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MALARIA;
EPIDEMIOLOGICAL STUDY IN FATA AREAS OF KHYBERPUKHTUNKHWAH PAKISTAN

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ABSTRACT… Introduction: Malaria is second most life threatening disease in the world. It shows highest morbidity rate among serious illness including tuberculosis etc. Pakistan is at high risk of this disease giving very rise high frequency of Malaria victims in rural areas of Federally Administered Tribal Areas (FATA) of Pakistan. Due to its severe epidemics in specific regions they are termed as malarious areas of a country. **Objectives:** Main purpose of the study was to find out prevalence (p-value) of malaria in local community of FR Bannu region visited to basic health clinics. **Study Design:** In current survey based epidemiological descriptive study, we analyzed valuable data of malaria epidemic and its prevalence in selected areas of FATA (FR Bannu) region in Khyber Pakhtunkhwa via questionnaire & personal interaction. **Study Period:** The study was conducted in the months of June 2014 to August 2014. **Material & Methods:** Followed questionnaire against gender, age, seasonal, area & specie wise protocol survey. **Results:** Results showed ($P > 0.05$) ranging variables including high number of plasmodium vivax strain over plasmodium falciparum, gender comparison was dominant by male against females, age wise effect of pathogenic strain upon infants and old aged peoples, seasonal occurrence and its prevalence was less in cold months and in start of summer season where the data of rural areas was at its peak risk. **Conclusion:** It is concluded that pregnant ladies and infants are at high risk in such areas, so more care and control programs for malaria eradication are needed in selected areas of Pakistan.

Keywords: Malaria, epidemics, plasmodium vivax, plasmodium falcipraum

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INTRODUCTION

Malaria is a common health problem in the world specifically in Pakistan because this is a tropical country having vast system of irrigation and a lot of stagnant water after heavy rain fall, which provides an ideal environment for mosquito breeding. About 125 years ago French scientist CLA Laveran discovered malaria parasite, still globally it is an important tropical disease (Sharma et al., 2007). The most prevalent species are Plasmodium falciparum and Plasmodium vivax causing malaria.[1]

In 2010, about 660 000 deaths were expected among 219 million people while in 2011 almost 3.3 billion people were at risk. Facts and knowledge related to epidemiology of malaria is necessary for vaccines and drug designing.[2,3] Due to variation in east of Afghanistan, the refugees came to federally administered tribal areas (FATA) in 2002. The epidemics of Plasmodium falciparum had been investigated in one of the local camp in 2003 with an incidence of 100.4 cases per year. Such rampant create a main support to the burden of malaria.[4] The predisposing factors consist of immune status of individual, unusual weather, change in vector to person contact as well as the capacity of health authority to respond and detect epidemics.[5]

In Pakistan, malaria is endemic and constitutes a national health priority. But, the parasites and vectors are resistant to available anti-malarial medication and insecticide. Misuse of anti-malarial drugs by untrained practitioners and clinicians in various geographic locations of the world pose dangerous consequences to human health. The incidence of Plasmodium falciparum

is a growing risk in areas with dominance of Plasmodium vivax.[6]

To our knowledge there is very little information regarding the present status of malaria epidemiology in federally administered tribal areas (FATA) of Pakistan due to war on terrorism. Therefore, the current study was carried out to analyze the epidemiology and occurrence of Malaria.

METHODS

The present study was conducted in FATA areas of Khyber Pakhtunkhwa FR Bannu to determine the prevalence of malaria among the local community visited to health care centre and NGOs camps.

Study period

The study was conducted in the months of June 2014 to August 2014.

Study Design

A simple epidemiological study was carried out to determine malaria prevalence.

Data collection

Data was collected from local health care units with questionnaire and NGOs as well.

Prevalence rate

The prevalence rate was determine with simple formula number of positive cases divided by total patient multiply by hundred.

Data analysis

The data was analyzed by gender, age, month or season wise, area and specie wise.

RESULTS

We randomly selected 500 samples from victims of malaria and examined the slides carefully.

