

Malaria in the Population District Dir Lower Khyber Pakhtunkhwa, Pakistan

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Authors' Contributions

1 & 6 Data Collection & Processing.

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ABSTRACT

Background: Malarial parasitic infection is one of the chief global health issue causes many morbidity and mortality mostly in the population of developing countries.

Objectives: To assess the incidence and infection related to Plasmodium in the peoples of Dir (Lower).

Materials and Methods: Blood samples were taken by the finger pricked process of all individuals of the study sample from which thin and thick smears were prepared on the same slide. Used methyl alcohol for the fixation of thin smears. Giemsa stain of 10% were used for staining of blood film. All the slides were examined carefully under microscope with 100X objective. Crosschecked all the slides by senior Pathologists.

Results: A total of 1439 participants were studied for the presence of malarial infection in which n=232 (16.12%) were positive for malaria which was found higher in age group 16-30 n= 76 (18.22%) while the less cases were found in age group 31-45 years n=45 (14.46%). Males n=174 (18.45%) were found more infected than females n=58 (11.69%). In month wise study August n=49 (18.42%) and July n=46 (18.11%) were found with highest prevalence while lowest prevalence were noted in April n=10 (12.98%).

Conclusion: Knowledge in public about Plasmodium infections, vectors, causes, preventive measurements and related disorder can prevent Plasmodium infection.

Keywords: Malaria, Plasmodium, nets, prevalence.

INTRODUCTION

Malaria is the principle public health issue of the globe with the chief causes of mortality and morbidity in the world, mostly found in developing countries including Pakistan and is biggest in all parasitic infection [1]. Malaria caused by a blood parasite of the genus Plasmodium which is transmitted by vector female anopheles mosquitos called malarial vectors [2]. In developed countries malaria is uncommon, but

Plasmodium infections is still prevalent in under developed and developing countries and approximately 1/2 of the globe population lives in malaria endemic regions including countries Iraq, Bangladesh, Afghanistan, India, Iran, Pakistan, Middle East, Central and South America and Africa region [3]. Plasmodiums have different species but these four species *P. vivax*, *P. malariae*, *P. ovale* and *P. falciparum*, are mainly causes malaria in human. While in majority cases *P. falciparum* and *P. vivax*

were most common. However; mortality is significantly caused by *P. falciparum*. [4]. *P. vivax* and *P. falciparum* are responsible for Plasmodium infections in Pakistan through primary vectors *Anopheles stephensi* and *A. culicifacies* [5]. Sweating, nausea, weak health, chills, cough, enlargement of spleen, weakness, backpain, malaise, vomiting, headache, pain, diarrhea and fever etc. are the common symptoms of malaria [6]. It is estimated that approximately 216 million cases of malarial infection had arisen globally with about 445,000 deaths in year 2016. [7]. Malaria is recorded the second most prevalent disease in the public health sector of Pakistan. Currently overall n=91/123 (86.7%) of the districts of Pakistan, are affected by malarial infection. About 95 million people are lives in high malarial infected areas [8]. In Pakistan *P. falciparum* found with 37 % contribution while *P. vivax* was contributed in 65% of Plasmodium infected cases. While regarding vector management and malaria control programs, 5 million new malaria cases with a substantial number of deaths are reported in Pakistan. However in Pakistan, after heavy rainfall the stagnant water provide favorable situation for mosquito breeding. Malaria transmission presents throughout the year but were more extreme from the month July to November in which mosquitoes were more active in majority in these months. *P. vivax* transmission is peaking during the period of June to September and arises again from April to June while the transmission of *P. falciparum* is occur during the months of August and December. Almost 37% of infections have been reported in the areas of Pakistan located near Afghanistan border and other neighbor countries [9]. The aim of the study is to assess and evaluate the frequency of malaria in district Dir Lower.

MATERIALS AND METHODS

Study area

Geographically district Dir Lower is located in the north-western part of Khyber Pakhtunkhwa and one of the district of Malakand divisions. Linked with Afghanistan on its west, district Swat on its East Chitral and Upper Dir on north-west and north respectively while with district Bajaur and Malakand on its south. Panjkora River flows across the middle of this district. Regarding climatic condition January is the coldest while July is the hottest month.

Temperature reaches to 42°C in summer and in winter it down into -1°C.

Data collection

A cross sectional study was conducted in different clinics and THQ Samar Bagh from April 2018 to November 2018. Biodata of all participants like names, gender and age were documented.

Inclusive criteria

Patients with temperature, shivering, headache, diarrhea etc .were included in this study.

Exclusive criteria

For the reduction of false positive result; children less than one year and other parasitic and bacterial infected patients were excluded.

