

Research Article

Prevalence of *Plasmodium* species in human population of taluka Pano-aqil, Sindh, Pakistan

Mehtab Ali Mahar^{1*}, Abdul Manan Sheikh¹, Nadir Ali Birmani², Safdar Ali Ujjan¹ and Badar Alam Samejo¹

1. Department of Zoology, Shah Abdul Latif University, Khairpur-Pakistan

2. Department of Zoology, University of Sindh, Jamshoro-Pakistan

*Corresponding author's email: mehtabmahar87@gmail.com

Citation

Mehtab Ali Mahar, Abdul Manan Sheikh, Nadir Ali Birmani, Safdar Ali Ujjan and Badar Alam Samejo. Malaria burden. Pure and Applied Biology. Vol. 8, Issue 2, pp1420-1424. <http://dx.doi.org/10.19045/bspab.2019.80082>

Received: 01/01/2019

Revised: 29/04/2019

Accepted: 02/05/2019

Online First: 09/05/2019

Abstract

The study was conducted to check the prevalence of *Plasmodium* species in population of Taluka Pano-aqil, Sindh, Pakistan during January to December, 2014. The data was collected age, sex and month wise. A total of 2257 samples were collected and out of them only 15% were positive with malaria. Among positive cases, 80% were *P. vivax* and 20% were *P. falciparum*. The month-wise data shows the maximum burden of *P. vivax* (100%) was recorded in July and minimum burden was recorded in March (58%), whereas, the maximum burden of *P. falciparum* (41.66%) was recorded in March and minimum load was recorded in September (15.21%). The age-wise prevalence shows the maximum burden of *P. vivax* (85.14%) in over 21 year age group and minimum burden (77.27%) in 1-10 and 11-20 year age group, whereas, the maximum burden of *P. falciparum* (22.77%) in 1-10 and 11-20 year age group and minimum burden (14.85%) in over 21 year age group.

Keywords: *P. falciparum*; *P. vivax*; Pano-aqil; Sindh; Pakistan

Introduction

Malarial parasites comprising more than 200 species of *Plasmodium* are known to infect various animal species such reptiles, birds, and mammals. Four *Plasmodium* species (*P. vivax*, *P. falciparum*, *P. malariae*, *P. ovale*) are known to cause damage to Human nature [1]. Another species, *P. knowlesi* found to infect macaque is considered to be zoonotic in human [2]. Mosquito, the vector of *Plasmodium* in human play very important role in the epidemiology of malaria, west Nile virus and dengue fever etc [3]. WHO reports around 140 million people in Pakistan are at risk of malaria and among them about 18% live at high risk [4]. Report

indicates the work has been done on the prevalence of *Plasmodium* species in human population in Pakistan [5-8], but none of the report is available from the study area. It was therefore, proposed to carry out the survey on the prevalence of *Plasmodium* species in human population of taluka Pano-aqil, Sindh, Pakistan.

Materials and methods

From January to December, 2014, the present study was conducted in human population of taluka Pano-aqil, Sindh, Pakistan. The data was collected from government hospital Pano-aqil and malaria centers in Taluka Pano-aqil. The data collection method was followed of Yasinzai

and Kakarsulemankhel [9, 10]. The data was analyzed month-wise, age-wise and sex-wise. Three age groups 1-10 years, 11-20 years and 21 and/or above years were

Results

Suspected malarial cases were studied to separate the *P. vivax* and *P. falciparum*. Among these positive cases, 80% cases were infected with *P. vivax* and 20% cases were infected with *P. falciparum* (Table 1).

Maximum load of *P. vivax* was recorded in the month of July and minimum in month of March, whereas, maximum load of *P. falciparum* was recorded in the month of March and minimum in month of September (Figure 1).

prepared. Data was statistically analyzed to know the complete prevalence of *P. vivax* and *P. falciparum* within the study rea.

Moreover, as results show that *P. vivax* was noted greater in 21-above age group, whereas, lesser in 1-10 and 10-20 year age group. The prevalence of *P. vivax* was observed higher in 1-10 and 11-20 year age group and lesser in 21-above years age group (Table 2 & Figure 2). So far the gender-wise prevalence is concerned, maximum load of *Plasmodium vivax* was observed in males and females but the ratio of *P. falciparum* was noted lowest in males and females in present locality (Table 3 & Figure 3).

