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Epizootiological studies of malaria in Gamharia block of Madhepura, Bihar

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Abstract- The present paper deals with the status of malaria in different areas of Gamharia block of Madhepura, Bihar during 2016-2019. A total 3,149 pyretic cases were examined for malaria positively in eight panchayats (three villages from each panchayat). Of these 266 cases were found positive for malaria parasite (228 *P.vivax* and 38 *P.falciparum*). SPR and SFR for the years 2016, 2017, 2018, 2019 were 6.20 and 1.48, 9.84 and 0.93, 6.17 and 1.38, 6.83 and 1.04 respectively. The average SPR for the above four years was 7.26 (range 6.17-9.84). The average SFR for the above four year was 1.20 (range 0.93-1-48). In the year 2019 an abrupt increase in *P.falciparum* infection in Gamharia has been recorded.

Keywords : Epizootiological study, malaria, SPR, SFR, BSE, Gamharia

INTRODUCTION

Malaria is a mosquito-borne infectious disease that affects humans and other animals.¹ Malaria causes symptoms that typically include fever, tiredness, vomiting, and headaches. In severe cases, it can cause yellow skin, seizures, coma, or death.² Symptoms usually begin ten to fifteen days after being bitten by an infected mosquito. If not properly treated, people may have recurrences of the disease months later.¹ In those who have recently survived an infection, reinfection usually causes milder symptoms. This partial resistance disappears over months to years if the person has no continuing exposure to malaria.²

Malaria is one of the most common infections of humans in the world. This common disease is caused by a protozoan parasite, Immodium which has been with us

since the dawn of time well before Homo sapiens evolved. There has been a drastic increase in Malaria in India which is now endemic in almost all parts of the country.³ 95 per cent of Indian population lives in malaria risk areas and depending upon the breeding potential of mosquitoes, there is a risk of increase in cases in endemic form every 5 to 7 years. The rainfall has been one of the leading causes of malaria endemics as it causes increase in the population of vector species. In regions where laboratory tests are easily available, malaria should be suspected, and tested for, in any ill person who has been in an area where malaria is endemic. In areas that cannot afford laboratory diagnostic tests, it has become common to use only a history of fever as the indication to treat for malaria.⁴

Bihar is one of the worst malaria infected states in India with a large number of deaths. During the last decade it has been observed that malaria is one of the most

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prevalent diseases in and around Gamharia. Gamharia is one of the administrative divisions of Madhepura district of Bihar. The block headquarters are located at a distance of 18 km from the district headquarters, namely, Madhepura. Panchayats in Gamharia as follows- Bhabani, Bhelwa, Gamharia, Kodihar Tarewe, Orahi Ekperha, Itwa Jiwachhpur, Chikani and Jiwachhpur.(fig 1) The present work was undertaken with a view to know the status of malaria in some rural parts of Gamharia panchayat during the years 2016 to 2019.

MATERIALS & METHODS

Malaria is usually confirmed by the microscopic examination of blood films or by antigen-based rapid diagnostic tests (RDT).^{5,6} In some areas, RDTs must be able to distinguish whether the malaria symptoms are caused by *Plasmodium falciparum* or by other species of

parasites since treatment strategies could differ for non-*P. falciparum* infections.⁷ Blood from a total 3,149 pyretic patients were screened randomly for malaria in three rural localities of each of the eight Panchayats of Gamharia. Screening of blood for malaria positivity was done every month from 2016 to 2019. Thick and thin blood smears were prepared and stained with Jaswant Singh-Bhattacharji stain commonly referred to as JSB stain (a rapid staining method for detection of malaria).^{1,2} In a limited number of cases, rapid malaria positivity test kit, Pf/Pv test kit was also used. *P.falciparum* malaria cases were also generally confirmed using Para-Hit f dipsticks rapid test. Blood drop obtained by pricking ring finger (left hand) and was used for making smears. Thick stained smears were used to scan for the presence of parasite and the thin stained smears were used for studying parasite morphology for species identification.



Fig 1. Panchayat wise map of Gamharia observed for the study

RESULTS

The details of examination of blood smears of pyretic cases as well as malaria test kit results are shown in Table-1 from the year 2016 to 2019 a total of 3,149 pyretic cases were examined for malaria positivity. Of these 266 cases

were found positive for malaria parasite (228 *P.vivax* and 38 *P. falciparum*).

SPR (Slide Positivity Rate) and SFR (Slide Falciparum Rate) for the study period have been calculated using following formulae:-

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S.P.R. = Total positive x 100 / Total slides examined.

S.F.R. = Total positive PF x 100 / Slides examined.

