2. VECTOR BORNE DISEASES

2.1 Transmission dynamics of malaria in tribal areas

The study is being carried out in two highly malarious districts of Madhya Pradesh. Five villages have been selected each from Baigachak (Dindori district) and Kanha (Mandla district). Vector density was monitored using hand catch, light trap and animal bait method.

A total of 3971 and 1613 blood slides were collected from fever cases during winter season of 2006 from Baigachak and Kanha area respectively. Age wise analysis revealed that more malaria cases were in children (2-14 years) as compared to infants and adults. The difference was statistically significant in Baigachak (X^2=217.2, df 4, p<.0001) (Table 2.1.1). Overall malaria in terms of slide positivity rate (SPR) is significantly more in Baigachak than Kanha area (exp. ß 4.05 P<0.0001). *P. falciparum* predominates in both the areas (90%). Season wise analysis of data (Fig 2.1.1) reveals that in Baigachak transmission of malaria is perennial and summer is the lean period while in Kanha although malaria is less prevalent (OR=1.2, 95%CI=1.0-1.4, P<0.0001) but seasonal variations are quite marked and peak transmission was recorded during winter (OR=12.2, 95%CI =4.9-30.3, p<0.00001).

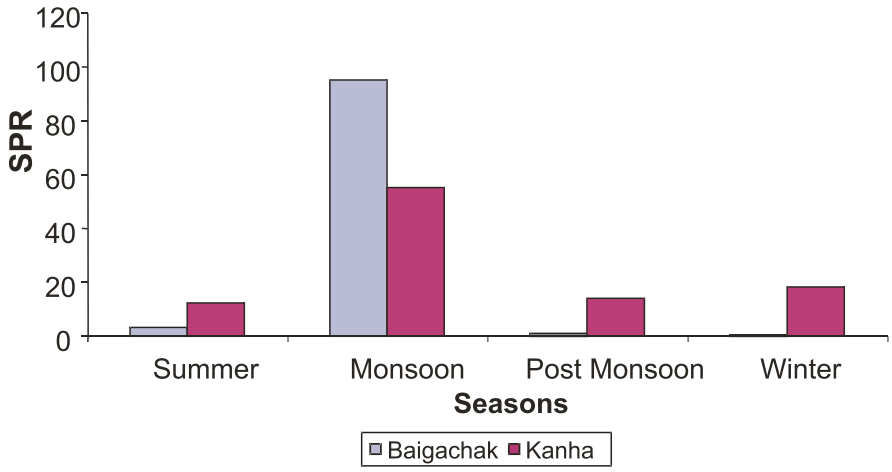
Table 2.1.1: Epidemiological situation of malaria in study area from active fever survey

Age		Kanha			Baigachak	
group	BS Col.	SPR	Pf%	BS Col.	SPR	Pf%
0-1	73	10.96 (8)	87.5 (7)	170	35.29 (60)	76.7 (46)
>1-4	114	7.02 (8)	87.5 (7)	518	45.7 (237)	84.8 (201)
>4-8	199	13.6 (27)	88.9 (24)	564	42.2 (238)	90.7 (216)
>8-14	187	9.1 (17)	88.2 (15)	527	38.1 (201)	94.5 (190)
>15	1040	8.94 (93)	96.7 (90)	2192	20.4 (447)	92.2 (412)
Total	1612	9.5 (153)	93.5 (143)	3971	29.0 (1183)	90.04 (1065)

Entomological studies reveal that overall indoor per man hour density of *An culicifacies* was higher in Kanha (12.7) than Baigachak (5.4) (t=4.6 p<0.0001). Sibling species composition

shows that species C of *An. culicifacies* is the dominant (>85%) species while species A is rare at both sites. Sibling species D is found in Baigachak though in small number (5.5%) while B is commonly prevalent in Kanha (10%). Regarding sibling species complex of *An. fluviatilis,* species T is present at both the site while species S is present only in Baigachak which is an efficient vector.

Fig 2.1.1: Seasonal variation in malaria prevalence





A malaria breeding site

2.2 Seasonal variations in Plasmodium species: Case study of a rural peripheral hospital from central India

Maihar in Satna district is known for 'Sharda Devi temple' situated on the top of the hill. Millions of devotees and tourists throng the temple all round the year. There is 3.1 mn cement factory which provides an industrial touch to the holy place. Maihar / Satna was not considered a malarious place. However, due to rapid socio-economic, ecological changes and high mobility of population for a variety of reasons, the malaria situation has deteriorated recently in most part of the state. The number of reported cases remained very low due to low accuracy of malaria microscopy and irrational clinical practices. In view of this a malaria clinic was established at the Maihar civil hospital, to screen all fever cases clinically suspected to be malaria. The main objective of the study was to determine malaria prevalence rates caused by each species of Plasmodium, and the annual and seasonal changes in the prevalences of infection.

