

Epidemiological Approach to Malaria: Plasmodium Vivax Is Common in Lal Qilla (Sub Division), Pakistan

¹Akbar Hussain, ¹Tauseef Ahmad, ²Naseer Ullah, ¹Muhammad Ayub Jadoon and ¹Zohaib

¹Department of Microbiology, Hazara University, Manshra, Khyber Pakhtunkhwa, Pakistan

²Department of Zoology, Hazara University, Manshra, Khyber Pakhtunkhwa, Pakistan

Abstract: Aim of the present study was to evaluate the prevalence of malaria among the local population visited to local health care center Lal Qilla (Sub division) District Dir (Lower) Khyber Pakhtunkhwa Pakistan. A descriptive study was arranged. Patients with malaria were evaluated. The analysis of data was done, sex wise, age wise, month wise and species wise. Out of the total 2386 suspected patients of malaria the 694 (29%) were positive. The male are more susceptible to get disease as compare to female 382 (55%) and 312 (45%) respectively. The high burden of cases 580 (83%) of malaria occurred in age group 15-64 years while the lowest cases 53 (8%) were recorded in age group >65. However, the seasonal analysis shows that the high number of cases was occurred in November 139 (68%) while the lowest cases were reported in March 3 (3%). Out of the total positive cases the 673 (97%) were found *Plasmodium vivax* while the 21 (3%) were *Plasmodium falciparum*. From the present study it was concluded that *Plasmodium vivax* is still prevalent in Lal Qilla (Sub Division).

Key words: Prevalence • Descriptive Study Malaria • Plasmodium Vivax • Plasmodium Falciparum

INTRODUCTION

Malaria is still one of the major public health problems worldwide, especially developing countries. Malaria is vector born disease caused by the genus *Plasmodium* include four species *Plasmodium vivax*, *Plasmodium falciparum*, *Plasmodium ovale* and *Plasmodium malariae*. Malarial infection is transmitted by the bite of an infective female *Anopheles* mosquito.

The common symptom of malaria is fever, chill, high temperature, sweating and severe cases the renal failure, seizure, mental confusion, coma and death may occurred [1-2]. Mostly the severe infection is caused by the *P. falciparum*. In worldwide the most infection is cause by *P. vivax* and *P. falciparum*. In 2010, 216 million cases of malaria with 655,000 deaths were reported worldwide. The Pakistan belt a high incidence of malaria. Approximately 5 million cases of malaria reported annually. In Pakistan the *P. vivax* and *P. falciparum* are common [3-6].

MATERIALS AND METHODS

The present study was conducted in Lal Qilla (Sub division) District Dir (Lower) Khyber Pakhtunkhwa

Pakistan from January 2004 to December 2004. All the suspected patients were come with common symptom, fever, high temperature and sweating. The data was collected from the Rural Health Center (RHC) Lal Qilla (Sub division). For data collection a special design perform were used include, date of entry, name of patients, address of patients, sex and age. A descriptive study was design to find out the prevalence of malaria among the local population visited to local health care center. The data were analyzed sex wise, age wise, month wise and species wise.

RESULTS

The study was proved by the ethical authority of RHC Lal Qilla (Sub division). A total number of 2386 suspected cases of malaria were diagnosed during the period January 2004 to December 2004. Out of the total cases the 694 (29%) were positive for malarial parasites.

Sex Wise Distribution: The data were analyzed for the sex wise distribution. The study shows that the male are more susceptible to get malaria as compared to female. The total 2386 suspected cases with malaria were

Table 1: The distribution of Malaria patients from January 2004 to December 2004

Months	Total samples	Positive	No. <i>P. vivax</i>	Male	Female	No. <i>P. falciparum</i>	Male	Female
January	76	4 (5%)	4 (100%)	3 (75%)	1 (25%)	0	0	0
February	46	3 (7%)	3 (100%)	2 (67%)	1 (33%)	0	0	0
March	92	3 (3%)	3 (100%)	3 (100%)	0	0	0	0
April	159	16 (10%)	16 (100%)	10 (63%)	6 (37%)	0	0	0
May	208	33 (16%)	33 (100%)	18 (55%)	15 (45%)	0	0	0
June	213	48 (23%)	48 (100%)	29 (60%)	19 (40%)	0	0	0
July	436	128 (29%)	128 (100%)	61 (48%)	67 (52%)	0	0	0
August	298	39 (13%)	39 (100%)	22 (56%)	17 (44%)	0	0	0
September	301	106 (35%)	104 (98%)	59 (57%)	45 (43%)	2 (2%)	2 (100%)	0
October	180	86 (48%)	85 (99%)	48 (56%)	37 (44%)	1 (1%)	0	1 (100%)
November	204	139 (68%)	121 (87%)	70 (58%)	51 (42%)	18 (13%)	11 (61%)	7 (39%)
December	173	89 (51%)	89 (100%)	44 (49%)	45 (51%)	0	0	0
Total	2386	694 (29%)	673 (97%)	369 (55%)	304 (45%)	21 (3%)	13 (62%)	8 (38%)

