaria control efforts require community participation, which in turn depends on individual knowledge & awareness of the disease.<sup>9</sup>

70% of malaria in India was *P. Vivax* contrary to previous reports.<sup>1</sup> A previous study<sup>6</sup>, showed, case fatality rate as 0.3% in severe vivax malaria. No mortality was observed in our study.

### Conclusion and Recommendations

Rapid growth & development has lead to deforestation & construction boom. This represents a major challenge for public health in urban areas. Effective malaria control measures are imperative for human resource development. Vector control & surveillance has to improve. Most of the cases are still sensitive to Chloroquine which is cheap and effective. Prompt detection and treatment will definitely go a long way. Co-infection with other viral illnesses and incidence of thrombocytopenia in *P. Vivax* malaria is a cause of concern. Close surveillance is mandatory in this regard. Preventive strategies should also aim specifically at spread of infection from the migrant to the indigenous population. To reduce morbidity & mortality we have to adopt conventional methods like adequate vector control measures in the form of larvicides (insecticide treated mosquito nets (LLINs), indoor spraying with residual insecticides (IRS), environmental management & modification, and high risk cases must have personal prophylaxis too.

Presence of the plasmodium in the immigrants if detected early can be treated thus reducing the risk of spread. Population movement across states, shortage of skilled human resources and insecticide as well as drug resistance still pauses challenges to the eradication efforts.

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