Journal of Entomology and Zoology Studies

Available online at www.entomoljournal.com

J E Z S Journal of Entomology and Zoology Studies

E-ISSN: 2320-7078
P-ISSN: 2349-6800
JEZS 2016; 4(4): 33-37

Received: 08-05-2016
Accepted: 09-06-2016

Shehzad Zareen
Department of Zoology, Kohat University of Science and Technology-26000, KPK, Pakistan.

Hameed Ur Rehman
Department of Chemistry, Kohat University of Science and Technology-26000, KPK, Pakistan.

Nusrat Yasin
Department of Microbiology, Kohat University of Science and Technology-26000, KPK, Pakistan.

Nasir Mahmood Khattak
Lecturer WAPDA Cadet College Tarbela, Pakistan.

Abid Ur Rehman
Department of Zoology, Kohat University of Science and Technology-26000, KPK, Pakistan.

Raqeebullah
Department of Zoology, Abdul Wali Khan University Mardan, KPK, Pakistan.

Muhammad Irfanullah Khan
Department of Zoology, Kohat University of Science and Technology-26000, KPK, Pakistan.

Correspondence
Shehzad Zareen
Department of Zoology, Kohat University of Science and Technology-26000, KPK, Pakistan.

Malaria infirmity among neonates of rural and urban areas of district Kohat, KPK, Pakistan

Shehzad Zareen, Hameed Ur Rehman, Nusrat Yasin, Nasir Mahmood Khattak, Abid Ur Rehman, Raqeebullah and Muhammad Irfanullah Khan

Abstract
Malaria is serious blood infection caused by *Plasmodium* species transmitted by vector i.e. female Anopheles mosquito. Malaria-infected pregnant mother is always at higher risk of fetal abortion, low birth weight and premature birth which may even leads to death of neonate. A total of 500 blood samples were collected randomly from different locations of district Kohat. About 290 (58.00%) were male while 210 (42%) were female neonates. Total 8(1.60%) neonates were found positive for the malaria infection. Out of which 1(0.02%) was positive for the infection of *Plasmodium falciparum* while 7 (1.4%) were positive for the infection of *vivax*. Neonates from rural areas are at higher risk of Malaria infection particularly those whose mother is malaria positive at the time of pregnancy. Those people who do not protect their newly born babies from mosquitoes were at higher risk of malaria infection. Mother should be properly diagnosed and treated prior to get pregnant. During pregnancy mother should take preventive measures i.e. use of mosquito repellents and anti-mosquito nets. Newly born babies should be handled very carefully to protect him from the bite of mosquitos.

Keywords: Malaria, Pregnancy Neonates, District Kohat

1. Introduction
Malaria is serious blood infection caused by Plasmodium species transmitted by vector i.e. female Anopheles mosquito [1]. It is severe one among five destructive illnesses [2]. About 500 million people are at risk of malaria infection while it causes 2.7 million mortalities per year [3]. About 500,000 plus malaria cases are reported in Pakistan annual [4]. Most common cause of human malaria in Pakistan is *P. vivax* as well as *P. falciparum* [5].Malarial parasites developed resistance to many modern medicines that is why it is becoming most prevalent problem of the world [6]. Pregnant women are more affected by malaria infection. Study reveals that about 200,000 dies of malaria every year throughout the world. While about 400,000 cases of anemic neonates are reported annually [7]. With the recent realization that HIV further aggravates (make more serious) pregnancy-associated malaria (PAM) there is an urgent need to understand these diseases during pregnancy and turn this knowledge into effective therapies [7]. Maternal malaria is associated with reduced birth weight, which is thought to be affected through placental insufficiency, which leads to Intrauterine Growth Retardation (IUGR) [8]. Pregnancy-Associated Malaria attacks on foetus when infected RBC cross the maternal circulation and infect the foetal blood [7]. Malaria-infected pregnant mother is always at higher risk of fetal abortion, low birth weight and premature birth which may even leads to death of neonate [6]. The aim of the research work was to find out the malaria Infirmity among Neonates of rural and urban Areas of District Kohat, KPK, Pakistan.

