Clinico-Epidemiological Profile of Malaria

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ABSTRACT

BACKGROUND

Malaria is a major public health problem in India. The clinical manifestations of Malaria range from mild symptoms to severe disease. Death was also observed in many parts of the country. We aimed to study the clinical, epidemiological profile and incidence of Malaria in Bidar district among patients visiting teaching hospital from periphery of the district.

METHODS

A total of 300 blood samples were collected from cases with history of high fever, chills, profuse sweating, headache, nausea, vomiting, abdominal pain, and muscle pain. Thick and thin smear preparation and examination were carried out.

RESULTS

Out of 300 samples collected, 13 smears were positive for Malaria (4 cases of *P. falciparum* and 9 cases of *P. vivax*) Majority of subjects were in the age group of 26 – 35 years, males were affected more compared to females. No statistically significant result was observed.

CONCLUSIONS

Sporadic pattern of Malaria incidences was observed in the Bidar district. These areas have inadequate sanitation and constant water stagnation, harbouring high vector density and contributing to high infection. Heightened preventive and hygienic measures through educational programmes may substantially reduce the risk of contracting infections in these areas.

KEY WORDS

Bidar, India, Malaria, NVBDCP, *Plasmodium vivax*, *P. falciparum*, Prevalence

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DOI: 10.14260/jemds/2019/753

Financial or Other Competing Interests:
None.

How to Cite This Article:

Patil R, Kulkarni S. Clinico-epidemiological profile of malaria. J. Evolution Med. Dent. Sci. 2019;8(46):3479-3481, DOI: 10.14260/jemds/2019/753

Submission 19-09-2019,
Peer Review 28-10-2019,
Acceptance 04-11-2019,
Published 18-11-2019.

BACKGROUND

As the second most populous country in the world, with a population exceeding one billion people, Malaria is a major public health problem in India which contributes significantly to the overall malaria burden in Southeast Asia. During recent years 200-300 million clinically suspected cases and half a million deaths were reported worldwide.¹ Being a vector born disease malaria significantly contributes to the social and economic progress in sub-Saharan Africa, south east Asia and south America. Malaria is a parasitic infection transmitted from person to person by infected *Anopheles* mosquito. There are four kinds of malaria parasites that can infect humans: *Plasmodium vivax*, *P. ovale*, *P. malariae*, and *P. falciparum*. The two major human malaria species in India are *Plasmodium falciparum* and *P. Vivax*.²⁻³ With nearly 95% of its population residing in malaria-endemic areas, India is battling the burden through implementation of the National Vector Borne Disease Control Program (NVBDCP).⁴ The National Vector Borne Disease Control Program of India reported ~1.6 million cases and ~1100 malaria deaths in 2009.⁵ Historically, the highest incidence of malaria in India occurred in the 1950s, with an estimated 75 million cases and 0.8 million deaths per year (World Health Organization, Country Office for India). Yearly, around 10,000 - 30,000 travellers to endemic region, get infection after returning to their home places.⁶ The states severely affected include Uttar Pradesh, Bihar, Karnataka, Orissa, Rajasthan, Madhya Pradesh and Pondicherry. Malaria is endemic in Karnataka and it has witnessed an increasing incidence of cases over the past 5 years due to increase influx of migrant population. Through continuous efforts of the NVBDCP, malaria is now on a declining trend.⁶ The clinical manifestations of Malaria range from mild symptoms to severe disease and death was also observed in many parts of the country. *Vivax* malaria usually presents with high grade fever, headache, abdominal pain, nausea and vomiting. Deaths due to malaria occurs by severe anaemia, renal failure, acute respiratory failure, hypoglycaemia, shock, and/or central nervous system involvement (*Falciparum* malaria).⁷⁻⁸ This study was undertaken to find out the clinical and epidemiological pattern of disease in the Bidar district.

Hence, we aimed to study the clinical, epidemiological profile and incidence of Malaria in Bidar district from patients visiting teaching hospital from periphery of the district.

