

Research Article

A study of prevalence and seasonal trends of different malarial species in district hospital

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ABSTRACT

Background: Malaria imposes great socio-economic burden on humanity. In India, the epidemiology of malaria is complex because of wide distribution of anopheline vectors which transmitting mainly two Plasmodial species named *P. falciparum* and *P. vivax*. Though India is one of the known endemic countries, incidence of malaria is commonly influenced by environmental factors like climate, season, temperature and socioeconomic status. Objectives of the study were to know the prevalence of different malarial species and to know the seasonal trend of malaria.

Methods: This study done microbiology department of district hospital over period of June 2015 to December 2015. We had collected total 6763 samples. We used Microscopic examination for the diagnosis of malaria by preparing thick and thin smears and stained using field stain.

Results: We had collected total 6763 samples out of which 108 samples are found microscopically positive (1.5%). In our hospital we observed only *Plasmodium vivax* and *Plasmodium falciparum* spp. Prevalence of *P. vivax* (64%) found more compare to *P. falciparum* (34%) and peak positivity rate found in July to October.

Conclusions: In our study the most frequently implicated species was *P. vivax*. This indicates that *P. vivax* is the most widespread infection in India which results in a pronounced morbidity and the seasonal prevalence observed high in July to October. In order to implement effective preventive measures, proper surveillance on the incidence and prevalence of malaria is required.

Keywords: *Plasmodium vivax*, *Plasmodium falciparum*, Malaria, Seasonal trends

INTRODUCTION

Malaria is one of the leading infectious diseases. Malaria is caused by *Plasmodium* parasites. It spreads to people through the bites of Anopheles mosquitoes, known vector for malaria. There are mainly four species that cause human infection i.e. *Plasmodium falciparum*, *Plasmodium vivax*, *Plasmodium malariae* and *Plasmodium ovale*. Amongst which *Plasmodium falciparum* and *Plasmodium vivax* are common in India.

As well as *Plasmodium falciparum* is more fatal than *Plasmodium vivax* because of its complications.¹ Malaria is one of the major public health problems and it is endemic in 104 tropical and subtropical countries of the

world. In tropics, it is major cause of morbidity and mortality too. According to the World Health Organization Southeast Asia contributed to only 2.5 million cases to the global burden of malaria. Of this, India alone contributed 76% of the total cases.²

In 2013, 0.88 million cases have been recorded, with 128 million tests being conducted on the suspected cases, with *P. falciparum* causing 53% and *P. vivax* causing 47% of the infections.³ According to the World Malaria Report 2014, 22% (275.5m) of India's population live in high transmission (>1 case per 1000 population) areas, 67% (838.9m) live in low transmission (0-1 cases per 1000 population) areas and 11% (137.7m) live in malaria-free (0 cases) areas. At present, official figures

for malaria in India, available at NVBDCP, indicate 0.7-1.6 million confirmed cases and 400-1,000 deaths annually.^{4,5}

Though India is one of the known endemic countries, incidence of malaria is commonly influenced by environmental factors like climate, season, temperature and socioeconomic status.⁶ Also, and nowadays it is problem of both rural n urban areas so this study aims to carry out prevalence surveillance in district hospital of North Gujarat, India.

Objectives of the study were to know the prevalence of different malarial species and to know the seasonal trend of malaria.

METHODS

This retrospective study was conducted in our hospital from June to December 2015. Total 6763 patient were evaluated. All patients with complain of fever included in study. Patients with fever as chief complain who either had attended OPD or Patients admitted in ward, have undergone primary examination and their blood samples were collected by central laboratory.

We used Microscopic examination for the diagnosis of malaria by preparing thick and thin smears and stained using field stain. On microscopy we have examined for detection of malaria parasite, species identification and different forms of malarial parasites.

RESULTS

We had collected total 6763 samples from this 108 samples is found microscopically positive. In our district hospital we get only *Plasmodium vivax* and *Plasmodium falciparum* spp. So over all prevalence of malaria in our area is 1.5%. From 108 microscopically positive samples, prevalence of *P. vivax* is 64%, *P. falciparum* 35%, and

mix infections which include *P. vivax* and *P. falciparum* is 0.92% (Figure 1).