2. Materials and Methods
2.1 Study area
From the period of January 2015 to December 2015 District Kohat of Khyber Pakhtunkhwa province was selected as study area for sample collection.

2.2 Selection of Patients and sample collection
About 500 Samples were randomly collected from newly born babies of district Kohat of age group 1-31 days were included in this study. Complete record of all the samples along with neonates' clinical histories were recorded on a questionnaire.3 drops of blood were collected

from heal of neonate as fingers of neonates are so week and small for blood collection. Blood was collected using disposable lancet. Samples were processed on the spot for two types of diagnostic tests.

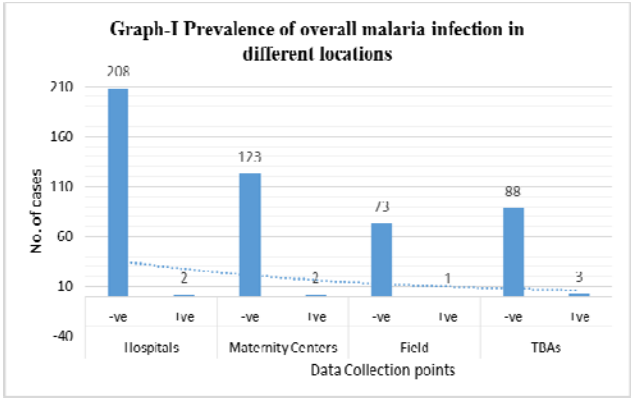
2.3 Microscopy
As soon as blood sample was collected one drop of blood was used on make thin smear of a slide which was further stained and processed in parasitological laboratory, Kohat university f Science and technology Kohat. Methanol was used to fix the smears and then they were stained and gently washed with distilled water. Each sample was analyzed at least for 15-20 minutes under binocular microscope (Olympus Japan). Rest of the 2 drops was used to detect Malaria using Rapid Diagnostic Test strip.

Fig I: Bioline Rapid Diagnostic Test strip (Germany)

2.4 Rapid Diagnostic Test
Bioline RDT (Germany) Rapid Diagnostic Test (RDT) kit was used for diagnosis of species of malarial parasites. After adding blood sample into RDT strip, buffer solution was added into that strip to check the bands of both *P. vivax* and *P. falciparum.*

3. Results
A total of 500 blood samples were collected randomly from different locations of district Kohat. About 290 (58.00%) were male while 210 (42%) were female neonates. Total 8(1.60%) neonates were found positive for the malaria infection. Out of which 1(0.02%) was positive for the infection of *Plasmodium falciparum* while7 (1.4%) were positive for the infection of *Plasmodium vivax.*

3.1 Graph-I Prevalence of overall malaria infection in different locations
About 2/210(0.95%) samples were confirmed positive among samples collected from different Hospitals, 2/125(1.6%) samples were positive from mother care centers, 1/74(1.35%) was confirmed positive from field sample while 3/91(3.29%) samples were positive from samples collected from Traditional Birth Attendants. A high prevalence of Malaria infection was found in those neonates whose birth was attended by TBAs.

