

# A study of clinical profile of malaria in a tertiary referral centre in South Canara

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## Abstract

**Background & objectives:** The incidence of malaria is on the raise in South Canara district of Karnataka in the recent years and there is not much information on malaria from this region. This study was undertaken to analyse and introspect the presentation of this disease in a tertiary referral centre.

**Methods:** This retrospective case analysis was done on patients over the age group of 15 yr admitted with diagnosis of malaria to the Medical Department in this tertiary health institution situated in South Canara. The outpatient and inpatient records from September 2002 to August 2004 were retrieved and scrutinised using a prepared case sheet performa on the basis of patient's demographic profile, clinical findings, investigations, treatment and complications.

**Results:** A total of 314 patients were diagnosed and treated for malaria, of them 124 were treated as outpatients and 190 cases were managed as inpatients. Males (81%) outnumbered females (19%) and many were within the age group of 21–30 yr. The incidence of malaria increased from the month of June onwards coinciding the monsoon season. *Plasmodium vivax* was the major parasite type (52.54%), followed by *P. falciparum* (33.75%), mixed malarial infection (13.69%) and most of them received combination therapy. Hepatopathy was the most common complication and all the deaths were due to cerebral malaria.

**Interpretation & conclusion:** Malaria is responsible for major health concern in this region, particularly in rainy season and is found to affect comparatively the younger adult population. *P. vivax* was the major parasite type causing malaria and most of the complications were due to *P. falciparum*.

**Key words** Combination therapy – hepatopathy – malaria – *Plasmodium vivax* – seasonal trends – South Canara

## Introduction

Malaria is one of the most common parasitic infections in our country and over 1.65 and 1.77 million cases were reported in 2003 and 2004 respectively<sup>1</sup>. Malaria has been a serious problem in some parts of our country due to the slow progress in its control. Lack of proper health infrastructure, inability to control the disease in endemic areas, and movement of

the population are some of the factors responsible for failure to curb malaria. Karnataka has the highest incidence of malaria in south India and in 2003 nearly 100 thousand cases were reported in this state, with 22 deaths.

South Canara is the coastal district of Karnataka state and Mangalore being its principal city. In the recent years there has been a raise in the incidence of

malaria in South Canara district and this year alone about 5000 cases of malaria were reported until the month of May as per information received from the District Malaria Office. This retrospective study is aimed at determining demographic pattern and clinical presentation of malaria in adult patients admitted to our hospital over the last two years.

### Material & Methods

**Study area:** This study was done in Justice K.S. Hegde Charitable Hospital, Deralakatte situated in the outskirts of Mangalore City. Being a teaching hospital and tertiary referral centre case input is primarily from this region and also from bordering districts. A reasonable number of patients does come from the adjoining Kerala state as well. South Canara is the coastal district of Karnataka state with five talukas in an area of 8,441 km<sup>2</sup> with 29% covered by forest area and has a population density of 100–300 people/km<sup>2</sup>. The rainy season is from month of June to September and summer from March to May with an average annual rainfall of 3,940 mm and relative humidity of 55–60%.

**Study design:** This was a retrospective study done on confirmed cases of malaria admitted from 1 September 2002 to 31 August 2004. A case sheet performa was prepared and the data (demographic profile, clinical features, investigation, treatment and complications) from all the case records were filled up and later on were analysed. The outpatient and inpatient data were analysed separately due to limitations in the investigations and follow-up in the former. The outpatient data were collected from the OPD and laboratory registers. Patients were enrolled in the study with the following inclusion and exclusion criteria.

**Inclusion criteria:** All the cases were tested positive for malaria parasite and treated at the Department of Medicine in the age group of 15 yr and above were included.

**Exclusion criteria:** Patients presenting with fever (malaria smear negative), but treated empirically for malaria were excluded from the study and patients presenting with clinical features mimicking malaria (malaria parasite test negative), as in leptospirosis, dengue fever and sepsis had been excluded.

### Results

A total of 314 cases were treated for malaria, of which 124 were outpatients and 190 inpatients.

**Outpatient data analysis:** Out of 124 patients 102 (82%) were males and 22 (18%) were females. Age-wise distribution and their proportion are shown in Fig. 1. Majority of the cases (106) were reported from Mangalore district and the rest were from Kerala state and neighbouring districts (18). Among the 124 cases reported, 75 (60.48%) were *P. vivax*, 35 (28.22%) were *P. falcifarum* and the rest 14 (11.29%) were mixed malarial infections. The incidence of cases was on the raise from June onwards coinciding with rainy season (Fig. 2).

**Inpatient data analysis:** A total of 190 cases were admitted, of which 153 (80.5%) were males and 37 (19.5%) were females. Age-wise distribution of patients is shown in Fig. 1. Majority of the cases were from Mangalore district (167), the rest (23) were from Kerala state, neighbouring districts like Hassan and Chikmagalur and also small number from north Karnataka (Bagalkot) who worked in this region as construction labourers.

