

ORIGINAL ARTICLE

Frequency of Thrombocytopenia in Malaria Patient at Tertiary Care Hospital

MUHAMMAD KHALID¹, KOMAL IQBAL², MUHAMMAD NADEEM³, KHALID KHAN⁴, AQEELA KOUSAR⁵, SIDRA RAO⁶, MUHAMMAD ABRAR⁷, FIZA ABBAS⁸

¹Associate Professor Medicine, Nowshera Medical College/ Qazi Hussain Ahmad Medical complex

²Assistant professor, Bacha Khan Medical College Mardan

³Assistant Professor, Department of Medicine, Lady Reading Hospital, Peshawar

⁴Associate Professor, Paediatric medicine, Nowshera Medical College Nowshera

⁵Institute of Microbiology, University of Veterinary and Animal Sciences, Lahore

^{6,7,8}Department of Microbiology and Molecular Genetics, Faculty of Life Sciences, University of Okara, Okara 56130 Pakistan

Corresponding author: Khalid khan, Email: khalid.peds@gmail.com

ABSTRACT

Background: Hematological disorders, including anemia, thrombocytopenia and leukopenia are quite frequent among malaria patients.

Objective: To assess the frequency of thrombocytopenia in malaria patient at tertiary care hospital

Methodology: This study was descriptive, cross-sectional study carried out at the medicine department, Qazi Hussain Ahmad Medical Complex, Nowshera for a period of six months from May 2022 to October 2022. Pre-designed proforma was used to collect patient information, such as demographics and medical history. A hematology analyzer was used to calculate the hematological variables from the CBC results. All the collected data was analyzed by using IBM SPSS version 23.

Results: There were 83 (55.33%) males and 67 (44.77%) females. The overall frequency of thrombocytopenia amongst 150 patients with malaria was 90% (n=135). Amongst patients with thrombocytopenia, grade 1 thrombocytopenia was observed in 75 (50%) patients, grade 2 in 38 (25.33%) patients, grade 3 in 23 (15.33%) patients while grade 4 thrombocytopenia was observed in 14 (9.33%) patients.

Conclusion: Our study concludes that thrombocytopenia is highly prevalent amongst patients with malaria. This leads us to the conclusion that the platelet count is a useful first-stage screening parameter in individuals with acute febrile illness.

Keywords: Thrombocytopenia; Malaria; p.vivax; p.falsiparum

INTRODUCTION

Malaria is the most common problem responsible for majority of the causes of mortality and morbidity globally. Malaria is a vector-borne illness, and female anopheles mosquitoes are responsible for its transmission¹. According to the WHO Report, roughly 781,000 people lose their lives to malaria each year, and the disease affects more than 225 million people worldwide each year². In 2011, 3.3 billion people were susceptible to malaria globally, and it was anticipated that there would be 219 million instances and 660,000 fatalities, with 80% of instances and 90% of deaths occurring in Africa³. One of the most significant health issues in tropical and subtropical regions of the globe is malaria.

The majority of Pakistanis reside in rural regions between tropical and subtropical nations, where malaria is prevalent. In Pakistan, July and August are peak months for malaria. In Pakistan, the majority of people reside in rural regions. In comparison to Khyber Pakhtunkhwa and Sindh, where malaria prevalence is more evenly distributed, it is more common in Baluchistan and federally governed tribal regions. In Pakistan, 91 districts (86.7%) have an endemic malaria problem⁴.

Pakistan has a high prevalence of malaria, making it a national health concern⁵. Microscopic analysis of blood smears stained with Giemsa is used to diagnose malaria. A thick smear's advantage is utilized to identify species. Because various species may be treated in a variety of ways, it is crucial to identify species⁶. Rapid diagnostic tests (RDTs) for malaria, which need much less training, are already being utilized for regular malaria testing. Malaria caused by the parasite *Plasmodium vivax* is more widespread and may impact more individuals than malaria caused by *Plasmodium falciparum*⁷. When compared to the risk posed by the other four species, *Plasmodium falciparum* is known to have the greatest rates of morbidity and death and a high degree of parasitemia⁸.

Hematological disorders, including anemia, thrombocytopenia and leukopenia are quite frequent among malaria patients⁹. According to several studies, thrombocytopenia is the best recognized sign of malaria^{10, 11}. In their investigation, Kochar and team found that 24.6% of malaria patients had thrombocytopenia¹². The relationship between malaria and thrombocytopenia has long been researched, although

its specific pathogenic mechanism is still unclear. Multiple factors, including increased bleeding, excessive platelet activity, and apoptosis, contribute to the thrombocytopenia seen in malaria patients¹³. Additionally, the malarial antigens create immune complexes that phagocytose the damaged platelets and eliminate them¹⁴. The present study was carried out to assess the frequency of thrombocytopenia among the patients with malaria at tertiary care hospital.

