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A Comprehensive Study of the Epidemiological Pattern of Malaria

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Abstract:
Background and objectives: *Malaria is one of the leading causes of morbidity and mortality in tropical countries. The objectives of the study are(1) to study epidemiological pattern of malaria.(2) to emphasis the accurate diagnosis or species identification of mixed-species malaria and consequences of underreporting of the same (3)to report a rare case of congenital malaria.*
Methods: *The laboratory records of cases having malarial parasites positive in peripheral blood smear of year 2014 were analyzed retrospectively for epidemiological data.*
Results: *Total 75 cases were studied, which shows maximum cases affected between 16-30 yrs age group, with male predominance.12% cases showed mixed malarial parasites infection. One case of Congenital malaria was reported in our study.*
Conclusions: *Young adults are the most commonly affected age group for malaria. Mixed-malarial (falciparum and vivax) infections very often go unrecognized, or are often under reported, with a tendency to over report the more dangerous P. falciparum.*
Keywords- *Congenital malaria, Epidemiological pattern, mixed malarial parasites infection*

I. Introduction

Malaria is a tropical disease caused by the protozoan parasite Plasmodium. It is one of leading causes of morbidity and mortality in the tropics. [1].Malaria kills a child somewhere in the world every minute. [2]The disease in humans is caused by the direct effects of red blood cell (RBC) invasion and destruction by the parasite and the host's response. [3]

In regions where P. falciparum and P. vivax coexist mixed-species infection are common and yet rarely reported. Surveys usually report rates less than 2% and yet careful clinical studies record rates up to 30% and this figure is even higher when PCR detection methods are used [16].Concurrent infections with different plasmodium species may have important implications on the host response and development of cross-species immunity. [5] Neonatal malaria is considered a rare occurrence due to the protective effect of maternal immunity after birth. [6] The aims and objectives of the study are (1) to study epidemiological pattern of malaria.(2) to emphasis the accurate diagnosis or species identification of mixed-species malaria and consequences of underreporting of the same (3)to report a rare case of congenital malaria.

II. Material And Methods

The laboratory records of cases having malarial parasites positive in peripheral blood smear of year 2014 were analyzed retrospectively. The details of the cases like age, sex, type of malarial parasite infection were collected and analyzed for epidemiological data.

III. Result

Out of total 75 malaria parasite positive cases studied, male & female cases were 49 & 26 respectively. The male to female ratio was 1.9:1.

Table 1:Age Profile of Malaria cases

Age	No. of malaria cases	malaria cases(%)
0-15	19	25%
16-30	30	40%
31-45	15	20%
46-60	11	15%

Table 2:Age profile of malaria cases with Different plasmodium parasite species infection

Age	type of malaria cases		
	P. vivax	P.falciparum	Mixed (P.vivax & P.falciparum)
0-15	15	2	2
16-30	20	5	5
31-45	11	2	2
46-60	7	4	0

Table 3:Profile of different Plasmodium species infection

Type of Malarial parasite infection	No. of cases	% of cases
P. vivax	53	70.7%
P.falciparum	13	17.3%
Mixed(P. vivax & P.falciparum)	9	12.0%

One case of Congenital malaria was reported.

IV. Discussion

Male was predominantly affected & Male to female ratio was 1.9:1,which correlates with most of the studies. [7, 8] Mixed-malarial (P. falciparum and P. vivax) infections very often go unrecognised, or are often under reported, with a tendency to over report the more dangerous P. falciparum. In endemic areas, where the prevalence of malaria revealed by sensitive PCR methods is much higher than evident from microscopy, high rates of mixed blood stage infection (~20%) have been reported, presumably because both infections are carried chronically [9,10]. In study done by V. Josef[11] ,only 2.9% with mixed malaria infection, on peripheral smear examination, were identified as malaria cases during the study period of 2 years. This is consistent with surveys done in Thailand, which report that mixed infections constitute less than 2% of all malaria cases. However, studies using sensitive polymerase chain reaction (PCR) methods in the same region as the survey put the incidence of mixed infections at around 30% of all malarial infections. [4] Thus mixed malarial infections are often under estimated and can have a significant impact on patient management. In our study 12% of total malaria cases were found having mixed malarial parasite infection, which is higher compared to other studies. [11,4] If mixed-species malaria is misdiagnosed as a single P. vivax infection, treatment of P. vivax increases P. falciparum parasitaemia. Mixed-species infections increase the possibility of anti-malarial drug resistance. Hence, a drug-resistant population of Plasmodium parasites will emerge [12]. Therefore, accurate diagnosis or species identification of mixed-species malaria is critical for therapeutic decisions [12,13].

Congenital malaria, defined as asexual parasites detected in the cord blood or in the peripheral blood during the first week of life[14], is due to transmission from the mother through the placenta just before or during delivery[15].Congenital malaria is a rare disease. [16]Neonatal malaria is considered a rare occurrence due to the protective effect of maternal immunity after birth. [6] Neonates may also be protected through factors that inhibit parasite growth, such as lactoferrin (which binds iron) and secretory IgA, found in breast milk and in maternal and infant sera [17].Young infants with malaria may have different clinical manifestations [18,19] and lower parasite densities [20] than older children. Nevertheless, even low-density infections (1–500 parasites/μL) in infants can result in anaemia if left untreated [21], and may rapidly progress to become life-threatening[22]. One case of Congenital malaria was reported in our study.The baby was 9 days old male patient when malaria was lab diagnosed as mixed P.vivax & P.falciparum infection by peripheral blood smear & he had history of clinical symptoms since 4 days. The baby's mother was also positive for mixed malarial parasite infection by peripheral blood smear.

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