Laboratory analysis

Diagnosis of Plasmodium species were done by preparing thick and thin blood smear of the suspected persons. Blood samples were taken by the finger pricked process of all individuals of the study sample from which thin and thick smear were prepared on the same slide. Methyl alcohol was used for the fixation of thin smear. Giemsa stain (Biopzyme company) of 10% was used for staining of blood film. All the slides were examined carefully under microscope with 100X objective. Crosschecked the all slides were by senior Pathologists.

Statistical analysis

Statistical test logistic regression and P test were performed and P-value was calculated for age and gender.

RESULTS

In present study a total of 1439 suspected individuals were examined for the investigation of malarial parasitic infection in which n=953 (66.22%) were males and n=486 (33.77%) were females. Out of the total n= 232 (16.12%) individuals were found infected with malarial parasites. In gender wise study males n=174 (18.45%) were found more infected than females n=58 (11.69%) Table 1. 9 P-value 0.180). In age wise study the prevalence of malarial parasites was higher in age group 16-30 years of whom n= 76 (18.22%) individuals were found positive for malaria parasite followed by age 1-15 years n=58 (16.06%) and 46-60 n= 53 (15.14%) years while the less cases were found in age group 31-45 years n=45 (14.46%)

Table 2. Figure 1. (P-value 0.008). Regarding month wise occurrence the highest prevalence were noted in August n=49 (18.42%) and July n=46 (18.11%) followed by September n= 37 (16.97%) October n= 28 (16%) June n= 25 (14.14%) and May n= 17 (13.82%) while lowest cases were noted in April n=10 (12.98%) Table 3.

Table 1. Gender wise abundance of malaria infection in study sample.

Gender	No. of slides	Positive	Percentage	P-value
Males	953	174	18.45	0.180
Females	486	58	11.69	
Total	1439	232	16.12	

Table 2. Age wise prevalence of malaria in study population.

Age	No. of slides	Positive	Percentage	P-value
1-15 years	361	58	16.06	0.008
16-30 years	417	76	18.22	
31-45 years	311	45	14.46	
46-60 years	350	53	15.14	
Total	1439	232	16.12	

Table 3. Month wise prevalence of malaria in study population.

Months	No. of slides	Positive	Percentage %
April	77	10	12.98
May	123	17	13.82
June	177	25	14.14
July	254	46	18.11
August	266	49	18.42
September	218	37	16.97
October	175	28	16
November	149	20	13.42
Total	1439	232	16.12

