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Prevalence of Malaria in the Different Hospitals of Takht Bhai and District Mardan Khyber Pakhtunkhwa

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ABSTRACT

The study highlights the prevalence of malaria security in preventing malaria, particularly in Takht Bhai Mardan nations and regions affected by conflicts. Improving preventive measures and access to proper security against malaria can have a significant impact on people's health in also pregnant women and children. Addressing malarial infection is crucial for preventing overall health and preventing the associated short-term and long-term infection of malaria. Proper netting and preventive hygiene, are essential for malaria control. Inadequate preventive measurement of malaria may lead to death in children as well as in pregnant women. Which can exacerbate malaria and affect the overall health of the people? It is essential to study the awareness of malaria and preventive measurement and its role in malaria control. The study acknowledges that malarial infection is a multifaceted problem influenced by various factors, including infections and anemic conditions in all human populations. The study aims to understand the overall prevalence of malaria. Seasonal wise, age-wise and in pregnant women. Also the prevalence profiles of malaria in children in the area and their potential impact on health in the local area of Takht and Mardan. Malaria is a significant public health problem in Mardan, particularly in the local area of Takht Bhai, and this research could provide insights into the association between human health and malarial infection in

the overall population of Takht Bhai Mardan. So the government should focus on the malaria problem of Tehsil Takht Bhai district Mardan Khyber Pakhtunkhwa.

Keywords: Parasite, Plasmodium, Infection, Mosquito, Cause

INTRODUCTION

Malaria is a mosquito borne disease caused by protozoan parasites *Plasmodium*. It threatens millions of people globally. Out of the five *Plasmodium* species infecting man, two species *Plasmodium falciparum* and *Plasmodium vivax* are accountable for the bulk of the global burden of human malaria. *P. vivax* malaria is often known as benign tertian malaria. But it is incorrectly assumed to be benign because it is acute and severe. A person with *P. vivax* malaria experiences paroxysms of high fever, chills, headache, fatigue, and musculoskeletal pain [1].

Four species of malaria parasite, members of a genus of protozoa within the suborder haemosporidiidea, infect humans, and all are spread by female anopheles mosquitoes. In practice, only one of these parasites, *P. falciparum*, causes fatal disease the pathogenesis of the more clinical aspects of *P. falciparum* malaria, such as hyperlactatemia, metabolic acidosis, hypoglycemia, respiratory distress, impaired consciousness, and anemia, has been reviewed recently [2].

Our understanding of the malaria parasites begins in 1880 with the discovery of the parasites in the blood of malaria patients by Alphonse Laveran. The sexual stages in the blood were discovered by William McCollum in birds infected with a related haematozoan, Haemoproteuscolumbae, in 1897 and the whole of the transmission cycle in culicine mosquitoes and birds infected with *Plasmodium* relictum was elucidated by Ronald Ross in 1897. The discovery that malaria parasites developed in the liver before entering the blood stream was made by Henry Shortt and Cyril Graham in 1948 and the final stage in the life cycle, the presence of dormant stages in the liver, was conclusively demonstrated in 1982 by Wojciech Krotoski [3].

Malaria remains extremely burdensome, causing about 2 million deaths annually. However, malaria is almost exclusively a Problem of the geographical tropics. About 40% of the world's population remainsat risk for infection, of whom 19% live in Africa; in addition, about 90% of clinical malaria cases occur in sub-Saharan [4].

Preventive measures can be effective in limiting the mortality and morbidity associated with malaria. Mosquito bites can be avoided by use of appropriate environmental control and use of protective clothing, bed nets, repellents, and insecticide. Chemoprophylaxis is a mainstay of malaria prevention, and new, effective agents are increasingly available. Rapid, accurate diagnosis and effective medical treatment can help people who become ill with malaria despite their preventive efforts [5].

Simple malaria can be treated with oral medications. The use for *Plasmodium falciparum* infection is artimisinins which decreases the capacity of the parasite to give resistance to any single drug component. For the treatment of malaria in pregnant women, the WHO recommends the use of quinine plus clindamycin in the early trimester. Infection caused by *Plasmodium vivax, Plasmodium ovale* or *Plasmodium malariae* is usually treated on the basis of outpatient [6].

