

# A Study of Haematological Changes in Diagnosed Cases of Malaria in a Tertiary Care Hospital at Rajkot (Gujarat), India: A Study over a Period of Two Year

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**Abstract:** Present study was carried out in P.D.U. hospital, Rajkot for time period between October 2012 to June 2014. The study was conducted on the indoor and outdoor patients having clinically suspected malaria. The diagnosis of malaria was established by thin blood smear, thick blood smear and antigen card test. Then haematological changes were studied by automated cell counter and peripheral smear examination, in these diagnosed cases of malaria which concluded that anemia and thrombocytopenia and mild rise in ESR where significantly associated with malaria while WBC count has no statistic significant. Blood indices also do not show any correlation with malaria.

**Keywords:** Anemia, Thrombocytopenia, ESR

## 1. Introduction

"Malaria" received its name from Italian as it was believed to arise due to foul air common near marshy area.

Malaria is a major health problem in India, being one of the biggest burdens in terms of morbidity and mortality among all infectious diseases. Malaria is caused by parasites of genus plasmodium and transmitted to men by bite of female anopheline mosquito<sup>1</sup>. Genus plasmodium has four species – p.vivax, p. falciparum, p. malariae, p.ovale.

Malaria causing plasmodia are parasites of blood and hence induce haematological alterations. The haematological changes that have been reported to accompany malaria include anaemia, thrombocytopenia & Leucocytosis, leucopenia, mild to moderate atypical lymphocytosis, eosinophilia and neutrophilia<sup>2, 3,4</sup>. Platelet abnormalities are both qualitative as well as quantitative. Thrombocytopenia is common occurrence in acute malaria and it is observed in vivax and falciparum malaria to varying degrees<sup>2,3,4</sup>. Hence the present study is undertaken to evaluate the various haematological parameters as affected in malaria and to observe the variations if any, in P.falciparum, p.vivax and mixed infections.

## 2. Material & Methods

Present study was carried out in P.D.U. hospital, Rajkot for time period between October 2012 to June 2014. The study was conducted on the indoor and outdoor patients having clinically suspected malaria. The diagnosis of malaria was established by three different methods including thin smear and thick smear prepared from blood collected in EDTA bulb and stained with field stain and Antigen card test was

also performed for all the cases .For malaria positive cases following further test were performed from EDTA bulb:

Hemoglobin, Total count, Differential count, Platelet count, Peripheral smear examination, Blood indices including MCV, MCH, MCHC.

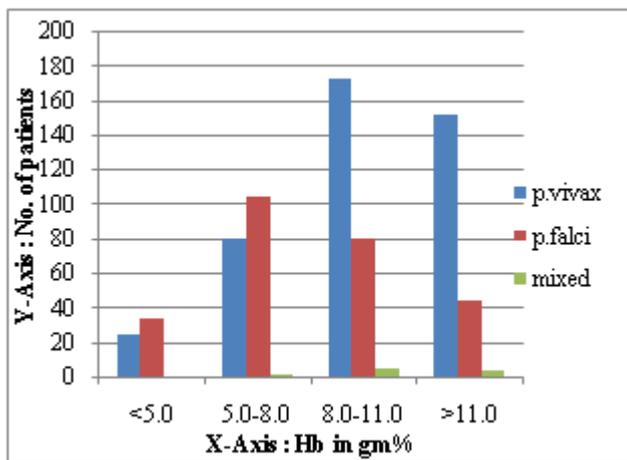
Hemoglobin, Total count, platelet count, MCV, MCH and MCHC were done in automated cell counter. Field stained peripheral blood film was used for differential count and peripheral smear examination. ESR was done by westergren's method from the blood collected in citrated bulb.

## 3. Results

Total 700 cases positive for malaria parasite were studied and hematological Changes in these cases were studied.

**Table 1:** Prevalence of anaemia in p.falci and p.vivax patients

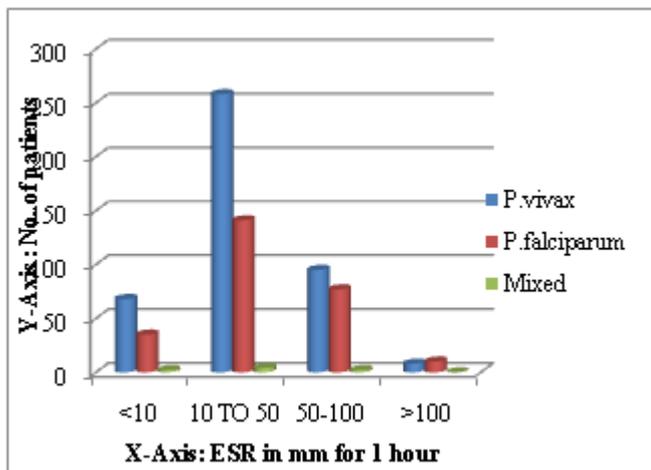
Hb(gm%)	Species			
	P.vivax	P.falciparum	Mixed	Total
<5.0	24(5.6%)	34(12.9%)	0	58(8.3%)
5.0-8.0	80(18.7%)	105(39.9%)	1(12.5%)	186(26.6%)
8.0-11.0	173(40.3%)	80(30.4%)	4(50%)	257(36.7%)
>11.0	152(35.4%)	44(16.8%)	3(37.5%)	199(28.4%)
Total	429(100%)	263(100%)	8(100%)	700(100%)



This study shows that 71.6% of patients with malaria had an Hb level <11.0 gm% i.e. 71.6% patients were anaemic and only 28.4% patients had an Hb level >11.0 gm%. RBC indices showed no consistent findings. PS picture was of normochromic normocytic type in 55% of cases and in 33% of cases it was of hypochromic microcytic type.

