RESEARCH ARTICLE

RISING INCIDENCE OF MALARIA IN AHMEDABAD, GUJARAT IN 2011-12

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ABSTRACT

Background: Malaria, a disease of antiquity, has proved to be a formidable deterrent to the cultural and socio-economic progress of man in tropical, subtropical and monsoon prone zones if world.

Aims & Objective: To highlight that the incidence of malaria is static throughout the year in India.

Material and Methods: We analysed our institutional data for the period between April-2011 to Aug-2012 P. vivax was found to account for 69% of all malaria cases and P. falciparum for the other 31%. Infection by P. vivax and P. falciparum (63.13%) was commonest age group of 16 to 40 years.

Results: Plasmodium infection was more common in the age group 16-40. Male were having more incidence of plasmodium infection. The incidence of P. vivax infection was peak during May to Sep. Same way incidence of falciparum was peak in August to November.

Conclusion: The incidence of p. vivax was present throughout the year. Overall incidence of p.vivax was high. The available data indicate that the burden of malaria morbidity (P. vivax) is very high in this country. P. Vivax malaria is present throughout the year with the peak in months of May to September. On the other hand incidence of p. Falciparum has a peak in monsoon months i.e. Aug to Nov. In order to implement an effective malaria control program, accurate information on the incidence and prevalence of malaria is required.

KEY-WORDS: Malaria; Para Check; Peripheral Smear; Plasmodium Falciparum; Plasmodium Vivax

Introduction

Malaria, a disease of antiquity, has proved to be a formidable deterrent to the cultural and socio-economic progress of man in tropical, subtropical and monsoon prone zones if world.[1-9] As p. Falciparum malaria is associated with most serious complications, diagnosis of it constitutes a medical emergency. One of the most pronounced problem in controlling the morbidity and mortality caused by malaria is limited access to effective diagnosis and treatment in areas where malaria is endemic.[10] Microscopy examination of blood smear is widely used routine method for detection of malaria parasites and remains the gold standard for malaria diagnosis. Owing to the paucity of accurate information on the burden of malaria in urban India retrospective,

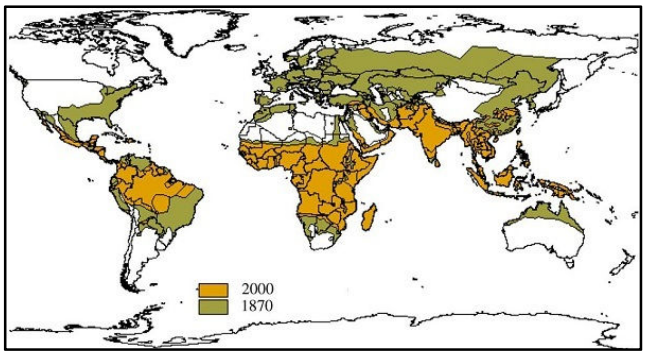

Figure-1: Current distribution of malaria (Source: WHO, 2002) and the historical distribution (1870).

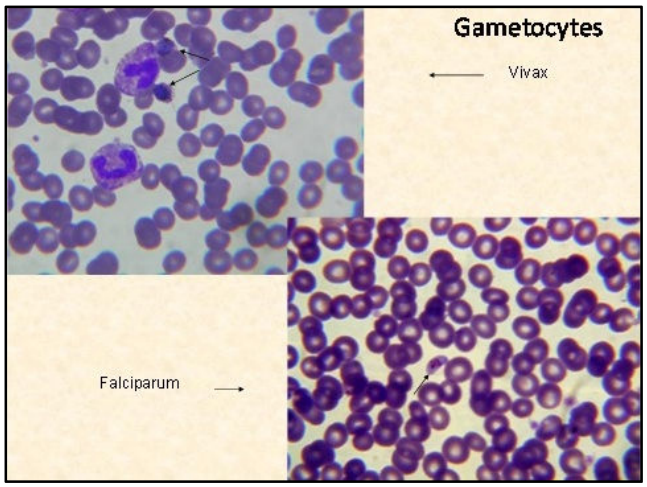

Figure-2: Microscopy Examination of Blood Smear showing Gametocytes

epidemiological study was carried out in Ahmedabad city, which has a population of about 5 million.[2,6,8] P. vivax always predominated but the proportion of cases attributed to complicated P. vivax increased markedly during recent years.[10,11] First, malaria incidence is hugely influenced by geography and prevailing climate. The poorest countries tend to be in high-risk tropical and subtropical regions.

