



Staging back of Malaria in Kerala, India: A Retrospective study

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Abstract

Malaria is one of the important public health problem in India by considering its prevalence, virulence and drug resistance. The aim of this study is to find out the case infection and fatality over age, sex and time period. It is a hospital based retrospective study of five years. The data were collected from the medical records department of the hospital and analysed by using Microsoft excel. 'Z' test applied for finding out the comparison of proportions. Out of 139 confirmed cases of malaria, 121 cases were males (87.05%) and 18 cases (12.95%) were females. The proportion of malaria cases is higher in males than females. The majority of 58.99% of cases are in 20-39years. Case fatality of malaria is 2.15% and it is 1.65% in males and 5.5% in females and it is highly significant ($p=0.0036$). Out of 139 malaria cases reported in the study, 46.04% cases were Plasmodium falciparum, 27.33% were Plasmodium vivax and 26.61% were due to unspecified malaria infection. The preponderance of males and adult age group indicating the involvement of outdoor work exposure in the case infection. As the labours from the malaria endemic areas are the source of infection in the study area, much personal prophylactic measures to be adopted by the labours during the outdoor works and vector control activity to be strengthened through the Primary Health Centre in the area.

Keywords: Malaria, case infection, age and sex.

Introduction

Malaria is a mosquito borne infection. It is caused by the parasites of genus plasmodium. The infected mosquito transmits the diseases by biting the human body and the carriers are the infected female Anopheline mosquitoes. A typical attack comprises of three stages such as cold stage, hot stage and sweating stage and showing symptoms such as head ache, fever, shivering, vomiting, haemolytic anaemia, jaundice, haemoglobin in urine, retinal damage and convulsions¹. Malaria reports from almost all states of India especially from eastern states².

Methodology

The study restricted to 139 confirmed cases of malaria which was reported at a tertiary level teaching hospital situated at the central part of Kerala during a time period of five years from April 2005 to March 2010. The patients under study were divided in to five age group of 20 years age interval such as <20years, 20-39 years, 40-59years, 60-79years and 80years and above. The data were collected from the medical records department and analysed by using Microsoft excel. 'Z' test applied for finding out the difference in proportions.

Result and Discussion

Result: Out of 139 confirmed cases of malaria, 121 cases were males (87.05%) and 18 cases (12.95%) were females. The

proportion of malaria cases was higher in males than females. While <20 years report the 23.74% cases, the majority of 58.99% of cases were in 20-39years followed by 15.10% cases in 40-59years and 2.15% cases is in 60-79years of age and none of the cases reported above 80years and above. Case fatality of malaria is 2.15% and it is 1.65% in males and 5.5% in females and the difference is highly significant ($p=0.0036$). The trend of malaria cases in males and females fluctuating from 2005 to 2010 has shown in figure1 and different types of malaria of same time period has depicted in figure 2. Out of 139 malaria cases reported in the study, 64 (46.04%) cases were Plasmodium falciparum, 38 (27.33%) were Plasmodium vivax and 37 cases (26.61%) were due to unspecified malaria infection.

Discussion: Malaria is one of the important public health issues in the world. More than hundred countries of the world are reported as malarious and 50 of them belong to African continent³. While SEAR (South East Asia Region) reports 2.5 million malaria cases in the world, India contributes 76% of these⁴. Since independence government of India has taken many measures to combat malaria and this led to the reduction of malaria cases from 75million to 2 million cases in 1950's³. With the launching of malaria control programme, the malaria cases reduced from 6.4 million to 2.1 million cases⁵. While vector borne diseases account for 1.6% of India's total population⁶, malaria continues its dominance as a serious public health problem due to its prevalence, virulence and drug resistance.

