

Survey of Prevalence of *Plasmodium Vivax* & *Falciparum* of Adult Population of Hussai, Village of District Mardan, Khyber-Pakhtunkhwa Pakistan

1Unays Siraj¹, Maaz Miraj¹, Naveed Ahmad¹, Aziz ur Rahman Safi²

¹Department of Zoology Abdul Wali Khan University Mardan Khyber-Pakhtunkhwa Pakistan

²PhD scholar Department of Microbiology, Kohat University of science & Technology Kohat, KPK Pakistan

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ABSTRACT

Objective: To examine the occurrence of *Plasmodium Vivax* and *falciparum* and timing of vertical transmission of *Plasmodia* in the adult population of village Hussai. **Design:** Follow up median from 19 (range 19 to 50) test only for *Plasmodium Vivax* and *Falciparum*. **Subjects:** One Hundred Twenty-Five (125) suspects (male and female) finished those study, Sixty Three (63) 50.4% Male and Sixty Two (62) 49.6% Female. **Main outcome measure:** Figure out the Occurrence of *Plasmodium Vivax* and *Falciparum*, by using of Malaria rapid diagnostic tests (RDTs), and RDTs which is utilized for determination and finding the presences of *Plasmodium falciparum* and *Vivax* in the adult universe of Hussai Village. **Results:** Sixty-Seven (67) of the One Hundred Twenty Five (125) had tested and shown a positive outcome of the Malaria (*Vivax* and *Falciparum*). **Gender wise** in whole suspects, Sixty Three (63) **Male** tested and Forty (40) 32% Show Positive result while in this, Forty (40) 32% male shown Pf positive and Thirty Six (36) 28% shown Pv-positive and Thirty Five (35) 28% male shown both Pf and Pv result, while Twenty Three (23) 18.4% display negative outcome. In **Female** Twenty-Seven (27) 21.6% Female Show Positive result and female Twenty Eight (28) 22.4% show only **Pf** positive and Twenty Five (25) 19.2% displayed Pv-positive, such as Twenty Five (25) 20% shown both **Pf** (*Plasmodium Falciparum*) and **Pv** (*Plasmodium Vivax*) result in female and negative end display by thirty five whose percentage is 28%.

Conclusion: The study suggested that, the ratio of *Plasmodium* (*Vivax* and *Falciparum*) in the adult & mature population of Village Hussai, District Mardan Khyber-Pakhtunkhwa in male slightly larger than females.

KEYWORDS: *Plasmodium Vivax*, *Plasmodium Falciparum*, reproductive Male and Female, Hussai, Mardan, Khyber-Pakhtunkhwa Pakistan.

INTRODUCTION

Malaria is on the most harmful disease to the human and still it is a challenging problem not only for Pakistan but for the rest of the World. It is especially, a burden for developing or less developed countries. It is considered the third leading causing of deaths in the population and the fourth of all historic periods [1]. "For thousands of periods of the year malaria has been the main communicable disease of human being. As the drugs available for patients but still malaria is believed to be the most significant transmissible disease. An estimates show that approximately 200 to 500 million new cases reported every year in the world and the resulting deaths is about 1 million to 2.5 million deaths per year. Four species (4) of malaria is reasonable and communicable for the sickness in *Homo-Sapiens*: *Plasmodium Falciparum*, *Plasmodium vivax*, *Plasmodium Ovale* and *Plasmodium Malariae*. Other subdivisions of *Plasmodia* infect reptiles, birds besides other mammals. Malaria is extended to humans by the taste of female mosquitoes of the genus *Anopheles*"¹. "In all Europe countries malaria is a noticeable communicable disease"². "Malaria still controls a challenge in the Hussai village, Distt of Mardanin Khyber-Pakhtunkhwa Pakistan, and also including 45 nations, the Nigeria malaria ration is widespread and nearly 588 million are at risk"³. Five species of the malaria parasite (*Vivax*, *Falciparum*, *Ovale*, *Malariae* & *Knowlsei*) that infects humans but in this majorly effect the human, which is *Plasmodium falciparum* and *Plasmodium Vivax*, fifth species *Plasmodium Knowlsei* normally it's considered a parasite in the monkey, but also drive of calamitous communicable disease in man. In most vertebrate hosts, *Plasmodium* parasite is not pathogenic particularly but in human, they can cause and responsible for malaria.