Materials and Methods

We analysed retrospectively our institutional data for the period between April-2011 to September-2012. Malaria screening data from 1400 patients (21364 totals Investigated for malaria) in S.C.L. Hospital were analysed to investigate the patterns of referral, temporal trends and geographical distribution of severe malaria in Ahmedabad. Study participants: Patients attending medical indoor in medical department for malaria were included in the study. The clinical features were high grade fever. They underwent following investigation for malaria: (1) Thin film; (2) Thick film and (3) Para check.

Results

The incidence of infection with each Plasmodium species showed seasonal variation, with that of P. vivax increasing from January to September but then declining as the incidence of P. falciparum increased. In developing countries like ours, the changing pattern of complicated vivax malaria gives us challenge to be very vigilant towards identifying the accurate diagnosis of specific species of malarial parasite with prompt and radical treatment.[4,5,9]

The malaria incidence detected (1500 cases, representing a mean annual incidence of 12.2 cases/1000) was nine times greater than that officially reported (4119 cases, or 1.3 cases/1000 each year). The annual malaria-attributable mortality detected (22 deaths/million) was (0.3 death/million).[5,9] The results of the retrospective analysis not only provide a more accurate, baseline estimate of the burden of malaria in an urban area of India but also clearly indicate the need for a much more efficient health-information system, for recording and managing malaria in such a setting. Plasmodium infection was more common in the age group 16-40. P. vivax malaria was more between 16-60 year age group. This shows adults are more affected. Male were having more incidence of plasmodium infection. Incidence in male was 58.27% while in female was 41.73 %.[22,23]

Table-1: Age Distribution

Age (yrs)	P. Vivax (%)	P. Falciparum (%)
0-15	117 (11.73%)	18 (1.80%)
16-40	432 (43.32%)	198 (19.85%)
41-60	156 (15.64%)	36 (3.61%)
>61	31 (3.10%)	09 (0.90%)

Table-2: Sex Distribution

Sex	P. Vivax (%)	P. Falciparum (%)
Male	430 (58.42%)	151 (57.85%)
Female	306 (41.58%)	110 (42.15%)

The incidence of vivax infection was peak during May to Sep. Same way incidence of falciparum was peak in Aug to Nov. There was no case of falciparum during May-11 to June-11 and Feb-12 to April-12.

The only two Plasmodium species encountered were P. vivax and P. falciparum in both children & adults during the period of April-11 to Sept-12.

Table-3: Monthly Incidence of Malaria

Month	P. Vivax		P. Falciparum	
	OPD	IPD	OPD	IPD
April-11	01	13	00	02
May-11	24	30	00	00
June-11	24	30	00	00
July-11	11	30	00	03
August-11	39	92	08	43
September-11	68	75	10	41
October-11	17	40	13	45
November-11	07	19	09	46
December-11	02	06	04	20
January-12	02	01	03	06
February-12	07	03	00	00
March-12	09	11	00	00
April-12	31	42	02	00
May-12	44	63	01	02
June-12	31	71	00	00
July-12	45	51	02	00
August-12	64	98	11	27

From April-11 till Sep-12, 997 malaria cases were admitted, of which 261 (26.1%) harboured Plasmodium falciparum and 736 (73.8%) Plasmodium vivax.[1,5,8] Infection was commonest in both vivax and falciparum (63.13%) between 16 and 40 years of age.[26] Patients age group 0-15 had total 135 (13.54%), age group 41-60 had total