MATERIALS AND METHODS

Study design: Descriptive, cross-sectional study

Study setting: The current study was conducted at the medicine department, Qazi Hussain Ahmad Medical Complex, Nowshera.

Study duration: Six months from May 2022 to October 2022

Sample size: The sample size was 150 by employing WHO sample size calculator.

Inclusion criteria: All the malaria positive patients of both the gender with age range of 18-60 years presenting to the hospital were included.

Exclusion criteria: All the patients negative for malaria on peripheral blood film, patients with co-existing bacterial infections, acute febrile illness, chronic liver problem, dengue fever, sepsis, viral hepatitis, disseminated intravascular coagulation, systemic lupus erythematosus, patients with bleeding disorders, patients diagnosed with thrombocytopenia, patients on antimalarial drugs, and patients with cancer were not included.

Ethical approval and informed consent: Ethical approval for this research work was taken from the hospital ethical and research committee. Each participant gets a short description of the research before the data collection and their signed consent was collected.

Data collection procedure: Pre-designed proforma was used to collect patient information, such as demographics and medical history. Every participant who tested positive for malaria parasites on a blood smear underwent clinical examinations. A hematology analyzer was used to calculate the hematological variables from the CBC results.

Statistical analysis: All the collected data was analyzed by using IBM SPSS version 23. Quantitative variables were documented in the form of means and standard deviation while qualitative

variables were documented in the form of frequencies and percentages.

RESULTS

Totally 150 patients were included in this study. There were 83 (55.33%) males and 67 (44.77%) females. (Figure 1) Based on age distribution, 77 (51.33%) patients were 18-30 year old, 33 (22%) were in age range of 31-40 years, 23 (15.33%) were 41-50 years old while only 17 (11.33%) patients were in age 51-60 years. The mean age (sd) was 26 (11) years. (Figure 2) Out of 150 cases, 135 (90%) cases were positive for *Plasmodium vivax* whereas only 15 (10%) patients were positive for *Plasmodium falciparum* malaria. (Figure 3) The overall frequency of thrombocytopenia amongst 150 patients with malaria was 90% (n=135). (Figure 4) Amongst patients with thrombocytopenia, grade 1 thrombocytopenia was observed in 75 (50%) patients, grade 2 in 38 (25.33%) patients, grade 3 in 23 (15.33%) patients while grade 4 thrombocytopenia was observed in 14 (9.33%) patients. (Figure 5)