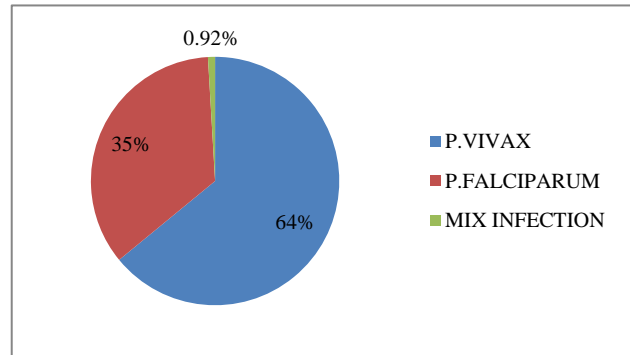


Figure 1: Prevalence of different type of plasmodium infection.

Table 1 shows month wise distribution of malaria infection in our hospital. In present institute we observed seasonal trend, which shows highest prevalence in September. There was increasing prevalence from June to October and after that decaling trends was found (Figure 2).

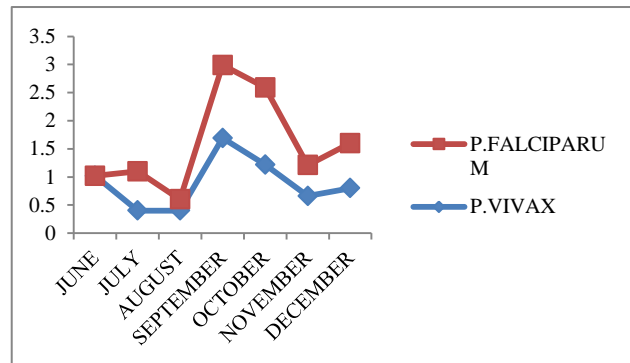


Figure 2: Seasonal trend of malaria infection.

Table 1: Month wise positivity rate of different malaria species.

Month	Total samples	Total positive	<i>P. vivax</i> (%)	<i>P. falciparum</i> (%)	Mixed Infection
June	588	6	6 (100%)	0 (0%)	0
July	712	4	3 (75%)	1 (25%)	0
August	968	16	14 (87.5%)	2 (12.5%)	0
September	1360	33	23 (69.69%)	10 (30.30%)	0
October	1383	38	17 (44.73%)	19 (50%)	2 (5.26%)
November	905	11	6 (54.54%)	5 (45.45%)	0
December	847	2	1 (50%)	1 (50%)	0

DISCUSSION

Malaria, a seasonal disease, in most parts of India; The maximal prevalence is from July to October. Good

rainfall, relative humidity of 60% and temperature between 20 and 30°C favour the spread of malaria.⁷ According to Park textbook of Preventive and Social Medicine.⁸ In India, about 70% of the infections are

reported to be due to *P. vivax*, 25-30% due to *P. falciparum*, 4-8% due to mixed infection and 1% due to *P. malariae*. We observed 64% of cases are due to *P. vivax* and 35% of total cases are due to *P. falciparum*, which correlated with Park textbook of preventive and social medicine.

Study by Muddaiah M, et al demonstrated highest infection rate of Plasmodium vivax i.e. 52.54%, Plasmodium falciparum of 33.75% and mixed malarial infection rate was 13.69%.⁹ In study of Pakistan by Ali Bin Zubairi S, et al showed that *P. vivax* and *P. falciparum* accounted for 83% and 13% of cases respectively.¹⁰

Similar findings of highest *P. vivax* infection rate were observed in present study. Further analysis with month wise distribution of cases shows that malaria cases start increasing from June every year and remain more or less high till October; thereafter it tends to fall gradually. Similar finding were also reported by Hadiya T. et al study where 61.41% and 38.56% cases were positive for *Plasmodium vivax* and *Plasmodium falciparum* respectively and comparable seasonal trends with our study. Month wise distribution of cases of present study was correlated with study by Prajapati et al.^{11,12}

Further analysis with shows that malaria cases start increasing from June every year and remain more or less high till October, thereafter it tends to fall gradually. Similar finding were also reported by Prajapati et al.¹²

CONCLUSION

From our study we concluded that there is high prevalence of *P. vivax* as compare to *P. falciparum* infection. Maximum numbers of cases were reported in month of September to October which concludes that malaria has its peak during rainy season. There was a substantial reduction in prevalence and incidence rates of both *P. vivax* and *P. falciparum* thereafter. In order to implement an effective preventive measure, proper surveillance on the incidence and prevalence of malaria is required.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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