

LABORATORY SURVEILLANCE OF MALARIA AT DISTRICT BAHAWALPUR PUNJAB, PAKISTAN

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ABSTRACT

Background: In Pakistan malaria is prevalent in different parts of all the four provinces. The estimated number of annual malaria cases in Pakistan is 1.5 million. The climate of Pakistan is conducive for malarial transmission. **Objective:** The present study was planned to determine the laboratory surveillance of malaria in Bahawalpur District over a period of five years. **Patients & Methods:** The present descriptive study was conducted on malarial epidemiology in Bahawalpur region over a period of 5 years from 2007 to 2011. The study was conducted by collecting data from those health facilities where malaria screening was done routinely. Thick and thin smears were taken by the trained personal on glass slides and stained by Giemsa technique. They were then examined microscopically for the diagnosis and specification of malarial parasite. Doubtful samples were sent to consultant haematologists at tertiary level health facilities for confirmation. **Results:** Annual parasite index was highest in 2007 i.e 0.091. Slide positivity rate was highest (0.21) in 2007 and dropped (0.01) in 2010. Annual Blood Examination Rate was also highest (4.28) in 2007. **Conclusion:** Our findings showed that annual blood examination rate, slide positivity rate and annual parasite index continued to drop during the study period.

Key words: Malaria, Plasmodium falciparum, Mosquitoes, Surveillance

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INTRODUCTION

Malaria is a vector borne disease. It is caused by plasmodium, an intracellular parasite transmitted by mosquito. Plasmodium has different species. Plasmodium Vivax and Falciparum are the commonest species responsible for human disease. Worldwide, an estimated 300-500 million people suffer from malaria each year with 1.52 million deaths per anum.^{1,2} Malarial parasite (Plasmodium) is primarily transmitted by the bite of mosquito but infection can also occur through exposure to infected blood products (transfusion malaria) and by congenital transmission.³ Malaria occurs throughout the year. Prevalence of malaria shows seasonal variation.⁴ It is higher in autumn and spring. Light microscopy of thick and thin Giemsa stained blood film remains the standard method for diagnosing malaria.⁵

In Pakistan malaria is prevalent in different parts of all the four provinces.^{6,7,8} It has seasonal variations. The estimated number of annual malaria cases in Pakistan is 1.5 million.⁹ The climate of Pakistan is from tropical to temperate along the southern coast,¹⁰ elevation range is

between sea level and 9,000 meters.¹¹

The most common malarial parasites in Pakistan are Plasmodium vivax (64%) and Plasmodium falciparum (36%).¹² Province wise, malaria is found in Khyber Pakhtunkhwa, Balochistan, Sindh and the Federally Administered Tribal Areas.¹³ Malarial transmission in Pakistan is not stable. P. vivax peaks from April to September,¹⁴ while P. falciparum is mainly transmitted from August to December. Multiple factors are considered important for endemicity of malaria in these areas.^{15,16} The objective of present study was to determine the laboratory surveillance of malaria in Bahawalpur district.

MATERIAL AND METHODS

The present descriptive study was conducted on malarial epidemiology in Bahawalpur region, over a period of 5 years from 2007 to 2011. The study was conducted by collecting data from those health facilities where malaria screening was done routinely. Thick and thin smears were taken by the trained personal on glass slides and stained by Giemsa technique. They were then examined microscopically for the diagnosis and specification of malarial parasite. Doubtful samples were sent to consultant haematologists at tertiary level health facilities for confirmation. Annual Blood Examination Rate (ABER) was calculated as: Smears examined in a year X 100 / Total population. Slide Positivity Rate (SPR) was calculated as: Total

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positive $\times 100$ / Total slides examined. Annual Parasitic Incidence (API) was calculated as: Total no of positive slides for parasite in a year $\times 1000$ / Total population. The data was entered and analyzed by using SPSS version 13.

RESULTS

Results of the study are shown in table I. Plasmodium vivax remained the commonest malarial parasite, followed by plasmodium falciparum throughout the study period. Males (56%) were most frequent victims followed by females (44%). However, annual parasite index was highest in 2007 i.e 0.091. Slide positivity rate was highest (0.21) in 2007 and dropped (0.01) in 2010. Annual Blood Examination Rate was highest (4.28) in 2007.