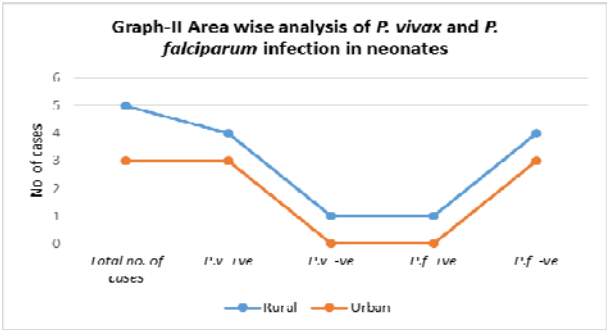


3.2 Location wise analysis of prevalence of *P. vivax* and *P. falciparum*
Blood samples were collected from four different sources i.e. Hospitals, Maternity centers, field and from Traditional birth attendants. Frequent visits were done with prior information of birth of a baby. About 210 samples were collected from hospitals of district Kohat out of which 2(0.95%) were positive for *P. vivax* infection while 1(0.47%) was positive for *P. falciparum* infection. About 125 samples were collected from Mother Care Centres out of which 1(0.80%) was positive for *P. vivax* infection while no one was positive for *P. falciparum* infection. Out of 74, 1(1.35%) sample from field was found positive for *P. vivax* infection while no one was found positive in field samples. A total of 91 samples were collected from Traditional Birth Attendants (TBAs) out of which 3(3.29%) were found positive for *P. vivax* while no one was found *P. falciparum* positive from samples collected from TBAs. All positive neonates were affected from low birth weight (Table-I).

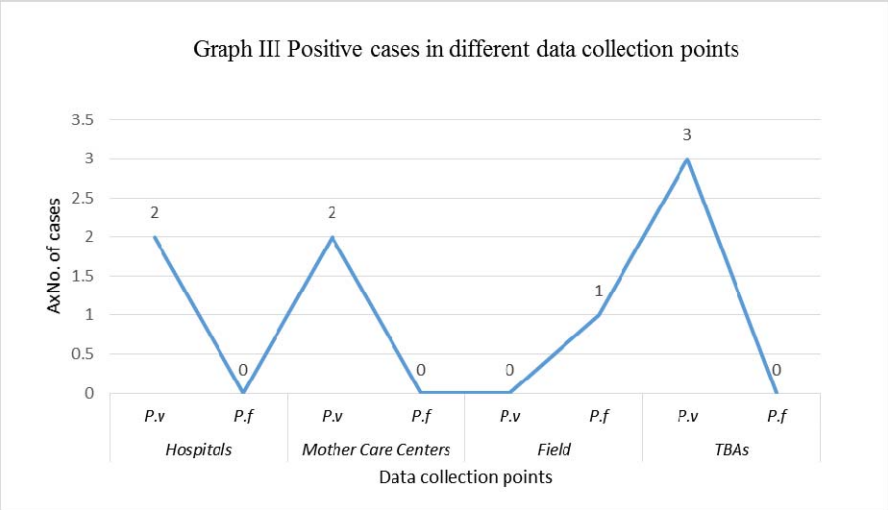
Table I: Location wise analysis of prevalence of *P. vivax* and *P. falciparum*

Location	*P. vivax*		*P. falciparum*		Total n (%)
	Positive n (%)	Negative n (%)	Positive n (%)	Negative n (%)	
Hospitals	2(0.95)	208(99.04)	1(0.47)	209(99.52)	3/210(1.42)
Mother Care Centres	1(0.80)	124(99.20)	0(0.00)	125(100.00)	1/125(0.80)
Field	1(1.35)	73(98.64)	0(0.00)	74(100.00)	1/74(1.35)
TBAs	3(3.29)	88(96.70)	0(0.00)	91(100.00)	3/91(3.29)
Grand Total	7(1.40)	493(98.6)	1(0.20)	499(99.80)	8/500(1.60)

3.3 Area wise analysis of *P.vivax* and *P.falciparum* infection in neonates
A total of 5/8(62.5%) samples belonged Rural areas of district Kohat, as a large number Rural population prefer to take health services from nearby cities, blood samples were collected from hospitals and maternity centres of main city of district Kohat. In Rural areas 4/5(80%) sample were found *P.v* positive while 1/5(20%) was confirmed positive for *P.f* infection. A comparatively low prevalence was recorded in Urban areas as 3/3 (100%) samples were confirmed positive for *P.v* infection.