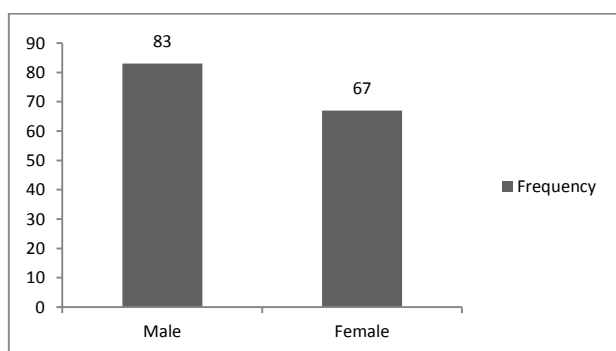


Figure 1: Distribution of patients, based on gender

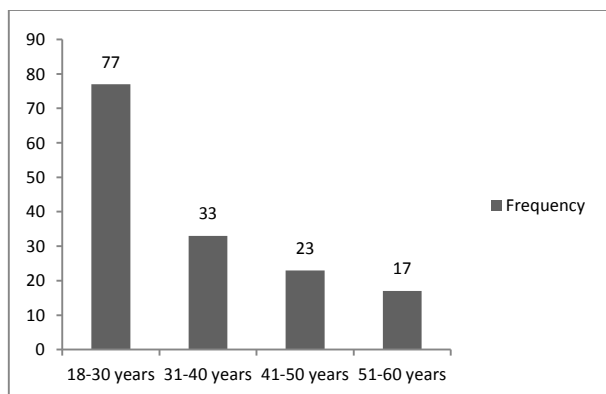


Figure 2: Distribution of patients, based on age

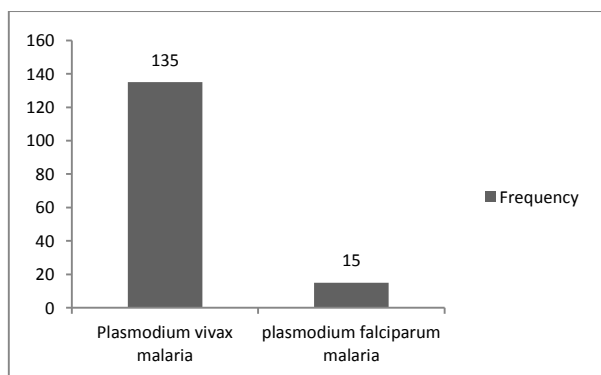


Figure 3: Distribution of patients, based on type of malaria

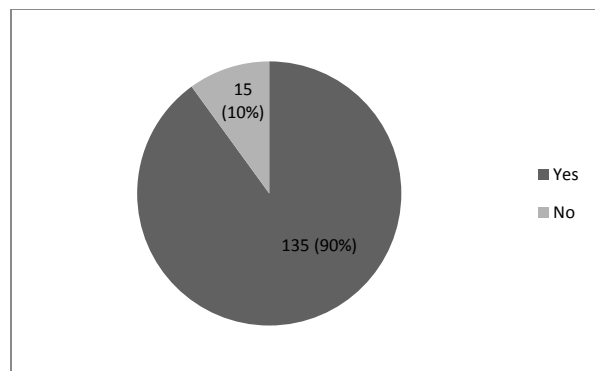


Figure 4: Overall frequency of thrombocytopenia amongst malaria patients

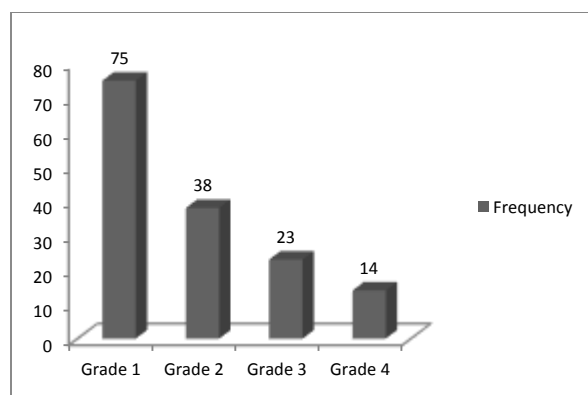


Figure 5: Distribution of patients, based on grades of thrombocytopenia

DISCUSSION

In several regions of Pakistan, *P. vivax* and *P. falciparum*-related malaria are prevalent. Malaria is a serious hematological illness that affects practically all blood components. The most prevalent related hematological problems are anemia and thrombocytopenia. Malaria has been identified as the main cause of decreased platelet counts in endemic locations. Due to its strong association with malaria, this is sometimes used to diagnose the disease in patients who presented with a fever. Malaria risk rises 12–15 times when platelet count is less than 1,50,000/cumm¹⁵⁻¹⁷. This study was carried out to assess the frequency of thrombocytopenia in malaria patient at tertiary care hospital. In our study, totally 150 patients were included in this study. There were 55.33% males and 44.77% females patients. Out of 150 cases, 90% cases were positive for *Plasmodium vivax* whereas only 10% patients were positive for *Plasmodium falciparum* malaria. Malaria caused by *Plasmodium vivax* is more widespread and may afflict more individuals than malaria caused by *Plasmodium falciparum* in many parts of the globe⁷. An earlier study done by MUHAMMAD ASIF et al. reported that *p.vivax* malaria is more common in Pakistan as compared to *p. falciparum*¹⁸. Another study carried out by Hamza Ali Khan et al. observed similar results and reported that *p.vivax* malaria was present amongst 92.7% patients while *p. falciparum* was observed only in 7.3% patients¹⁹. In the current study, the overall frequency of thrombocytopenia amongst 150 patients with malaria was 90% (n=135). Between 60% and 80% of malaria patients have also been observed to develop thrombocytopenia²⁰. In accordance with our results, a study done by Patel et al. reported thrombocytopenia amongst 93.6% patients with malaria²¹. Another study also reported comparable results and shows thrombocytopenia in 80% of their malaria patients²². In our study majority of the patients were with *p.vivax* malaria. A Brazilian study also reported more cases of thrombocytopenia in *p.vivax* as compared to *p.falciparum*²³. In contrast to our findings, a previous study reported more cases of thrombocytopenia in

p.falciparum patients than p.vivax²⁴. Amongst patients with thrombocytopenia, grade 1 thrombocytopenia was observed in 50% patients, grade 2 in 25.33% patients, grade 3 in 15.33% patients while grade 4 thrombocytopenia was observed in 9.33% patients. In accordance with our study, another study reported almost similar results¹⁹. The precise cause of malarial thrombocytopenia is uncertain. P. vivax was found within platelets, as shown by Fajardo and Tallent, who hypothesised that the parasite had a direct lytic impact on the platelets²⁵. Recent reports suggest that the lysis of platelets is mediated by both non-immune-mediated destruction and an immunological process involving specialised platelet-associated IgG antibodies that attach actively to malaria antigen present in platelet²⁶. Damage to the platelets caused by oxidative stress has also been suggested as a possible contributor to the etiopathogenesis of malaria²⁷. In order to treat these patients as quickly as possible, it will be helpful to look for thrombocytopenia amongst acute febrile patients and to rank malaria as the top differential diagnosis.

CONCLUSION

Our study concludes that thrombocytopenia is highly prevalent amongst patients with malaria. This leads us to the conclusion that the platelet count is a useful first-stage screening parameter in individuals with acute febrile illness.

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