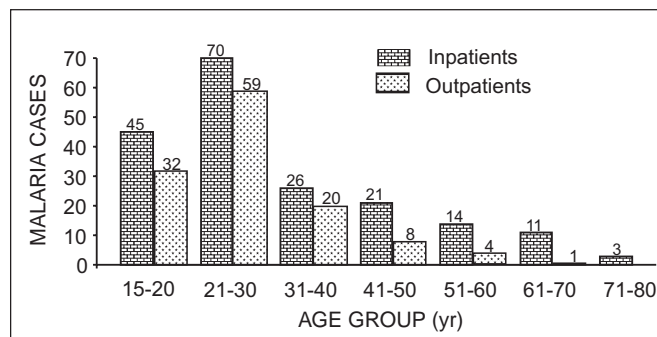


Fig. 1: Age-wise distribution of patients

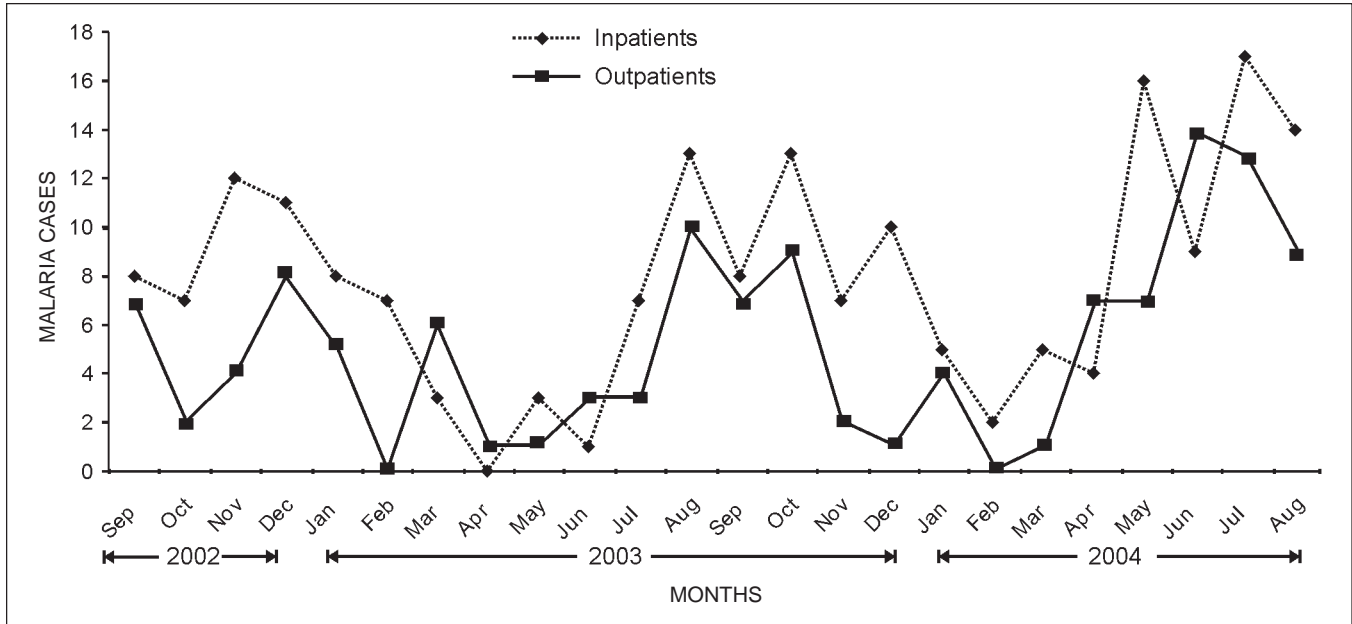


Fig. 2: Seasonal malaria incidence pattern

The number of admissions due to malaria increased from June onwards showing a similar pattern as noted in the outpatient data (Fig. 2). Symptoms analysis on admission showed that all the cases (100%) had fever, with range of 1 to 28 days with a mean duration of 6.25 days. Nausea and vomiting were reported in 72 (37.36%) cases and headache in 64 (33.6%) cases. Jaundice was reported in 30 (15.78%) cases, cough in 22 (11.57%), pain abdomen in 11 (5.78%), and altered level of consciousness in 8 (4.21%). Fever, nausea/vomiting and headache were the predominate symptoms in the inpatient group (Table 1).