About 2/8(25%) samples were reported positive for *P. vivax* from different Hospitals and Mother Care Centers while no *P. falciparum* infection was recorded there. In field, only 1/8(12.5%) sample was found positive for *P. falciparum* infection with no positive report for *P. vivax*. Only 3/8(37.5%) samples were confirmed positive for *P. vivax* infection with no positive report of *P. falciparum* infection (Graph-III).



3.4 Comparative analysis of Microscopy and Rapid Diagnostic Test in different age groups.

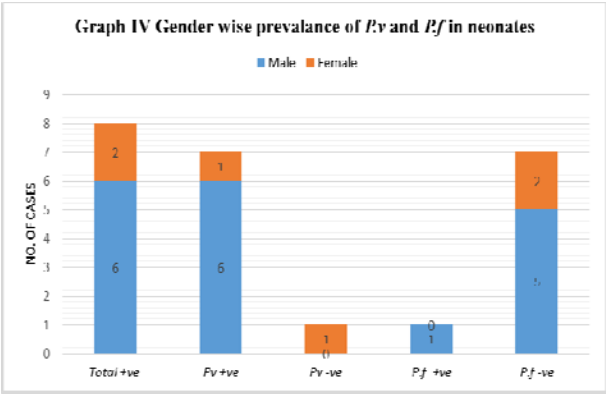
Neonates were divided into different age groups ranging from 1 day to 31 days. About 7/500(1.4%) patients were confirmed positive for *P. vivax* infection by microscopy with no *P. falciparum* positive sample, while one 8/500(1.6%) samples were conformed positive i.e. 7/8(87.5%) for *P. vivax* infection and 1/8(12.5%) for *P. falciparum* infection. One sample was misdiagnosed by microscopy that was confirmed positive by RDT strip (Table-II).

Table II: Comparative analysis of Microscopy and Rapid Diagnostic Test in different age groups.

Age Groups (Days)	Microscopic Examination n (%)		Rapid Diagnostic Test n (%)		Total no. of Samples
	P.v	*P.f*	*P.v*	*P.f*	
	+ve	+ve	+ve	+ve	
1-5	1(3.84)	0(0.00)	1(3.84)	1(3.84)	26
6-10	0(0.00)	0(0.00)	0(0.00)	0(0.00)	76
11-15	0(0.00)	0(0.00)	0(0.00)	0(0.00)	12
16-20	2(2.98)	0(0.00)	2(2.98)	0(0.00)	67
21-25	1(2.22)	0(0.00)	1(2.22)	0(0.00)	45
26-20	1(0.97)	0(0.00)	1(0.97)	0(0.00)	103
21-25	2(2.63)	0(0.00)	2(2.63)	0(0.00)	76
26-31	0(0.00)	0(0.00)	0(0.00)	0(0.00)	95
Total	7(1.40)	0(0.00)	7(1.40)	1(0.20)	500

3.5 Gender wise prevalence of *P.vivax* and *P.falciparum* in neonates

Among 7/500(1.4%) *P.vivax* positive samples 6/7(85.71%) were male while 1/7((14.28%) was female neonate, likewise among 1/500(0.2%) *P. falciparum* positive sample neonate was recorded male