Classification:

The humans are infected by the four species namely, *Plasmodium Vivax*, *Plasmodium Ovale*, *Plasmodium Falciparum* and *Plasmodium Malariae*. *Plasmodium Falciparum* is responsible for the causing of serious disease.

*Corresponding Author: Unays Siraj, Department of Zoology Abdul Wali Khan University Mardan, Khyber-Pakhtunkhwa Pakistan.

For the vast mainstream cases it is the *Plasmodium Falciparum* and *Plasmodium Vivax*. The preponderance of the planetary burden of human malaria is generated by two parasites: *Plasmodium Vivax* and *Plasmodium Falciparum*.

***Plasmodium Falciparum*:** Form Gorillas, *Plasmodium Falciparum* originated. What's more human procured the infection done a single cross-species. *Plasmodium Falciparum* causes the riskiest form of malaria, it can develop into fatal cerebral malaria and also sometimes refer to as malignant tertian malaria and its allocation of the malaria may be sub-tropic & tropic (hot). It's the primary cause of mortality correlated with malaria and it doesn't form hypnozoites but sudden relapses can happen months or even in a year or more vague signs such as a headache, pains, fatigue, aches, anorexia, or nausea. The beginning involves a severe headache, fever, & nausea and vomiting, with occasional severe epigastric pain (the signs depend on the organs involved). There may be just a tactile sensation of coolness.

***Plasmodium Vivax*:** "*Plasmodium Vivax*, has a major adverse impact on planetary health⁴. *Plasmodium Vivax* has the most extensive topographical allocation of malaria in human with an approximated 2.49 billion characters living in hazard of infection in 2010"⁵. "*Plasmodium Vivax* malaria is prevalent in many states of the biosphere. It accounts for more than partial of all malaria cases in Latin America & Asia. Even though the overflowing occurrence of disease generates by this parasite"⁶.

