



Prevalence of Human Malaria Infection in Lal Qilla Pakistan

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Abstract

Malaria is caused by parasite belongs to genus *Plasmodium* which contributes high morbidity and mortality worldwide especially in developing countries. This study was conducted in Lal Qilla, District Dir (Lower) Khyber Pakhtunkhwa, Pakistan to find out the prevalence rate and species distribution of malaria. A descriptive cross sectional study was design. The samples were collected during January 2011 to December 2011 and microscopy was done at Lal Qilla Hospital. A total of 2741 samples population were studies. Our results demonstrate that the prevalence rate was reported 10.29%. The males are more infected with malaria as compare to females 62.77% and 37.23% respectively. Out of total positive cases 98.94% were *Plasmodium vivax* and 1.06% was *Plasmodium falciparum*. High cases of malaria infection were reported in the month of September 19.03% while low cases were reported in March 3.12%. Conclusion of the current study was, the males are more infected rather than females and malaria infection was high in September. On the other hand *Plasmodium vivax* is the common species reported in Lal Qilla. For the statistical analysis of the data PHStat2 version 2.5 were used and the *p*-value less than 0.05 consider as significant.

Keywords: Malaria, Morbidity, Mortality, Descriptive cross sectional study, *Plasmodium vivax*, *Plasmodium falciparum*, Lal Qilla.

Introduction

From very ancient times the human beings fighting against many health hazards, includes infectious diseases. Malaria is one of them,

contributes to high mortality and morbidity. The infection rate was high in developing countries. The poverty contributes the disease spreading. A single cell parasite of the genus *plasmodium* causes malaria. Four species of the genus *Plasmodium* have been identified, which causes

malaria in human. The four species of malaria are *Plasmodium falciparum*, *Plasmodium vivax*, *Plasmodium malariae* and *Plasmodium ovale*. Among these the *Plasmodium falciparum* is of a greatest risk, to weak immune system of human beings. This Variety of parasites account for 80% of cases and 90% of deaths in humans beings (Ahmad et al., 2014; Kakkilaya, 2003). According to World Health Organization (WHO) approximately 216 million clinical cases along with 655,000 deaths were reported from malaria worldwide (WHO, 2011).

The common symptom of malaria includes temperatures, fever, chills, vomiting, headache etc. Malaria is endemic in tropical and subtropical area because the climatic and weather condition allows the mosquito breeding. According to WHO/UICEF 2005, the malaria is endemic in 24 countries. Each year malaria kills over a million of peoples worldwide mostly children (Korenromp, 2004). The malaria mainly infects the pregnant women and children. Due to poverty and ignorance regarding the disease contributes the spread of malaria (Perandin, 2003). Proper nutrition is very necessary for good health. Due to malnutrition the vulnerability appears to a wide variety of disease (Lutter and Rivera, 2003; Martorell and Haschke, 2001).

Materials and Methods

The approval was taken from the respective authority of Tehsil Head Quarter Hospital Lal Qilla. A descriptive cross sectional study was carried out to find the prevalence rate of malaria among local population of Lal Qilla Dir (Lower), Khyber Pakhtunkhwa, Pakistan and describes the species wise distribution. This study was conducted during January 2011 to December 2011. The inclusion and exclusion criteria were defined. The patients have temperature, fever, chills etc was includes in this study. Those patients which don't have general symptom of malaria were excluded from the current study. Age of the suspected patients were between 1 to >60 years. The diagnosis was done at Tehsil Head Quarter Hospital Lal Qilla. The microscopic examination (using Compound microscope) was done of the suspected patients preparing the thick film slide. Descriptive analysis of the data was done using Micro Soft Excel 2007. The data was statistically analyzed using PHStat2 version 2.5. *p*-value less than 0.05 consider as significant.

