Vol. 5 No. 1 (2026)

Pakistan Journal of Medical & Cardiological Review

https://pakjmcr.com/index.php/1/about

Online ISSN 3007-2387

Print ISSN 3007-2379

Prevalence of Different Plasmodiume Species in Malarial Patients Visiting Al Khidmat Hospital Peshawar

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Received on 12 Jan, 2026
Accepted on 19 Feb, 2026
Published on 21 Feb, 2026

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Abstract

Malaria is a big problem for health around the world. It still poses a danger to developing nations. Epidemiological data from various regions of Pakistan is inadequate for a precise assessment of the incidence of different types of malaria. We conducted this study to ascertain the prevalence of different malaria types in patients exhibiting fever and their response to anti-malarial agents in this region. This cross-sectional study took place at Al Khidmat Hospital in Peshawar, from April 2025 to July 2025. The study included all patients who came to the outpatient clinic with a fever. Following a comprehensive medical history and meticulous

clinical examination, we analyzed blood samples for malaria using the ICT technique.After getting a full medical history and doing a full physical exam, we used the ICT method to look for malaria in blood samples. After clinical diagnosis, 20 out of 500 samples (5%) tested positive for the malarial parasite, while 480 samples (95%) tested negative. The study population showed that females were more likely to have malaria (15.03%) than males (5.01%). Furthermore, the incidence of malaria was documented as follows: in the age group of 01 - 20 years, 3 cases (0.6%); in the age group of 21 - 40 years, 13 cases (2.6%); in the age group of 41 - 60 years, 4 cases (0.8%); and in the age group of 61 - 80 years, 0 cases (0%). We reached a conclusion from this study,in these parts of the Peshawar district, *P. vivax* is the most common species.

Keywords: Plasmodium vivax, Plasmodium falciparum, malaria, and prevalence

INTRODUCTION

Malaria is one of the most common leading causes of morbidity and mortality on the earth surface, cause by the vector-borne eukaryotic protists of the genus Plasmodium. Plasmodium is a parasite which is transmitted naturally by the bite of a female mosquito anopheles called malarial vectors. The mosquito has more than 3,000 species in which about 100 are the vectors of human diseases. Plasmodium parasite has different types which are *Plasmodium vivax, Plasmodium falciparum, Plasmodium oval, Plasmodium Malariae* and *Plasmodium knowlesi.* It is found in both tropical and subtropical regions including some parts of America, Asia, and Africa. *P.falciparum* and *P.vivax* are mostly common in all over the world (Ahmad *et al.*, 2018)

In Pakistan *P. falciparum* and *P. vivax* malaria are the major health problems and the leading cause of death. The dangerous form of malaria which is caused by *P. falciparum* is mostly found in Africa, whereas *P. vivax* is found worldwide but is less dangerous. Mainly malaria is a disease of indigence that is more prevalent in the ruler areas, where the majority of populations live in poverty. This disease mostly occurs in the months of July and August in Pakistan. Malaria has been epidemic in Khyber Pakhtunkhuwa, Baluchistan and Sindh. Per annum about 0.3 to 0.5 billion cases and 0.02 billion deaths are estimated. Since long time ago malaria has been a reality of death and life. Like other countries also in Pakistan, it is an important problem and cause of mortality. In Pakistan the transmission of malaria mainly occur after the July - August

monsoon, malarial infection has been reported. Per year in Pakistan roughly 0.05 billion malarial clinical cases have been estimate (Qureshi *et al.*, 2020)

Transmission of malaria is observed to be significantly high, with the major transmission of *P. vivax* that is high in hot weather from June to September and again in April to June and with infection recurrences in December. Malaria is included in serious life threatening and injurious diseases from very past and still it is a dominant issue not only in Pakistan but also for the rest of the countries. Malaria disease is specially a burden for developing and less developed countries. Malaria is considered as one of the major reasons for deaths in the world population and still malaria is the main cause of morbidity and mortality in poorly developed regions in the world. In Pakistan, there are different factors that contributes and encourage appropriate environment for malarial spread which includes agricultural practices with an immense irrigation system and monsoon rains, additionally travelling of population inside the country as well as across international borders which are with Iran and Afghanistan respectively (Farooq *et al.,* 2020).

