PREVALENCE OF MALARIAL PARASITES IN TEHSIL MANDANR, DISTRICT BUNER KHYBER PAKHTUNKHWA

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Abstract- Present study was carried out in local population of Tehsil Mandanr, District Buner for incidence of Malarial parasite and a total of 2308 suspected cases were screened for Malarial parasite during September 2019 to August 2020 and divided into age wise, gender wise, specie wise, season wise and month wise distribution. Under a microscope, thick and thin smears were made and examined. Out of 2308, 165 were found positive for Malarial parasite in which 158 out of 2308 (6.84%) were *P. vivax* and 7 out of 2308 (0.30%) were *P. falciparum* whereas 2143 were found negative. However, 73 males out of 1090 (6.69%) were positive while 92 out of 1218 (7.55%) female were positive. Malarial parasite was high during Autumn and Summer season i.e. (87.63%) and (85.96%) respectively whereas Winter season shows low prevalence i.e. (39.35%) and Spring shows moderate i.e. (70.37%). November has high positive cases for Malarial parasite i.e. 36 while March has less positive cases i.e. 3. No positive case for mixed specie was found. Whereas 16-30 years of age shows high positive cases i.e. 86 while 46- > has less positive cases i.e. 19.

Index Terms- Malaria, Anopheles, Plasmodium, Mandanr, Buner.

I. INTRODUCTION

T Malaria is an infectious, life threatening, most endemic and the most deadly disease caused by single celled obligate intraerythrocytic protozoan of the genus *Plasmodium* (Minja, 2013; Melese, 2017). Malaria is still a large cause of human mortality and overrule in Africa (Ullah *et al.*, 2015). A female Anopheles mosquito acting as a vector spreads malaria from person to person, resulting in at least 400,000 deaths and 200 million cases annually (Minkeu and Vernick, 2018). Anopheles is a member of the order Diptera, family Culicidae, class Insecta, phylum Arthropoda, and subfamily Anophelinae of Kingdom Animalia.Anopheles goes through six immature phases as it develops. four larval phases, the pupal stage, and the egg stage

(Forstinus *et al.*, 2015). Anopheles have more than 480 species worldwide in which about 70 are responsible for the transmission of Malaria in humans. 40/70 species are main vectors for Malaria (Minkeu and Vernick, 2018). *Anopheles stephensi* and *Anopheles culcifacies* are common vectors of Plasmodium in Khyber Pakhtunkhwa (Khan *et al.,* 2018). Plasmodium is a sporozoan parasite serve as their hosts when an organism is in its embryonic phases. (Hickman *et al.*, 2008). Plasmodium have five major types i.e. *P. vivax*, *P. falciparum*, *P. ovale*, *P. Malariae* and *P. knowlesi*. *P. vivax* and *P. falciparum* are common species of Malaria in Pakistan (Majid *et al.*, 2016). *P. falciparum* is responsible for 90% deaths and causative agent of about 80% Malaria (Ibrahim *et al.*, 2014). There are 300–500 million cases reported globally each year, with 1.5–2.7 million deaths (Majid *et al.*, 2016). Malaria is prevalent like other countries in Pakistan where annually 4.5 million cases of Malaria are reported (Arian *et al.*, 2019). Finding the prevalence of malarial parasites is one of the study's objectives among different Seasons, Months, Gender, Age and Specie wise in Tehsil Mandanr, District Buner.

II. MATERIALS AND METHODS

STUDY AREA

The present study was conducted in different areas of Tehsil Mandanr and Rural Health Center (RHC), Nawagai, District Buner. In Pakistan's Khyber Pakhtunkhwa, Mandanr Tehsil is located in district Buner. As per the 2017 census, the population is 152,975.

METHODOLOGY

The method used by Manson-Bahr and Bell (1987) to detect malaria cases involved taking thin and thick blood films from probable patients in specific study area localities. Collections of the blood samples were based on age and grouped into (1 to 15) up to (45 to >). Performa was created with data on people who had clinical symptoms, such as pain, headache, nausea, coughing, fever, chills, and vomiting (Shah *et al.*, 2018). Giemsa

was used to stain blood slides in a lab. Nonetheless, keys were used to identify the Plasmodium species (Sood, 1989; Paniker-Jayaram, 2002).