192 (19.20%) and age group > 61 year had total 40 (4.13%) patients. Seasonality of malaria incidence was marked with a single peak in P. falciparum transmission from August to October coinciding with peak rainfall, whereas P. vivax showed an additional peak in March-August .The incidence of p. vivax was present throughout the year. Meanwhile case of p. Falciparum was not found in May 11 & June 11, Feb 12 & March 12 admitted malaria cases. Case fatality in severe malaria was 18% from 2008–2011, remaining steady during this period.[8,12] The incidence of P. Vivax was 68.57% in the age gp.16-40. Same was high in other age group with p. Vivax. There were all parachek +ve patients for malaria infection. While peripheral smear was +ve in 937 patients. This may be due to outside treatment taken by the patients. Because after treatment parasite may decrease in no. while the antigen still remains in blood. In this study we have found that incidence of Plasmodium infection was constant from April-11 up to Nov-11. Then there was decline in the incidence from Jan-12 to March-12. Again the incidence increased from April-12.

The overall increase in admitted malaria cases to the institute suggests recent control measures are not so successful. However, there are no reliable data on the incidence of severe malaria in the endemic area of Ahmedabad, and most of these patients do not reach tertiary health facilities.[3] Improvement of early treatment and simple supportive care for severe malaria in remote areas and implementation of a referral system for cases requiring additional supportive care could be an important component of further reducing malaria-attributable morbidity and mortality.[25] Even preventive measures needs to be improved.

Discussion

Although overall numbers were large, this study had several limitations. All data were from a single tertiary referral hospital. Data were only collected on those patients who had a malaria test by the on-site malaria diagnostic laboratory. The study relies on the assumption that the quality of malaria diagnosis did not change significantly from 2011- 2012. This is likely to be the case, as the same highly experienced staff were employed throughout and used the same techniques in hospital malaria clinic. It does, however also rely on the medical staff referring the same group of patients for testing during this period but data on this were not collected.

There was a strong and consistent seasonal pattern of P. falciparum incidence, with a large peak between August to November each year largely coinciding with the maximum rainfall during the monsoon season (July-October). This finding is in contrast with the pattern reported in two earlier reports[15,16] describing one transmission peak in March-May and one in September-November, with June-August being described as off-peak months.[15,19]

Incidence of p.vivax malaria was 73.8% which is comparable with other study.[21] However, in both these publications no monthly incidence data were presented. For the incidence of P. vivax a peak was observed in the months from May-11 to August-11, additional peak in the months from May-12 to August-12. The incidence of P. falciparum, which uses the same vector system, has the peak in August which is common with p. Vivax infection. In India the weather is hot and humid in this period. This gives the vector mosquito to flourish in number. This may give rise to highest incidence of both infections. The same seasonality has been described in vivax malaria in other study.[7,17]

Another significant change recorded in this study was extension of P. vivax period. All earlier (other) studies carried out showed a summer peak due to P. vivax dominated malaria, while monsoon peak due to P. falciparum Which gradually decline up to March, thereby reducing the P. falciparum season and thus causing disappearance of the summer peak due to P. falciparum. The relative increase in prevalence of P. falciparum infection in monsoon was also supported with increase in insecticide resistance in A Culicifacies.[18,20] There is male predominance in this study. Probably more exposure to the vector is the culprit. Other is may be more male patients attend the outdoor department.

The available data indicate that the burden of malaria morbidity (p.vivax) is very high in this country.[11,14,23] Same is seen in other study as

reported earlier from Thailand in areas under the influence of both P. vivax and P. Falciparum (Luxemburger et al. 1997)[24]; however, mortality is very low.

There was apparent association between rainfall and prevalence of P. falciparum infection as proposed by Bouma and Van der Kaay (1994) and the years of high and low rainfall were not followed by high prevalence of P. Falciparum infection as reported earlier (Singh & Sharma 2002a).

Conclusion

P. Vivax malaria is present throughout the year with the peak in months of May to September. On the other hand incidence of p. Falciparum has a peak in monsoon months i.e. Aug to Nov. In order to implement an effective malaria control program, accurate information on the incidence and prevalence of malaria is required.[20]

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