It has been reported that in Pakistan, malaria transmission occur mainly after July-August monsoon. For the control of malaria, anti-malarial drugs are used. A well establish program is working for the control of malaria but still fifty thousand of death occur every year. The use of medicines for treating malaria, the removal of mosquitoes from an area and the prevention from bites are some of the steps used to prevent the malaria. The rate of the infection depends on the density of the population of humans and anopheles mosquitoes in a specific area.

Aims and objectives

Keeping in view different aspects of diseases, the study was designed with the following aims and objectives.

- To find the month wise prevalence of malaria in Tehsil Takht Bhai district Mardan.
- To find out species wise distribution of malarial parasites.
- To find out seasonal wise prevalence of malaria.
- To assess prevalence of malaria in pregnant women.
- To assess gender wise prevalence of malaria.

In Pakistan, the accurate information about incidence and prevalence of malaria are very necessary to implement an effective malaria control progarm. It was clear from the available literature that epidemiological data from a different region of the country is insufficient Khadim, 2002. This study will contribute to the epidemiology of malaria in Pakistan. Hussain et al. Hussain et al., conducted an epidemiological study in a local population of Lal Qilla Dir (Lower) and reported 29% positive cases of malaria (97% *P. vivax* and 3% *P. falciparum*). No cases of *P. malariae*, *P. ovale* and mixed infection (*P. vivax* and *P. falciparum*) were recorded. According to Daud et al. 83.33% of total suspected cases of malaria were found positive in the general population of Mithakhel District Karak. Yasinzai and Kakarsulemankhel, Yasinzai and Kakarsulemankhel, 2013 notified 38.3% malaria positivity rate at district Panjgur in South-Western Pakistan. The ratio of *P. vivax* was found very high as compared to *P. falciparum* 79.6% and 20.3% respectively. Khan et al. Khan et al., carried out a study in a general population of Bannu District reported that 27.1% cases were found positive for malaria infection. Species wise analysis shows that high infection rate was observed with *P. vivax* 22.6%, while the *P. falciparum* was observed in 3.04% population and mixed infection was recorded in 1.46% cases. No case of *P. malariae* and *P. ovale* were investigated.

Muhammad Iqbal Yasinzai et al., investigated the incidence of malarial infections in human population in 20 localities of district Bolan, Baluchistan, Pakistan. Malarial parasites were identified in the blood slides of suspected patients of the disease from July, 2004 to June, 2006. Out of 3709 suspected cases of malaria, 38.9% were found to be positive for malarial parasite. Out of positive cases, 86.2% were identified as *Plasmodium vivax* infection, 13.7% cases with *P. falciparum*. However, seasonal variation was also noted in Bolan area with the highest (91.4%) infection of *P. vivax* in December and lowest (71.4%) in January, while infection of *P. falciparum* was the highest (28.5%) in January and lowest (8.5%) in the month of December. Infection in males was 75.5% and in females was 24.4%.

Hussain Khan et al., conducted a cross-sectional in the Department of Medicine, Gomal Medical College, D. I. Khan, from 28th August 2005 to 27th February2006. All adult patients presenting to the outpatient clinic with fever as a chief complaint, were included in the study. Four hundred and ninety patients presented with fever as a chief complaint during the study period. Out of these, 98 (20%) were found positive for malaria, 75 (76.53%) males and 23 (23.46%) females. The average age of positive cases was 27.28 years, with an average age of 26.52 years in case of males and 29.86 for females.

Arbab Ali Junejo., et al. investigated for malarial parasite and its species in hospitalized Children, who were clinically suspected as malaria.