LABORATORY DIAGNOSIS OF MALARIA

Various techniques are used in the laboratory to diagnose malaria. These include staining thin and thick blood smears for conventional microscopic diagnosis, concentration techniques like the quantitative buffy coat (QBC) method, immune chromatographic test (ICT), rapid diagnostic tests (RDT), Para Screen, SD Bio line, Para check, and molecular diagnostic methods like polymerase chain reaction (PCR) (Tangpukdee *et al.*, 2009).

MATERIALS

Lancet, slides, ethanol, giemsa's stain, oil emersion and Compound Microscope were used (Shah *et al.*, 2018). The materials used in research study were Alcohol swab (use to clean the area from which blood has been taken), Cotton wool (use upon the puncture area to stop the blood), BD Syringe (0.60 x 25 mm, 23 G x1, Disposable) (used for to take blood from the vein), Lancet (used for to take blood from the finger), Blood sucker puppet (used to suck blood from the vein or finger and pour to RDT), Malarial buffer (used to pour upon the RDT buffer section as reagent), Glass slide (used for to examine the blood smear under microscope), Giemsa's stain (which is necessary for the appearance of malaria parasite in the slide), Sideer/Emulsion oil, Compound Microscope (used to identify the parasites), Methanol (used for cleaning purpose), Giemsa stain and Tourniquet (used to tie the arm while taking blood from the vein).

PREVALENCE RATE

Prevalence of Malaria is analyzed by using following formula.
Prevalence rate = No. of Patient's having Malaria / Total No. of Patient's diagnose × 100 (Majid *et al.*, 2016).

SYMPTOMS

The following malaria symptoms were observed during the current study: 102–105°F fever, headache, chills, sweating, weakness, abdominal pain, nausea, vomiting, diarrhea, back pain, chills, cough, and Patients with poor health who reside in marshy locations and feverish spleen enlargement.

BLOOD COLLECTION:

Blood samples were collected from patients by pricking their finger with lancet or taken from vein through Syringe and then sucked up the blood by a puppet or with syringe.

TECHNIQUES USED FOR MALARIA DIAGNOSE: -

RAPID DIAGNOSTIC TEST

Rapid diagnostic test kits used during outdoor collections that isICT (immune chromatographic technique) method. This ICT is a special Malarial kit which has its own antigen in it. This kit has three separate portions, one portion is labeled as (C), (P$_v$) and (P$_f$) for clear, *P. vivax* and *P. falciparum* respectively. Other portion is for blood labeled as (S) and other for buffer labeled as (B). When blood is taken from patient so 2 or 3 drops of blood is pour in blood portion and then 2 drops of Malarial buffer pour into buffer portion, then wait for 8 to 10 minutes and result will be displayed.

PREPARATION OF SLIDES

The patients' fingertip tips were cleansed with an alcohol-soaked swab and dried with dry cotton. By utilizing a disposable blood lancet to prick the patient's fingertip and blood samples were taken. Blood was added to a slide to create a smear, which might be thick or thin, and was then let to dry in the air before being placed in the giemsa stain, which is required for the appearance of the malaria parasite on the slide. The slide is kept for a while to dry after being stained with Giemsa's dye and washed with ethanol before being coated with emulsion oil to prepare it for microscopic inspection (Ali and Rahman, 2017).

THICK BLOOD SMEAR

Significant volume of blood can be quickly examined with the use of a thick blood smear. It makes it possible to identify parasitemia at even very low levels for the discovery of only parasites. A normal thick blood film that has been properly produced is ten times more sensitive than a thin film. Before declaring a thick film negative, it is typically advised to examine it with high power microscope fields. A well produced thick film equals 0.25 ul of blood (Khan, 2013).

