

# A Study on the Prevalence of Malaria in Kolkata, West Bengal

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**ABSTRACT:** Malaria has remained a major public health problem in India, with cases therein contributing significantly to the overall malaria burden within South East Asia. Majority of malaria cases in India have occurred within the eastern and central regions of the country. Over 80% of the country's total malaria cases have been reported from 10 states. Statistics for the state of West Bengal had reported approximately 26,000 and 25,000 malaria cases in 2014 and 2018, respectively, with Kolkata still being considered the most malaria-prone district of West Bengal. A cross-sectional study was designed based on data collected from the Kolkata Municipal Corporation, documents on Taltala area residents during the winter. Collected data included age, sex, malaria category, medicine intake history and others. Outcomes following medication, such as chloroquine tablets, artemisinin-based combination therapies, and primaquine, were also assessed. A total of 120 patients was included, the vast majority of whom were males (88.3%). Vivax malaria (87.5%; mean age of cases, 37 years) predominated over falciparum malaria (12.5%; mean age of cases, 28 years). Fewer cases occurred in October (49.16%) compared to November (50.83%), suggesting the prevalence of malaria during the winter. The current study showed that uncomplicated malaria cases predominated. Moreover, severe malaria was infrequent, no fatalities occurred, and response to oral drug therapy was good.

## INTRODUCTION

Malaria has remained a major public health problem in India, with cases therein contributing significantly to the overall malaria burden in Southeast Asia. Majority of malaria cases in India have occurred within the eastern and central regions of the country. Around 90 countries, accounting for approximately 36% of the total world population, continue to be exposed to the risk of malaria. The main causative agent of this infectious disease is a parasite called '*Plasmodium*' from the protozoan family, which is spread through

Anopheles or Culex mosquitoes—the main vectors of this infectious disease. World Health Organization (WHO) estimates show that out of 1.4 billion total population across 11 countries, approximately 1.2 billion are at risk of being exposed to the malaria epidemic. Among the afore mentioned 11 countries, India has reported 2.5 million cases of malaria, which accounts for approximately 76% of the total reported cases, substantially contributing to the global burden nowadays. Three prospective research areas can be utilized to study malaria, that is, biological, ecological, and socio-cultural. The biological area, in which most studies have focused, holds more significance

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compared to the rest of other areas (Brown *et al.*, '90). Nonetheless, socio-cultural factors are evidently critical in controlling malaria given that human behavior can control the etiology of this disease. The combined interdisciplinary approach has been considered the best possible method of dealing with malaria. Most of the studies in India have focused on prevalence data collected from epidemic investigations. Despite studies on malaria, limited data have been available specifically for age, gender, and seasonal variance (Kumar *et al.*, 2007). The current study, therefore, focuses on some of these aspects.

#### *Background of the Study*

After India attained independence in 1947, 75 million malaria cases had been estimated at a population of 330 million. During the eradication era in the late 1950s and early 1960s, remarkable malaria eradication had been achieved, with malaria cases significantly declining to just 100,000 cases in 1964. Unfortunately, the number of cases gradually increased thereafter, reaching the 6.4 million mark by 1976 (Control of tropical diseases: malaria prevention and control WHO, 1997). Nineteen countries in sub-Saharan Africa and India carried almost 85% of the global malaria burden (WHO, 2019). The number of cases within the country still account for 4% of global malaria cases and approximately half of the total *Plasmodium vivax* cases worldwide (Ghosh and Rahi, 2019).

#### *Clinical Features*

Typically, malaria produces fever, headache, vomiting and other flu like symptoms. The parasite infects and destroys red blood cells resulting in easy fatigability due to anaemia, fits/convulsions and often loss of consciousness. Parasites are carried by blood to the brain (cerebral malaria) and to other vital organs.

#### *Objective*

The current study aimed to investigate the present status and trends of malaria in a designated ward under the jurisdiction of the KMC to determine timing, location, and distribution of malaria cases, as well as identify risk factors to mitigate future outbreaks.