Table 1. Month-wise prevalence of Plasmodium species in taluka Pano-aqil

Month	Suspected cases	Positive cases %	<i>P. falciparum</i> %	<i>P. vivax</i> %
January	315	23.80	17.33	82.66
February	155	9.67	20	80
March	187	6.41	41.66	58.33
April	177	5.08	22.22	77.77
May	163	15.95	30.76	69.23
June	161	9.93	31.25	68.75
July	90	3.33	00	100
August	134	27.61	21.62	78.37
September	236	19.49	15.21	84.78
October	153	14.37	27.27	72.72
November	252	13.88	22.85	77.14
December	234	20.08	10.63	89.36
Total	2257	15%	20%	80%

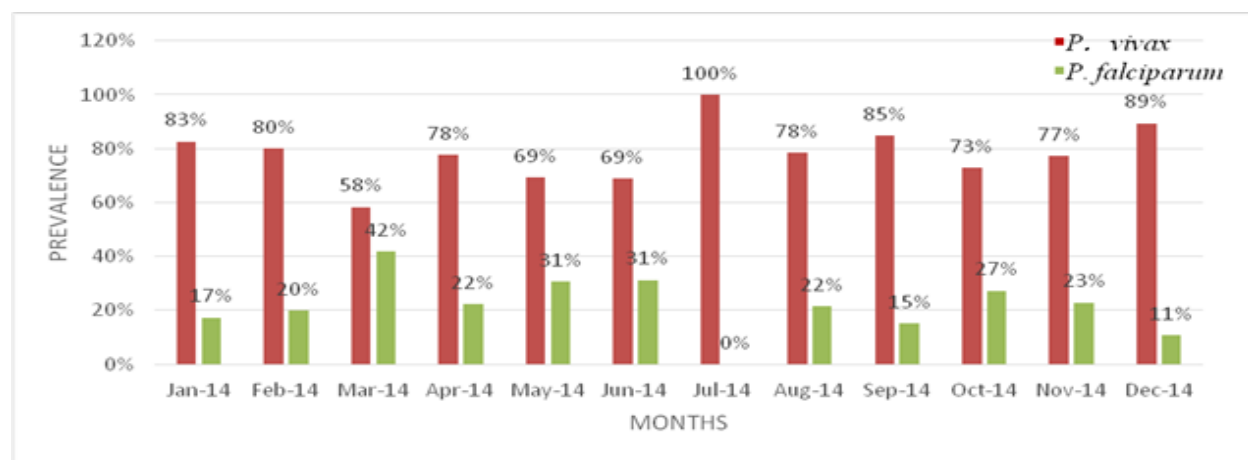


Figure 1. Month-wise prevalence of Plasmodium species in taluka Pano-aqil

Table 2. Age-wise prevalence of *Plasmodium* species in taluka Pano-aqil

Age	<i>P. vivax</i> %	<i>P. falciparum</i> %	Total Positive cases
1-10 years	77.27	22.72	110
11-20 years	77.27	22.72	132
21 and above years	85.14	14.85	101
Total	79.59%	20.40%	343