THIN BLOOD SMEAR

The thin film is useful for identifying the species of malaria. Due to its simple preparation and examination, it is more widely used as a diagnostic procedure in hospitals and clinics. Thin films can be examined to reveal gametocytes, huge trophozoites, schizonts, and ring forms of the infecting Malarial species. In RBCs, the parasite can occasionally be seen producing distinct stippling or spots. A thin blood film is viewed under 100X fields of microscope using just 0.005ul of blood (Khan, 2013).
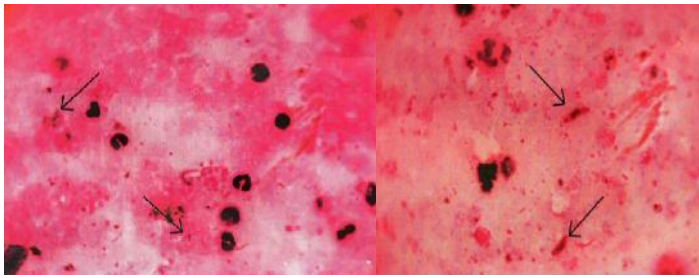
Thick blood smear *P. vivax* and *P. falciparum* gametocytes (Kurd *et al.*, 2019).

MICROSCOPY

In 1880, Laveran used a light microscope to find a malarial parasite in the red cells of a burned patient. Since Gustav Giemsa developed an eosin-methylene blue stain mixture in 1904, stained thin and thick blood smears with Giemsa have been used to diagnose malaria (Khan, 2013). For specific diagnosis of *P. falciparum* and *P. vivax*, slides were examined by oil immersion lens of compound microscope at ×100.

DATA ANALYSIS AND STORAGE

When the whole procedure of the test done by mean of ICT or Microscopy then all of results data were saved in a dairy or also in computer. One printed copy of report is given to the concerned patient.

STATISTICAL ANALYSIS

All of the data are statistically assessed using SPSS 26. Furthermore, SPSS is used to construct all of the tables and graphs before they are copied into Microsoft Word 2010.

III RESULT

A total of 2308 suspected cases were studied from different laboratories and Regional Health Center (RHC) Nawagai in Mandan Buner. Out of which 165 (7.14%) were found positive for Malarial parasites. In 2308 cases 165 were found positive for Malarial parasite in which 158/2308 (6.84%) were P. vivax and 7/2308 (0.30%) were P. falciparum whereas 2143 were found negative. Additionally, 73/1090 (6.69%) male were positive while 92/1218 (7.55%) female were positive.

Season wise Prevalence of Malaria

The autumn and summer season show the higher prevalence (87.63%) and (85.96%) respectively in Tehsil Mandanr, District Buner and Winter season shows the lower
Prevalence i.e. (39.35%).
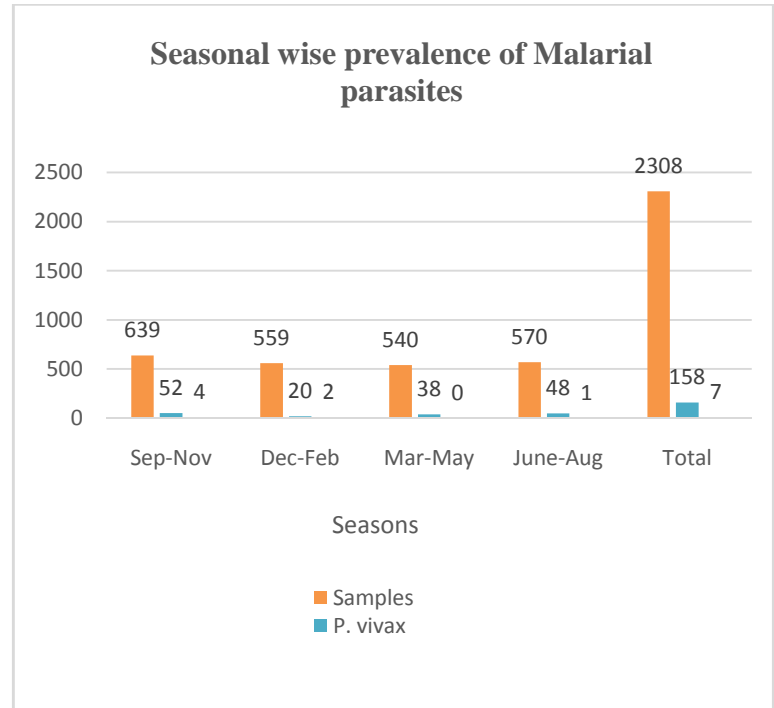
MONTHS WISE PREVALENCE OF MALARIA