Recurrence or recrudescence was seen in 24 patients (18 *Pv* + 4 *Pf* + 2 mixed) as per history. There were no records of their pervious treatment. One vivax malaria patient showed resistance to chloroquine. This was based on persistent fever and smear being positive in spite of 48 h of chloroquine treatment (25 mg/kg) with no vomiting documented during the course of therapy. This patient received injection Artesunate (total dose of 480 mg) with which fever subsided and smear was reported negative and was followed by primaquine therapy (15 mg/day) for 14

Table 1. Clinical symptoms of inpatients treated at the hospital

Symptoms	<i>P. vivax</i>	<i>P. falciparum</i>	Mixed infections	Total
Fever	90	71	29	190
Nausea & vomiting	34	25	13	72
Headache	35	19	10	64
Jaundice	7	20	3	30
Cough	8	11	3	22
Pain abdomen	4	3	4	11
Altered consciousness	0	6	2	8

days. General physical signs on admission, 186 (98%) cases had temperature, 28(14.73%) had icterus and 21 (11.5%) had pallor. Systemic examination revealed, splenomegaly in 30 (15.7%), hepatosplenomegaly in 26 (13.6%), hepatomegaly in 8 (4.2%) and altered level of consciousness in 8 (4.2%) in which two had mixed infection and six were found to have *P. falciparum*. An interesting fact was that, two patients had microfilaria in their blood smears. This was an incidental finding since this re-

gion is endemic for filariasis. Raised erythrocyte sedimentation rate (ESR) in 104 (53.7%), anaemia in 27 (14.27%), leucopenia in 60 (31.57%), thrombocytopenia in 16 (8.42%), raised blood urea in 21(14.21%) and serum creatinine in 14 (11.57%) cases. Abnormal liver function test was observed in 28 patients, raised direct and indirect bilirubin in 28 (14.73%), serum glutamate oxaloacetate transaminase (SGOT) in 26 (13.68%), serum glutamate pyruvate (SGPT) in 25 (13.15%) cases. Viral markers were negative. Urine analysis revealed proteinuria in 16 (8.42%), granular cast in 8 (4.2%) cases.

Inpatients had other associated diseases, like diabetes (5), hypertension (6), chronic obstructive pulmonary disease (COPD) (6), and ischemic heart disease (IHD) (3). Among the 196 patients, 186 (98%) improved and discharged. Two patients went against medical advice and two patients died due to cerebral malaria. A statistically significant number of ( $p < 0.05$ ) patients received more than one antimalarial drug during their course in the hospital (Table 2). If we look at over all number (outpatient and inpatient), *P. vivax* constituted 165 (52.54%) cases, *P. falciparum* constituted 106 (33.75%) cases and the rest were mixed malarial infection of about 43 (13.69%) cases.

### Discussion

This retrospective study shows males (81%) were most affected compared to women (19%). Many of the patients were between the age group of 15 and 40 yr, with high incidence between the age group of 21 and 30 yr<sup>2</sup>. Since the hospital is situated in South Canara majority of the cases were reported from the same region and small number from the adjacent districts and state as well. The results revealed that malaria incidence in this region is seasonal and malaria cases increases with the onset of rainy season. The present results are in conformity with the incidence pattern as reported by earlier workers in different parts of India<sup>3-6</sup>. *P. vivax* was the major para-

**Table 2. Treatment received by inpatients**

Drugs received	No. of patients	Percentage
Chloroquine	130	68.42
Primaquine	152	80
Quinine	61	31.2
Artether	79	47.9
Doxycycline	34	17.8
Sulphadoxine-pyrimethamine	30	15.78
Artesunate	14	7.3

site species (52.54%), followed by *P. falciparum* (33.75%) and mixed infections (13.69%). The number of *P. falciparum* cases was relatively more in inpatients compared to outpatients. In this study malaria parasite test was done using quantitative buffy coat (QBC) method and studies have found it to be more sensitive and specific in detecting the parasite compared to the routine smear (thick and thin) method<sup>7</sup>.

Fever is the most common symptom<sup>6,8</sup> and majority of the patients presented within a week of onset of symptoms (mean duration of 6.25 days). Clinical presentations revealed splenomegaly and hepatosplenomegaly and the severity of the disease in this area with complications like hepatopathy, acute renal failure, cerebral malaria etc. which is of great concern. Such severe complications were also reported in several studies carried out in a tertiary care and referral hospitals<sup>8-15</sup>. Filariasis is endemic in South Canara and Kerala state and this could be the reason for the detection of microfilaria in two of the patients. Concomitant infection of *Plasmodium* species and *Wuchereria bancrofti* was reported in Orissa, but influence of one parasite over the other was not significant<sup>16</sup>. Chloroquine and primaquine was the most preferred antimalarial combination due to high incidence of vivax species and the later drug was used against gametocytes in falciparum malaria<sup>17</sup>. A significant number of the patients received combination therapy.

Malaria is a significant and serious health problem in Karnataka state and particularly in South Canara district. In the recent years there has been a sharp raise in the incidence of malaria in this region due to rapid growth and development, which has led to construction boom and deforestation and now represents a major challenge for public health in urban areas. There is a raise in the number of malaria cases with the onset of rainy season and so is the incidence of *P. falciparum* in the recent years, which is a matter of concern. Due to raising fear of resistance, multidrug approach has been tried and thereby has helped in preventing serious complications. In spite of advances in detection and management of malaria, deaths due to its complications are still inescapable. It is indicated that adequate vector control measures associated with active surveillance with the help of primary health care system will certainly reduce the malaria transmission and severe morbidity and mortality of the diseases in this part of India.

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