Epidemiology: In United states each year nearly thousands of cases of malaria are sort out and 1016 cases testified in 1991, the mainstream is in Africa, 466 cases and also 221 instances over India *Plasmodium Vivax* accounted for 43% of the situations, the same time *Plasmodium Falciparum* for 39% the proportion from claiming *Plasmodium Falciparum* is best clinched alongside Africa, 221 cases in India *Plasmodium Vivax* accounted for 43% of the cases while *Plasmodium Falciparum* for 39%, in Africa the ratio of *Plasmodium Falciparum* at high peak as compares to other lands of biosphere"⁷. "According to 2012 WHO report the approximated numbers of malaria cases and darkness are be concomitant, by a great degree of doubt. In 2012, there were an approximated 207 million cases of malaria wide-reaching (95% uncertainty intermissions, 135–287 million) and 627 000 malaria deaths (95% uncertainty intermission, 473 000–789 000). Most of the approximated cases (80%) and deaths (90%) take place in forming part of Africa, the region south of the Saharan, to the highest degree, (77%) of the deaths occur in kids under 5 years of age. Approximately 9% of approximated cases planetary are due to *P.vivax*, although the fraction outdoor the African continent is 50%"⁸. "Average malaria infection prevalence declined 46% in kids aged 2–10, from 26% to 14% in 2013. During 2013, an approximated 128 million people were tainted with *Plasmodium Falciparum* in the forming part of Africa regions south of the Saharan Desert. In overall, 18 nations account for 90% of communicable diseases in forming part of Africa; 37 million communicable diseases (29%) arose in Nigeria and 14 million (11%) in the Elected *Respublica* of the Congo, the two nations with the maximum numbers of infections"⁹. "In 2013, there were 97 countries and lands with ongoing malaria conduction, and 6 nations in the prevention of reintroduction phase, producing anentire of 103 nations and lands (of anentire of 196 multinationals) influenced by malaria. In 2013, worldwide, there were a probable 198 million cases of malaria. Most of these cases (82%) were in the WHO African State, tracked by the South-East Asia State (12%) and the east of the Mediterranean Sea Regions (5%), nearly 8% of credible cases wide-reaching are due to *P. vivax*, even though the fraction external the African continent is 47%"¹⁰. "In Pakistan incidence of malaria toxi cities in human population in 37 localities of motherland (Pakistan) Balochistan and district Zhob. Malarial parasites were documented in the blood slides of suspected patients of the disease from July 2004 to June 2006 and included Seventy Thousand Seven Hundred Forty-Eight (7748) subjects. Out of Seventy Thousand Seven Hundred Forty-Eight (7748) suspected cases of malaria, 3240 (41.8%) were originate from being positive for malaria parasite in blood smear slides. Out of positive cases, 1681 (51.8%) were known as *Plasmodium Vivax* impurity and 1559 (48.1%) cases with *Plasmodium Falciparum*. All the same, the cyclical variant was also marked with the maximum (85.4%: 141/165) communicable disease of *Plasmodium Vivax* in March and lowermost (18.6%: 59/316) in October while infection of *Plasmodium Falciparum* was uppermost (81.3%: 257/316) in October and lowermost (14.5%: 24/165) in March. Infection with *Plasmodium Vivax* in female 26.3% (58/220) in May & male was 75.7% (125/165) in March although the infected value of *Plasmodium Falciparum* 20.5% (65/316) in a female in the month of October and male infected value was 61.5% (245/398) at the period of July month"¹⁴. In Pakistan the infections *Plasmodium* is frequently recognized to *Plasmodium Vivax*. Also, *Plasmodium Falciparum* and other diverse infections are prevalent. Besides this, disease malaria with species composition is available in a range high and a regional deviation in the prevalence"¹⁴. "Serve malaria is largely influenced by *Plasmodium Vivax* and *Plasmodium Falciparum*, but *Plasmodium Falciparum* is nearly closed to cause serve malaria as parallel to *Plasmodium Vivax*. According to the another author, in D. I. Khan four hundred and ninety patients are presented, in this 98 (20%) were shown positive outcome, seventy-five 75 (76.53%) males and twenty-three 23 (23.46%) females, species wise *Plasmodium Vivax* display 40 (40.81%)

positive outcome and *Plasmodium Falciparum* show 57 (58.17%) positive outcome and sure one percent hint show *P. Malariae*. The malaria positive result, according to this result the ratio of *Plasmodium Vivax* and *Falciparum* is much greater than *Plasmodium Malariae* (Fig. 1)[14]”.

(Fig.1)

Sex	P. Vivax	P. Falciparum	P. Malariae
Male	30 (40)%	44 (58.66%)	1 (1.34)
Female	10 (43.48%)	13 (56.52%)	0
Total	40 (40.81%)	57 (58.17%)	1

MATERIALS AND METHOD

Work Area: Village Hussai, Semi-urban region of District Mardan, and Khyber-Pakhtunkhwa Province of Pakistan (Islamic Republic) Hussai Village, situated nearby 200 km from Peshawar City (Famous, big and main City of Province Khyber-Pakhtunkhwa) in Village Hussai, the legal age of living is deprived, weak and pastoral fields without water piped deliver and lack of many other important establishments like Hospital, High School and College for both gender.

Cross-sectional Studies: The cross-sectional study identified malarial parasites in 125 suspected malaria patients from September to November 2016 in Village Hussai, cross-sectional surveys were conceded out after repeated meetings with the community and discussions nearby the purposes of the mission and its protocols. The knowledgeable agreement was got from the study subjects, or in the case of a female, their parent or Partner. Contributors were cross-examined & clinically examined.

Subject purpose and population: The present subject was guided as a cross-sectional survey from September to November 2016 and targeted adult population (Male and Female). The suspected were examined for *Plasmodium Falciparum* and *P. Vivax*. We included in the written report only adult population. The main occupancy of the village is teaching, farming, and different category of shopkeepers, fishing, and hunting.