Descriptive study: This is hospital based retrospective study conducted at Children hospital Chandka Medical College Larkana from Jan 2008 to Dec 2008. Files of patients who were clinically diagnosed as malaria according to World Health Organization/National Malaria Program were reviewed. Data regarding age, sex and malarial parasites and their species was collected. Data was analyzed by using SPSS version 15 for windows and results were presented as frequency tables,

Charts and graphs: Two patients were clinically suspected as malaria. Majority of patients 139 (69.5%) were between five to twelve years. There was male predominance 117 (58.5%). Malaria parasites were seen in 73 (36.5%), *Plasmodium, P. vivaxwas* seen in majority 43 (58.9%) of cases, *P. falciparumwas* seen in 30 (41.09%), there was no case of *Plasmodium malairae* or *Plasmodium ovale*. Majority of patients 196 (98%) improved and were discharged, 04 (2%) patients died: Out of 200 clinically suspected cases of malaria, 73 (36.5%) were malarial parasite positive, *Plasmodium falciparum* was predominant specie.

Lagerberg et al., described that pregnant women are more likely than non-pregnant women to become infected with malaria and to have severe infection. The effects of malaria during pregnancy include spontaneous abortion, preterm delivery, low birth weight, stillbirth, congenital infection, and maternal death. Malaria is caused by the four species of the protozoa of the genus *Plasmodium*, which is transmitted by the bite of the female Anopheles mosquito, congenitally, or through exposure to infected blood products. This article reviews the epidemiology, pathology, clinical symptoms, diagnosis, and treatment of malaria in pregnant women. Interventions to prevent malaria include intermittent preventive treatment, insecticide-treated nets, and case management of malaria infection and anemia.

Staid Jamil et al., conducted a study to determine the variation in frequency of *Plasmodium vivax* and *Plasmodium falciparum* malaria in different seasons of the year in Khyber Teaching Hospital, Peshawar. Out of total 411 diagnosed malaria cases, total 134 (32.60%) presented in the autumn season (*vivax*=33.58%, and *falciparum*=66.42%), 37 (9%) in winter season (*vivax*=32.4%, and *falciparum*=67.6%), 76 (18.49%) in spring season (*vivax*=93.4% and *falciparum* 6.6%) and 164 (39.90%) in summer season (*vivax*=89.6, and *falciparum*=10.4%). The

malaria showed a highly significant pattern in different seasons of the year (p=0.00) in a way that *Plasmodium falciparum* malaria reached its highest frequency in autumn and winter seasons while *Plasmodium vivax* malaria reached its peak frequency in spring and summer seasons.

Mehran Qayum et al., the descriptive cross-sectional study was conducted in Jalozai from March to November 2010. More than two-fifth (42%, n=49) of the study population was unaware of malaria, while more than three fifth (70%, n=76) was ignorant of the preventive strategies. The study found that the surveyed population (55%, n=64) had access to health education on diseases caused by mosquitoes but less than half of them (44%, n=28) reported that health education included preventive strategies against malaria. Health education was done at community (40%) and household levels (60%). Simple Bed Nets were given to 68% (n=78), while 26 (32%) families reported that the nets providers were not in a useable state. No education on the proper usage of bed nets was available, and replacement of the nets was not noticed. Health education programmes should include preventive methods.

Saba Ahmed et al., performed a studyat at Civil Hospital Karachi from September 2011 to January 2012.Various clinical features and laboratory parameters were analyzed according to WHO guidelines and treatment failure to anti-malarial drugs was recorded. Mean frequencies, percentages and *chi-square* test were used for analysis. Statistical significance was defined as p-value <0.05. Total of 81 patients were enrolled in the study. Mean age of children was 5.5 ± 3.4 years. Type of malaria infections that were seen included *P. falciparum* 46(57%), mixed infection 26 (32%) and *P. vivax* 9 (11%). Frequent clinical features included splenomegaly (74%), multiple organ dysfunction (MOD) (70%), cerebral malaria (31%) and malnutrition (27%). Thrombocytopenia (86%) and severe anemia (42%) were the common laboratory findings. Shock (p<0.001), renal failure (p<0.001), hepatic involvement (p<0.002) and cerebral malaria (p<0.002) emerged as strong predictors of complications. Fourteen out of 81 cases showed early treatment failure to Quinine. Shock, renal failure, hepatic involvement and cerebral malaria are strongly associated with complications in severe malaria. MOD and malnutrition were identified as significant new clinical features present in severe malaria in this study.