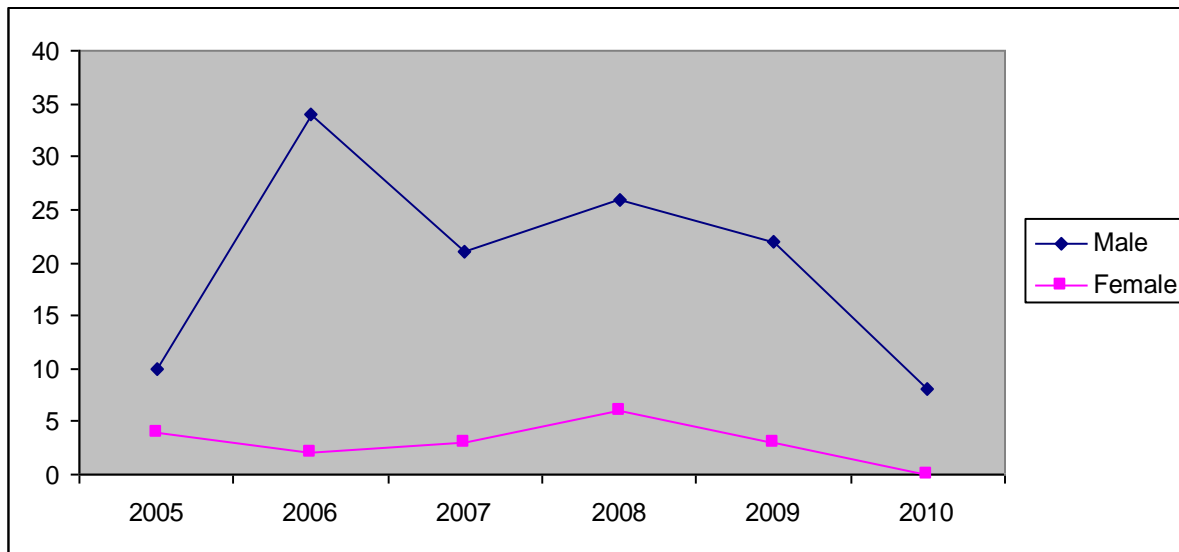


Figure-1
 Trend of case infection of malaria in males and females from April 2005 to March 2010

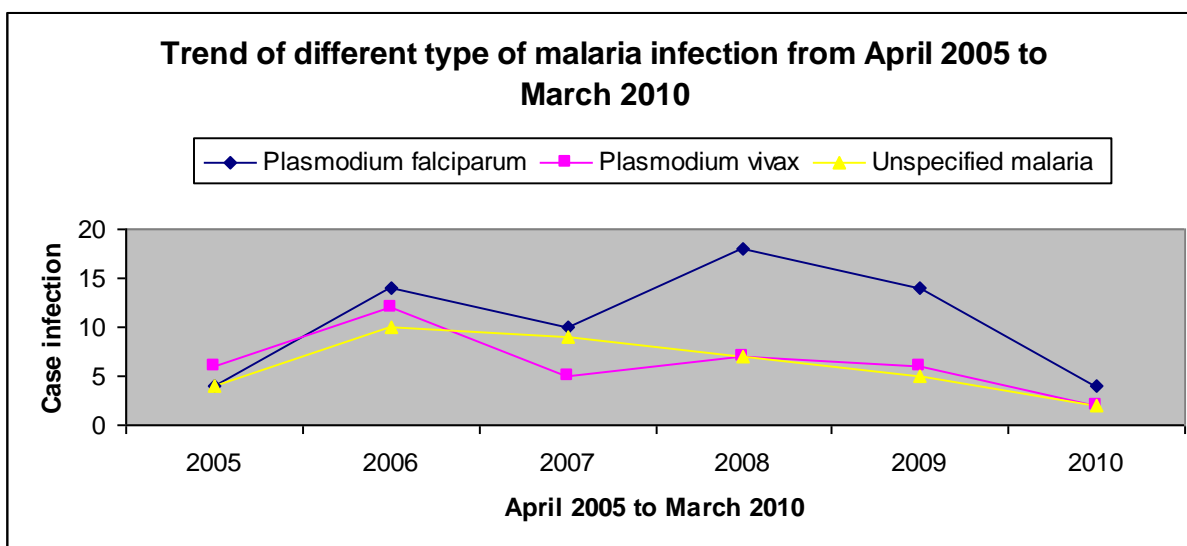


Figure-2
 Trend of different type of malaria infection from April 2005 to March 2010

Table-1
 Age and Sex wise distribution of case and infection and fatality of Malaria

Age	Case Infection			Case fatality		
	Male	Female	Total	Male	Female	Total
<20yrs	25(20.7%)	8(44.4%)	33(23.74%)	0	1	1
20-39yrs	75(61.9%)	7(38.8%)	82(58.99%)	0	0	0
40-59yrs	20(16.5%)	1(5.5%)	21(15.10%)	2	0	2
60-79yrs	1(0.82%)	2(11.1%)	3(2.15%)	0	0	0
80yrs and above	0	0	0	0	0	0
Total	121	18	139	2	1	3

Out of 139 malaria cases reported in the study, 46.04% cases were *Plasmodium falciparum*, 27.33% were *Plasmodium vivax* and 26.61% were due to unspecified malaria infection. The other studies conducted in different states of India on this regard also second the preponderance of *Plasmodium falciparum*. Gauravi Mishra in their study of malaria in Ratnagiri district, Maharashtra⁷ reports the 59.09% of infection was due to *Plasmodium falciparum*. A study conducted by Ananad et al⁸ in North India reports 85.36% of infection caused due to *Plasmodium falciparum*. Another study conducted by Sidhu et al⁹ also reveals that 50% of case infection was due to *falciparum*, 40.6% of *vivax* followed by 6.2% by *malariae* and 3.1% due to mixed infection of *Plasmodium falciparum* and *Plasmodium vivax*. Nadjm et al¹⁰ in their study on 'Malaria an update for physicians' also support that more infections happens due to *Plasmodium falciparum* because *Plasmodium falciparum* constitutes 75% of infection while *Plasmodium vivax* occupies only 20% of infection. A study reported by Singh et al¹¹ reveals that *Plasmodium vivax* cases have been reduced over time and *Plasmodium falciparum* is more prevalent than other types of malaria infection. On the contrary to the above findings, K. Park³ reports that malaria 70% of malaria infections in India are due to *Plasmodium vivax*. Madhu Muddaiah et al¹² in their study on malaria in South Canara, Karnataka states also reveals that *Plasmodium vivax* constitutes as highest; 52.54%, *Plasmodium falciparum* 33.75% and mixed malarial infection is 13.69%.