The month with the highest monthly prevalence of malarial infection was November, with 36 (%) positive cases, while the month with the lowest rate of infection was March, with 3 (%). During the study period there was no positive case found for mixed specie.
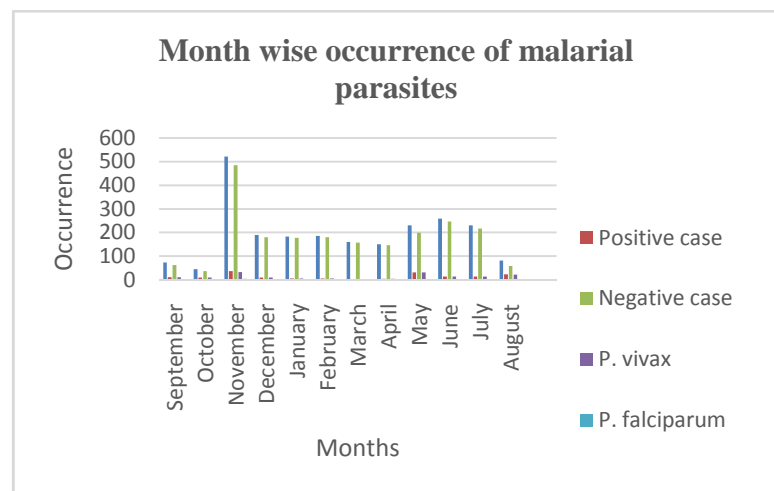
SPECIES WISE INCIDENCE OF MALARIA

Species wise occurrence shows that a total of 2308 suspected cases iwere studied 165 cases were found positive for Malaria parasites. Out of 165 positive cases, 158 cases were found positive for *P. vivax* (6.84%), whereas 7 cases were found positive for *P. falciparum (*0.30%*)*. During the study period there was no positive case found for mixed specie i.e. (*P. ovale, P. knowleski* and *P. malariae*). Result shows that the prevalence of *P.vivax* is higher than other species of plasmodium in Buner.

**Species wise prevalence**
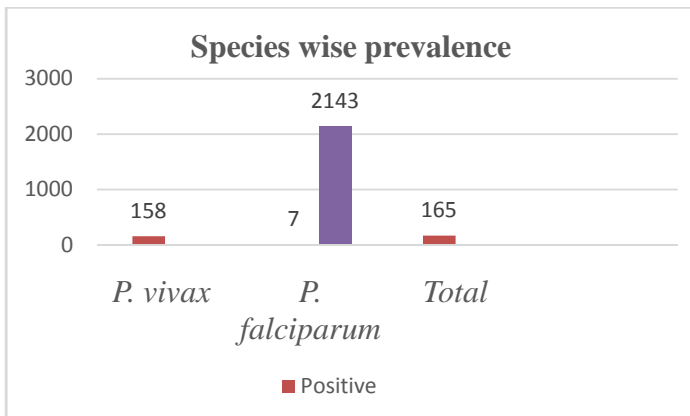
GENDER WISE PREVALENCE OF MALARIA

Blood samples were taken from both male and female population. In 165 positive case 73 (6.69%) males (16-30 years)were infected with plasmodium while 92 (7.55%) females (16-30 years)were suffering from malaria. During the overall study, prevalence for malarial parasite was higher in female than male population.

Gender Wise Prevalence
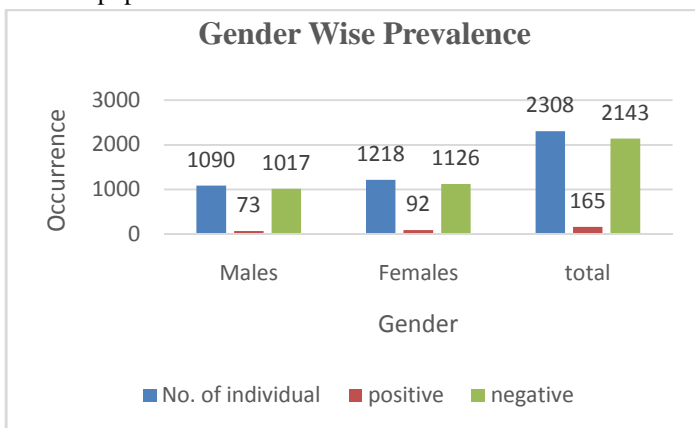
AGE WISE OCCURRENCE OF MALARIAL

During the study period the age (16 to 30) shows high positive cases for Malarial parasite that were 86 (%) whereas the age

range (46 to >) shows less positive cases for Malarial parasite that were 13 (%).

