



ASSOCIATION OF PLASMOOIIUM VIVAX MALARIA AND ABO BLOOD GROUP IN TERTIARY CARE TEACHING HOSPITAL AT WESTERN U.P.

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ABSTRACT

Introduction: Malaria is caused by an obligate, intracellular protozoan parasite. *P. vivax* infection is most common. Blood group antigens A and B are trisaccharides attached to a variety of glycoproteins and glycolipids on the surface of erythrocytes and these trisaccharides act as receptors for rosetting ligands whereas such antigens are not found in blood group O. **Objective:** To assess the distribution of ABO blood group and their relationship with *P. vivax* malaria among patients attending in TMMC&RC. **Material and Methods:** Total 200 blood samples were collected from suspected malaria cases from March 2016 to February 2017. Thin and thick blood film slides were prepared using Leishman solution. ABO and Rh blood grouping was done using agglutination method in haematology lab. **Result:** Out of total 200 samples, 76 (38%) were malaria positive in which 52 (68.42%) patients were found to be infected with *P. vivax* and blood group O positive 26 (50%) was the dominated blood group. **Conclusion:** This study suggests that individuals of blood groups O are more susceptible than followed by A, B & AB to *P. vivax* infection.

KEYWORDS: Malaria, Blood group.

INTRODUCTION

Malaria is a protozoal disease that occurs in tropical and subtropical regions of the world. Malaria is caused by infection with parasites of the genus *Plasmodium* and transmitted to man by certain species of infected female *Anopheles* mosquito.^[1]

About 300- 500 million cases of malaria occur every year, with about 90% occurring in Sub-Saharan Africa and 100 countries in the world are considered malaria. A typical attack comprises three distinct stages cold stage, hot stage and sweating stage. The clinical features of malaria vary from mild to severe and it is based on species of parasite present, the intensity of infection, patient's state of immunity and some other conditions like malnutrition and other diseases.^[2]

There are four species that infect human *P. vivax*, *P. falciparum*, *P. ovale* and *P. malariae*. Out of them *P. vivax* infection is most common and *P. falciparum* is most fatal. There is one more species discovered that is *P. Knowlesi*. The World Health Organization has revived many programs on malaria eradication.^[3]

This study was conducted to investigate the association between ABO blood group system with malaria and how malaria parasites interact with their human hosts. Because malaria parasites spend a substantial part of their life cycle invading red blood cells and growing

within them. They have evolved specific receptor-ligand interactions to facilitate RBC binding and in which involve blood group antigens.^[4]

Blood group antigens A and B are trisaccharides attached to a variety of glycoproteins and glycolipids on the surface of erythrocytes and these trisaccharides act as receptors for rosetting ligands whereas blood group antigens are not found in blood group O. As a result of that rosettes formed by blood group O are suggested to be smaller and easily disrupted than rosettes formed by blood group A, B & AB.^[5]

All blood group systems are inherited and shared by all human population but the frequency varies. These variations depend upon the alleles distribution, mating system of a population, socioeconomic status, ethnic group, and race. So the aim of our study was to assess the ABO/Rh blood group distribution and correlation with malaria.^[6]

MATERIAL AND METHODS

Study site

The study was conducted in the Parasitology section of Microbiology department at TMMC & RC MORADABAD on 200 blood samples which were collected from suspected malaria cases from March 2016 to February 2017.

Before collecting blood sample, explanation about the procedure was given to the patient and a informed written consent was obtained from every study participant. And patients attending the centre TMMC&RC screened for malaria infection using thin thick film.

A total of 200 malaria suspected cases 124 participated were found to be healthy. And 76 were found to be positive. Out of 76 malaria positive samples, 52 (68.42%) sample were found infected with *P. vivax*, 16(21.05%) with *P. falciparum* and 8 (10.52%) sample were having mixed infection of both *P. vivax* and *P. falciparum*.

Laboratory density determination

Thin and thick blood both film slides were prepared using Leishman's staining stain and stained slides were examined under 100 x oil immersion lens.

Blood group determination

Similarly, the ABO and Rh blood grouping of the study participants was determined by direct slide method, using agglutination method in haematology lab using commercial antisera. Two drops of whole blood were placed in two different places of a grease- clean glass slide on which a few drops of antisera for blood group A and B was applied. The blood cells and the antigen were mixed with applicator stick. The slide was then tilted to detect for agglutination and the result recorded accordingly.

RESULT

Out of 200 samples, 76 (38%) samples were malaria positive and 124(62%) were malaria negative. (fig 1) All samples were found to be Rh positive. Out of 76 malaria positive samples, 52 (68.42%) sample were found infected with *P. vivax*, 16(21.05%) with *P. falciparum* and 8 (10.52%) sample were having mixed infection of both *P. vivax* and *P. falciparum* (fig. 2) In this study, 38 (73.07 %) males and 14 females (26.92%) were found to be positive with malaria infection.

P. vivax infection in 0-20, 21-30, 31-40, 41-50, 51-60 and above 60 were 7,18, 20, 4, 2,1 respectively. *P. falciparum* infection in respective age group were 0, 7, 5, 3, 1, 0 where as mixed infection with *P. vivax* and *P. falciparum* in mentioned age group were 0, 4, 3, 1, 0, 0 respectively. (Table 1 and Fig 3) Among 52 *P. vivax* positive samples, the O blood group was 26(50%), A blood group was 14 (26.92%), B blood group was 9(17.30%), and AB blood group was 3(5.76%)(Fig. 4).