In a study by Naheed Ali and Syed Basit Rasheed., collection was done from four different localities *viz.* Hayatabad, Lalazar Colony, Malakander and Ittehad Colony in Peshawar. A total of 15083 individuals were collected which included 7382 males, 7700 females and one gynandromorph, belonging to two genera *Culex* and *Anopheles*. More than 99% of the collected larvae and pupae belonged to the genus *Culex* with three species, *viz*. *Cx. Pipiens quinquefasciatus*: the most abundant species, *Cx. tritaeniorhynchus* and *Cx. vishnui* occupying the same habitat and occurring in May, June and October while the genus Anopheles was found to contain six species *viz.* An. *Nigerimus* (collected in April), An. *subpictus*, An. *culicifacies*, An. *fluviatilis*, An. maculates (collected in October) and An. *stephensi* (found both in April and October).

Saif Ullah et al., determined the efficacy of Arthemether-Lamefuntrine (AL) in patients with malaria. Study was conducted in Medical Unit DHQ Hospital Sargodha and Medical Unit V, DHQ Hospital Faisalabad from 1st January 2011 to 30 June 2011. Total 129 adult patients both male and female diagnosed to have malaria both on clinical and laboratory examination were included in the study. Patients were given AL (20/120) 2 tablets 12 hourly for three days. An Adequate Clinical and Parasitological Response (ACPR) was defined as absence of fever and parasitaemia (negative slide for malarial parasite) by day 45 after end of treatment. Out of 129 patient's adequate response (ACPR) was seen in 122 patients with efficacy of 94.6%. AL is an important and effective treatment option for treatment of patients with malaria.

Hussain Khan et al., 2006 conducted cross-sectional study in the Department of Medicine, Gomal Medical College, D. I. Khan, from 28th August 2005 to 27th February 2006. All adult patients presenting to the outpatient clinic with fever as a chief complaint, were included in the study. Four hundred and ninety patients presented with fever as a chief complaint during the study period. Out of these, 98 (20%) were found positive for malaria, 75 (76.53%) males and 23 (23.46%) females. The average age of positive cases was 27.28 years, with an average age of 26.52 years in case of males and 29.86 for females.

Sarwat Naz et al., these studies were undertaken to evaluate the insecticidal effect of ivermectin, on the survivorship of zoophilic malaria vectors Anopheles culicifacies and *A. stephensi* under field conditions of (district Okara) Punjab, Pakistan Anopheles mosquitoes were sampled on cattle given ivermectin treatment. Insecticidal effect of ivermectin on the survivorship of *A. culicifaciesand A. stephensi* was monitored for 12 days post blood feeding. In conclusion, ivermectin in a dose appropriate for cattle use led to a significant reduction in both *A. culicifacies* and *A. stephensi* survival when they fed on treated cattle, compared with controls. *A. stephensi* was found more susceptible than *A. culicifaciestoivermectin* after feeding on treated cattle and insecticidal effect was observed for 28 day post ivermectin treatment.

Shahid Niaz Khan et al., this study was aimed to know the burden of malaria infection and to re-evaluate its high prevalence in general population of Bannu District: Out of 823 blood samples, 223 (27.1%) subjects were found positive for Plasmodia is, while the distribution of species prevalence was observed as 186 (22.6%) and 25 (3.04%) for *Plasmodium vivax*, and *Plasmodium falciparum*, respectively along with a mixed infection of 12 (1.46%). Variation with high incidence (42.65%) was found in the age group of 21-30 years.