Category wise distribution
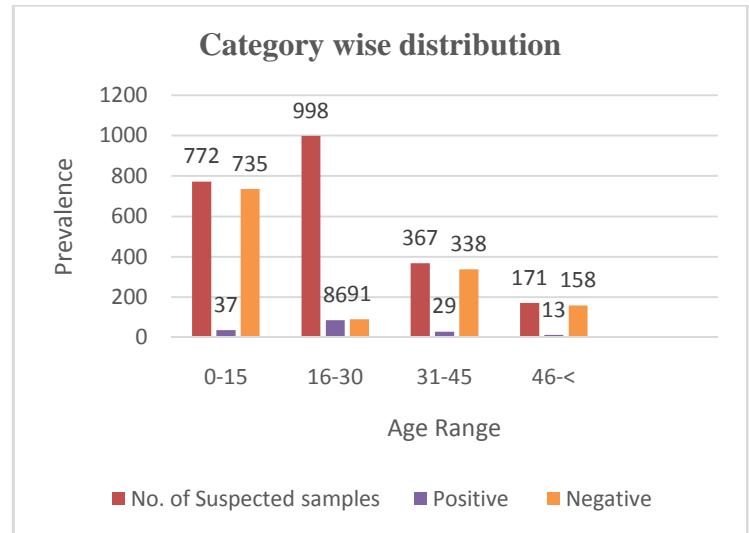
IV DISCUSSION

The current study was carried out from September 2019 to August 2020 in Tehsil Mandanr, District Buner, to determine the prevalence of malarial parasites. The findings indicate that *P. vivax* was more prevalent. Because of their low socioeconomic status and unhygienic living conditions. Females between the ages of 16-30 in present study were affected more. The world's second biological issue was malaria (WHO, 2011). It was discovered that *Plasmodium falciparum* is more lethal and harmful in rural districts of Punjab and Muzaffargarh. (Sahar *et al.,* 2012) A total of 997 blood samples were taken for the current investigation on the prevalence of malaria in Barikot, District Swat. The month of November had the highest number of positive cases i.e., 24 out of 67 (35.82%) while the month of May had the lowest number of cases i.e., 12 out of 106 (11.32%). Tehsil wise prevalence shows that most positive cases were found in UC Kota that were 60 out 230 (26.08%) and low cases were found positive in UC Ghalaigai 42 out of 320 (13.12%). Gender wise prevalence of malaria disease shows that 106 out of 385 (27.53%) males were found positive for malaria disease whereas 98 out of 612 (16.01%) were females (Shah *et al.,*2018).Present study conducted in District Swat in 2017 shows that 932 out of 9255 (10.07%) patients were found positive for malaria parasite. Month wise prevalence shows most of the positive cases were found in the month of July which are 368 out of 2225 (16.53%) and less cases were noted in the month of February which are 21 out of 833 (2.52%). Tehsil wise prevalence shows that most positive cases were found in Tehsil Barikot that were 584 out 2973 (19.64%) and low cases were found positive in Tehsil Bahrain 1 out of 108 (0.92%). Age wise prevalence of malaria disease shows that 386 out of 932 (41.42%) were found positive for malaria disease in the age

range of (1-10) whereas 8 out of 932 (0.86%) were found positive for malaria disease in the age range of 60 above (Syed, H.H *et al.,* 2021).

V CONCLUSION

The primary factors contributing to this sickness were sleeping outside without a mosquito net, giving mosquitoes a proper medium, and leaving savages exposed to the elements

VI ACKNOWLEDGMENT

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