The prevention of malaria includes medication, elimination of mosquito and prevention of bites. Malaria presence in a specific area depends upon the density of human population and anopheles mosquito population (Sabot *et al.,* 2010). In the past few decades, malaria transmission has been highest in the northern part of Pakistan, especially in Khyber Pakhtunkhuwa province (Khattak *et al.,* 2020).

Secondly, the most widely accepted method for molecular diagnosis is PCR. Hence; the goal of timely diagnosis is difficult to achieve. Scanty literature is available to investigate the clinical significance of haematological parameters in malarial patients from Pakistan (Zakeri *et al.,* 2020).

The characteristic presentations of *falciparum* at Quetta were observed and recorded 109 (74 males and 35 females) cases positive for *P. falciparum* during May 1996 to November, 1997 with ages between 15 - 75 years in Quetta. In Nawabshah, out of 435 clinically suspected cases of malaria, 144 patients (33.1%) were confirmed by existence of *P. falciparum*. In 380 cases of cerebral malaria at Children Hospital, Chandkia (Ibrahim *et al.*, 2014). Our understanding of the putative mechanisms by which cytokines may mediate beneficial and harmful effects, through activation of phagocytic

cells, could help to develop new treatment strategies, regardless of the emergence of parasite multidrug resistance (Malaguarnera *et al.,* 2020).

METHODOLOGY

Study Place

This study was conducted at Al Khidmat Hospital Peshawar, KP.

Study Duration

Blood samples were collected from people during the period of April 2025 to July 2025.

Sample Size

Blood sample of 500 people of different ages were selected from Al Khidmat Hospital Peshawar.

Selection Criteria

Inclusion Criteria

People resident of District Peshawar

Exclusion Criteria

People resident of other than District Peshawar.

Sample Collection

This is a cross sectional study and was conducted at Al khidmat hospital Peshawar from April to July, 2025. A total of 500 blood specimens were collected from malaria suspected patients. The 3 ml blood specimens were obtained by disposable syringes and collected in EDTA (Ethylene diamine tetra-acetic acid) anticoagulant-coated tubes after informed consent. Designed questionnaires were filled from suspected patients, contained limited variables including gender, age, symptoms. We included in this study, patients all age groups and sex with malaria signs and symptoms (chills, headache, fever, nausea, fatigue, vomiting and sweats). The malaria cases were detected by thin and thick blood films techniques under the microscope.

Data Analysis Procedure

SPSS version 22 were used for the analysis of data and descriptive statistic were applied, Table and Graph was draw for all variables such as gender, frequency, percentage of male and female positive cases and also draw a tables and graph for all variable during microscopic examination of blood sample.

RESULTS

4.1. Age Wise Distribution of Individual

The malaria frequency regarding the age group of patients ranging from 1 to 20 years of age out of total 111 (22.2%) patients were found and only 03 (2.7%) patients were found positive for malaria. (Table 4.1) (Fig.4.1). Similarly, the frequency regarding the age group of patients ranging from 21 to 40 years of age out of total 306 (61.2%) patients were found and only 13 (4.2%) patient were found positive for malaria. And similarly the frequency regarding the age group of patient ranging from 41 to 60 years of age was found 80 (16%) and only 04 (5.0%) patient were found positive for malaria. And above 60 years age 03 (0.6%) patients was found which have no malaria was shown in Table 4 .1.