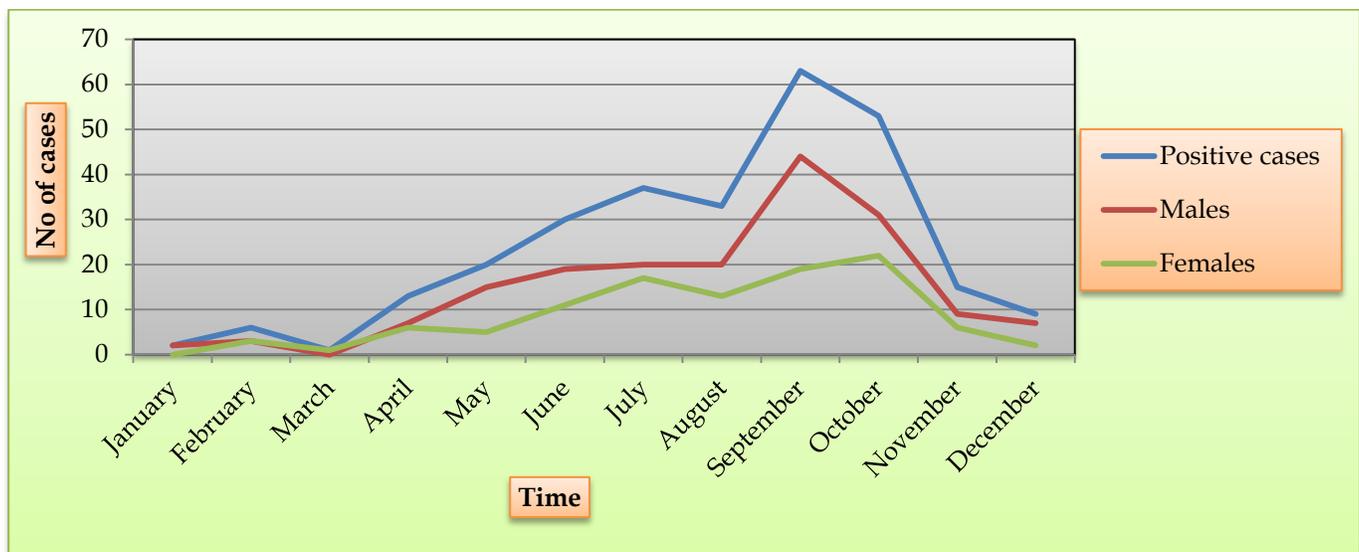


Figure 1: Distribution of males and females positive cases of malaria in Lal Qilla District Dir (Lower) Khyber Pakhtunkhwa, Pakistan during January 2011 to December 2011

Table 1: Distribution of total suspected cases, positive cases and species wise distribution of malaria in Lal Qilla District Dir (Lower) Khyber Pakhtunkhwa, Pakistan during January 2011 to December 2011

Months	Total No of cases	Males	Females	Positive cases	Males	Females	P. vivax	Males	Females	P. falciparum	Males	Females
January	64	36	28	2 (3.12%)	2 (100%)	0	2 (100%)	2 (100%)	0	0	0	0
February	139	64	75	6 (4.32%)	3 (50%)	3 (50%)	6 (100%)	3 (50%)	3 (50%)	0	0	0
March	47	23	24	1 (2.13%)	0	1 (100%)	1 (100%)	0	1 (100%)	0	0	0
April	243	109	134	13 (5.35%)	7 (53.85%)	6 (46.15%)	13 (100%)	7 (53.85%)	6 (46.15%)	0	0	0
May	356	197	159	20 (5.62%)	15 (75%)	5 (25%)	20 (100%)	15 (75%)	5 (25%)	0	0	0
June	348	197	151	30 (8.62%)	19 (63.33%)	11 (36.67%)	30 (100%)	19 (63.33%)	11 (36.67%)	0	0	0
July	337	171	166	37 (10.98%)	20 (54.03%)	17 (45.97%)	37 (100%)	20 (54.05%)	17 (45.95%)	0	0	0
August	328	201	127	33 (10.06%)	20 (60.60%)	13 (39.40%)	33 (100%)	20 (60.60%)	13 (39.40%)	0	0	0
September	331	220	111	63 (19.03%)	44 (69.84%)	19 (30.16%)	62 (98.41%)	44 (69.84%)	18 (29.03%)	1 (1.59%)	0	1 (100%)
October	298	150	148	53 (17.79%)	31 (58.49%)	22 (41.51%)	51 (96.23%)	30 (56.60%)	21 (39.62%)	2 (3.77%)	1 (50%)	1 (50%)
November	154	91	63	15 (9.74%)	9 (60%)	6 (40%)	15 (100%)	9 (60%)	6 (40%)	0	0	0
December	96	57	39	9 (9.38%)	7 (77.78%)	2 (22.22%)	9 (100%)	7 (77.78%)	2 (22.22%)	0	0	0
Total cases	2741	1516 (55.31%)	1225 (44.69%)	282 (10.29%)	177 (62.77%)	105 (37.23%)	279 (98.94%)	176 (63.08%)	103 (36.92%)	3 (1.06%)	1 (33.33%)	2 (66.67%)