Analysis of data revealed that malaria was present throughout the year and both *Plasmodium vivax* and *P.falciparum* were prevalent in all age groups but their prevalence was highly seasonal. Season wise distribution of malaria cases (all age group combined) showed the lowest prevalence (147/1817) in hot dry summer season (Feb-May) which was mainly due to *P.vivax* (88%) followed by monsoon (367/2985) where the relative contribution of *P.vivax* and *P.falciparum* were 59% and 41% respectively (OR=1.59, 95%CI=1.30-1.96) and highest prevalence (419/2281) was recorded in post-monsoon/ autumn (Oct-Jan) (OR 2.56, 95%CI =2.09-3.14), which was due to *P.falciparum* (78%).

The age specific data on malaria revealed that children between >4-14 yrs were more at risk of developing malaria (353/1678) as compared to other age group (OR 2.22, 95%CI =1.91-2.57). The study is in progress.



Sharda Devi Temple at Maihar



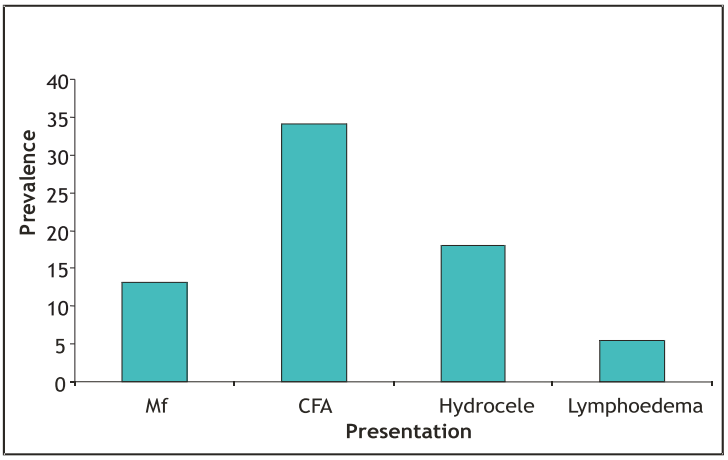
Malaria breeding sites close to Maihar Temple

2.3 Concomitant infections of intestinal parasites with Filariasis

The study was carried out in Rajnagar Tehsil of Chhatarpur district, Madhya Pradesh. The subjects were assessed for prevalence of filariasis by night blood smear and Og4C3 ELISA. Of the 627 individuals participated in the study, about 60% were males. On clinical examination it was observed that 18% males were suffering from hydrocele and 4.8% of the males were having lymphodema. The presence of lymphodema in females was observed to be 6.4%. The Mf prevalence was found to be 13% in the study population and Mf-density was 330 Mf/ml (Geometric Mean). By the use of Og4C3 ELISA, it was observed that 35% individuals were having filarial infection. However, about 50% individuals living in the area and continuously exposed to mosquito bite did not suffer from filarial infection and disease. While comparing the onset of acute filarial disease with age it was observed that individuals in adolescent age group experienced lymphangitis and fever. However, none of the 70 children with age 10 years or less suffered from acute disease. The presentation of hydrocele in males was prevalent in all age groups except children less than 10 years. Lymphoedema or elephantiasis was prevalent in all the adult age groups (Fig 2.3.1).

Stool samples of these individuals were examined by direct smear and sugar floatation method. Of the 225 stool samples collected, 55.2% were found to be positive for intestinal parasites of one type or other and the predominant infection was roundworm (29.8%) followed by *H. nana* (6.5%). There was no correlation between prevalence of filariasis and intestinal parasites.

Fig 2.3.1: Prevalence of filariasis in Chhattarpur district





IEC activities



Poster displayed

2.4 Prevalence of Dengue vector *Aedes aegypti* in Jabalpur

This is the continuation of the prevalence of dengue in Jabalpur city. The new areas which were not surveyed earlier have been surveyed from September onwards. Two new areas namely Jabalpur Cant and Jabalpur Central were surveyed for the first time. Over all 1491 households having 4374 water filled containers were examined for the presence of *Aedes* immatures. Seventy nine households were found to have *Aedes* infested containers. Overall the computed House, Breteau and Container index (HI, BI, & CI) were 5.3, 5.9 and 2.0 respectively. The distribution is not uniform as recorded in earlier surveys and Jabalpur West area (Garha) continue to lead in prevalence of *Aedes aegypti* followed by Central area (Fig. 2.4.1).

Examined water filled containers were classified in twenty categories. Among these 11 were used for storage of water for routine usages in the houses and constitute 86 % of the examined containers. Ninety three percent *Aedes* infested containers were from these potable water containers while other containers contribute only 7%. Cement tank followed by cement cistern and mud pot continue to be the most preferable for breeding of *Aedes aegypti*. No breeding was seen in overhead tank (Plastic and Cement both), plastic container and plastic drums.

Among the infested containers 36% were having standing crop of pupa. In all 2830 pupa were collected from 32 infested containers. