

# FREQUENCY OF PLASMODIUM VIVAX IN PATIENTS HAVING UNCOMPLICATED MALARIA.

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## Abstract

**Background;** Malaria which is potentially life threatening disease that is spread by protozoan parasites. Malaria yet remains to be a important public health concern among most of the endemic regions of world. There are 5 most common human species of plasmodium referred as “Plasmodium falciparum, P. vivax, P. ovale, P. knowlesi, and P. malariae” which can spread the disease. The major complications are caused by P. falciparum and P. vivax, with P. falciparum being the more virulent. This study was conducted to determine the frequency of plasmodium falciparum among patients with uncomplicated malaria in our population. **Objective;** To determine the frequency of Plasmodium vivax in patients with uncomplicated malaria. **Study Design;** Descriptive, Cross-sectional study. **Setting;** Department of Medicine, Nishtar Hospital, Multan. **Results;** Of these study cases, 93 (56.4 %) were male patients while 72 (43.6%) were female patients. Mean age of our study cases was noted to be  $35.52 \pm 10.39$  years. Majority of our study cases i.e. 101 (61.2%) were from rural areas while 64 (38.8%) were from urban areas, 129 (78.2%) were poor and 65 (39.4%) had positive history of using anti – malarial drugs. Mean duration of disease was  $4.37 \pm 2.82$  days and majority of our patients i.e. 107 (64.8%) had disease duration up to 5 days. Plasmodium vivax was diagnosed in 129 (78.2%) patients.

**Conclusion;** High frequency of plasmodium vivax was noted in our study, among patients with uncomplicated malaria. Plasmodium vivax was significantly associated with female gender and previous use of anti-malarial drugs.

**Keywords;** plasmodium falciparum, malaria, plasmodium vivax.

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## Introduction;

Malaria is generally by *Plasmodium falciparum*, and it is important public health issue of many developing countries<sup>1-4</sup>. Globally, every year more than 200 million people suffer from the disease and leading to approximately 627,000 deaths. Most of the regions sub-Saharan African countries are predominantly more affected from malaria<sup>5,6</sup>. There are four 4 species of *Plasmodium* which can infect human beings which are referred as “*P. falciparum*, *P. vivax*, *P. ovale* and *P. malariae*”<sup>7,8</sup>. In its endemic forms, it is prevalent in more than 100 countries which is regarded as one of the mostly commonly spread parasitic disease among human beings. In tropical as well as sub-tropical regions particularly in Sub-Saharan Africa and countries of Southeast Asia, it ranks first with reference to the socioeconomic and public health importance<sup>9-11</sup>. This infectious disease exhibits significant spatial heterogeneity on local, regional and global scale. Furthermore efforts taken to relate differences of prevalence of the disease in terms of varying situations in environment and modes of transmission at these levels<sup>12</sup>. Whilst it has further been complicated to distinguish different prevalent species of plasmodium to describe underlying causes of associated local heterogeneity.

In Pakistan, in recent years, there has been a six times rise in the prevalence of falciparum malaria as reported by national Malaria control Program which estimates around 42% among all patients. Various underlying factors involved in its rise may include chloroquin resistance, ambient temperatures in autumns which favors extraordinary transmission and rapid decrease in vector control activities across the country<sup>13</sup>.

Plasmodium falciparum and vivax malaria are major health problems in Pakistan.<sup>13</sup> Yasinzai et al<sup>14</sup> reported 57.1% plasmodium falciparum from Balochistan. In another study was 75% in Qallat district while P. falciparum was 25%.<sup>15</sup> Fazal et al<sup>13</sup> 12.2% plasmodium falciparum from Mardan.

From the available literature, it is evident that frequencies of different species of plasmodium varies from population to population due to genetic diversity and natural adaptation of the parasite. So this study was conducted to ascertain the role of P. falciparum in patients with malaria.