Recruitment of study participants: An aggregate of 125 adult age range (19 to 50) was randomly taken. Suspected for marked with restorative consideration might have been included in the study.

Laboratory Method: We Collected 3ml blood from separately patient by utilizing a syringe, examined for *Plasmodium Vivax* and *Plasmodium Falciparum*, under the superintendence of the prime observer through a useful and effective malaria “rapid diagnostic tests (RDTs). It is a kit which usually contains 20 to 25 test strips but a single buffer vial, occurred for all *Plasmodium* antigens and RDT formats. RDTs are currently rolling out by national malaria controller agendas in endemic settings as a tool for parasite-based analysis of the scope of artemisinin-based combination therapy (ACT). A report [14] shows about 70,000,000 exams were performed. Take 3mL blood through a pipette, place a bead of blood on an S section of the Kit, after this, put 3 drops of buffer on A section of the Kit and wait for 20 minutes to find a result, CON means (control) Pv means *Plasmodium Vivax* and Pf means *Plasmodium Falciparum*. Using an RDT, two banded kit and solution the each patient was tested carefully for *Plasmodium Falciparum* and *Plasmodium Vivax*. The time was assumed to make the analysis was nearby 27 minutes per exam.

Statistical Analysis:

In statistical analysis the age is expressed as a mean \pm standard deviation and the applicant’s answers are categorized. In each class the proportions were compared with two-dimensional cross-tabulations with Chi-square testing to examine the bivariate relationships between the occurrence of *Plasmodium Vivax* & *Plasmodium*

Falciparum independent variables (gender, age group). Data analysis was done by using Excel in Microsoft Office 2013.

Result: In these 125 examined samples, 62 were males and 63 females. In these tested samples 67 have malaria parasites while 58 showed negative result, see (Fig.2). The act of persons tested for separate age set throughout the subject period, upward to 125 individuals, the changed phase of groups were as follows respectively (Tables 1). Among the full population of suspects, the ratio of *Plasmodium Falciparum* and *Plasmodium Vivax* show different value in both male and female(Fig.3).

