Epidemiology and parasitological survey of malarial parasites in Khyber Pakhtunkhwa, Pakistan

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Malaria is one of the main community health problems in South Asia including Pakistan. A study was conducted to evaluate the recent epidemiology of malaria in Bannu district. District Bannu is a plain area in the southern part of Khyber Pakhtunkhwa, Pakistan and has a high rate of transmission of malaria.[1] The study was conducted by microscopy method at Malarial Research Laboratory and by rapid diagnostic test (RDT) at Women and Children Hospital Bannu, in District Bannu. A total of 11,353 individual samples were examined by microscopy method and 2,431 samples were analysed by RDT from January 2016 to January 2017. All the patients had presented with one or more of the following signs and symptoms: fever, shivering, vomiting, headache, joint pain, nausea etc. Questionnaires were used to collect demographic and other relevant information from the patients such as age, gender, residential area, history of anti-malarial drugs formerly used, and last episode of malaria. Out of the total of 11,353 malaria-suspected samples studied by microscopy, the parasite was detected in 1829/11353(16.11%) samples. Plasmodium vivax was noted in 1825 (99.78%) while Plasmodium falciparum was detected in only 4 (0.21%) out of 1829positive cases. Among the 1829 total positive cases, 780 (42.64%) were males and 1049 (57.35%) were females (Table-1). Awan et al noted in their investigation that the infection rate in male (7.18%) was found to be higher than in females (6.66%) which is contradictory to our findings.[2] Among the 2,431 samples examined via RDT, 516 (21.22%) cases were confirmed by RDT's findings; Plasmodium vivax was detected in 474 (91.86%)samples, Plasmodium falciparum in only 17 (3.29%), while mixed infection of Plasmodium vivax and Plasmodium falciparum was found in 25 (4.84%)cases. Out of these 516 cases, 268(51.93%) were males while 248 (48.06%) were females (Table-2). A study of malaria screening in Karachi observed the prevalence of P. vivax to be two times higher than P. falciparum.[3] Similar finding were reported by Idris et al wherein out of the 1,994 patients screened, 145 (7.2%) were found to be infected; P. vivax was detected in the majority (72.4%) compared to P. falciparum (24.1%).[4] The rate of infection of P. vivax was also higher than P. falciparum in the present study, as true relapses do not occur in P. falciparum and there seems to be no second exothermic cycle, whereas relapses occur in P. vivax.[5] Another reason is that P. vivax usually dies out within three years while the longevity of P.falciparum in humans seldom exceeds one year.[6]

Table-1: Distribution of positive malaria parasite cases (microscopy method) in Bannu District.

Plasmodium species	Found positive	Males	Females
Plasmodium vivax	1825 (99.78%)	778 (99.74%)	1047 (99.80%)
Plasmodium falciparum	4 (0.21%)	2 (0.25%)	2 (0.19%)
Mixed infections	0 (0%)	0 (0%)	0 (0%)

Table-2: Distribution of positive malaria parasite cases (rapid diagnostic test) in Bannu District.

Plasmodium species	Found positive	Males	Females
Plasmodium vivax	474 (91.86%)	253 (94.40%)	221 (89.11%)
Plasmodium falciparum	17 (3.29%)	5 (1.86%)	12 (4.83%)
Mixed infections	25 (4.84%)	10 (3.73%)	15 (6.04%)

Conclusion

The parasitological and epidemiological survey shows that P. vivax was greater than P. falciparum among the people of district Bannu. The presence of such infection may be due to lacking of education and health improving facilities.

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References

1. Awan Z, Ali H, Shah A, Khan M, Suliman M. Malaria among the students of religious schools of Bannu District,

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KhyberPakhtunkhwa, Pakistan. Pak J Zool. 2012; 44:959-62.
2. Awan ZUR, Jan AH. Rice fields in relation to malaria in district Bannu, Khyber Pakhtunkhwa. Proc PakCongrZool. 2008;28:11-21.
3. Mahmood, KH.Malaria in Karachi and other areas in Sindh. Pak Arm Forces Med J. 2005; 55:345-8.
4. Idris M, Sarwar J, Fareed J. Pattern of malarial infection diagnosed at Ayub Teaching Hospital Abbottabad. J Ayub Med CollAbbottabad. 2007;19:35-6.
5. Weatherall DJ, Miller LH, Baruch DI, Marsh K, Doumbo OK, Casals-Pascual C, et al. Malaria and the red cell.Am SocHematol. 2002; 35-57.
6. Iqbal S, Pirzada AH, Rahman S, Iman N. Cerebral malaria, an experience in NWFP, Pakistan. J Med Sci. 2006;14:35-9.