### Material and Methods;

A specialized proforma has been developed to record the findings of this study. All the cases of malaria having fever  $\geq 101$  F° assessed on thermometer plus positive test with ICT malaria were recruited from Department of Medicine Nishtar Hospital, Multan. Known patients with CAD, Coagulopathy & bleeding disorders such as hemophilia, those with history of intake of anti-malarial drugs within 48 hours, Previously diagnosed cases of brain tumors, tuberculous meningitis, viral or bacterial encephalitis and multiple sclerosis were excluded from our study. Venous blood (5 ml) sample was drawn and sent to the central laboratory of Nishtar Hospital Multan for routine investigations like ICT malaria, CBC, smears to be observed under light microscope for detection of plasmodium vivax in Giemsa stained blood smears which were observed under light microscope. Data was entered and analyzed by computer program SPSS-18. Mean and standard deviation for the age of patients was calculated. Frequencies and percentages were calculated for categorical variables like gender, age groups, intake of anti-malarial drugs, plasmodium falciparum.

### Results;

Our study comprised of a total of 165 patients with uncomplicated malaria who met inclusion criteria of our study. Of these study cases, 93 (56.4 %) were male patients while 72 (43.6%) were female patients. Mean age of our study cases was noted to be  $35.52 \pm 10.39$  years and most of our study cases i.e. 115 (69.7%) were aged 20 – 40 years. Majority of our study cases i.e. 101 (61.2%) were from rural areas while 64 (38.8%) were from urban areas, 129 (78.2%) were poor and 65 (39.4%) had positive history of using anti – malarial drugs. Mean duration of disease was  $4.37 \pm 2.82$  days and majority of our patients i.e. 107 (64.8%) had disease duration up to 5 days. Plasmodium vivax was diagnosed in 129 (78.2%) of our study cases.

### Discussion;

Malaria which is potentially life threatening disease that is spread by protozoan parasites. Malaria yet remains to be a important public health concern among most of the endemic regions of world. There are 5 most common human species of plasmodium referred as “Plasmodium falciparum, P. vivax, P. ovale, P. knowlesi, and P. malariae” which can spread the disease. The major complications are caused by P. falciparum and P. vivax, with P. falciparum being the more virulent<sup>16-18</sup>. This study was conducted to determine the frequency of plasmodium falciparum and plasmodium vivax among patients with uncomplicated malaria in our population. Our study comprised of a total of 165 patients with uncomplicated malaria who met inclusion criteria of our study. Of these study cases, 93 (56.4 %) were male patients while 72 (43.6%) were female patients. Such male gender predominance has been reported in many different studies, a study conducted by Khattak et al<sup>18</sup> also reported male gender preponderance over female gender. A study conducted by Leghari et al<sup>19</sup> in Bahawalpur has also reported 56% male gender predominance which is close to our study results. Yasinzai et al<sup>20</sup> reported high male gender predominance in as many as 76 % patients which is similar to that of our study results. A study conducted in KPK by Shah et al<sup>21</sup> has also documented 52.3 % male gender predominance.

Mean age of our study cases was noted to be  $35.52 \pm 10.39$  years. Yasinzai et al<sup>20</sup> also has reported similar results. A study conducted in KPK by Shah et al<sup>21</sup> has also documented malaria being more common in young patients, supporting our findings.

Malaria is predominantly more common in slum areas with inadequate sanitation, sewage facilities and lower socioeconomic status<sup>21</sup>. Majority of our study cases i.e. 101 (61.2%) were from rural areas while 64 (38.8%) were from urban areas, 129 (78.2%) were poor and 65 (39.4%) had positive history of using anti –

malarial drugs. Mean duration of disease was  $4.37 \pm 2.82$  days and majority of our patients i.e. 107 (64.8%) had disease duration up to 5 days. A study conducted in KPK by Shah et al<sup>21</sup> has also documented similar findings.

*Plasmodium vivax* was diagnosed in 129 (78.2%) of our study cases. A study conducted by Khattak et al<sup>18</sup> also reported 86 % cases with malaria were diagnosed with *Plasmodium vivax* which is in compliance with that of our study results. A study conducted by Leghari et al<sup>19</sup> in Bahawalpur has also reported *Plasmodium vivax* being more prevalent causative agent which is in compliance with our study results. Yasinzai et al<sup>20</sup> reported *Plasmodium falciparum* in 70 % malaria patients which is different from our study results. In another study by Yasinzai et al<sup>15</sup>, in Qallat district while *P. falciparum* was 25 % which is close to our study results. Fazal et al<sup>13</sup> reported *Plasmodium vivax* 87.8% from Mardan.

### Conclusion;

High frequency of *Plasmodium vivax* was noted in our study, among patients with uncomplicated malaria. *Plasmodium falciparum* was significantly associated with female gender and previous use of anti-malarial drugs.

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