Arbab Ali Junejo et al., studied to look for malarial parasite and its species in hospitalized Children, who were clinically suspected as malaria. Data regarding age, sex and malarial parasites and their species was collected. Data was analyzed by using SPSS version 15 for windows and results were presented as frequency tables, charts and graphs. Two patients were clinically suspected as malaria. Majority of patients 139 (69.5%) were between five to twelve years. There was male predominance 117 (58.5%). Malaria parasites were seen in 73(36.5%), *Plasmodium, P. falciparum* was seen in majority 43(58.9%) of cases, *P. vivaxwas* seen in 30 (41.09%), there was no case of *Plasmodium malairae* or *Plasmodium ovale*. Majority of patients 196 (98%) improved and were discharged, 04 (2%) patients died. Out of 200 clinically suspected cases of malaria, 73 (36.5%) were malarial parasite positive, *P. falciparum* was predominant specie.

Kamini Mendis et al., studied that malaria requires a re-orientation of control activity, moving away from a population-based coverage of interventions, to one based on a programme of effective surveillance and response. Sustained efforts will be required to prevent the resurgence of malaria from where it is eliminated. Eliminating malaria from countries where the intensity of transmission is high and stable such as in tropical Africa will require more potent tools and stronger health systems than are available today. Malaria control and elimination are under the constant threat of the parasite and vector mosquito developing resistance to medicines and insecticides, which are the cornerstones of current antimalarial interventions. The prospects of malaria eradication, therefore, rest heavily on the outcomes of research and development for new and improved tools. Malaria control and elimination are complementary.

Pari worked on the prevalence of malaria among primary school children of Mardan District and reported 16% of malarial infection. The prevalence of malaria observed by Shah among students of religious schools (Madaris) of Bannu District was 3.61%. In 2003 Karim observed the prevalence of malaria among school children in rural areas of Bannu District, and reported 3.05% of malarial infection.

Sha Sahar et al., this study was conducted from November-2008 to October-2010 in a high malaria-hit district Muzaffargarh. The overall reported cases at RHC included 10,028 suspected malaria cases, of which, 208 were confirmed as *P. falciparum* patients. It was made out that malaria cases reported in age group (16-30) years were significantly higher ($P<0.001$), among which males were victimized significantly more ($P<0.001$) than the females. The overall *P. falciparum* positivity rate throughout the survey interval was 2.07%. It was 0.47% in the 1st year of the research, while in the 2nd year it increased significantly ($P<0.001$) and reached to 2.69%. This rapid increase was caused by the heavy floods hitting Punjab during the research span.

MATERIALS AND METHODS

Place of sample collection and analysis

A total number of 3000 blood samples were collected from the patients in T.H.Q Takht Bhai than analyzed. This collection was carried out from April 2022 to March 2023.

Sampling area

Blood samples were collected from T.H.Q Takh Bhai, Selection included healthy and diseased individuals having malarial symptoms, visiting to T.H.Q Takht Bhai Mardan.

Materials

Glass slides, sterilized prickers, spirit, microscope and distilled water.

Chemicals

Distilled water, methanol, and Geimsa stain.

Sampling procedure

The ring finger of the left hand of patient pricked with the help of pricking needle and allows blood to come out. Then I took a clean slide and took 3 drops of the blood on the glass slide, and took another drop of blood at a distance of one cm from the first drop. I used another slide as spreader and made thick smear by joining the 3 drops of blood and spreading it in an area of 10 mm in diameter. I also made thin smear of blood by bringing the spreader with the drop of blood at an angle of 40-45 degrees from the horizontal and pushing the spreader slowly down the surface of the slide drawing the blood behind and the smear was formed. Then I allowed it to air dry, to become visible for the examination of parasite. Then I brought these samples for checking to the laboratory. There these samples were first dipped in methanol for 2 minutes and Giemsa stain was poured upon it with the help of dropper and stayed for 15 minutes. Geimsa stains was made by the mixing of concentrated Geimsa stain 1 ml and water 9 ml.

Microscopy

Blood from individuals having malarial symptoms were used to form thick and thin smears. In thin smear we examine the species of *Plasmodium* while thick smear is used for the detection of the parasite. Slides were then studied for the examination of *Plasmodium* under microscope.