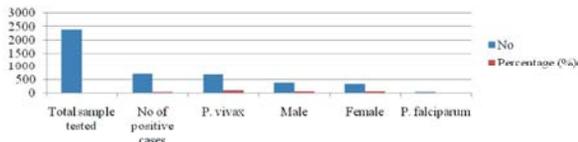


Fig. 1: Sex wise distribution of Malaria patients

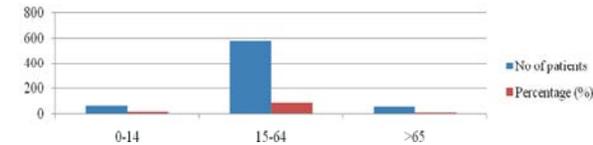


Fig. 2: Age wise distribution of Malaria positive cases

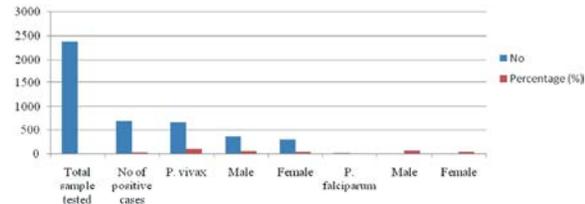


Fig. 3: Distribution of Plasmodium vivax and Plasmodium falciparum

reported. The 1321 were male and the 1065 female. Out of the total cases the 694 (29%) were positive for malarial parasites while the 1692 (71%) were negative. Out of positive cases the 382 (55%) are male and the 312 (45%) were female as shown in Figure 1.

Age Wise Distribution of Malaria Patients: For the age wise distribution the local population were divided in to three age groups, age group 1: 0-14, age group 2: 15-64 and age group 3: >65. The present study shows that the highest burden of cases 580 (83%) were found in age group 2 followed by age group 1, 61 (9%) and age group 3, 53 (8%) as shown in Figure 2.

Month Wise Distribution of Malaria Patients: The present data were also analyzed month wise. It was found that the highest number of malaria were recorded in

November 139 (68%) followed by December 89 (51%), October 86 (48%), September 106 (35%), July 128 (29%), June 48 (23%), May 33 (16%), August 39 (13%), April 16 (10%), February 3 (7%), January 4 (5%) and March 3 (3%). The present study shows that the high burden of cases occurred in the monsoon session. The *P. falciparum* were reported in September, October and November. Out of total 21 (3%) cases of *P. falciparum* the highest cases were reported in November 18 (86%) followed by September 2 (9%) and October 1 (5%) as shown in table 1.

Species Wise Distribution of Malaria Patients: The present data were also analyzed for the species wise distribution. Out of the total 694 positive cases the 673 (97%) were found *P. vivax* with a ratio 369 (55%) males and 304 (45%) were females while the 21 (3%) were found *P. falciparum* with a ratio 13 (62%) males and 8 (38%) were females as shown in Figure 3. The male are more susceptible to both species of malaria (*P. vivax* and *P. falciparum*) to get disease as compare to female.

DISCUSSION

The present study was conducted to provide parasitological information for population living in the Lal Qilla (Sub division). The present study shows the point prevalence of malaria. This study will be helpful for the prevention of malaria in the said area. Different studies have been done in Pakistan. The results are different due to local factors influencing mosquito breeding, health education and malaria preventive programs. In this study, the frequency of malaria is 29%, which was higher than some earlier studies that reported 11.72% cases in Karachi [7] and 11.7% cases of malaria was reported in the general population of Balochistan [9]. The result of our study is comparable with other study [10]. In the present study the frequency of malaria was lower than Memon and Afsar, [4] that reported 47% in Karachi.