3.6 Month wise Prevalence of Malaria infection among neonates

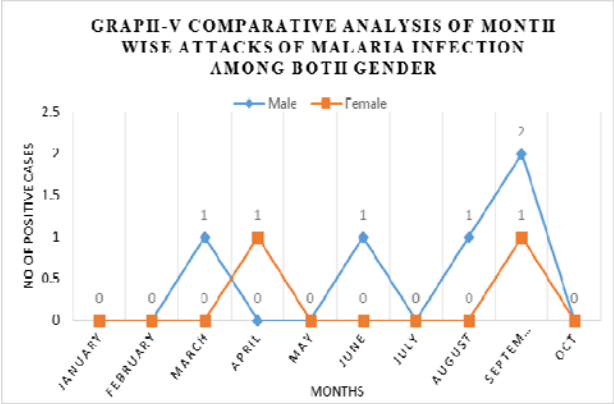
In the month of January, a total of 48/500(9.6%) samples were collected out of which no one was confirmed positive the Malaria infection, similarly out of 54/500(10.8%) samples collected in February, no one was diagnosed positive. Among 63/500(12.6%) samples collected in the month of March only 1/8(12.5%) Male was diagnosed positive while no female neonate was infected with Malaria infection. In the month of April, out of 45/500(9%) samples only 1/8(12.5%) female was reported positive while no male was found with malaria infection. Among 71/500(14.2%) samples collected in the month of May, no sample was recorded positive. Only 1/8(12.5%) male neonate was found positive in the month of June. In July among 55/500(11%) no sample was recorded positive. In the month of august 49/500(9.8%) only 1/812.5%) male was found positive. In the month of September, among 34/500(6.8%), 2/8(25%) males were confirmed positive while 1/8(12.5%) female was confirmed positive for Malaria infection. (Table-III)

Table III: Monthwise Prevalence of Malaria infection among neonates

Months	Total Male n (%)		Total Female n (%)		Total No. of Samples
	+ve	-ve	+ve	-ve	
January	0(0.00)	22(100.00)	0(0.00)	26(100.00)	48
February	0(0.00)	34(100.00)	0(0.00)	20(100.00)	54
March	1(2.77)	35(97.22)	0(0.00)	27(100.00)	63
April	0(0.00)	24(100.00)	1(4.54)	21(94.45)	45
May	0(0.00)	41(100.00)	0(0.00)	30(100.00)	71
June	1(5.55)	17(94.44)	0(0.00)	16(100.00)	34
July	0(0.00)	34(100.00)	0(0.00)	21(100.00)	55
August	1(4.00)	24(96.00)	0(0.00)	24(100.00)	49
September	2(7.69)	24(92.30)	1(12.50)	7(87.50)	34
Oct	0(0.00)	30(100.00)	0(0.00)	17(100.00)	47
Grand Total	5(1.72)	285(98.27)	2(0.95)	208(99.04)	500

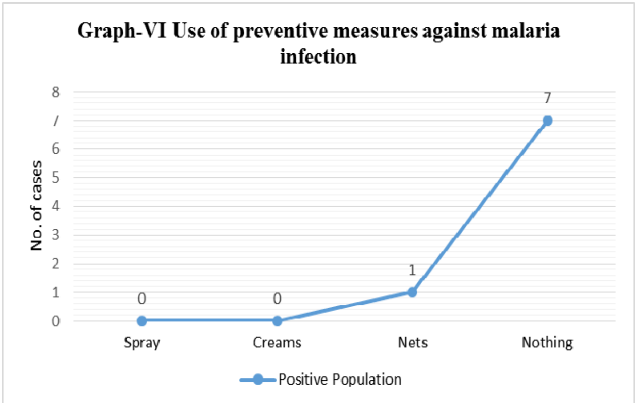
3.7 Comparative analysis of month wise attacks of Malaria infection among both gender

In the month of March, a High rate of Malaria infection was found in male neonates as compare to female, while this case situation was opposite in the month of April. Again in the months of June and August infection among male was more prevalent as compare to female. A high rate of malaria infection was found in the month of September where still male population was at higher risk of malaria infection as compare to female neonates (Graph-V)



3.8 Use of preventive measures against malaria infection:

Among 7/8(87.5%) positive patients a large no. of people i.e.7/8(87.5%) were those who didn't use and sort of mosquito repellent for prevention of malaria, so their neonate were more prone to be bitten by mosquitos and got malaria infection. There was only 1/8(12.5%) neonate whose parents used mosquito nets for as preventive measure but still got Malaria infection. But results show that was positive for the infection of *P. falciparum,* which is considered to be congenital (Graph-VI)