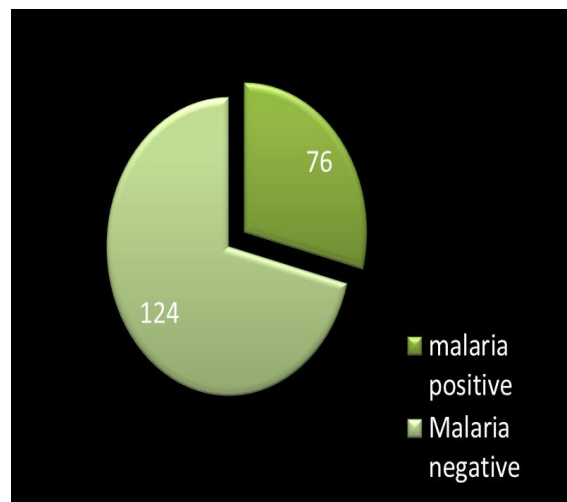


Fig.1:- Distribution of Malaria Positive and Negative cases.

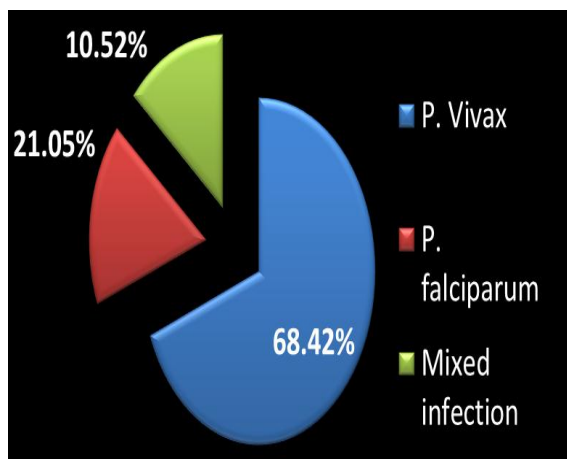


Fig.2 :- percentage wise distribution of plasmodium Species.

Age wise distribution

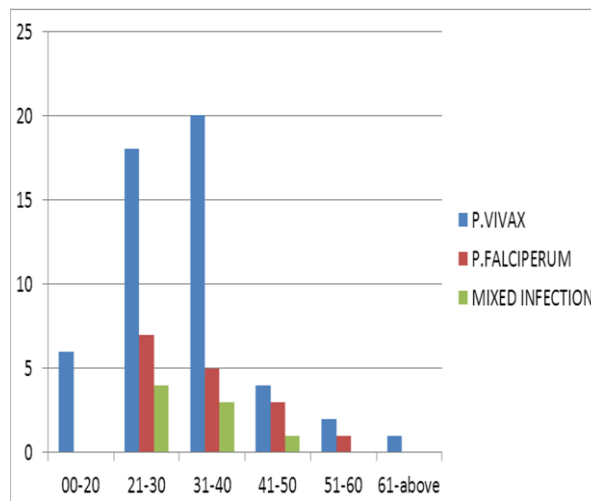


Fig.3:- Graph Showing Age wise distribution Pattern of Plasmodium Species.

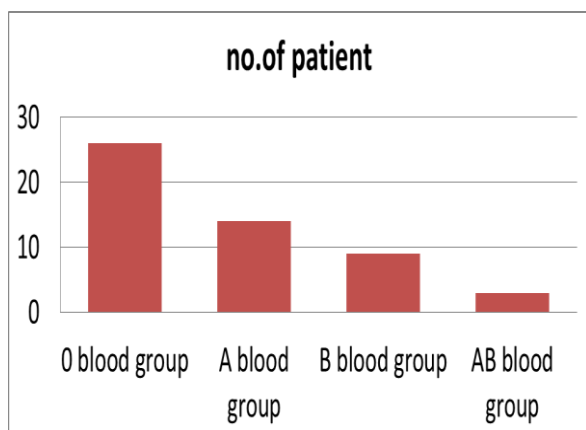


Fig.4:- Correlation of blood group with Plasmodium vivax infection.

Table 1: Showing Age wise Distribution of patients among different species of Plasmodium.

Age of patient	P. vivax	P. falciparum	Mixed infection
0-20	7	0	0
21-30	18	7	4
31-40	20	5	3
41-50	4	3	1
51-60	2	1	0
61-Above	1	0	0

DISCUSSION

Out of 200 samples, 76 (38%) samples were malaria positive and 124(62%) were malaria negative. In our study, Out of total 52 positive (*P. vivax*) patients, 38 (73.07 %) males and 14(26.92%) females were positive to malarial infection and which is less than reported by Abro et al. in which 94 males (91.5%) were positive and 9 (8.5%)^[7] female were positive. In our study, more percentage of malaria cases were attributable to *P. vivax* (68.42%) than *P. falciparum* (21.05%) because of higher widespread infection of vivax in this region.

In our study, most of the malaria positive patients were in the age group of 21-30 years ie, 29 (38.15%) followed by 31-40 years i.e., 28 (36.84%) while in the study of Rathod et al the age group 21-30 years 246 (32%) patients were positive to malarial infection.^[8] Among 52 *P. vivax* positive samples, the O blood group was 26(50%), A blood group was 14 (26.92%), B blood group was 9(17.30%), and AB blood group was 3(5.76). The same result was also reported by Ayele Mandefro et al (2014).^[9]

CONCLUSION

The study concluded that malaria infection occur more in male (73.07 %) as compare to female (26.92%). and in this region *Plasmodium vivax* infects more people as compared to *Plasmodium falciparum*. This study reveals that ABO and Rh blood group of human being may show differences in susceptibility to malarial infection. Maximum numbers of malaria positive cases were seen in blood group O positive followed by A positive, B

positive and AB positive. This study suggests that the person having blood group O are more prone to malarial infection in western U.P.

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