## MATERIALS AND METHODS

A cross-sectional study was designed based on data collected from the KMC primary health center and a pretested questionnaire administered to Taltala area residents during the winter. For the ethical consideration verbal or written approval was taken from the residents. A medical history was taken, after which a clinical examination was performed in all patients using standard protocol. Weight and height were measured following the standard anthropometric protocol. Body mass index (BMI) was calculated as kg/m<sup>2</sup>. Fever was defined as an axillary temperature over 37.5°C. Venous blood was collected in ethylene diamine tetra acetic acid vials. Malaria parasites were counted per 200 white blood cells on Giemsa-stained thick blood films, while parasite species were defined based on thin-film microscopy.

## RESULTS

The total study population taken was 120 subjects. Among the included subjects, 106 (88.33%) and 14 (11.66%) were males and females, respectively. Patients were considered for analysis if they had microscopically visible parasitemia and if malaria diagnosis was available within 24 hours. Data was mainly collected on the basis of registration records as secondary data and simple statistical analyses were done. Kolkata Municipal Corporation showing indicators of malaria intervention in Borough 6, Annual Blood Examination Rate (ABER) is 9.61, Slide Positivity Rate (SPR) was 15.6 and Annual Parasite Incidence (API) was 15.53. Considering distribution of malaria category *Plasmodium vivax* (PV) 105 nos (87.5%) and *Plasmodium falciparum* (PF) 15 (12.5%). Mean age and SD of subjects PV is 36.77 (3.39) and PF was 28.46 (7.35). The effected population in the month of October, 2019 was 59 (49.16%) and in the month of November 2019 was 61 (50.83%). In treatment procedures details the patient's anti-malarial treatment as recommended by the WHO doses of chloroquine, artemisinin-based combination therapy (ACT), and primaquine. We observed that patients fared better with chloroquine (total dose of 25 mg/kg body weight) distributed over 3 days (76.66%) compared to distributed doses (12.5%). The 3 day treatment with ACT was found to be effective only in a small number of patients (5.83%). Radical treatment with primaquine

(0.25 mg/kg or 15 mg daily for 14 days followed by standard chloroquine therapy) yielded a cure rate of 16.66%, while a dose of 0.75 mg/kg weekly for 8 weeks yielded a cure rate of 79.16% in affected individuals.

#### DISCUSSION

The present study showed that among the included patients affected by malaria in Kolkata, almost 88% were due to *P. vivax*, while only 15% were due to *P. falciparum*. Majority of the patients managed with oral medications. Moreover, severe malaria was rare, while the fatalities were absent. However, the present study provides a sufficiently representative depiction of the status of malaria within Kolkata. The percentage of subjects affected by malaria after the peak monsoon season during the early winter months was quite high, suggesting *P. vivax* relapse (i.e., long and short latency) in the eastern part of India. However, given that the present study does not comprehensively investigate this phenomenon, further detailed studies on the matter should be encouraged. The medications adopted (WHO Model Prescribing Information, 1995; NVBDCP: National Guidelines for Treatment of Malaria, 2020) has provided the necessary information for understanding routine treatment approaches for cure. In practice, however, the selection of treatment is influenced not only by the intrinsic properties of the drug but also by the degree to which the locally occurring parasites developed specific patterns of drug resistance. This study emphasized that prompt diagnosis and treatment of the disease is dependent on targeted use of antimalarial drugs with the aim of reducing the risk of drug resistance and unnecessary drug-induced toxicity. Therefore, investing in malaria control provides public health benefits while improving the economic environment during the ongoing economic liberalization throughout India. In the present times almost all states and union territories of the country, India are affected by COVID-19. Given the seasonal pattern of epidemic prone diseases every year in our country, disease like malaria cannot only present as a diagnostic dilemma but may coexist in COVID-19 cases. This poses challenges in clinical and laboratory diagnosis of COVID-19 and has a bearing on clinical

management and patient outcomes. The scope of this research paper will help to reinforce the suspicion of malaria in a particular geographic region, where a fever is diagnosed as COVID-19, particularly during the rainy, post rainy season and winter months in areas endemic for this disease.

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