

Original Research Article

## Prevalence of Malaria by Peripheral Blood Smear in Far Western Region of Nepal

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**Abstract:** Malaria is a major cause of death in tropical and sub-tropical countries, killing each year over 1 million people globally. Kailali and Kanchanpur district of far western region is endemic for malaria and poses a diagnostic challenge in the medical community. Evaluation of recent epidemiological status of malaria situation in the two endemic districts of far western region of Nepal with high transmission of malaria and to assess the knowledge, attitudes and practices of the people in prevention and treatment for malaria infection. A cross-sectional study was carried out with volunteer participation of suspected malaria patients seeking care at the Malakheti Hospital, Seti Zone, a health care centers located in malaria endemic districts in Nepal. Conventional Giemsa stained thick and thin blood smears prepared from finger prick blood were examined following standard protocols. A questionnaire was designed to obtain patient age, sex, ethnic group, disease symptoms, and prevention and control measures. SPSS was used for statistical analysis of the data. Out of total 800 samples examined for the malarial infections from which 449(66.1%) and 351(43.9%) were male and female respectively. Out of which there was a prevalence of 88 (11%) malaria infections in the study in which *P. vivax* (85) and *P. falciparum* (2) and combination of both (1). In sex wise distribution male showed the higher prevalence in compared to the female that of 13.8 times higher with P value of 0.002 which is highly significant. There was no significant relation in the ethnic group while age group 20-29 showed the highest infection as compared to other age group. In spite of different efforts by the government this place still remains to be endemic for malaria. To improve the malaria morbidity in the districts, health education of the most marginalized people through audio visual methods may be beneficial. A time interval diagnosis is needed for the improvement of the situation in these regions.

**Keywords:** Malaria; epidemiology, diagnosis, thick and thin blood smears; endemic; prevalence.

### INTRODUCTION

Malaria is caused by protozoan parasites of the genus *Plasmodium*. The most serious and sometimes fatal type of malaria is caused by *Plasmodium falciparum* & *P. vivax*. The other human malaria species *P. ovale*, *P. malariae*, and sometimes *P. knowlesi* can cause acute, severe illness but mortality rates are low. Malaria is the most important infectious disease in tropical and subtropical regions, and continues to be a major global health problem, with over 40% of the world's population exposed to varying degrees of malaria risk in some 100 countries. It is estimated that over 500 million people suffer from malaria infections annually, resulting in about 1-2 million deaths [1, 2]. Malaria is transmitted by female Anopheline mosquitoes poses a diagnostic challenge to medical community worldwide [3].

In Nepal, the incidence of malaria has now been reduced to 4,000-5,000 cases from about 15,000 cases annually [4]. Out of the total population of 22.8 million, 73% (16.4 million) living in 65 districts of 5 developmental regions of Nepal are at risk of malaria [5].

Community participation in turn depends on people's knowledge and attitude towards the disease. An epidemiological study of malaria revealing its distribution in relation to different socioeconomic predictors, knowledge and attitude of people at risks towards prevention and control can provide valuable information for formulation and implementation of effective malaria control strategy. Socioeconomic conditions of the community have direct bearing on the problem of malaria [6, 7].

Clinical diagnosis of malaria is extremely difficult even to an experienced medical practitioner. Reliable laboratory methods are needed to assist the clinical diagnosis of malaria.

The present study is aimed to evaluate the prevalence of malaria among patients seeking care with at least one symptom compatible to malaria along with the knowledge of the respondents on malaria transmission, prevention, protection measures, control and treatment in two malaria endemic districts (Kailali and Kanchanpur) of far western region of Nepal [8].

**MATERIALS AND METHODOLOGY**

A cross-sectional study was carried out in two endemic district Kailali and Kanchanpur far western region of Nepal. Samples were collected between October 2013 to September 2014. All the patients visiting to the Malakheti hospital at Kailali, with at least one symptom compatible to clinical malaria were included in the study upon agreeing (informed consent) to participate voluntarily in the study with a questionnaire including age, sex, ethnic group and religion.

Giemsa stained thick/thin blood smears prepared from finger prick blood samples collected from each patients were examined for presence of malarial parasites following standard protocol [9]. All collected data on patient’s slide microscopic finding were noted in the register and analyzed using SPSS as appropriate statistical tool analysis of the data.

