DOI: https://doi.org/10.53350/pjmhs2115123370

ORIGINAL ARTICLE

Prevalence of Clinical Malaria in District Khairpur Mir's Sindh, Pakistan

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ABSTRACT

Aim: To evaluate the frequency of malarial parasites in different seasons at district Khairpur Mir's, Sindh, Pakistan.

Study Design: A prospective study.

Place and study duration: This study was conducted at Post Graduate Diagnostic and Research Laboratory (PGRDL), Institute of Microbiology Shah Abdul Latif University (SALU), Khairpur and Bismillah Medical Center (BMC), Khairpur, from 01-Jan-2021 to 30-June-2021.

Methodology: Febrile patient of all ages and both sexes were included, pre-diagnosis of malarial parasites using the Immunochromatographic test (ICT) kits, the blood samples were taken by venepuncture procedure after collecting samples in Ethylene diamine tetra acetic acid (EDTA) tubes for ICT and blood slides for microscopy. All results were entered and analyzed in SPSS 24 version. Continuous variables were presented as mean and SD and qualitative variables were presented as frequency/percentages. Probability value ≤0.05 was considered as significant.

Results: In this study overall 7332 febrile patients with means age 37.8±22.54, from which male 3476 (47%) and majority of 3856 (53%) were female patients. Whereas 1908 (26%) patients were suffered from the active state of malaria and majority of 5424 (74%) population suffered from non-malarial diseases having vague symptoms including the chills, fever, body aches, abdominal cramps. The positive cases of Plasmodium vivax 1534 (20.92%) Plasmodium falciparum 316 (4%) whereas mixed cases are 58 (1%).

Conclusion: The malarial parasites were observed predominantly with type of P. Vivax followed by P. falciparum and mix cases. Therefore dire need to take preventive measures by controlling the spread of plasmodium species in month of March onward till June.

Keywords: Malarial Parasites (MP), Febrile Patients, Immunochromatographic Test (ICT).

INTRODUCTION

Malaria is a parasite infection spreads via a vector of mosquitos in the tropical and subtropical areas around the globe [1]. In different parts of the world, it has the prime health and social impact. Conferring by World Health Organization (WHO), there in 2018 two hundred twenty-eight million malaria cases were there, with 405,000 fatalities and 416,000 in 2017 globally, according to the WHO's latest malaria report. [2]. Furthermore, the WHO's in 2018 claimed that malaria cases via African statistics only shows almost 2.13 billion cases, (93 %) whereas it was followed by the South-East Asia 3.4% [2]. The parasitic caused human malaria by Plasmodium vivax(P.v), Plasmodium falciparum (P.f), Plasmodium knowlesi (P.k) Plasmodium ovale (P.o), Plasmodium malariae (P.m) and are the five Plasmodium species. [3]. The most communal prevalent parasite (99.7%) in Africa reported in 2018 is Plasmodium falciparum. accounting for of malaria cases and in Eastern Mediterranean almost 71% [2]. Universal occurrence of Plasmodium vivax is 53% with the South-East Asia has uppermost limit of 47% patients being in Bharat, here P. vivax only prevail in Eastern Mediterranean region like Pakistan 11% and Afghanistan 8% [2,4]. Notwithstanding the recent development in the direction of the purge of malaria, antimalarial drugs and vaccination, may the rheostat of malarial parasitic infections otherwise up to date it seems starching.

Annually almost 1,000,000 cases of malaria are reported in Pakistan and it seems the most burden country to counter the disease [4,5]. WHO at present reports in Pakistan 84% cases of P. vivax malaria is predominant whereas the cases of P. mall established parts in Pakistan have the uppermost malaria load owing to the huge figure of falciparum are 14.9% and mixed cases of both species are 1.1% are respectively [2]. Khairpur as a largest district of Sindh after Karachi which is the most disadvantaged and tremendously population and borders sharing with Sukkur, Larkana, Shikarpur, Noshehro froze, Nawab shah, Sanghar and Indian border apart migration of KPK population to Sindh in winter seasons[6–8].

The inter change of people and goods largely routed general municipal wellbeing particularly in Sindh the programs on the malaria control vector [9]. The failure of the vector management line ups has caused in the re-arrival of protozoal infection and twisted it into a malaria widespread region [10]. Multiple researchers have revealed that the relocation of individuals from malarial endemic regions to less or non-immune publics can principaly be a serious hazard of malaria re-introduction in malaria free-zones [7,8]. Afghan refugees to KPK, dispersed in internal areas of Pakistan may have also impacted the dispersant of disease too[11,12]. The migration of refugees across the borders has big impact (~24%–36%) on public health along the uncontrol of disease a part. The same is endorsed by ministry of health Pakistan and KPK Government authorities reports [13].