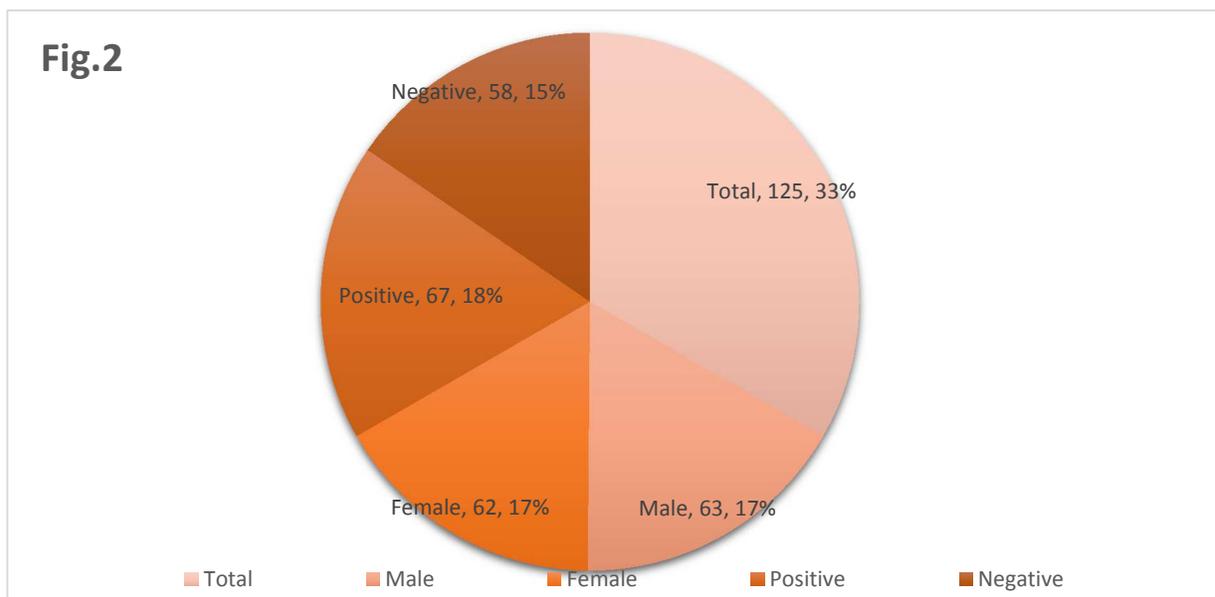
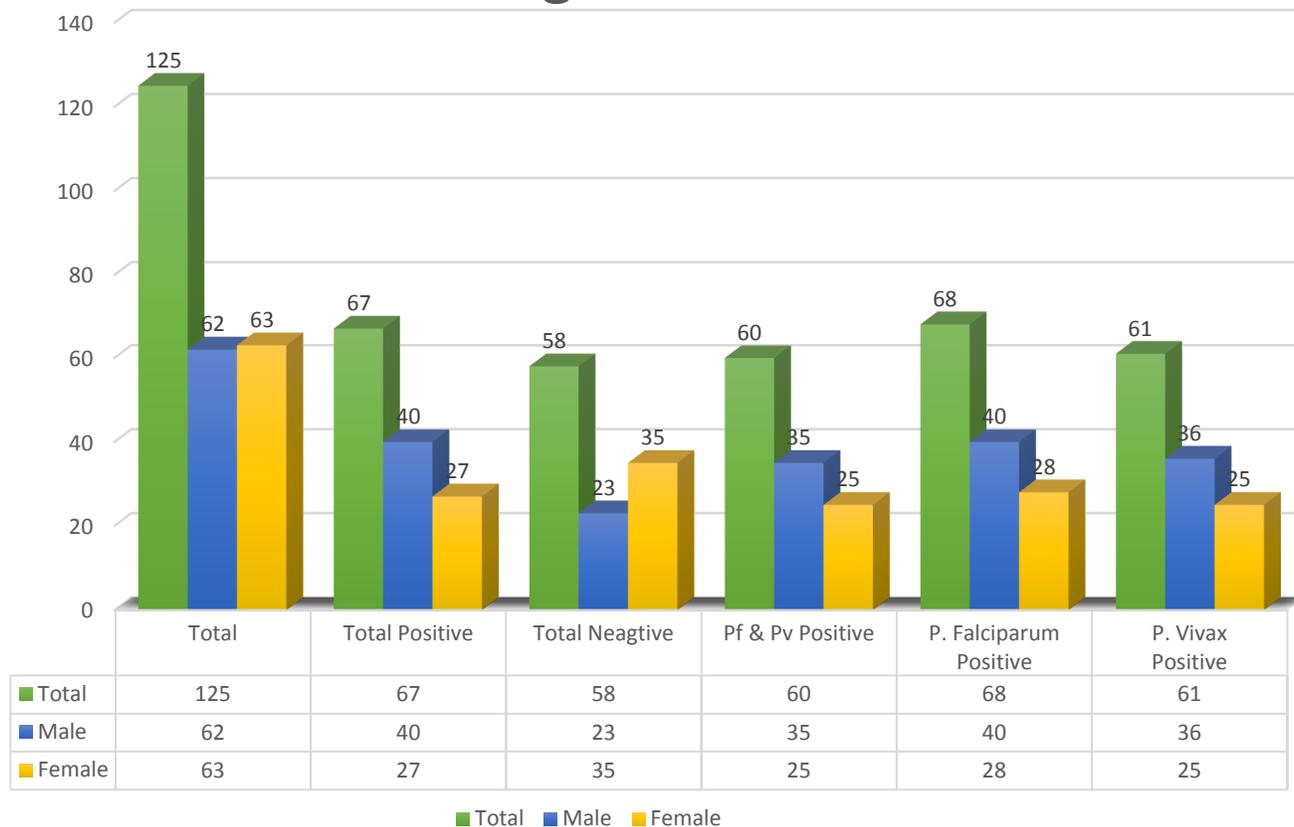


