



ISSN: 2348-5906  
CODEN: IJMRK2  
IJMR 2019; 6(6): 120-123  
© 2019 IJMR  
Received: 25-09-2019  
Accepted: 27-10-2019

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## Prevalence of human malarial infection in school going children of district Khuzdar (city), Balochistan

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### Abstract

Malaria is one of the most significant medical issue, brought about by a vector-borne illness of the Genus, *plasmodium*. This parasite is transmitted through the bite of female Anopheles mosquito, which is known as a malarial vector. The present work was conducted between 1st June 2018 to 30th May 2019, to check the prevalence rate of malarial infection in school going children of Khuzdar. The overall no. of 1193 blood slides were examined in 12-schools of Khuzdar district, checked for malaria two times in every month, out of 1193/334 smears were positive to be infected. Overall prevalence was (27.9%), *Plasmodium vivax* was increasingly predominant (67%) than *P. falciparum* (15.8%) and mixed infection (17.0%). The high infection rate was observed (37.1%) in Govt girl's high school Khuzdar and the lowest rate (16.4%) in Govt: Primary school zahreena khattan. Gender wise prevalence of malaria was highest in males (60.47%) than females (39.52%).

**Keywords:** Prevalence rate, *P. vivax*, *P. falciparum*

### Introduction

Malarial infection is one of the major medical issue caused by the *plasmodium* parasite. The transmission is usually from the Anopheles vector<sup>[1]</sup>. The word malaria in Italian phrases "mala" named for bad and "aria" denoted for worst air<sup>[2]</sup>. Globally four species of plasmodium are prevalent, *P. falciparum*, *P. vivax*, *P. malariae*, *P. ovale* and the fifth specie *P. knowlesi* now has been discovered in some countries<sup>[3]</sup>, with *Plasmodium falciparum* and *Plasmodium vivax* as the most predominant<sup>[4]</sup>. The 2018 World Malaria Report revealed that in 2017, 219 million cases were reported and 435,000 confirmed deaths. Most of these deaths occurred in the area of Africa (92%) relative to South-East Asia (5%)<sup>[5]</sup>.

Every year 300-500 million instances are reported worldwide and in the year 2013, 627500 masses have been mentioned globally because of malarial infection<sup>[3]</sup>. In the age, below 10 yr's, the infection prevails at about 87% each year<sup>[1]</sup>, with the infection prevailing in both rural and urban areas. Due to the environmental atmospheric condition in rural areas, malaria is most common. Many factors effect malaria such as un-hygienic condition, improper sanitation and stagnant water everywhere<sup>[6]</sup>. The infection mostly prevails among children under 10-yr's and pregnant ladies in Pakistan. Most of the symptoms of malaria have been seen during the months especially from august- September<sup>[7]</sup>. In developing countries, this infectious spread excessively thus lowering living standard<sup>[8]</sup>. In all districts of Pakistan, malaria is commonly spread due to already prevailing malarial cases<sup>[9]</sup>. It is important to monitor the spread of drug-resistant malaria parasites to direct control strategies<sup>[10]</sup>.

### Materials and methods

#### Study Design

The current study was carried out to check malarial prevalence in all ages of school children in district of Khuzdar. The blood slides were collected from 1<sup>st</sup> May 2018 to 30<sup>th</sup> April 2019. The symptoms observed in children were fever, chills and vomiting. Students that were not having general signs and symptoms of malaria, were not included in the study. About 12 primary, middle and high schools of Khuzdar district were visited. For collection of blood samples,

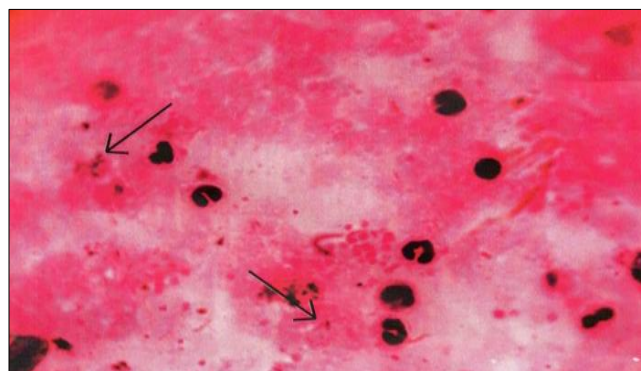
W.H.O recognized techniques were applied from school to school visit. Children were classified into three age groups, 3-5, 6-10 and 11-16 years of age, and a total 1193 smears were obtained twice a month from 12 different schools of Khuzdar district.