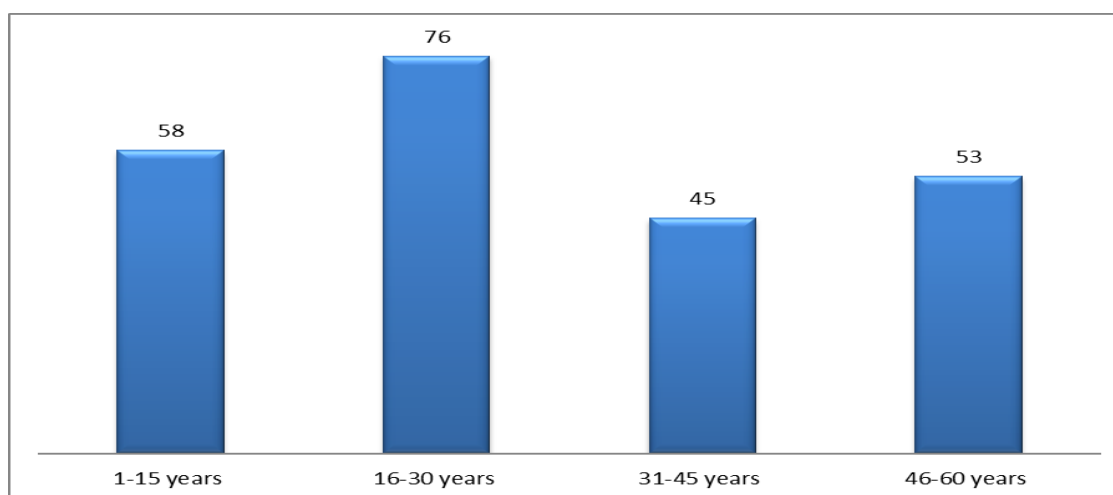


Figure 1. Age wise prevalence of malaria in study population

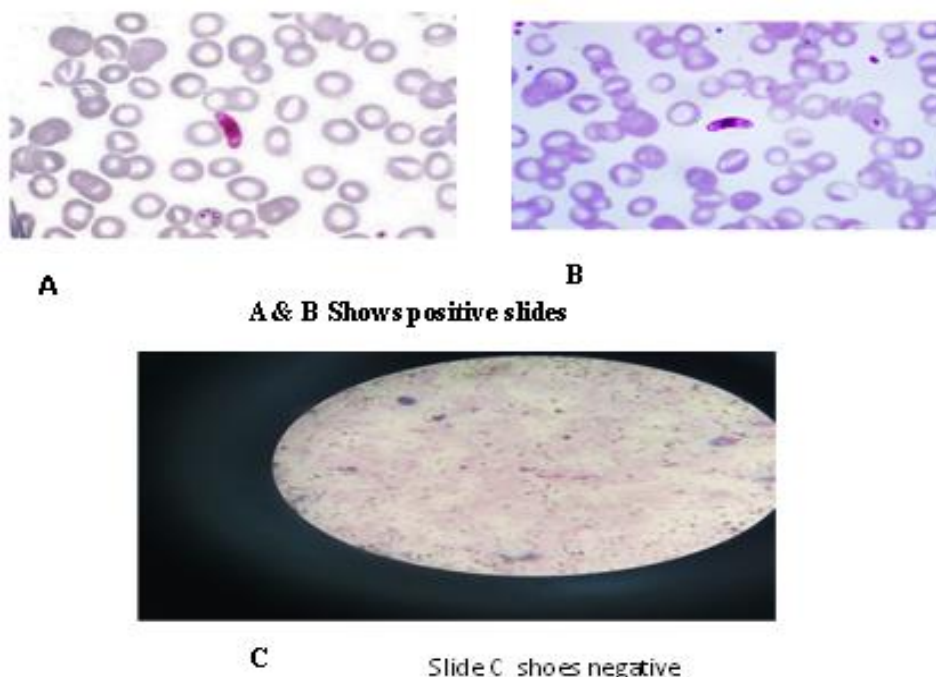


Figure 2. Positive and negative slides

DISCUSSION

Present study conducted for the investigation of malarial parasitic infection which is the serious disease in Pakistan. In all parasitic infections malaria is the biggest and is the world principle public health issue with the chief causes of mortality and morbidity, mostly found in developing countries including Pakistan [1]. Current study revealed that the total $n=232$ (16.12%) were found infected with malarial parasites which is higher in males $n=174$ (18.45%) than females $n=58$ (11.69%), while in age group 16-30 years of whom $n=76$ (18.22%) and 1-15 years $n=58$ (16.06%) individuals were infected. August $n=49$ (18.42%) and July $n=46$ (18.11%) were found with high prevalence in month wise study while least number of infections were observed in the month of April. A study from the same district Dir Lower conducted by Ullah *et al.*, and reported the prevalence of malaria is higher in males (12.5%) than females (10%). Which is very similar to our study. Shah *et al.*, conducted a study from Lower Dir and documented the prevalence of malaria is higher in age group 21-30 years (11%) than others age groups [10]. While a work done by Rahman *et al.*, on malaria in district Shangla and documented the prevalence of malaria was higher in the month of August followed

by July [11]. These studies is also strongly supported our study. According to Ullah *et al.*, the prevalence of malaria was 7.83% in district Swat Khyber Pakhtunkhwa [12]. In the population of Lower Dir district Khyber Pakhtunkhwa 12.2 % of malaria prevalence were observed by Zeb *et al.*, [13]. Shah *et al.*, From Braikot Swat 20.46 % prevalence of malarial parasites was recorded [14]. However 52.47 % prevalence of malarial infection was recorded in the population of Southern and Northern districts of Khyber Pakhtunkhwa by Khan *et al.*, [15]. And a study conducted by Khan and Ullah on the prevalence of malaria and reported 13.1% of the malarial parasitic infection from Bajaur Agency (Now district Bajaur) FATA Pakistan [16]. Karim *et al.*, reported 78% of plasmodium infection from tribal areas of Pakistan [17]. Plasmodium infections occur due to low socio-economic status and lack of preventive measurements. Various habits can prevent the malarial infection like uses of nets, drainage of ponds and stagnant water separate place for animals. Malaria is a big health problem more attention is needed to aware population from malarial infection, its vectors and sources. Knowledge about malaria, vectors and developing trainings on health problems, proper sanitation, uses of nets, and drainage of polluted water etc. in the population is needed.

CONCLUSION

It is concluded that socio-economic status, lack of awareness, no uses of nets and anti -mosquitos sprays, no proper sanitation, rearing of animals, presence of stagnant water near houses can responsible for malarial infections.

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