RESULTS

The current study were conducted from April 2022 to March 2023 for the identification of malarial parasites in the blood of suspected patients of the disease. The overall research work were conducted in the Tehsil Head Quarter Hospital Takht Bhai Mardan. Total of 3000 blood samples were collected, their thick and thin smears were made for microscopy. Out of 3000 samples 555 were found positive for malarial parasites showed a prevalence rate of 18.33 % in Tehsil Takht Bhai district Mardan. Out of 550 positive samples, all were found positive for *Plasmodium vivax* 550 (18.33%), while there is no sample was found positive for *P. falciparum*. While very low frequency rate were found in the months of December, January, February 0% due to the low temperature which does not provide suitable environment for the growth transmission of vector insect (Figure 1).

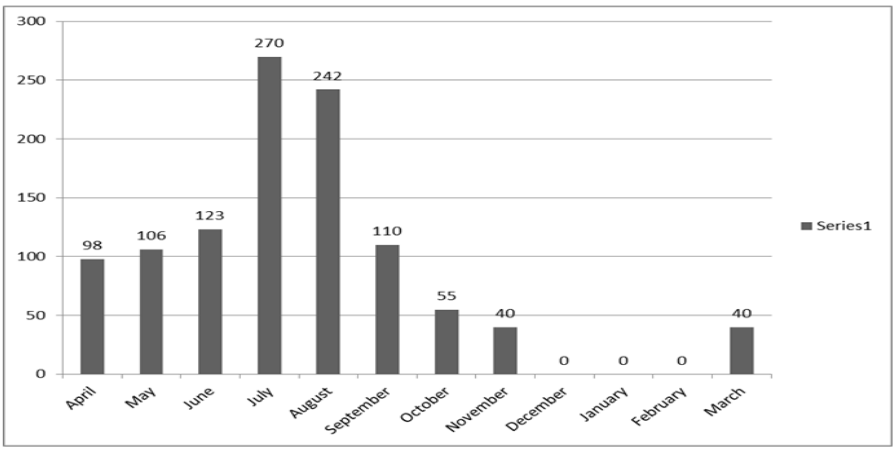

Figure 1 Month wise positivity rate of malarial parasites

Month wise results show that the positivity that the positivity rate of malarial parasite were gradualy increases from April to August and then from September to February were gradually decreases so the highest rate were found in the month of July and August 18%, 25.4% repectively. While in the months of December, January and February no positive samples were found with 0% (Table 1).

Table 1 Overall month wise frequency of malarial parasites

Name of month	Passive Case Detection (PCD			Slide positivity rate
	Slides	*Plasmodium vivax* (PV)	*Plasmodium falciparum* (PF)	
April	200	40	0	7.20%
May	300	50	0	9%
June	400	75	0	13.50%
July	550	100	0	18%
August	600	140	0	25.40%
September	250	60	0	10.80%
October	200	50	0	9%
November	100	10	0	1.80%
December	100	0	0	0%
January	50	0	0	0%
February	30	0	0	0%
March	220	30	0	5.40%
Total	3000	555	0	100%

Seasonal wise frequency of malarial parasites shows that the high positivity rate were found in the months of June, July, August 56.60% it is may be due to monsoon and rainy season. And moderate positivity rate were found in the month of March, April, May 21.70% due to moderate environmental conditions. Similar results were also found in the month of September, October, November 21.70% due to the same environmental condition. While very low result were found in the months of December, January, February 0% due to the low temperature which does not provide suitable environment for the growth transmission of vector insect (Table 2).

Table 2 Seasonal wise occurrence of malarial parasites

Name of month	Passive Case Detection (PCD)			Slide positivity rate
	Slides	*Plasmodium vivax* (PV)	*Plasmodium falciparum* (PF)	
March, April, May	720	120	0	21.70%
June, July, August	1550	315	0	56.60%
September, October, November	550	120	0	21.7
December, January, February	180	0	0	0%
Total	3000	555	0	100%

Specious wise positivity rate of malarial parasites shows that the *Plasmodium vivax* was found the most frequent in all of the malarial parasite. Out of overall 3000 samples 550 samples were found positive for identification. With

frequency rate of 18.33%. In the current research work the overall year no sample was found positive for *Plamodium falciparum*. Like *Plamodium falciparum* no mix infection in the overall research work (Figure 2).