**RESULTS**

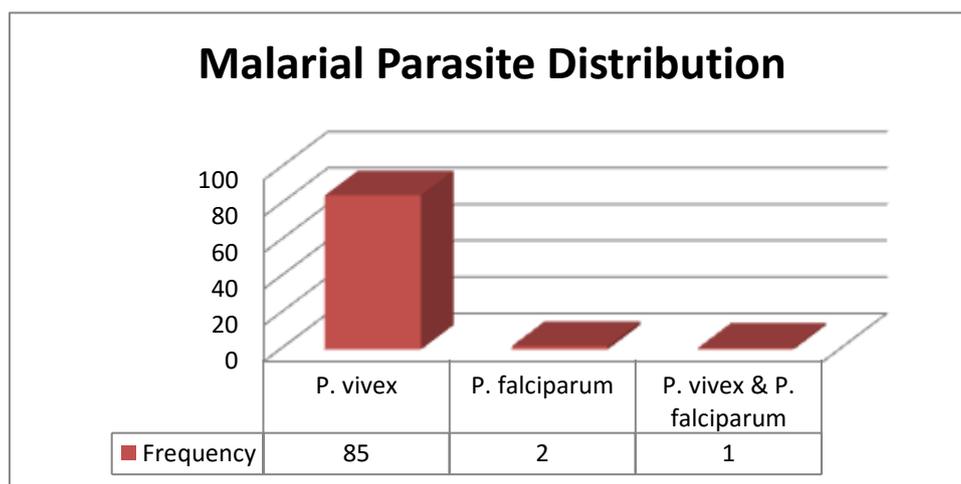
A total 800 samples were examined for the malarial infections from which 449(66.1%) and 351(43.9%) were male and female respectively as shown in Table 1. Out of which there was a prevalence of 88 (11%) malaria infections in the study in which *P. vivax* showed the highest prevalence of 85 alone out of 88 infections as shown in table 1 and chart 1. In sex wise distribution male showed the higher prevalence in compared to the female that of 13.8 times higher with P value of 0.002 which is highly significant. There was no significant relation in the ethnic group while age group 20-29 showed the highest infection as compared to other age group as shown in table 3.

**Table-1: Distribution of participants in sex wise for the study**

S. no.	Participants	Frequency(%)	Total
1	Male	449(61.1)	800(100%)
2	Female	351(43.9)	

**Table-2: Prevalence of malaria infection**

S. no.	Malaria infection	Frequency(%)	Total
1	Absent	712(89)	800
2	Present	88(11)	



**Chart-1: Distribution of different malaria parasite in infection condition**

**Table-3: Association of different variables with infection.**

Variables	Not infected	Infected			Total	Chi-square	P-value
		<i>P. vivax</i>	<i>P. falciparum</i>	<i>P. vivax</i> & <i>P. falciparum</i>			
Sex							
Male	384(48.01)	62(7.81)	2(.2)	1(.1)	449(56.1)	13.4	0.002
Female	328(41)	23(2.9)	0	0	351(43.9)		
Ethnic group							
Brahmin/Chettri	324(40.5)	28(3.5)	1(.1)	1(.1)	354(44.2)	16.54	0.731
Dalit	324(40.5)	56(7)	1(.1)	0	381(47.6)		
Janjati	45(5.6)	1(.1)	0	0	46(5.8)		
Madesi	4(.4)	0	0	0	4(.4)		
Muslim	1(.1)	0	0	0	1(.1)		
Others	13(1.6)	0	2(.2)	1(.1)	17(1.9)		
Age wise							
≤9	116(14.5)	20(2.5)	0	0	120(15)	22.3	0.364
10-19	158(19.8)	20(2.5)	0	1(.1)	179(22.4)		
20-29	178(22.2)	24(3.0)	1(.1)	0	203(25.4)		
30-39	82(10.2)	18(2.2)	1(.1)	0	101(12.6)		
40-49	83(10.4)	11(1.4)	0	0	94(11.8)		
50-59	45(5.5)	4(.5)	0	0	49(6.1)		
60 & above	47(5.9)	3(.4)	0	0	50(6.2)		

## DISCUSSION

During the study period October 2013 to September 2014, a total of 800 samples analysed. Out of which 449(66.1%) and 351(43.9%) were male and female respectively. 88(11%) cases were confirmed as malaria after microscopic investigation. Out of which 85/88 were *Plasmodium vivax*, 2 *Plasmodium falciparum*, and 1 with mixed infection (*P. vivax* + *P. falciparum*) which shows similar type infection rate in the study done by Joshi *et al.*, [10].

In Nepal, malaria transmission occurs mainly in rainy season (highest between June and August) [11]. We collected samples during all season which represents almost same proportion of the cases for the whole year. Higher infection in current study might be due to high mobility of the people in far western region with motor able (road) border points with India [8].

Higher numbers of male were infected than females may be due to outdoor activities of male in the late evening, which is consistent with the similar, other research findings [12, 8].

Slide Positive rate was highest in patients of 20-29 years age group, which may be because the young adults work outside the home in the paddy fields, nurseries than the people of other age groups which are similar in study with other findings [8]. No exact relation was established with the ethnic group.

## CONCLUSION

Both the far western terai districts are still endemic to malaria; health education is a vital part

lacking in improving the condition, justified with higher percentage of illiterate and labourers class people infected as compared to others. Education of the use of bed nets is insufficient and needs more aggressive health education to improve the condition in coming days.

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