In this study we followed the description of questionnaires asking and knowing from different patients through local health facilities or diagnostic labs and NGO camps. Individual illustration of data collected viz gender, age, seasonal, regional and specie based are as shown below;

Gender wise prevalence of malaria

Considering the gender wise infection of malaria, we studied total 500 tests conducted for both male and female. In which overall 144 males (80 %) were infected. Among total 102 females (68%) were infected females and 119 children (80 %) were affected children. Thus gender wise data in Figure-1 showed that male is more susceptible compared to female while risk of children is at verge of infection to malarial attack giving rise to P-value >0.05.

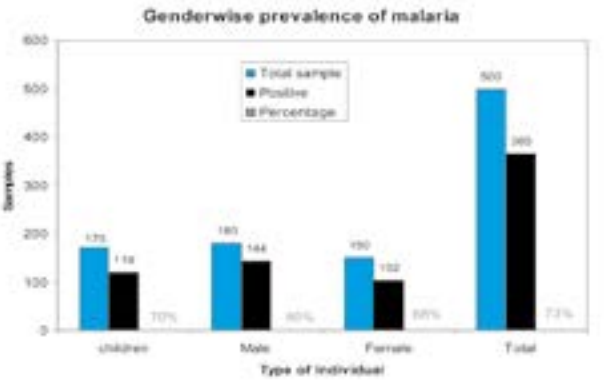

Figure-1. Graphical representation of gender wise prevalence of malaria in total 500 Samples.

The Figure-1 of bar graph shows graphical representation of different genders including male, female and children among total studied samples of 500. In which red bars shows male, blue bars shows female. In male out of 180 reported 144(80%) positive cases. While in female 102(60%) positive cases out of 150 samples. Similarly, in children shows 119(70%) positive cases out of 170 samples. Total 500 samples in which 365(73%) positive cases were reported.

Age wise occurrence

Similarly, in our current study the epidemiology

Total Sample	Total Positive	P.V	male	Female	children	P.F	M	F	C
500	365	350	137	97	116	15	7	5	3

Table-I. Specie wise prevalence of malaria in FR Bannu.

of malaria was assessed via age parameter. The age wise individual's differences were divided into three categories (a) 10-20 years, (b) 20-40 years, (c) 40-60 years. Age wise occurrence of malaria was observed in following manner i.e. high rate of malaria infection in third group i.e. 147 peoples (81%) followed by middle aged group i.e. 148 patients (74%) and similarly first group with less vulnerability 70 patients (60 %) were recorded as shown in Figure-2. The percentages thus obtained showed that ages 40-60 years of patients were more susceptible while 10-20 years aged patients are less susceptible to malaria infection.

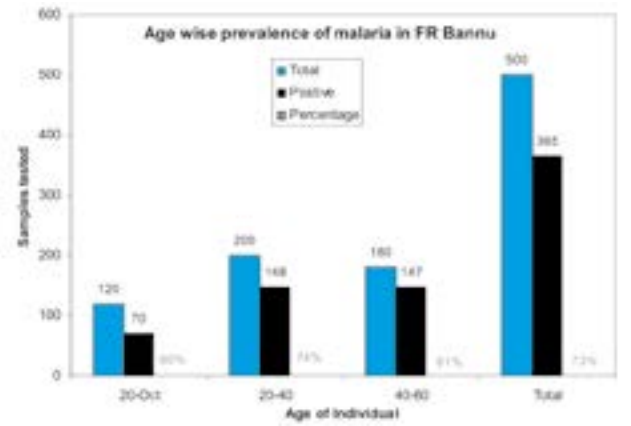

Figure-2. The Above bar graph shows the age wise distribution of malaria among general population of FR Bannu. Red bar shows positive cases while blue bar shows total samples. Age of 10-20 shows that 70(60%) cases positive among 120.And age of 20-40 shows 148(74%) positive cases out of 200.Similarly age of 40-60 shows 147(81%) out of 180 samples.

