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Pathology

To Determine Various Haematological Indices for Cases of Malaria

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Abstract		**Original Research Article**

The present study titled "Comparative analysis of haematological alterations in malaria patients and its correlation with parasite density" was conducted among the patients at IMCHRC, Indore. In which we found that out of the total 60 malaria cases, 33 had P. Falciparum, 26 P. Vivax and 1 mixed infection & the correlation of Hb values with diagnosis was found to be significant at p=0.00018.
Keywords: Haematological, Malaria & Blood.
Study Designed: Prospective observational study

INTRODUCTION

Malaria is a mosquito-borne infectious disease affecting humans and other animals caused by parasitic protozoans (a group of single-celled microorganisms) belonging to the Plasmodium type. Malaria causes symptoms that typically include fever, tiredness, vomiting, and headaches. In severe cases it can cause yellow skin, seizures, coma, or death. Symptoms usually begin ten to fifteen days after being bitten. If not properly treated, people may have recurrences of the disease months later. In those who have recently survived an infection, reinfection usually causes milder symptoms. This partial resistance disappears over months to years if the person has no continuing exposure to malaria [1].

The disease is most commonly transmitted by an infected female Anopheles mosquito. The mosquito bite introduces the parasites from the mosquito's saliva into a person's blood [2]. The parasites travel to the liver where they mature and reproduce. Five species of Plasmodium can infect and be spread by humans [1]. Most deaths are caused by P. falciparum because P. vivax, P. ovale, and P. malariae generally cause a milder form of malaria. The species P. knowlesi rarely causes disease in humans [2]. Malaria is typically diagnosed by the microscopic examination of blood using blood films, or with antigen-based rapid diagnostic tests [1]. Methods that use the polymerase chain reaction to detect the parasite's DNA have been developed, but are not widely used in areas where malaria is common due to their cost and complexity [3].

MATERIALS & METHODS

The present study titled *"Comparative analysis of haematological alterations in malaria patients and its correlation with parasite density"* was conducted among the patients at Index Medical College, Hospital & Research Centre, Indore (*Gram Morodhat*, District Indore).

Study Design: Prospective observational study.

Study Area

Index Medical College, Hospital & Research Centre, Indore.

Study Population

Patients with malaria treated at Index Medical College, Hospital and research Centre, Indore were included in the study.

Study Duration: January 2017 to April 2018

Sample Size: 60 patients

Data collection

All the appropriate samples of blood in the Department of Pathology were investigated and records were made with relevant history as per the predesigned proforma.

Methodology

The blood samples of patients suspected with malaria were collected and thick and thin smears fixed in methyl alcohol were prepared. Thin smears were

stained with Leishman's stain and thick smears with Field's stain (pH 7.2).

The smears were screened under oil immersion and the grading of parasites was done as follows

+	1-10 parasites/100 oil immersion field
++	11-100 parasites/100 oil immersion field
+++	1-10 parasites/oil immersion field
++++	>10 parasites/oil immersion field

Automated cell counter was utilized for Hb, RBC, WBC, PCV, MCH, MCV, MCHC and platelet count.

Blood smears were examined for following findings
- Changes in leucocyte count
- Changes in platelet count
- Morphology for confirmation of malaria

Inclusion Criteria
- Patients of all ages and both sexes with blood film proven malaria.
- Antigen proved malaria cases by rapid diagnostic tests.

Exclusion Criteria
- Patients of malaria with negative smear.

- Volunteer donors having frequency of donation less than 3 months.
- Patients taking antimalarial drugs and vitamin supplements.
- Treated cases of malaria in past two months.
- Patients having GIT infections, PEM, Cirrhosis,
- Hepatitis, Obstructive jaundice,
- Cancer, DM, Hypertension, Obesity, Smoking, Alcoholism and HIV.

Investigation Details
- Thick and thin smears stained with Field's and Leishman's stains respectively.
- Hb, RBC, WBC, PCV, MCH, MCV, MCHC and platelet count.

