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SLIDE POSITIVITY RATE IN CLINICALLY SUSPECTED MALARIA CASES

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ABSTRACT

Objectives: Malaria continues to be a major public health problem in Pakistan. Microscopy is a cheaper and ideal tool for the diagnosis of malaria. This study was planned to determine the slide positivity rate in clinically suspected cases of malaria.

Material and Methods: This five year prospective study was conducted in district Swabi from 1st January 2004 to 31st December 2008. A total of fifty physicians were given a questionnaire to do microscopy during febrile period on patients having a clinical suspicion of malaria and to record results. Results were collected after every four months and then analyzed at the end of the study period. Slide positivity rate (SPR) was calculated by the formula: total positive cases ÷ total slides taken × 100.

Results: A total of 95416 slides were examined. Out of the total, 93782 (98%) were negative and 1634 (2%) were positive. Of 1634 positive cases 116 (7.1%) had *Plasmodium falciparum* (P. faiciparum) infection while 1518 (92.9%) had *Plasmodium vivax* (P. vivax) infection.

Conclusion: Slide positivity rate is very low in clinically suspected cases of malaria. This shows an over diagnosis of Malaria by physician and/or inaddiquate microscopy by pathologist/laboratory technician.

Key Words: Malaria, Microscopy, Slide Positivity Rate.

INTRODUCTION

Malaria is the most important human parasitic disease world over. There has been resurgence of malaria in the past few years and added to this is the increasing problem of drug resistance of the parasite. Each year malaria infects one and a half billion people, killing one to two million and severely slowing economic development[1,2].

In Pakistan, Malaria kills an estimated fifty thousand of half a million reported cases annually. Malaria is the second most prevalent and devastating disease among the top ten priority illnesses and accounts for 12.5% of the overall disease burden of the country. During 2005 Lady Health Workers (LHW) treated 4.3 million patients as malaria cases. Health management information system reported 2.9 million clinical cases of malaria while disease surveillance program reported 4.7 million slides preparation and registered 128,206 cases of malaria in the same year[3].

Malaria is one of the common causes of fever in the tropics and is often treated presumptively[4]. Clinical diagnosis is however unreliable due to its non-specific signs and symptoms[5]. Clinical diagnosis, as compared to microscopy has sensitivity of 74.5% and specificity of 45%[6] so clinical diagnosis should be confirmed by microscopy.

Microscopy is the gold standard for the diagnosis of malaria but its potential benefits are not currently realized because of the poor quality of routine testing and irrational clinical practices[7]. An experienced microscopist can detect as few as five parasites/μL (0.0001% parasitemia) in a thick film and 200/μL (0.004% parasitemia) in a thin film[8]. Recent advent of rapid diagnostic tests (RDTs) for malaria may be a significant step forward in case of detection, management and reduction of unnecessary treatment for malaria. Although the sensitivity and specificity of RDTs is reported to be more than 90% for P. falciparum in a controlled setting but this is achievable at a parasite density of above 100 parasites/μL compared to the 5 parasites/μL density required for diagnosis by microscopy. This study was aimed at determining slide positivity rate in clinically suspected cases of malaria using microscopy as a diagnostic tool.

MATERIAL AND METHODS

This five year prospective study started on 1st January 2004 and ended on 31st December 2008 in District Swabi. Fifty physicians & general practitioners (G.Ps) from different areas of District Swabi were

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randomly selected. A pre-designed questionnaire was distributed among them. All doctors agreed to participate in the study. Patients of either gender 15 years of age or above presenting with fever and symptoms and signs suggestive of malaria as per physician and G.P opinion were selected by consecutive sampling method. Each patient's fever was documented and his or her verbal consent was taken for participation in the study and doing microscopy for malarial parasite at his or her own cost. Finger prick blood was taken from the willing patients during fever. Thick and thin smears were made, stained with 10% Giemsa stain, subjected to microscopy and results recorded. Results were collected after every 4 months till the end of the study period and analyzed. Slide positivity rate (SPR) was calculated by the formula: Positive Slides ÷ Total slides × 100. Exclusion criteria were patients less than 15 years of age, those not willing to participate and those having clinical symptoms and signs suggestive of a diagnosis other than malaria.

RESULTS

During the 5 year period, 95416 patients participated in the study. Of the total slides taken only 1634 (2% i.e. SPR) were reported as positive and the remaining 93782 (98%) as negative. Among the 1634 patients reported as positive, P. falciparum was identified in 116 (7.1%) and P. vivax in 1518 (93%) as shown in Table 1. Regarding seasonal distribution of clinically suspected malaria, 19343 (20%) cases were noted in the first quarter, 25959 (27%) in the second quarter, 26815 (28%) in the third quarter and 23299 (25%) in the fourth quarter. Slide positivity rate in cold months i.e. December to March is only 1% while in hot months i.e. June to September SPR is 3%. Frequency of P. falciparum among slide positive malaria cases is 3% in the first quarter, 1% in the second quarter, 4% in the third quarter and 24% in the last quarter as shown in Figure 1.