Month wise occurrence

We also observed the seasonal attack of malaria in this particular zone of FATA in different time rotation. In this way we came to know that very high number malaria cases occurred in the month of July i.e. 150/195 cases were recorded equivalent to (76.9%). In August it (74.1%) positive cases were recorded i.e. 115/155 of total. While in the month of June very low rate of occurrence of malaria infection was observed i.e. 100/150 slides were positive giving (66.6 %) cases as shown in Figure-3. Thus it is obvious from the recorded data that disease promoting factor is high in hot humid season giving prevalence (P>0.05) ratio.

Figure-3. Bar graph shows the graphical representation of malaria prevalence according to month wise. Month of June shows that 100(66.60%) positive for malaria out of 150 samples. And in the month of July shows 150(76.90%) out of 195 samples. Similarly in the month of August shows that 115 (74.10%) positive cases out of total 155 samples.

Comparison of malaria prevalence Rural and Urban Region

We also take 500 samples from three different hospital of district Peshawar to compare the malaria prevalence with rural region. In the Figure-4 below showed that malaria burden in rural region high as compared to urban region. Out of 500 malaria samples only 125[25%] positive cases were recorded. We come to know that malaria burden low in urban areas due to awareness about malaria proper diagnosis and treatment as well while use of insecticides spray also done by some of peoples in their homes. The climate difference also a reason. That may be a reason malaria incidence rate high in rural areas.

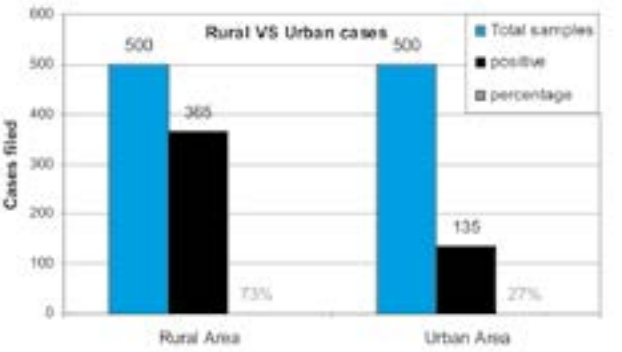

Figure-4. The above graphical representation of bar graph shows comparison of malaria distribution between rural and urban areas. Rural areas prevalence shows in above graph 365(73%) out of 500 samples while urban areas shows that 235(27%) positive cases out of 500 samples.

Species wise occurrence of malaria

Minute analysis of strain identification was carried out to find out the presence of microorganism. In this way we obtained ratio of malaria accordingly specie. The data in table (01) showed that presence of Plasmodium vivax 360 slides (98.6%) is much higher then Plasmodium falciparum 5 slides of (0.013%) as shown in Figure-5.

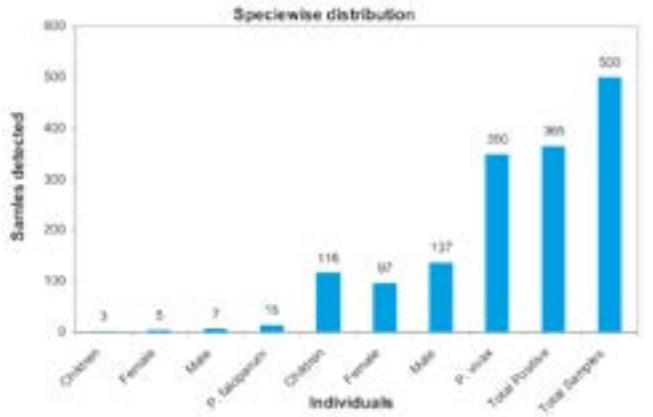

Figure-5. The above graph shows malaria distribution according to species wise. Out of 500 samples 365(73%) positive cases were reported. Out of 365 samples 350(95%) were p.vivix while 15(4.1%) were positive for p.falciparum.

Figure-6. Schematic region of FR Bannu area in Pakistan.

DISCUSSION

Malaria distribution varies from area to area and province to province e.g. 30% reported from Balochistan. 30% reported from Sindh.21% from Khyber pakhtunkhwa.11% from FATA and 8% from Punjab.[6] Malaria distribution in KPK especially in FATA area is a big health issue because FR Areas are at high risk for malaria because due to terrorism people of such areas face a lot of problems regarding diagnosis, treatment lack of knowledge about malaria, unhygienic condition and seasonal variation increase the prevalence of malaria in these areas.