Begin with 1947 Pakistan's freedom years the adjoining districts of borders have become the greatest penurious and awfully immigrant areas in the country with frightful social progress indices [14]. The poor approach to health care centres and fewer availability of antimicrobial drugs, malaria occurrences are higher in the said areas. A from that heavy floods and rainfall during the monsoon season, poor hygiene, miss management of Municipal authorities and fish farming ravine waters serve very ideal for upbringing of parasites causing malarial disease which are the main reasons that are already believed and reported [14], The epidemiologic studies along clinical burden of malaria in different districts of the Sindh where the condition relics unbothered. Nevertheless, in the present article we premeditated the prevalence of malaria in Khairpur district as a rampant menace.

METHODOLOGY

This was a prospective study carried out at post graduate diagnostic and research laboratory (PGRDL) Institute of Microbiology Shah Abdul Latif University, Khairpur (SALU) and Bismillah Medical Center (BMC) Khairpur, here in city almost every tahsil's complicated cases are referred usually if they are not properly treated at their basic health facility or tertiary level of

health care system. Following the standards for reporting of diagnostic accuracy studies (STARD) [16] all the patients were included having body temperature (>37.5°C)), along with the nonspecific symptoms like chills, body aches nausea, vomiting etc. This study was conducted from January to June 2021 because Khairpur is subtropical area it experiences the peaks and valleys in temperatures ranging from January, 2021 (Minimum 8.33°C to Maximum 23.33°C) June, 2021 (Minimum 28.88°C to Maximum 43.33°C)

Collection of samples: Total of seven thousand three hundred and thirty-two (7332) febrile patient of all ages and both sexes were included, pre-diagnosis of malarial parasites using the Immunochromatographic test (ICT) kits, the blood samples were taken by venepuncture procedure after collecting samples in Ethylene diamine tetra acetic acid (EDTA) tubes for ICT and blood slides for microscopy.

Laboratory Processing: Immunochromatographic tests (ICT) were executed in Bismillah Medical health care facility and PGRL of SALU ensuing to the assembler's directions by means of malaria ICT P.f/P.v swift diagnostic gadget (CTK Biotech, Inc., Poway, CA 92064, United States of America USA). One hundred parasites/µl of blood is the sensitivity standard of rapid diagnostic test this test uses 2 antibodies that have been halted across the test strip. One antibody (test area 1) is specific for the histidine rich protein 2 antigen of P. falciparum (Pf HRP-2). The other antibody (test area 2) is specific for a malarial antigen which is common to both P. falciparum and P. vivax species. 20 microlitre whole blood or 10 µl serum was applied to a sample pad and impregnated with colloidal gold labelled antibodies directed against the two malarial antigens. The test was considered valid if the control line was visible and positive even if the HRP2 and/or pan-malarial antigen lines were visible. An immunochromatographic test diagnosis of P. vivax malaria was made if pan-malarial antigen line was visible. A diagnosis of P. f malaria was made if the HRP-2 was visible, with or without pan-malarial antigen. Beside this the gold standard diagnostic procedure for malaria species identification and re-confirmation of all the results were done using the Microscopy of blood slides (smear) made using standard Giemsa staining procedure.

RESULTS

According to this study total 7332 febrile patients with means age 37.8±22.54, male 3476 (47%) and majority of 3856 (53%) were female. The positive cases of Plasmodium vivax 1534 (21%), Plasmodium falciparum 316 (4%) and mixed cases were 58 (1%), see Table No.1 whereas 1908 (26%) patients were suffered from the active state of malaria and majority of 5424 (74%) population suffered from non-malarial diseases having vague symptoms including the chills, fever, body aches, abdominal cramps etc. Here the young age groups in male and female were extra affected than infant and old age groups.

Since the weather of district Khairpur summers are humid and sweltering the winters are cool and short average 1-2 days rain a month around this study period. January and February remain136 (9.5%) positive which are the lowest prevalence months compared to rest of the study months March, April, May and June 1714 (30%). (Figure No. 1).

Table No.1; Frequency and pattern of malarial parasites.