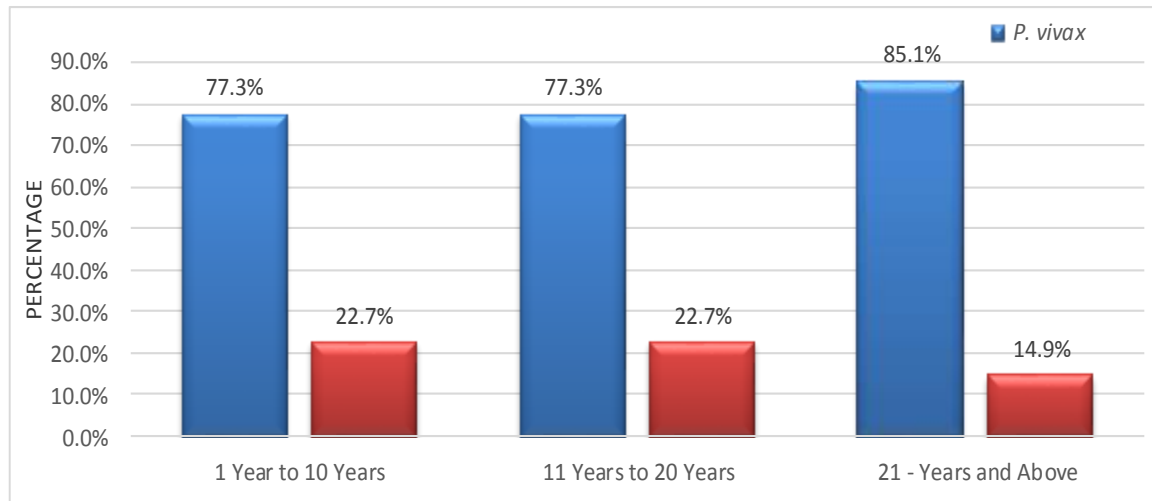


Figure 2. Age-wise prevalence of *Plasmodium* species in taluka Pano-aqil

Table 3. Sex-wise prevalence of *Plasmodium* species in taluka Pano-aqil

Taluk a	Positive Cases (Male)	Percentage of <i>P. vivax</i> (Male)	Percentage of <i>P. falciparum</i> (Male)	Positive Cases (Female)	Percentage of <i>P. vivax</i> (Female)	Percentage of <i>P. falciparum</i> (Female)
Pano-aqil	233	77.25%	22.74%	110	84.54%	15.45%

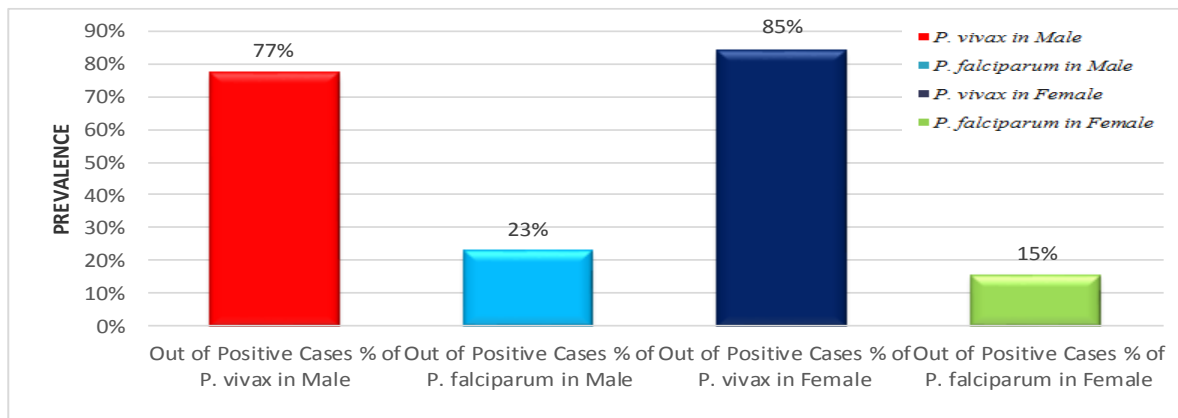


Figure 3. Sex-wise prevalence of *Plasmodium* species in taluka Pano-aqil

Discussion

According to the report, more than three million human beings live under malarial threat in 24 affected countries [11]. Malaria disease transmits to people when an infective female *Anopheles* mosquitoes — Malaria vector — bites. They often bite during dusk and dawn [12]. In present study the total 2257 suspected cases were studied and out of these only 15% found to be positive cases. The *P. vivax* was recorded with the highest prevalence 80% and *P. falciparum* was recorded with 20%. The other previous reports of [13-20] conducted in Pakistan also support the highest prevalence of *P. vivax* than *P. falciparum*. In present study, the *P. vivax* was 100% in the month of July, whereas, 58% in the month of March. *P. falciparum* was observed 42% in the month of March, whereas, not seen in the month of July. In previous reports [9, 10, 21, 22], the month-wise prevalence of *P. vivax* and *P. falciparum* varies due to geographical variation, habitat differences and climatic conditions. In present study, the *P. vivax* was 85.14% in 21 and above year age group and 77.27% in 1-10 and 11-20 year age group, while *P. falciparum* was 22.72% in 1-10 and 11-20 year age group and 14.85% in 21 and above year age group. In previous reports [9, 10, 21, 22] the age-wise prevalence varies due to geographical variation, habitat differences and climatic conditions. In present study, the *P. vivax* was recorded highest in both male (77.25%) and female (84.54%), while *P. falciparum* was recorded lowest in both male (22.74%) and female (15.45%).

Conclusion

The present study concludes that the burden of *P. vivax* is higher than *P. falciparum* in taluka Pano-aqil. The burden of *P. vivax* is higher in the month of July, whereas, the burden of *P. falciparum* is higher in the month of March. No differential results were found sex-wise. The burden of *P. vivax* is

higher in 21 and above year age group, whereas, the burden of *P. falciparum* is higher in 1-10 and 11-20 year age group.