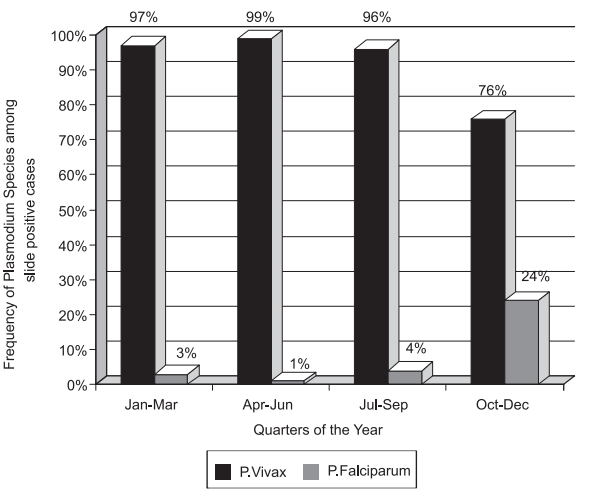

Fig. 1: Quarter wise species distribution of Plasmodium in slide positive cases of malaria from January 2004 to December 2008.

DISCUSSION

In our rural areas presumptive treatment with antimalarials is common in patients who present with fever. This approach is sensitive, however, fever is a

Table 1: Monthly distribution of suspected malaria cases and slide positivity rate (SPR) from January 2004 to December 2008

Month	Total slides	Negative slides	Positive slides	P. Falciparum (%)	P. Vivax (%)	SPR (%)
Jan.	4270	4212	58	2(3.4)	56(96.5)	1.35
Feb.	7057	7001	56	1(1.9)	55(98.2)	0.79
March	8016	7950	66	2(3)	64(96.9)	0.82
April	7884	7774	110	0	110(100)	1.39
May	9529	9374	155	3(1.9)	152(98)	1.62
June	8546	8355	191	1(0.5)	190(99.4)	2.23
July	8620	8428	192	2(1)	190(98.9)	2.22
Aug.	8328	8134	194	7(3.6)	187(96.3)	2.32
Sep.	9867	9592	275	17(6.1)	258(93.8)	2.78
Oct.	7802	7623	179	36 (20.1)	143(79.8)	2.29
Nov.	7654	7548	106	35(33)	71(66.9)	1.38
Dec.	7843	7791	52	10 (19.2)	42(80.7)	0.66
Total	95416	93782	1634	106 (6.4)	1518(92.9)	1.71

nonspecific symptom and use of fever alone as a means of diagnosis of malaria can result in a massive degree of over-treatment[9]. The WHO Global Malaria Program stresses on rapid diagnosis of malaria to reduce morbidity and mortality[10]. Despite the high sensitivity and specificity of RDTs, microscopy remains the gold standard for the diagnosis of malaria particularly at low parasite densities[11]. The overall slide positivity rate in our study was 2%. Idrees M et al has shown a rate of 7.27% in their study while another study from rural Punjab has shown a rate of 19.7%[12]. Departmental audit of NWFP Malaria Control Program 2001-2005 shows a slide positivity rate of 1.5%[13,14]. Plasmodium vivax and plasmodium falciparum were the organisms detected. No case of plasmodium ovale or plasmodium malaria was reported. In our study plasmodium vivax was the predominant parasite followed by plasmodium falciparum. The same was the case in the study of Idrees M et al[12]. The data from Malaria Control Program on the other hand shows plasmodium falciparum as the predominant organism accounting for about 70% of confirmed cases of malaria[14]. Another study from rural Punjab, Pakistan also reports the prevalence of plasmodium falciparum to be just over 57% while the remaining cases were either caused by plasmodium vivax or mixed infections with these two organisms. Rana MS et al[15] who conducted a study in five districts of Punjab also reported the incidence of plasmodium falciparum to be double that of plasmodium vivax[15]. Considerable seasonal variation exists in the occurrence of malaria and among the plasmodium species causing malaria. In the months from December to March SPR is 1% while it is 3% from June to September (i.e. in monsoon season). Other studies have also reported the same findings[12,16-17].

CONCLUSION

Slide positivity rate is very low in clinically suspected cases of malaria. This mismatch between clinical and microscopic diagnosis demands for studying other alternative methods such as rapid diagnostic tests for plasmodium antigens which are sensitive, specific and less subjective.

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