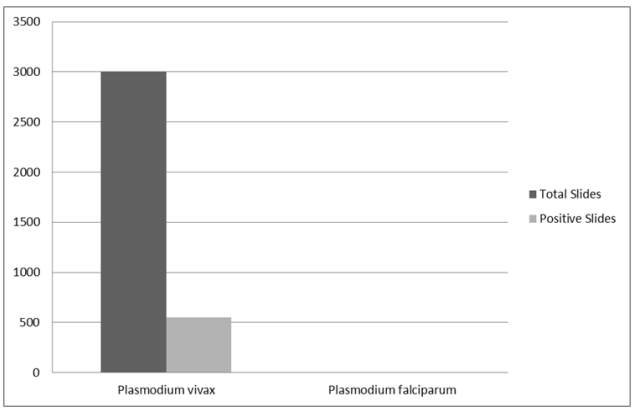

Figure 2 Specious wise Frequency distribution of malarial parasites

In the current research work the ratio of male 300 (54%) is slightly high that of female 255(46%) which are may due to the exposer to environment and much expose to malarial parasite. While the ratio of pregnant women's were much less as compare to gender wise or overall prevalence which were shown below in Figure 3.

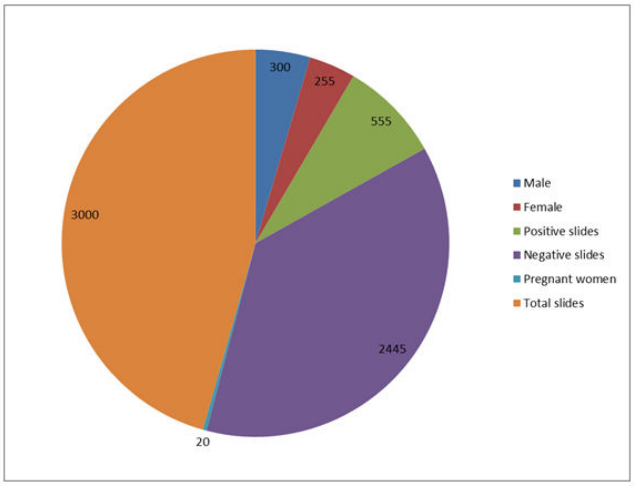

Figure 3 Gender wise and pregnancy wise frequency distribution of malarial parasites

DISCUSSION

During the current study, no case of *Plasmodium falciparum* was observed. The same was the case in a study done in Multan and other studies has a higher incidence rate of *Plasmodium vivax* (60.5%) was also observed in Kashmiri refugees settled in Muzaffarabad. In the current study the data was collected during April 2022 to March 2023. The month wise distribution of malaria shows that the prevalence rate was higher in the month of September (20.70%), followed by October (11.145) and lower in January (3.18%) and February (2.52%). The similar highly prevalence rate was reported previously, which was 41% in August, 23% in July and 22% in June.

The high number of cases was recorded in the month of September while the low numbers of cases were reported in the month of March. Pakistan is a tropical country where the most of peoples have agriculture profession. In rainfall season the water accumulates and provides better condition for the mosquito breeding. The rate of malaria infection was high in the monsoon season from July to November. The results of our study is comparable with the results of others studies.

In the current study the most common species reported of malaria was *Plasmodium vivax*. Seasonal wise Frequency of malarial parasites shows that the high positivity rate were found in the months of June, July, August respectively

56.60% it is may be due to monsoon and rainy season. And moderate positivity rate were found in the month of March, April, May 21.70% due to moderate environmental conditions. Similar results were also found in the month of September, October, November 21.70% due to the same environmental condition. While Many studies have shown the same results According to 7. Ahmad S, et al. reported high cases of malaria in the months of November 68%, December 51%, October 48% and September 35% [7]. The low prevalence rate was recorded in the month of March 3%. Proper treatment, diagnosis, awareness regarding the disease is needed to control and eliminate the malaria infection. While in the current study very low result were found in the months of December, January, February 0% due to the low temperature which does not provide suitable environment for the growth transmission of vector insect.