Month	Gender		Total Cases=n	Total Reactive Cases					Total Non-Reactive Cases	
	Male	Female		P.v	P.f	Mixed	Total=n P.v/P.f	(%)	(n)	(%)
Jan-21	291	367	658	55	11	1	66	10	592	90
Feb-21	353	436	789	60	10	4	70	9	719	91
Mar-21	371	432	803	195	32	9	227	28	576	72
Apr-21	491	506	997	338	54	12	392	39	605	61
May-21	930	966	1896	433	110	24	543	29	1353	71
Jun-21	1040	1149	2189	453	99	8	552	25	1637	75
Total	3476	3856	7332	1534	316	58	1908	26	5424	74
%	47%	53%	100%	21%	4%	1%	26%	--	--	--

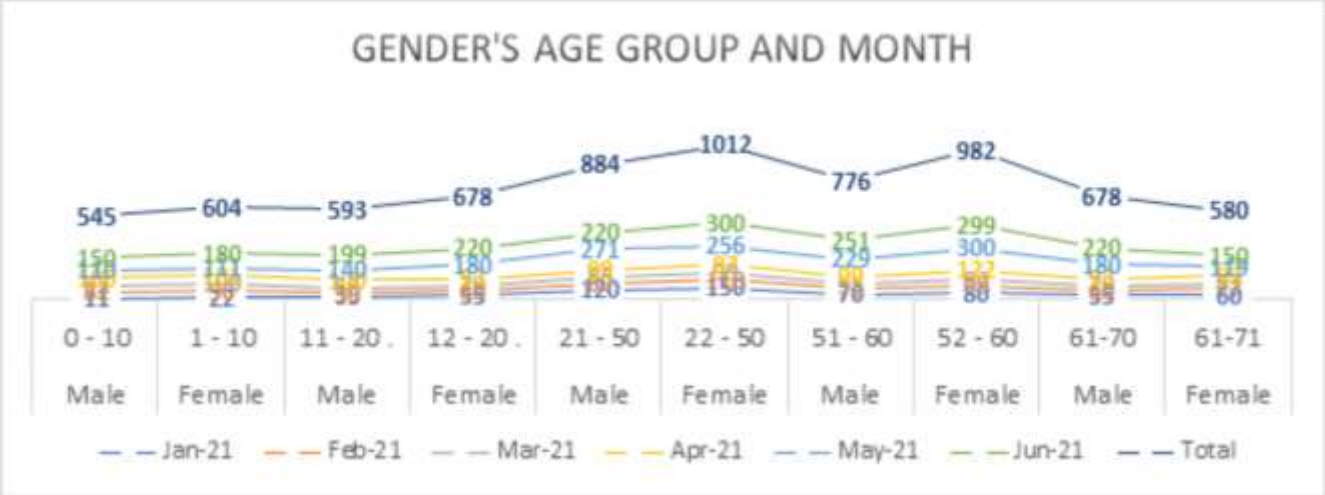

Figure No. 1; Detail of Plasmodium Reactive and Non reactive nouns of this study along %age (male and female)

DISCUSSION

The district Khairpur as a largest District of Sindh has big sharing area with multiple cities of province and long Indian sharing international border line of control (LOC), it has been lacking the proper municipal facilities thus having burden of malaria which adversely affects the prevalence of Plasmodium species. World health Organization has reported in 2019 that globally malaria affects 229 million people (Mohsin, et al., 2021). This study in which 7332 nouns participated 3476 (47%) are male and 3856 (53%) are female the positive cases of P.vivax are 1534 (20.92%) P.vivax as reported earlier by many reports is more dominant specie in Sind as well as Pakistan's most malaria endemic areas in comparison to the Plasmodium falciparum 316 (4%) as described

by Masood et.al., 2021too, (21) whereas mixed cases were 58 (8%) mixed cases, where as in totality almost 1850 (25%) patients population suffer from the active state of malaria and 5482 (75%) population suffers from non-malarial diseases having vague symptoms including the chills, fever, body aches, abdominal cramps etc.

Since the weather of district Khairpur summers are humid and sweltering the winters are cool and short average 1-2 days rain a month around this study period. January and February remain 136 (9.5%) positive which are the lowest prevalence months compared to rest of the study months March, April, May and June 1714 (30%) this suggests the seasonal significant variation of malaria cases in the district in particular and region in general. Soomro, P. et al., 2021, and other author's almost same results are given by Hussain M. et.al 2021(18, 20) at present almost the 60% of Pakistani residents animate in moderately endemic Malaria prevalent areas reported by Kumar, et. al 2021(19). Moreover, the findings of this study are comparable with previously reported literature.

CONCLUSION

This study revealed that the malarial parasites were present predominantly with type of P. vivax followed by P. falciparum and mix cases. This draws attention of public health authorities to improve the sanitation and drainage system of cities and towns for effective plasmodium vector control of malaria. In month of March onward the cases increase up till highest temperature of yearly cycles naturally limits vectors control.

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