METHODS

This cross-sectional study was conducted from August 2018 to February 2019 in the Department of Medicine of 750 bedded Teaching hospital of Bidar Institute of Medical Sciences (BRIMS) Bidar of North Karnataka. The study population consisted patients from urban and rural area of Bidar visiting to Outpatient Department of Medicine complaining of acute fever not less than three days with no evident focus of infection. A total of 300 patients of all age groups and sex visiting to Outpatient department of Medicine complaining of high fever, chills, profuse sweating, headache, nausea, vomiting, abdominal pain, and muscle pain are

included in the study. Brief history about the illness and patient details like age, sex and address are recorded. After thorough general physical examination, the findings were entered on a standard data collection sheet. This study protocol was approved by Institute's Ethics Committee, and samples were collected after obtaining informed consent from the patients.

The sample size (n=300) was estimated with an expected prevalence of Malaria as 15% with 4% absolute precision and 95% confidence interval. An interim analysis was carried out and the estimate from the interim analysis was used to modify the sample size. Convenience sampling method was adapted to carry out this study. Blood samples were collected from the patients and sent to the laboratory to carry out complete blood count analysis and thick and thin smear examination for malarial parasites. Thick and thin smears were made from capillary blood were stained with Leishman's stain and observed under oil immersion. Malarial parasite and its spp was identified by microscopy. Smears were repeated every 8 to 12 hrs for the next 48 hours in suspected cases when the first smear did not reveal parasite.

Statistical Analysis

Statistical software package SPSS version 22 (IBM Corp. Released 2013. IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp) was used to analyse the data. Chi-square test was applied wherever necessary and P-value of <0.05 was considered statistically significant.

RESULTS

Out of 300 samples collected, 13 smears were positive for Malaria disease. Amongst these 13 cases, 4 cases proved for *P. falciparum* infection and remaining 9 cases were positive for *P. vivax* infection. The most common symptom was pyrexia (All cases) followed by nausea with vomiting, headache. In 4 *P. falciparum* infection cases the most common complications observed was jaundice followed by cerebral malaria, renal impairment, hypoglycaemia, hepato-renal syndrome. Majority of subjects were in the age group of 26 – 35 years, males were affected more compared to females. There was no statistically significant result seen with respect to age and sex. Sporadic pattern of malaria was observed in the Bidar district. Total White blood cell count was normal in majority of affected population and Leukopenia was observed in very less number of cases.

Characteristics	Patients		Percentage (%)	
	Suspected	Positive	Suspected	Positive
Male	185	3	61.6	75
Female	115	1	38.4	25

Table 1. Characteristics of 4 *Falciparum* Malaria Patients

Characteristics	Patients		Percentage	
	Suspected	Positive	Suspected	Positive
Male	185	6	61.6	66.6
Female	115	3	38.4	33.4

Table 2. Characteristics of 9 *Vivax* Malaria Patients

DISCUSSION

In the present study 300 patients were studied. Out of which, 4 *falciparum* malaria and 9 *vivax* malaria confirmed cases were found which was predominant in this region. In case of *vivax* malaria infection, males were more affected than females. Also, *falciparum* malaria cases were more in males compared to females. This may be due to outdoor activities and mobility of males and females are better clothed than males. This observation is consistent with few other studies. Majority of confirmed cases were belonging to age group between 26–35 years followed by other age groups. This is consistent with the observation that malaria incidence is higher in young adults because of their outdoor activities and mobility.⁹⁻¹¹

All patients presented with intermittent/continuous fever. This observation is consistent with few other studies which suggest that fever with chills and rigor is the commonest mode of presentation. Headache was the second commonest symptom similar to the study previously reported.¹¹⁻¹² The classical triad of Malaria was observed in the present study with fever, splenomegaly and anaemia were the commonest findings. Anaemia was reported in majority of cases. Approximately 91% of confirmed cases had anaemia.

About 65% of affected population belonged to the middle socioeconomic group and 14% belonged to lower socioeconomic group. The incidence was lower in upper socioeconomic group. Maximum numbers of malaria cases were observed in monsoon and post monsoon period (August to November). The actual reason behind this is increased breeding in this tenure. This finding is consistent with few other studies. Total WBC count was well within the range in majority of patients. Leukopenia was observed in very less number of population.¹¹⁻¹²

CONCLUSIONS

Malaria is prevalent in Bidar and persists throughout the year with maximum level of infection cases seen during the rainy season. Both *P. vivax* and *P. falciparum* infections occur

throughout the year. Therefore, conducting educational programmes on malaria awareness and implementation of public control measures are likely to eradicate infection in Bidar.

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