Table.1)

Age wise overall positive ratio of malaria infection in Village Hussai, DisttMardan				
S. No	Age (Year)	Male (62)	Female(63)	
1)	17 to 20	04	03	
2)	20 to 30	22	28	
3)	30 to 40	20	18	
4)	40 to 50	10	06	

Fig.3



Discussion: In Pakistan the epidemic of malaria was strong, short existence, and manipulated by active and inactive interferences. By strengthening the health facilities, the finding of active case and making their treatment, larviciding of anopheles breeding positions, and circulation of insecticide-treated nets each played their role, although separating their private donations is not probable. The transmission of the chiller (Cooler) is end in November due to climate. No cases of deaths reported is amazing, especially with inferior first line treatment. The well trained health staff, and a well-run and close-at-hand clinic contribution free treatment, an effective second line drug, and consciousness community likely given should this nonappearance from claiming surplus passing's. Epidemiological data from different states of Pakistan is insufficient to exactly calculate the frequency of numerous kinds of malaria"[11]. "Malaria remains to be a serious civic fitness difficult issue in Pakistan. It is estimated countrywide in Pakistan in the year 2008, more than 2 million malaria infective cases founded with transience, guesstimate of 50,000 per year. In 2010, more than one million micro-scropy examined and established malaria cases reported from the Eastern Mediterranean, of which 22% through Pakistan. The exact estimate of the frequency *Plasmodium* in Pakistan is difficult due large variation in predominance and species spreading of malaria affecting parasites in diverse regions of the country still not entirely designated"[12]. "Our work will add to the data regarding the epidemiology of this malaria infection. The overflowing ratio of males in our study can be due to several constituents. Males are the working and outgoing population in our civilization, so they have more chances of being bitten through tainted mosquitoes. Besides, they give birth early and gentle access to the health maintenance facilities as related to females, because of our traditional interferences for females in this respect and another the overlookingmark of positivity of malaria parasites in blood contributors in this work is rather concerning. The preponderance of blood donors (66.4%) fall within the age range of 25–39 ages and are frequently males (82.2%). This is because of the showing of the upper degree of commercial contributors in the study population"¹³. "The ground for the low number of females is that females are culturally inhibited as far as commercial blood donation is

concerned. The legal age of donors (85.1%) had packed cell volume (PCVs) between 36 and 45%, the lower value is in line with what is generally recommended as lowest packed cell volume (PCV) values at which contributor should be lose blood from the body. This is a reflection of the high degree of asymptomatic malaria parasitemia in endemic malaria regions, comparable findings have been gotten by other writers in the African region in the worldwide population”[14]. “The incidence of malaria parasitemia among blood donors at different times of the year shows two peaks. The lower peak during the month of March (at the on24 J VECT BORNE DIS 42, MARCH 2005 set of the rainy season) and the higher during the months from July to September (Approaching those contiguous of the showering period). These occasional peaks need aid comparative of the peaks for mosque gnawing thickness discovered by an additional analyst in Pakistan What's more on other creators reporting weight occasional peaks from claiming intestinal sickness in additional reach”[15].

Conclusion: Our country Pakistan faces many challenges, such as the poor management and control of infectious diseases. Besides this many infectious diseases but almost in Pakistan, the ministry of health fail to highlight the available cases to report it and include it to the websites. The current Health minister does not make such activities to highlight each case of infectious diseases in ministry health websites. If such a data is available through websites then a researcher from medicines and mathematical modeling can make a best model and predict the disease status in the country. Then mathematical biologist can formulate model with control measure and will present some specific control measures for disease eradications. As we presented above the poor management of our country ministry of health, the malaria is still a threat to our country due to management, misdiagnosis, lack of diagnostic facilities, and not proper treatment. This study sorts out that the province Sindh, Baluchistan and Khyber-Pakhtunkhwa have a large number of malaria cases and should be focused. Further, efforts should be made on improving species analysis for handling and controlling of *Plasmodium Falciparum* in Hussai Village of District Mardan, Khyber-Pakhtunkhwa province.

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