Authors' contributions

Conceived and designed the experiments: MA Mahar, Performed the experiments: MA Mahar, Analyzed the data: NA Birmani, SA Ujjan & BA Samejo, Contributed reagents/ materials/ analysis tools: MA Mahar & AM Sheikh, Wrote the paper: Mahar MA & SA Ujjan

Acknowledgement

I am greatly indebted to Professor Dr. Aftab Ahmed Soomro, Principal Ghulam Muhammad Mahar Medical College Sukkur. Without his kind and timely support, it would have been nearly impossible for me to collect data needed for my Research Work from different Hospitals and Basic Health Units in Pano-aqil Taluka, District Sukkur.

Reference

1. Kho WG (2007). Reemergence of malaria in Korea. *J Korean Med Assoc* 50(11): 959-966.
2. Chin W, Contacos PG, Collins WE, Jeter MH, & Alpert E (1968). Experimental mosquito-transmission of *Plasmodium knowlesi* to man and monkey. *Am J Trop Med Hyg* 17(3): 355-358.
3. Rueda LM (2008). Global diversity of mosquitoes (Insecta: Diptera: Culicidae) in fresh water. *Hydrobiol* 595: 477-487.
4. WHO (2009). World malaria report Geneva.
5. Covell G (1931). The present state of the knowledge regarding the transmission of malaria by different species of Anopheline mosquitoes. *Rec Malaria Surv India* 2: 1-48.
6. Memon IA (1997). Dominant malaria parasite species in hospitalized children in Nawab Shah and chloroquine resistance. *Pakistan J. med. Sci.*, 13: 245-248.

7. Afridi AK, Khan J, & Khan GS (1998). The incidence of malaria in an urban slum of Peshawar. *J Med Sci* 8: 102-105.
8. Bhalli MA, & Samiullah (2001). *Falciparum* malaria –a review of 120 cases. *J Coll Phys Surg Pak* 11: 300-303.
9. Yasinzai MI & Kakarsulemankhel JK (2008). Prevalence of Human Malaria Infection in Pakistan: District Dera Murad Jamali. *Pak J Sci* 60: 3-4.
10. Yasinzai MI & Kakarsulemankhel JK (2012). Prevalence of Human Malaria Infection in Bordering Areas of Baluchistan with Sindh Province: District Jaffarabad. *J Postgraduate Med Ins* 26 (03): 277-282.
11. WHO/UNICEF (2005). *World malaria report Geneva*.
12. White GB (1974). Anopheles gambiae Complex and disease transmission in Africa. *Trans R Soc Trop Med Hyg* 68: 278-301.
13. Mohammad N & Hussain A (2003). Prevalence of malaria in general population of district Buner. *J Pak Med Ins* 17(1): 75-80.
14. Sheikh AS, Sheikh AA, Sheikh NS & Paracha SM (2005). Endemicity of malaria in Quetta. *Pak J Med Res* 44(1): 7.
15. Idris MJ, Sarwar & Fareed J (2007). Prevalence of malaria infection diagnosed at Ayub Teaching Hospital Abbottabad. *J Ayub Med Coll* 19: 35-36.
16. Yasinzai MI & Kakarsulemankhel JK (2007a). Incidence of malaria infection in Pak-Afghan border area of Pakistan: District Qilla Abdullah-Chaman. *Hamdard Med* 50: 62-66.
17. Yasinzai MI & Kakarsulemankhel JK (2008b). Incidence of human malaria infection in northern hilly region of Balochistan adjoining with NWFP, Pakistan: District Zhob. *Pak J Biol Sci* 1620-1624.
18. Murtaza G, Memon IA, Memon AR, Lal MN & Kallar NA (2009). Malaria morbidity in Sindh and the *Plasmodium* Species distribution. *Pak J Med Sci* 25(4): 646-649.
19. Soomro FR, Pathan GM, Bajaj D & Kakar JK (2010a). Malarial parasites species; Jacobabad District Sindh, Pakistan. *Professional Med J* 17(3): 440-443.
20. Asif N (2011). Malaria in Shorkot garrison- a four-year experience report. *Pak J Path* 22(2): 58-64.
21. Khan HU, Khattak AM, Khan MH, Mahsud IU & Humayun S (2013). A study of prevalence of malaria in adult population of DI Khan, *Pak Biomedica* 22: 99-104.
22. Jan AH & Kiani TA (2001). Haematozoan parasites in Kashmiri refugees. *Pak J Med Res* 40: 10-12.
23. Yasinzai MI & Kakarsulemankhel JK (2009). Incidence of human malaria infection in Central Baluchistan, Pakistan: District Bolan. *Biologia* 55(1,2): 43-50.