Table 4.1: *Age Wise Distribution Of Patient*

Age	Frequency	Percent (%)
1 to 20 years	111	22.2%
21 to 40 Years	306	61.2%
41 to 60 Years	80	16.0%
61 to 80 Years	3	0.6%
Total	500	100%

4.2 .Gender Wise Distribution of Individuals

Out of 500 patients, a total 20 (04%) patients were found positive for malaria (Table 4.2). Among these 171 (34.2%) patients were male and 329 (65.8%) patients were female. Moreover out of 171 male patients, 05 (2.9%) were positive and out of 329 female patients, 15 (4.5%) were positive, shown in Table 4.2.

Table 4.2: *Gender Wise Distribution of Patient*

Gender	Frequency	Percent (%)
Male	171	34.2%
Female	329	65.8%
Total	500	100.0%

4.3. Prevalence of Malaria Infection in both Male and Female

A total of 500 people n=480 (96%) people was negative and n=20 (4%) people results was positive for malaria infection. Out of n=500 patients, Out of these n=20(04%)

patients were found positive for malaria. Among these n= 01 (0.2%) patients were positive for *P. falciparum*, And n=19 (3.80%) patient were positive for *P.vivax.*

Table.4.3: *Prevalence Of Malaria Infection*

Result	Frequency	Percent (%)	Cumulative Percent
Negative	480	96.0%	96.0%
Positive	20	4.0%	100%
Total	500	100%	

DISCUSSION

Malaria is a serious health problem in Pakistan. Malaria cases vary significantly in different areas and cannot be assessed accurately due to a lack of different information. Pakistan is experiencing all four seasons with extreme weather conditions due to which parasitic species of malaria also have unequal distribution throughout Pakistan and their occurrence changes in seasons. The *P. vivax* frequency regarding the age group of patients ranging from 1 to 20 years of age out of total n=111 (22.2%) patients were found and only n=03 (0.6%) patients were found positive for malaria (Table 1). Similarly, The *P. vivax* frequency regarding the age group of patients ranging from 21 to 40 years of age out of total n=306 (61.2%) patients were found and only n=13 (2.6%)patient were found positive for malaria. And The *P. vivax* frequency regarding the age group of patients ranging from 41 to 60 years of age out of total n=80 (16.0%) patients were found and only n=4 (0.8%)patient were found positive for malaria. And above 60 years age n=3 (0.6%) patients was found which have no malaria was found. Out of n=500 patients, a total n=20 (04%) patients were found positive for malaria. Among these only n= 01 (0.2%) patients were positive for *P.falciparum*, And n=19 (3.80%) patient were positive for *P. vivax*. Moreover out of 500 patients, 171 (34.2%) were male and 329 (65.8%) were female. None of the subjects in the current study had *P. malarea* or *P. oval* infections. Similarly high and low prevalence status of both *P.vivax* and *P. falciparum* were observed respectively with neither *P. malarae* nor *P. ovale* infections. In our study it was found that the high prevalence of *P. vivax* as compared to *P. falciparum* might be due to its greater distribution and ability to produce gametes under hot temperate conditions were the possible reasons in the studied area. Regarding the degree of susceptibility of the age groups, some studies established that age-groups less than 15

were highly affected by malaria parasites. However, other reports confirmed that the productive age groups (15 – 45 years) were highly affected than other age groups. The result was supported with the pan African health organization report which established that malaria prevalence was highest among 20 – 39 age groups.

CONCLUSION

Malaria was found to be an alarmingly common disease in Peshawar, with higher prevalence of *P. vivax* compared to *P. falciparum*. The overall Malaria prevalence in the research was 20 (04%), indicating that Malaria remains a serious public health concern in the area with *plasmodium vivax* being the most common species. Malaria was most common in people between the ages of 21 – 40 (61.2%).

RECOMMENDATION

The current study was also recommended conducting the research on a wider scale to rule out the malaria infection in different ethnicities and geographic distribution in Pakistan. Poverty elimination, public health awareness, socio-economic development and adequate health facilities are key factors in efforts to minimize malaria incidence in Peshawar. Thus, the question arises as to whether it is worth investigating this association in the routine clinical setting or not. Further studies with a larger number of patients are needed to assess the causes and treatment of Malaria infection.

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