**Thick and thin smears strategies**

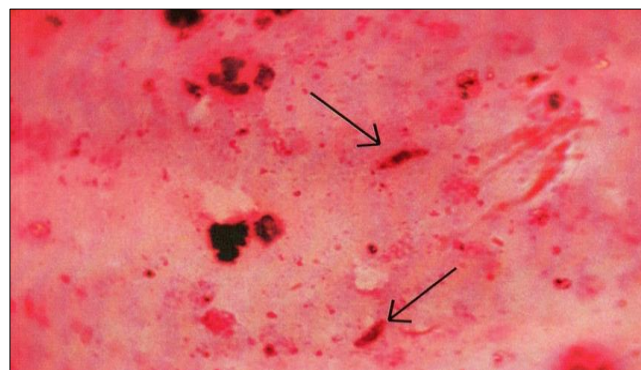
A drop of blood was taken into the glass slide and was spread with the other glass slide, dried and were fixed into the methanol and again dried and then fixed with Giemsa solution to 2 to 3 minutes and wash through the saline water and were fixed in the rack for drying, finally (both thin and thick) slides were ready for the microscopic identification and was screened for the presence of malarial parasites and further species identification. [11-14].

**Results**

Complete no. of 1193 blood slides, were checked for malaria in 12 different schools, of Khuzdar district. The Prevalence rate of *Plasmodium* was (27.9%), although *Plasmodium vivax* (Fig 1) was most frequent (67%) than *Plasmodium falciparum* (15.8%) (Fig 2) & mixed infection (17%). In (Table.1) the highest prevalence rate was seen in (Graph 1), Govt girl’s high school Khuzdar (37.1%) and lowest was observed in Govt girls’ primary school zahreena khattan (16.4%). In (Table 2) Gender wise prevalence rates of malaria were higher in (Graph. 2), males (60.47%) as compared to females (39.52%).



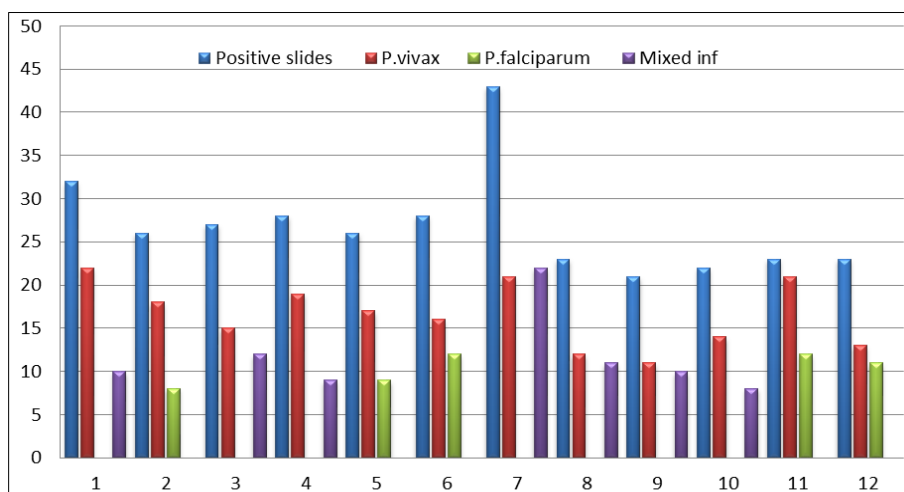
**Fig 1:** Thick blood smear *P. vivax* gametocytes