The ratio of *P. vivax* was found very high as compared to *P. falciparum* 79.6% and 20.3% respectively. Khan SN, et al. carried out a study in a general population of Bannu district reported that 27.1% cases were found positive for malaria infection [8]. Species wise analysis shows that high infection rate was observed with *P. vivax* 22.6%, while the *P. falciparum* was observed in 3.04% population and mixed infection was recorded in 1.46% cases. No case of *P. malariae* and *P. ovale* were investigated.

In the current research work the ratio of male 300 (54%) is slightly high that of female 255 (46%) which are may due to the exposer to environment and much expose to malarial parasite. While the ratio of pregnant women's were much less as compare to gender wise or overall prevalence [9]. Described that pregnant women are more likely than non-pregnant women to become infected with malaria and to have severe infection. The effects of malaria during pregnancy include spontaneous abortion, preterm delivery, low birth weight, stillbirth, congenital infection, and maternal death. Malaria is caused by the four species of the protozoa of the genus *Plasmodium*, which is transmitted by the bite of the female Anopheles mosquito, congenitally, or through exposure to infected blood products. This article reviews the epidemiology, pathology, clinical symptoms, diagnosis, and treatment of malaria in pregnant women. Interventions to prevent malaria include intermittent preventive treatment, insecticide-treated nets, and case management of malaria infection and anemia.

In the current research work the ratio of male 300 (54%) is slightly high that of female 255 (46%) which are may due to the exposer to environment and much expose to malarial parasite. While the ratio of pregnant women's were much less as compare to gender wise or overall prevalence Yasinzai MI and Kakarsulemankhel JK conducted cross-sectional study [10-12]. All adult patients presenting to the outpatient clinic with fever as a chief complaint, were included in the study. Four hundred and ninety patients presented with fever as a chief complaint during the study period. Out of these, 98 (20%) were found positive for malaria, seventy-five (76.53%) males and 23 (23.46%) females. The average age of positive cases was 27.28 years, with an average age of 26.52 years in case of males and 29.86 for females.

Yasinzai MI and Kakarsulemankhel JK, and Mendis K, et al. investigated the incidence of malarial infections in human population in 20 localities of district Bolan, Baluchistan, Pakistan. Malarial parasites were identified in the blood slides of suspected patients of the disease from July, 2004 to June, 2006. Out of 3709 suspected cases of malaria, 38.9% were found to be positive for malarial parasite. Out of positive cases, 86.2% were identified as *Plasmodium vivax* infection, 13.7% cases with *P. falciparum*. However, seasonal variation was also noted in Bolan area with the highest (91.4%) infection of *P. vivax* in December and lowest (71.4%) in January, while infection of *P. falciparum* was the highest (28.5%) in January and lowest (8.5%) in the month of December. Infection in males was 75.5% and in females was 24.4%.

CONCLUSION

On the basis of present research, it can be concluded that the weather of June, July and August was the best environmental condition for malaria vector transmission. And the peoples were most exposed to parasitized malaria. *P. vivax* and were most common in Tehsil Takht Bhai district Mardan causing severe malaria. In both males and females malaria disease were caused more by *P. vivax*. This infection may give high loss to the individuals of district Mardan.

Social marketing is a novel and shows potential approach to promote and supply efficient malaria control tools. In order to efficiently develop preventing method policies, a thorough understanding of factors contributing to possession and use are critical. Government should focus the malaria problem of Tehsil Takht Bhai district Mardan. Peoples were more suffered in the month of June, July and August so individual are being more affected which are the backbone of country. We should take practical steps to fulfill the needs that are important to control the spreading

of mosquito and also cleanliness aspects to eradicate the problem from Tehsil Takht Bhai district Mardan Khyber pakhtunkhwa.

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