Results

The higher authority of the THQ hospital Lal Qilla approved the current study. In a one year epidemiological study a total of 2741 samples were studied. The results shows that the 282 (10.29%) have malaria. The males to females ratio are 177 (62.77%) and 105 (37.23%) respectively (Table 1 and Figure 1). *Plasmodium vivax* was reported high 279 (98.94%) males to female ratio was 176 (63.08%) and 103 (36.92%)

respectively where the *Plasmodium falciparum* reported rare 3 (1.06%), males to females ratio was 1 (33.33%) and 2 (66.67%) respectively (Table 1 and Figure 2). The seasonal analysis shows that the high number of cases was reported in the month of September 19.03% while the lowest number of cases was recorded in the month of March 3.12% (Table 1 and Figure 3). No cases of *Plasmodium malariae* and *Plasmodium ovale* were reported, while no case of mixed infection was observed.

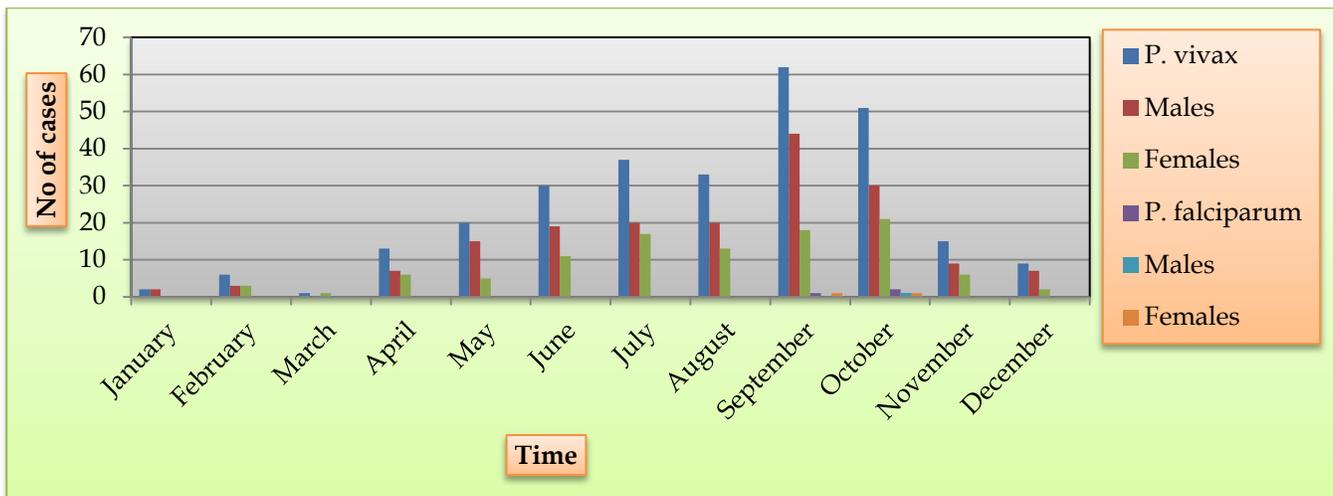


Figure 2: Species wise distribution of malaria cases in Lal Qilla District Dir (Lower) Khyber Pakhtunkhwa, Pakistan during January 2011 to December 2011