4. Discussion

A comparatively large number of positive cases i.e. 3/8(37.5%) were observed in those people who preferred to handle the delivery case by Traditional Birth Attendants. As this reveals the low socio economic status of people who either cannot afford medical facilities from private maternity center or they live far away from hospitals. The current study reveal that the risk of *P. falciparum* infection is too low but is present in neonates i.e. 1/8(12.5%) positive sample which is parallel to the study of [9]. Who identified the infection of *P. falciparum* in newly born babies? This infection is considered to be congenital. *Falciparum* positive neonate, reported in this study was of low weight than normal as mentioned by [8], which is thought to be congenital and caused by infectious placenta which leads to intrauterine growth retardation. A high prevalence i.e. 3/8(37.5%) of malaria infection was found in the month of September which is considered to be moist and rainy season cause resting of malaria vectors indoor. Current study was quite parallel to [10]. In current study 1/8 positive sample was misdiagnosed while it was confirmed positive by RDT.

5. Conclusion

Neonates from rural areas are at higher risk of Malaria infection particularly those whose mother is malaria positive at the time of pregnancy. Those people who do not protect their newly born babies from mosquitoes were at higher risk of malaria infection. Low Socio-economic status as well as shortage of mother health services is the major cause that leads to infections like malaria. Neonates have low immunity so they are more susceptible to get malaria. In Pakistan there are more chances in Rainy/humid months to get infected with malaria as mosquitoes rest indoors in these months. There are chances to misdiagnose Plasmodium species even with great expertise, Rapid Diagnostic Test used in this study is much easy to perform and give more accurate results.

6. Recommendations

Mother should be properly diagnosed and treated prior to get pregnant. During pregnancy mother should take preventive measures i.e. use of mosquito repellents and anti-mosquito nets. Newly born babies should be handled very carefully to protect him from the bite of mosquitos. There should be proper Mother health services in rural areas to protect the mother and the fetus from such infections.

7. Acknowledgment

This research is a part of Ph.D thesis of Mr. Shehzad Zareen, Kohat University of Science and Technology Kohat.

8. References

1. Cox FEG. History of the discovery of the malaria parasites and their vectors. Parasites & Vectors. 2010; 3:5.
2. Jamal MM, Ara J, Ali N. Malaria in pediatric age group: a study of 200 cases. Pakistan Armed Forces Medical Journal. 2005; 55(1):747.
3. Upadhyay DN, Sharma ML, Sony Y, Rajnee. Comparison in serum profile of peroxidants (MDA) and nonenzymatic antioxidants (Vit E and C) among patients suffering from falciparum malaria. Journal of Pakistan Medical Institute. 2011; 25:96-100.
4. Ali H, Ahsan T, Mahmood T, Bakht SF, Farooq MU, Ahmed N. Parasite density and the spectrum of clinical illness in falciparum malaria. Journal of College of Physicians and Surgeons Pakistan. 2008; 18:362-8.
5. Khan MA, Smego RA, Rizvi ST, Beg MA. Emerging drug resistance and guidelines for treatment of malaria. Journal of College of Physicians and Surgeons Pakistan. 2004; 14:319-24.
6. WHO. Malaria epidemiology in Pakistan, 2009.
7. Medical News. HIV and Malaria Combine To Adversely Affect Pregnant Women And Their Infants. University of Toronto, 2007.
8. Menendez C, Ordi J, Ismail MR, Ventura PJ, Aponte JJ, Kahigwa E *et al.* The Impact of Placental Malaria on Gestational Age and Birth Weight. The Journal of Infectious Diseases. 2000; 181:1740-1745.
9. Ibhanesebhor SE. Clinical Characteristics of Neonatal Malaria. Journal of Tropical Pediatrics. 1995; 41(6):330-333.
10. Sucharit S, Komalamisra N, Leemingsawat S. Population genetic studies on the Anopheles minimus complex in Thailand. Southeast Asian Journal of Tropical Medicine and Public Health. 1988; 19:717-723.