Table 1 shows the distribution of malaria based on age and sex. In the present study 87.05% of cases were males and 12.95% cases were females. Gender ratio is 6.7:1. Preetam N et al¹³ reveals in his study on clinical profile of malaria reports the preponderance of males than females in case infection. Murthy GL et al¹⁴ in his hospital study on malaria reveals that males are more infected than females. UK Chandrashekar et al¹⁵ in his study on malaria in Calicut district of Kerala also support that malaria infection in males are higher compared to females. A hospital based study conducted at KMC hospital at Attavar, in India by Chowta MN et al¹⁶ also supports high preponderance of males in malaria case infection. Another study conducted by Madhu Muddaiah et al¹² in Karnataka, states that high infection of cases records in males as 82% while female infection reports only 18%. Sharma et al¹⁷ in his study in Odisha and Vidhanjain et al¹⁸ in his study in Madhyapradesh, Bonilla E et al¹⁹ in Colombia, Chigozie et al in Nigeria²⁰ and S. Sahar et al²¹ in Pakistan also reveal the fact that males are more vulnerable to malaria infection. This high preponderance of males in case infection indicating the chance of outdoor work exposure in the case infection because males are more involved in construction industry, agriculture and other outdoor works than females and they are less clothed than females and this promotes more chances of mosquito bite. In the present study, malaria infection reports high in the 20-39yrs age group as 58.99%. This reveals the fact that adult working group is more vulnerable to the infection during their outdoor works. It is supported by Poonam Bhadja et al²² in their study on malaria patients at Rajkot,

Gujarat, Madhu Muddaiah¹² in Karnataka, Preetham N et al¹³ in central India and Nissapatorn V et al²³ in their study on parasitic infections in Malaysia.

In the present study case fatality of malaria is 2.15% and it is lower than 2.6% in Ahmedabad, Gujarat²⁴, 2.7% in Cambodia²⁵, 7.9% in Vellore, Tamilnadu²⁶, 9.8% in Alipurduar²⁷, 8.9% in Gabon, Central Africa²⁸, 10.63% in Maharashtra²⁹, 14% in Orissa³⁰ 19% in Sub Saharan Africa³¹, 21.1% in Zaire³², 25.6% in Jabalpur, Madhyapradesh³³, and, 63.3% in Bihar³⁴. In the present study the case fatality rate is 1.65% in males and 5.5% in females and its difference is highly significant ($p=0.0036$). But in a study conducted by Talsania NJ et al²⁴ about malaria related morbidity and mortality in Ahmedabad, Gujarat reporting that case fatality of males is 3% and in females is 2.11% and its difference is not statistically significant.

Kerala State belongs to the southern part of India which was declared as malaria eradicated State in 1965. But the new cases of malaria have been reporting since 1969 in the State as a result of imported cases from north-eastern and central states of India. Many workers related to agriculture and construction industry coming to Kerala and they brought malaria parasite through their blood and reintroduced in to this state. According to a report published in Times of India on 22nd April, 2013³⁵, nine malaria cases were reported from a construction site in Calicut district of Kerala. Out of these nine infected ones, two of them were Keralites, who caught infection from the other seven workers had been from the malaria endemic states of the India. The Hindu daily on July 12th 2012 also reports³⁶ 82 cases of malaria in Thrissur district of Kerala in connection with booming construction industry. The study area witness the much construction works day by day and this demands the movement of labours from north-eastern endemic states of India to this construction boom. Thousands of people from malaria endemic areas is attracting to the construction industry for getting better salary and to enjoy better living standards compared to their native states. These fast developments make a challenge in the ecosystem and the surroundings of construction site itself function as a breeding source of mosquitoes. This overcrowding of migrants creates much unhygienic environmental pollution in the area and leading to the profuse multiplication of vectors and results the transmission of malaria and other vector borne diseases such as Dengue, Chikengunya, Filariasis and Japanese encephalitis. Even though Kerala was considered as the model state for the health status³⁷, the recent picture of emerging and re emergence of vector borne diseases pushes the state in to a state of darkness and this negatively affects the economic development of the state also.

Conclusion

Even migrants are the main source of malaria, more cases reporting from all sections of the society. So the Primary Health centres of the each area have to be taken the responsibility of vector control measures and to ensure the surveillance system to

prevent the case infection and mortality of this fatal disease. High risk groups have to utilize the personal prophylactic measures to prevent mosquito bite and community based action programmes also essential to arrest the vector breeding sources in the surroundings.

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