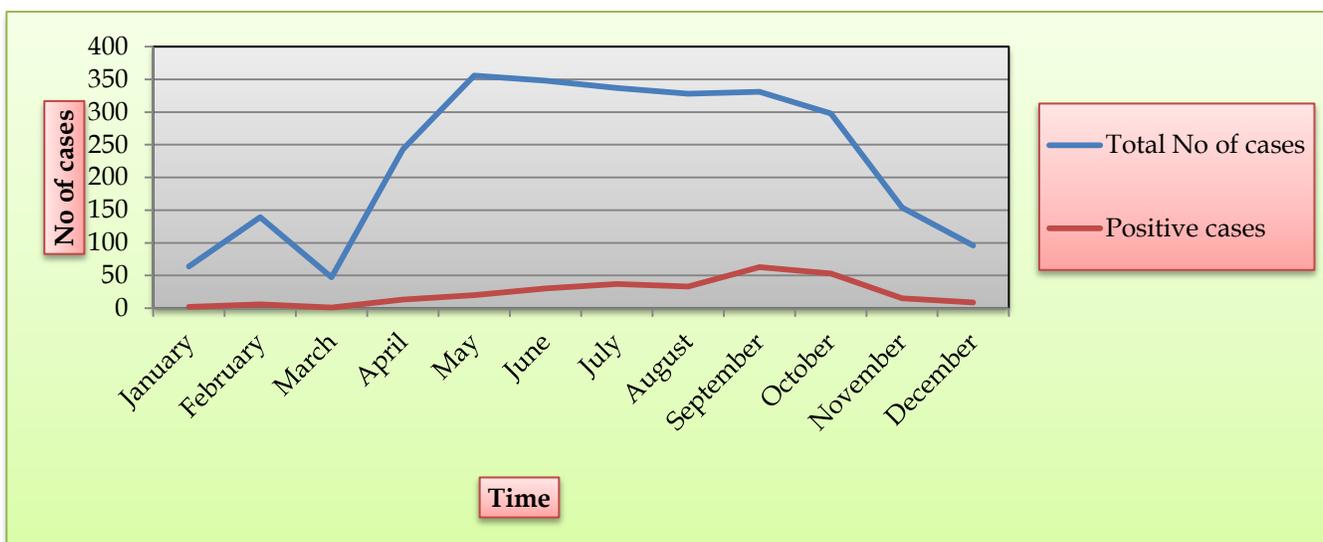


Figure 3: Month wise distribution of positive cases in Lal Qilla District Dir (Lower) Khyber Pakhtunkhwa, Pakistan during January 2011 to December 2011

Table 2: Statistical analysis of positive and negative cases using PHStat2 version 2.5

Gender	Positive cases	Negative cases	Total	p-value
Males	177	1339	1516	0.007826 Significant
Females	105	1120	1225	
Total	282	2459	2741	

Table 3: Statistical analysis of positive and negative cases of *Plasmodium vivax* using PHStat2 version 2.5

Gender	Positive cases of P.v	Negative cases	Total	p-value
Males	176	1339	1515	0.006003 Significant
Females	103	1120	1223	
Total	279	2459	2738	

P.v: *Plasmodium vivax*

Table 4: Statistical analysis of positive and negative cases of *Plasmodium falciparum* using PHStat2 version 2.5

Gender	Positive cases of P.f	Negative cases	Total	p-value
Males	1	1339	1340	0.462921 Non significant
Females	2	1120	1122	
Total	3	2459	2462	

P.f: *Plasmodium falciparum*

Discussions

In the current study the prevalence rate of malaria was reported 10.29% which were decreasing as compare to early studies conducted in Lal Qilla. Ahmad et al. (2013) reported 17.32% prevalence rate while Hussain et al. (2014) reported 29% prevalence rate of malaria infection in human in Lal Qilla. The decrease in the ratio of malaria infection shows positive sign to control and eliminate the disease from the said area. A better management and case detection is necessary to get free the area from the malaria infection. The rate of infection was reported high in males rather than females. Our results are comparable with others (Ahmad et al., 2013;

Bikha et al., 2009; Ansar et al., 2010). In the current study the most common species reported of malaria was *Plasmodium vivax*. Many studies have shown the same results (Soomro et al., 2010; Ahmad et al., 2013; Hussain et al., 2014). 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 (Hussain et al., 2014). 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. Ahmad et al. (2013)

reported high number of cases of malaria infection in the month of June 23.38%, October 20.39% and September 18.87%, while low rate of infection was reported in the month of January 8.34%. According to Hussain et al. (2014) reported high cases of malaria in the months of November 68%, December 51%, October 48% and September 35%. 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.

Conclusion

In this study the decrease in the malaria cases was observed. Malaria infection was reported high in male as compare to female. *Plasmodium vivax* was the most common species reported from the Lal Qilla.

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