Our study showed that malaria affects both the male and female genders and children as well. Further it is revealed that male is more at risk then female because out of 180 samples 144 [80%] cases were recorded. While female out of 150 showed that 102[68%] and children also are at risk like out of 170 samples 119[70%] positive cases were reported. Similar pattern were seen in Karak by Daud et al.,[7] male incidence high then female. Similarly in Lal Qila Dir Ahmad et al.,[8] reported that male are are at risk then female. Tareen and co-workers[9] also reported in Queta Baluchistan that male is most prone rather then female. The study evaluates the reason that male are more exposed than female. Male mostly work in field, farm etc. while female of that Areas mostly work in the home and they are properly covered.

Our study showed that malaria infects mostly the productive age group. Age of 40-60 showed high level of malaria infections out of 180 samples 147[81%] followed in the age of 20-40 out of 200 samples 148[74%] while low level of cases recorded in the age of 10-20. out of 120 samples 70[60%] positive cases reported. The result is similar with Lal qila dir where the age of 15-60 showed high number [76.2%] cases recorded. Same like in Queta age of 21-30 showed high malaria incidence [30%]. Malaria effect all age group but 20-60 age is at high risk. Similarly in Karak showed the same results 40-60 age showed 70[82.35%].

Regarding month- wise distribution, our results

showed that malaria is on peak in the month of July followed by august having ratio for month of July out of 195 samples 150 [79.6%] positive cases reported followed by August 115 [74.1%] cases recorded while less number of cases recorded equivalent 100 [66.6%] infections in June as compare to July and August. Similar pattern were followed by Daud et al.,[7] in Karak. Our results are comparable with Lal qila which are congruent to the month of June showing high malaria incidence [23.38%]. Similarly the study of[10] in Quetta showed that when temperature increases malaria infection increases. In District Buner showed similar results in the month of July August malaria burden increase as compare to another months.

Species wise distribution in our study showed that P.vivax cases are higher then P. falciparum and no mix infection was recorded. Out of 365 samples 350 [95.8%] cases were reported of P. vivax while 15 [4.1%] cases were recorded of p.falciparum. Similarly p.vivax cases appear more in male rather than female like 137 [39.1%] while 97[26%] in female cases of p.vivax. In children 116 [33.1] cases were recorded p.vivax. So Plasmodium falciparum cases were almost very low in FR Bannu region Out of 365 just 15[4.1%] cases were reported 7 in male, 5 in female while 3 cases in children.

Similarly, in Lal Qila Dir similar results reported that p.v cases were high rather then female. In Karak, Mitha Khel same like results observed. Queta district study showed similar results as well P. vivax ratios high as compare to P. falciparum. In the present study no P.ovale and P.malariae case reported. Similar results Appeared in Multan Pakistan. Our present study showed that P. vivax most commonly found in the selected area.

CONCLUSION

Epidemiological study of malaria was conducted in FATA particularly in FR Bannu region. The data obtained was checked according to the gender, age, season and specie wise in the human population of FR Bannu. In this study we followed the questionnaire asking and knowing from different patients through local health facilities or diagnostic labs and NGO camps. It is concluded that malaria load in this particular area (FR Bannu) of FATA is due to socio-economic condition. Because concrete analysis of obtained data are indicative of malaria occurrence due to reasons including housing design, unhygienic condition, no or less awareness about malaria, misuse of anti-malarial drugs and no practice of preventive measures in FR Bannu. Therefore, concluded that sufficient care about controlling malaria epidemics is essential.

Firstly, our survey showed that ratio of malaria caused by Plasmodium vivax is high as compared to Plasmodium falciparum. Secondly, spread of malaria is more vulnerable in peoples at the age of 40-60 years. Thirdly, male gender can be said to be more susceptible to malarial attack as compare to females. Additionally, the hot humid environment of month of July is favorable to growth of malarial microbes.

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