Table I: Epidemiology of malaria at Bahawalpur

Year	Population	Sample	PF	PV	SPR	API	ABER
2007	21,00,000	90,000	50	143	0.21	0.091	4.28
2008	21,37,800	44,000	07	009	0.03	0.007	2.05
2009	21,76,280	44,000	02	012	0.03	0.006	2.02
2010	22,15,453	26,000	07	020	0.10	0.012	1.17
2011	22,55,331	27,000	18	004	0.08	0.009	1.19

DISCUSSION

Man has always been the favorite victim of malaria, the most common vector borne parasitic infection since ancient times. Malarial epidemics have changed geographical distribution of different races of human on this planet. According to WHO report in 2004, number of malaria cases reported from Punjab and the Azad Jammu and Kashmir (AJK) were lowest. Highest number of cases was reported from Baluchistan and the Federally Administered Tribal Areas (FATA). Moderate number of cases were reported from Sindh and Khyber-Pakhtunkhwa.¹⁷ About ninety-five million of Pakistan's people (roughly 60% of Pakistan's population) live in malaria endemic regions.¹⁸ A recent rise in number of malaria cases could be due to floods affecting millions of people in approximately 60 districts.¹⁹ As much as 500,000 malaria infections and 50,000 malaria-attributable deaths occur each year in Pakistan.²⁰ About one third of these cases occur along the western border of Pakistan.¹³ A departmental audit of malaria control program revealed an increase in annual parasite index from 1.09 per 1000 to 2.01 per 1000 in 2005 in Khyber

Pukhtoonkhawa.⁶ A similar increase in malarial incidence was noted in parts of Baluchistan during 2004 to 2006.²¹ An increase in malaria indicators was reported from Sindh during 2002 to 2006.²² All basic indicators of Malaria disease are higher than optimum level. Annual Blood Examination Rate (BER), Slide Positivity Rate (SPR) and Annual Parasite Incidence (API) were 4.46, 2.94 and 1.36 respectively.²²

There was males preponderance (56%) as compared to females (44%). The age range of patients in this study was 17-68 years with peak incidence between 21-35 years. In a study conducted at Bahawalpur, the disease was more common during the changing season i.e. September-October and March-April with relative frequency of 40% and 28% respectively In 50 patients studied, most of them were of young age with a peak occurrence between 21-35 years.²³ The present study conducted at four Tehsils of District Bahawalpur also revealed that the basic malarial parameters were higher than those defined in the Millennium Development Goals. More males were affected than females. Plasmodium vivax was the commonest, followed by plasmodium falciparum species. This is in accordance with the findings of studies cited above. Some of the notable studies carried out in Pakistan in the recent years focused on clinical and laboratory parameters, morbidity caused by malarial infection and frequency of different types of malarial infection across the country²⁴⁻³⁰ as shown in Table II. These studies have provided important information for the medical scientists regarding investigation and treatment of malaria, and also knowledge about different species of malaria prevalent in different area of Pakistan. But it is also important to follow malarial parameters from the remote corners of our country, if we have to achieve the goals set by the millennium development program.

Table II. Studies carried out in Pakistan on malaria in recent years.

Year	Name of study	Sample	Plasmodium vivax	Plasmodium falciparum	Mixed Infection
2002-2004	Pattern of malarial infection diagnosed at Ayub Teaching Hospital Abbottabad ²⁴	1994	72.4 %	24.1 %	3.44%
2006	Clinical and laboratory findings in acute malaria caused by various plasmodium species ²⁵	502	19.9%	62%	18.1%
2006-2007	Haematological findings and endemicity of malaria in Gadap region ²⁶	3344	52%	42%	5.4 %
2004-2006	Incidence of human malaria infection in central areas of Balochistan: Mastung and Khuzdar ²⁷	7852	52.67	47.32	-
2003-2004	Malaria - An experience at CMH Khuzdar (Balochistan) ²⁸	505	24	69	07 %
2004-2006	Incidence of human malaria infection in Barkhan and Kohlu, bordering areas of East Balochistan ²⁹	3340	47.12	52.87	-
2004-2006	Frequency of various human malaria infections in hottest areas of central Balochistan, Pakistan: Duki, Hamai and Sibi ³⁰	6730	42.8	57.1	-

CONCLUSION

Our findings showed that annual blood examination rate, slide positivity rate and annual parasite index continued to drop during the study period.

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