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## **Research Paper**

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### **Prevalence of Human Malaria at Multan, Pakistan**

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The present survey was conducted to determine the prevalence of human malaria in Multan. A total of 252 blood samples were collected from a clinical Laboratory, Ghanta Ghar, Multan, Pakistan. The *Plasmodium* (*P.*) species recovered were *P. vivax* and *P. falciparum*. The prevalence of *P. vivax* and *P. falciparum* was 3.17 and 1.19%, respectively. The prevalence spp. was more in males (5.55%) as compared to females (3.17%). Age-wise prevalence of malarial parasite showed that it was more prevalent in patients of age group 1-5 years.

**Key words:** *Plasmodium vivax*, *P. falciparum*, prevalence, Pakistan

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### Introduction

Malaria still constitutes one of the major health threats to wide population across the tropical and subtropical areas of world. Malaria infects between 300 and 500 million people every year in Africa, India, Southeast Asia, the Middle East, Oceania, Central and South America. Out of them 2 million die each year (Martens and Hall, 2002). Most of the cases and almost all of the deaths occur in sub-Saharan Africa. At the present time, malaria kills about twice as many people as does AIDS. As many as half a billion people worldwide are left with chronic anaemia due to malaria infection (Martens and Hall, 2002). In some parts of Africa, people battle up to 40 or more separate episodes of malaria in their lifetimes. The spread of malaria is becoming even more serious as the parasites that cause malaria develop resistance to the drugs used to treat the condition (Martens and Hall, 2002; Molineaux, 1997).

There are four species of Plasmodium known to infect human beings viz., *P. vivax*, *P. falciparum*, *P. malariae* and *P. ovale* (Zeibig, 1997) but only *P. vivax*, *P. falciparum* are endemic in Pakistan. These species of Plasmodium are transmitted by mosquitoes (Suleman, 1988). The disease caused by *P. vivax* is known as benign malaria or vivax malaria. It is cosmopolitan in tropical areas except in parts of tropical Africa. It is the *P. falciparum* species which has given rise to the formidable drug resistant strains emerging in Asia and the fever caused by *P. falciparum* is known as malignant tertian malaria, *falciparum* malaria, black water fever or aestivoautumnal malaria. It is distributed in tropical and subtropical areas of Africa and Asia. Quartan or malaria malariae is caused by *P. Malariae*. It is distributed principally in Southeast Asia, also in Africa and Indian Subcontinent and is rare in Western Hemisphere. *P. ovale* causes ovale or tertian malaria. It is distributed in tropical Africa on the West Coast and in Ethiopia (Marquardt and De Demaree, 1985).

A great deal of work has been carried out on human malaria in other parts of Pakistan, but no work has been done in Multan so far. Keeping in the importance of this disease the present project was designed to investigate the human *Plasmodium* spp., their overall prevalence, seasonal variation and the relationship of sex and age of the host with *Plasmodium* spp.

### Materials and Methods

A total of 250 blood samples brought to the Butta Pathology Laboratory Multan, Pakistan were used in the present studies. Blood smears were made stained and examined under the microscope for the presence of malarial parasites (Cable, 1985).

### Results and Discussion

Two hundred and fifty two patients were examined for overall prevalence of *P. vivax* and *P. falciparum*. Out of 252 patients, 8 (3.17%) were infected with *P. vivax* and 3 (1.19%) were infected with *P. falciparum*. Gbakima (1994) reported maximum prevalence of *P. falciparum* (9.04%) followed by *P. malariae* (2.1%), *P. ovale* (0.5%) from Southern Sierra Leone. Genton *et al.* (1995) reported maximum prevalence of *P. falciparum* (55%) followed by *P. vivax* and *P. malariae* (20%) from East Sepik province, Papua-New-Guinea. Ghazala (1981) recorded the prevalence of malaria in Government Primary and Middle School children of Abbottabad (Pakistan). According to her the *P. vivax* was the most prevalent species (7.89%) followed by *P. falciparum*

Table 1: Relationship between age and *Plasmodium* spp. of human

Name of parasites	Patients examined	Age group of patient examined				
		1-5 yr (n=62)	6-10 yr (n=49)	11-15 yr (N=33)	16-20 yr (n=35)	>20 yr (n=73)
<i>Plasmodium vivax</i>	252	4 (6.45%)	2 (4.08%)	1 (3.03%)	1 (2.85%)	0 (0%)
<i>P. falciparum</i>	252	3 (4.83%)	2 (4.08%)	0 (0%)	0 (0%)	0 (0%)

(0.11%). Nazli (1984) reported the prevalence of malaria from school children of Hazara and Peshawar and recorded maximum prevalence of *P. vivax* (15.76%) and of *P. falciparum* (3.44%). Shah (1984) recorded prevalence of *P. vivax* (19.23%) and *P. falciparum* (4.23%).

The lower prevalence of *Plasmodium* spp. recorded during the present study may be due to the hosts resistance in that area as compared to other studies.

#### Releationship between sex and *Plasmodium* spp. of humans

Out of 126 male patients 5 (3.96%) were infected with *P. vivx* and 2 (1.58%) wit *P. falciparum*, 3 females out of infection of these parasites was thus maximum in male patients as compared to female patients.

Ghazala (1981) reported the prevalence of malaria students (1034%) and (7.67%) in female students of school children of abbotabad. Similar result have been obtained by (Mazaudier *et al.*, 1990; Nathwani *et al.*, 1992; Marcelo *et al.*, 1994; Nakazawa *et al.*, 1994; Kriechbaum and BaKar, 1996). Sex differences in parasite prevalence are usually attributed to Sociological and Physiological, nearly always hormonal in origin. According to Eidinger and Garrett (1972) and Daniels and Belosevic (1994) steroids may directly effect parasite growth and development and may influence immune response. Circulating levels of immunoglobulins, including, IgG, IgM and IgA are greater in females than in males.

#### Relationship between age and *Plasmodium* spp. of humans

The prevalence of *P. vivax* and *P. falciparum* was recorded maximum (Table 1) in patients having age groups one month to five years i.e. 6.45 and 4.83%. In endemic areas one would expect malarionetric indices to highest in children  $\leq 5$  years of age and decreased with increasing age indicating increasing production through acquired immunity (Ghazala, 1981; Mato, 1998; Molineaux 1997; Sabatinelli *et al.*, 1996; Suleman, 1988). Parasite pattern followed this expected pattern during the present study.

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