RESULTS

Table-1: Distribution of patients according to malaria and normal group

Diagnosis	Malaria Cases (n=60)		Normal Cases (n=30)	
	Number	%	Number	%
Normal	0	0	30	100
Mixed	1	1.67	0	0
P. falciparum	33	55.00	0	0
P. vivax	26	43.34	0	0
Total	60	100	30	100

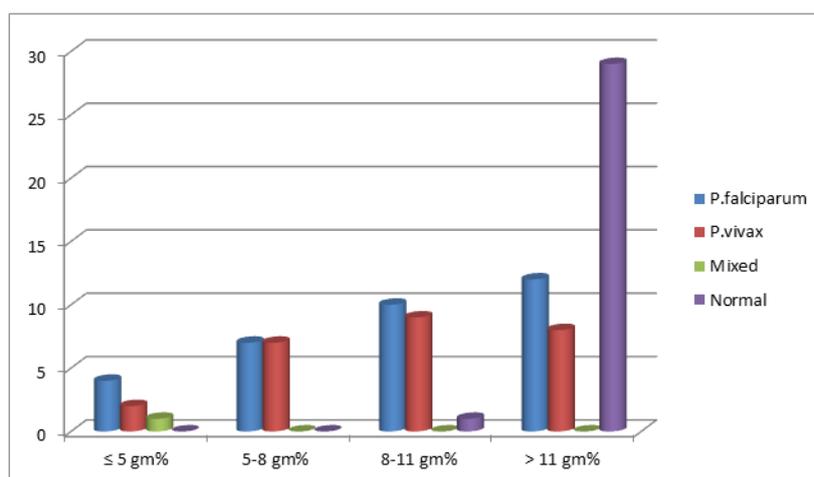Out of the total 60 malaria cases, 33 had P. Falciparum, 26 P. Vivax and 1 mixed infection.
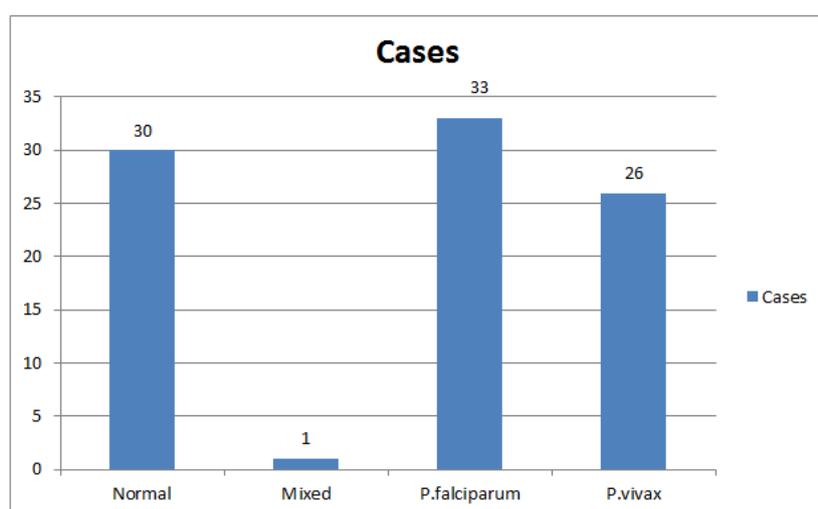
Graph-1: Distribution of patientsaccording to malaria and normal cases

Table-2: Distribution of malaria cases according to haemoglobin values

Hb Value	P. falciparum	P. vivax	Mixed	Malaria Cases (n=60)	Normal Cases (n=30)
≤ 5 gm%	4	2	1	7	0
5-8 gm%	7	7	0	14	0
8-11 gm%	10	9	0	19	1
> 11 gm%	12	8	0	20	29
Total	33	26	1	60	30
Chi square= 44.561; p-value=0.00018 (significant)					

The correlation of Hb values with diagnosis was found to be significant at p=0.00018.

Graph-2: Distribution of malaria cases according to haemoglobin values

DISCUSSION

There were total 60 malaria cases being compared with 30 controls. 33 (55%) cases had P.falciparum infection, 26 (43.34%) had P.vivax while 1 (1.6%) case had mixed infection

Table-1: Common studies have found vivax infection to be commoner than falciparum infection

Author	P. falciparum	P. vivax
Jadhav *et al.* [4]	Less	More
Erhart *et al.* [5]	Less	More
Bashawri *et al.*[6]	More	Less
Rojanasthien *et al.*[7]	More	Less

The first haematological parameter studied was Haemoglobin value. Anemia is one of the most common findings in malaria cases. Anemia, being defined as a haemoglobin value of less than 11gm/dl among both males and females, was also highly prevalent in the current study (Table 2). 20 out of the 60 malaria cases had Hb value above 11 gm%. 7 cases had Hb value less than 5 gm%. The finding was statistically significant at p= 0.00018. 86.7% and 94.4% cases in the studies conducted by Sharma *et al.* [8] and Biswas *et al.* [9] respectively had anemia, a finding that correlate well with the present study.

CONCLUSION

Malaria, being one of the endemic diseases of our region, always has an important place in health care industry. The haematological parameters in malaria show great variations depending upon various factors related to individual and geographical differences.

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