The present study shows that the male (55%) are more susceptible to get malaria disease as compare to female (45%) population of Lal Qilla (Sub division). Our results are same with others studies [7-8]. The possible reason for high number of cases in male are may be due to working in the field, their body are not fully covered, ignorance of the disease, no early medication, no proper treatment facilities etc. where the age is concern the high number of cases were found in the most significant and productive age group 15-64 (83%). The result of the present study was similar with Mohammad and Juma, [11] which reported 88.93% cases in the age group of 21 years and above. The disease in this age group may also the cause of poverty. According to our findings the highest rate of infection was recorded in November (68%) while the lowest rate of infection (3%) was noted in March. Pakistan is a tropical country where the vast systems of irrigation exist. After rainfall in the monsoon season a lot of water accumulate in the ponds, fields etc, which provide ideal condition for mosquito breeding. In Pakistan most cases of malaria was reported from the month July to November [12-14].

According to our finding the incidence of *P. vivax* was observed to be higher (97%) as compared with *P. falciparum* (3%). The result of our study is similar with Mohammad and Juma, [11] while studying incidence of human malaria infection in desert area of Pakistan District Kharan, reported that the overall incidence of *Plasmodium* was 43.44%, where *P. vivax* was observed to be the highest (88.69%) as compared with *P. falciparum* (11.30%). The result is also comparable with Yar *et al.* [15] observed high incidence of *P. vivax* (60.50%) as compared to *P. falciparum* (37.20%). However, in the present study mixed infection of *P. vivax* and *P. falciparum* was not observed. During present study, no case of *P. malariae* or *P. ovale* infection was observed, as the same was also not observed by the other studies done in Pakistan [8,11,15].

CONCLUSION

From the present study it was concluded that the malaria is common in age group 15-64 years. This study also shows that the *P. vivax* is still prevalent and common in Lal Qilla (Sub division).

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REFERENCES

1. Snow, R.W., M. Craig, U. Deichmann and K. Marsh, 1999. Estimating mortality, morbidity and disability due to malaria among Africa's non-pregnant population. Bull World Health Organ, 77: 624-640.
2. Weatherall, D.J., L.H. Miller, D.I. Baruch, K. Marsh, O.K. Doumbo, Casals-Pascual. and D.J. Roberts, 2002. Malaria and the Red Cell. Haematology, 1: 1-36.
3. Shah, I.M., Rowland and P. Mehmood, 1997. Chloroquine resistance in Pakistan and the upsurge of falciparum malaria in Pakistan and Afghan refugee population. Ann. Trop. Med. Parasitol, 91: 591-602.
4. Memon, A.R. and S. Afsar, 2006. Thrombocytopenia in hospitalized malaria patients. Pak J. Med Sci, 22: 141-3.
5. WHO, 2005. World Malaria Report 2005. http://whqlibdoc.who.int/publications/2005/9241593199_eng.pdf as at 10 Nov 2005.
6. World Health Organization. 2011. World malaria report 2011. Geneva, Switzerland: WHO Press.
7. Ansar, M.M., Z. Nusrat, A. Nadir, M.M. Aminah and K. Rubina, 2010. Haematological Findings and Endemicity of Malaria in Gadap Region. Journal of the College of Physicians and Surgeons Pakistan, 20(2): 112-116.
8. Ahmad, T., A. Hussain and S. Ahmad, 2013. Epidemiology of Malaria in Lal Qilla. International Journal of Technology and Scientific Research, 2(11): 199-202.
9. Khadim, M.T., 2002. Malaria: a menace at Zhob Garrison. PAFMJ, 52: 203-7.
10. Yasinzai, M.I. and J.K. Kakarsulemankhel, 2008. Frequency of various human malaria infections in hottest areas of central Balochistan, Pakistan: Duki, Harnai and Sibi. Pak Armed Forces Med J., 58: 276-85.
11. Mohammad, I.Y. and K.K. Juma, 2008. Incidence of Human Malaria Infection in Desert Area of Pakistan: District Kharan. Journal of agriculture & social sciences.
12. Amodu, O.K., A.A. Adeyemo, P.E. Olumese and R.A. Gbadegesin, 1998. Intraleucocytic malaria pigment and clinical severity of malaria in children. Trans R Soc Trop Med Hyg., 92: 54-56.
13. Khadim, M.T., 2002. Malaria a menace at Zhob Garrison. Pak Armed For Med J. Dec, 52(2): 203-207.
14. Lathia, T.B. and R. Joshi, 2004. Can hematological parameters discriminate malaria from nonmalarious acute febrile illness in the tropics? Indian J. Med Sci., 58(6): 239-244.
15. Yar, H.M., K. Masood, A. Maqbool and G.Q. Malik, 1998. Prevalence of malarial Parasite species in Multan district. The Professional, 5: 183-7.