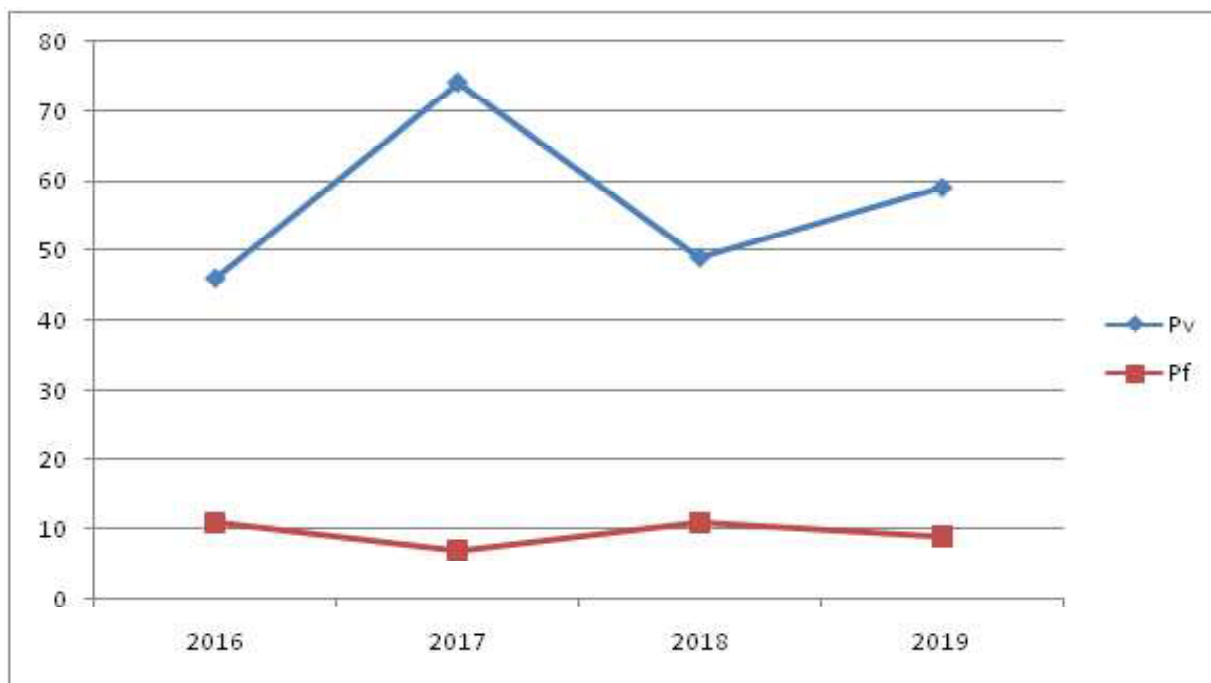
SPR and SFR for the years 2016, 2017, 2018, 2019 were 6.20 and 1.48, 9.84 and 0.93, 6.17 and 1.38, 6.83

and 1.04 respectively (Table-2). The average SPR for the above four years was 7.26 (range 6.17-9.84). The average SFR for the above four year was 1.20 (range 0.93-1.48)

Table 1- Records of monthly BSE and monthly positive cases of Gamharia during 2016-2019

Month	Year 2016			Year 2017			Year 2018			Year 2019		
	BSE	<i>Pv</i>	<i>Pf</i>	BSE	<i>Pv</i>	<i>Pf</i>	BSE	<i>Pv</i>	<i>Pf</i>	BSE	<i>Pv</i>	<i>Pf</i>
January	37	02	03	39	02	-	25	02	01	41	05	01
February	25	04	-	35	02	-	33	01	-	45	02	01
March	38	01	-	36	01	-	56	02	-	65	01	-
April	34	-	-	56	03	01	55	-	01	58	03	-
May	51	-	-	45	-	-	50	-	01	56	09	-
June	52	-	02	26	-	-	36	02	02	54	-	-
July	99	-	-	103	-	02	98	06	01	120	-	03
August	130	19	01	156	32	02	140	26	03	150	15	-
September	65	05	02	55	02	02	59	06	-	52	07	-
October	85	01	-	80	15	-	98	01	02	89	01	02
November	56	09	02	50	13	-	65	02	-	56	-	02
December	69	05	01	71	04	-	78	01	-	77	16	-
Total	741	46	11	752	74	07	793	49	11	863	59	09

BSE- Blood sample examined; *Pv* – *Plasmodium vivax*; *Pf*- *Plasmodium falciparum*



Graph 1 :-SPR and SFR for the years 2016-2019

Table 2- Data for malaria from BSE during 2016-2019

Year	BSE	Total positive	Pv	Pf	SFR	SPR
2016	741	57	46	11	6.20	1.48
2017	752	81	74	07	9.84	0.94
2018	793	60	49	11	6.17	1.38
2019	863	68	59	09	6.83	1.04

DISCUSSION

From the blood examination of pyretic patients during different months from January 2016 to December 2019, it appears that the occurrence of malaria was a constant feature during all months of the year. SPR ranged from 6.17 per cent to 9.84 per cent (Average 7.26 per cent). As far as the *Pv* and *Pf* infections are concerned, an average of 79.83 per cent malaria patients suffered from *Pv* malaria while an average of 20.17 per cent had *Pf* malaria. The data are in conformity to those reported by a number of other workers in India.^{8,9} The abrupt increase in *P.falciparum* infection in Gamharia in the year 2019 needs further serious monitoring of malaria cases.

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