**Fig 2:** Thick blood smear *P. falciparum* gametocytes

**Table 1:** Prevalence in khuzdar district

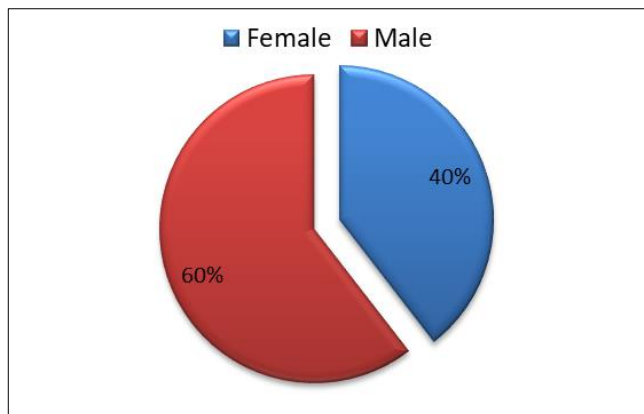
S. No	Name of schools	Overall no. of slides Studied	Total Positivity rate	<i>Plasmodium vivax</i>	<i>Plasmodium Falciparum</i>	Both p.v, p.f infection
1	Sun Rise model public high school Khuzdar	103	32 (31%)	25 (78.1%)	-	7 (21.8%)
2	Divisional public high school Khuzdar	110	26 (23.6%)	18 (69.2%)	8 (44.4%)	-
3	Pak Islamic public high school Khuzdar	87	27 (31.0%)	18 (66.6%)	-	9 (33.3%)
4	Govt girls’ middle school lizo khuzdar	83	28 (33.7%)	22 (78.5%)	-	6 (21.4%)
5	Govt girls’ high school Khuzdar	70	26 (37.1%)	17 (65.3%)	9 (52.9%)	-
6	Govt girls’ middle school niyamjo khuzdar	86	28 (32.5%)	16 (57.1%)	12 (75%)	-
7	Govt girls high school city Campus Khuzdar	175	43 (24.5%)	28 (65.1%)	-	15 (34.8%)
8	Govt girls’ primary school zahreena khattan	140	23 (16.4%)	16 (69.5%)	-	7 (30.4%)
9	Kohyaar public high shool khuzdar	76	21 (27.6%)	16 (79.1%)	-	5 (23.8%)
10	School of scholar public school khuzdar	68	22 (32.3%)	14 (63.3%)	-	8 (36.3%)
11	Govt girls’ high school khaira Abad Khuzdar	112	34 (30.3%)	21 (61.7%)	13 (61.9%)	-
12	Govt girls’ middle school saleha Abad khuzdar	83	24 (28.9%)	13 (54.1%)	11 (84.6%)	-
	Total	1193	334 (27.9%)	224 (67%)	53(15.8%)	57 (17.0%)



**Graph: 1.1:** School wise prevalence of malaria in school children of Khuzdar

**Table 2:** Gender-wise prevalence in Khuzdar District

S. No	Total no. of the Analyzed slides	A total no. of observed (+ ve) slides	A total no. of studied male (+ ve) slides	Total no. of female (+ ve) Slides studied
1	1193	334	202 (60.47%)	132 (39.52%)

**Graph 1.2:** Gender wise prevalence of malaria in school children of Khuzdar

### Discussion

Pakistan is facing hurdles in malarial management largely due to scarcity of skilled health employees, diagnostic facilities and presumptive remedies [15]. Overall prevalence was (27.9%), *Plasmodium vivax* was increasingly predominant (67%) than *P. falciparum* (15.8%) and mixed infection (17.0%). The high infection rate was observed (37.1%) in Govt girl's high school Khuzdar and the lowest rate (16.4%) in Govt: Primary school zahreena khattan. Gender wise prevalence of malaria was highest in males (60.47%) than females (39.52%).

A similar research study conducted on the school of urban areas, highlighted total positivity rates was (19.56%) whereas *P. vivax* was seen with the highest rate (83.52%) as compared to *P. falciparum* (6.01%) & mixed type of infection (12.29%) [1]. A study in KPK revealed prevalence rate of malaria to be (13.81%) [5]. Another study exposed that KPK as a disastrous hit province was more affected in our country than other 3 provinces that are Punjab (2.4%), Sindh (10.8%) and Balochistan (3.8%) [17]. A similar study revealed 32.78% cases to be positive for malarial infection [18]. Another study was conducted in Orakzai agency, which argues gender variation in malaria transmission as a result of Pakistan's socio-economic structure, such as low female involvement in agriculture activities [19].

About 200 cases of malaria were tracked in the Pakistan Army Institute and found high *P. vivax* infection (62.5%) compared to *P. falciparum* infection (36%) [20]. Another study showed the occurrence of infection that was increased from the end of July and August season [21], yet another study demonstrated elevated infection in Sept. and low prevalence frequency was mentioned in winter [22]. Malaria instances were seen more frequently all through August, September and October (autumn season) and less common in January and February (winter season) [23]. Consistent high prevalence of malaria in autumn may be due to monsoon as it facilitates favorable temperature in these months, which provides suitable situations for the breeding of mosquitoes and therefore results in elevated malaria instances [24]. Our study indicates that the occurrence of malaria was elevated vastly after 2008 in district Khuzdar. This could be due to disastrous

factors like flood, stagnant water and the best temperature for their larval growth.

### Conclusion

Malaria remained prevalent in school going children of Khuzdar District with high infection of *Plasmodium vivax* compared to *Plasmodium falciparum* and mixed infection. All these visited schools and nearby should be screened for the larval and adult mosquitoes to save the lives.

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