**Table 2:** Relationship of ESR with falciparum and vivax malaria

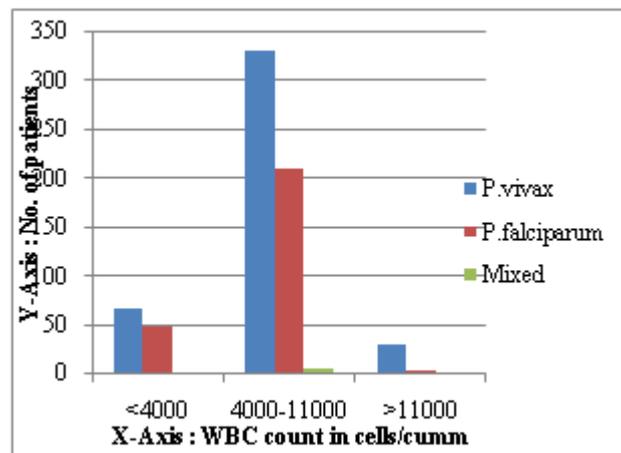
ESR(mm for 1 <sup>st</sup> hour)	Species			
	P.vivax	P.falciparum	Mixed	Total
< 10	68(15.9%)	35(13.3%)	2(25%)	105(15%)
10-50	258(60.1%)	141(53.6%)	4(50%)	403(57.6%)
50-100	95(22.1%)	77(29.3%)	2(25%)	174(24.8%)
>100	8(1.9%)	10(3.8%)	0	18(2.6%)
Total	429(100%)	263(100%)	8(100%)	700(100%)



60.1% AND 53.6% Cases of p.vivax and p.falci were having mild increase ESR, 22.1% and 29.3% cases of p.vivax and p.falci were having moderate increase ESR. Only 2.6% of total cases have severely raised ESR and only 15% of total cases were having normal ESR.

**Table 3:** Total WBC count in falciparum and vivax malaria

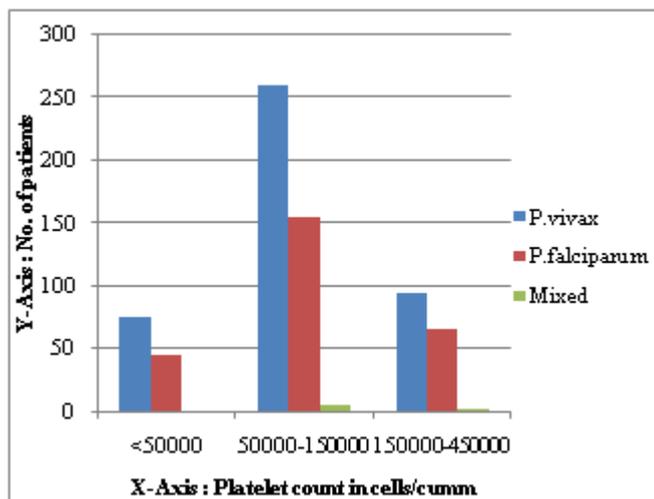
TLC (cells/cumm)	Species			
	P.vivax	P.falciparum	Mixed	Total
< 4000	68(15.9%)	49(18.7%)	2(25%)	119(17%)
4000-11000	330(76.9%)	210(79.8%)	6(75%)	546(78%)
>11000	31(7.2%)	4(1.5%)	0	35(5%)
Total	429(100%)	263(100%)	8(100%)	700(100%)



Total 78% cases were having normal WBC count, while total 17% cases were having leucopenia and only total 5% cases were having leucocytosis.

**Table 4:** Variation in platelet count in cases of falciparum and vivax malaria

Platelet count(cells/cumm)	Species			
	P.vivax	P.falciparum	Mixed	Total
< 50000	75(17.5%)	44(16.7%)	1(12.5%)	120(17.1%)
50000-150000	260(60.6%)	154(58.6%)	5(62.5%)	419(59.9%)
150000-450000	94(21.9%)	65(24.7%)	2(25%)	161(23%)
Total	429(100%)	263(100%)	8(100%)	700(100%)



Only 23% total cases were having normal platelet count while total 17.1% cases were having platelet count <50,000 and 59.9% total cases were having platelet count between 50,000 to 1.5 lacs. Significant species wise difference was not noted.

#### 4. Discussion

Prevalence of anemia in our study was 71.6% cases had anemia which is comparable with Haroon et al<sup>5</sup> (71%), Bashwari et al<sup>6</sup> (59.2%), Aslam et al<sup>7</sup> (61%). In present study 85% cases had raised ESR which is comparable with Das et al (87.3%) and Khan et al<sup>8</sup> 1996, (46%). Leucopenia was seen in 17% of the total cases in present study and leucocytosis in 5% of cases which is comparable with Bashawari et al<sup>6</sup>, 13.3% had low and 7.2% had high WBC

count and Haroonetal<sup>5</sup>, leukopenia was observed in 18% and leucocytosis in 3% cases. In our study, 73% cases had thrombocytopenia which is comparable with Khan et al<sup>8</sup> (70%) and Haroon et al<sup>5</sup> (87%).

## 5. Conclusion

Malaria remains a major cause of life threatening parasitic infection in the world. Various haematological changes can occur in both falciparum and vivax infections, most common anaemia and thrombocytopenia. Mild raised ESR was noted in significant number of cases. In a patient with febrile illness, observation of thrombocytopenia, anaemia and mild raised ESR requires careful search for malarial parasite. Changes in white blood cells are less dramatic and there are variations in the results of various studies. The changes reported include leukopenia or leucocytosis. RBC indices did not show any significant changes.

In conclusion the early diagnosis of malaria keeping in mind the various haematological changes, effective and aggressive therapy can limit the mortality and morbidity.

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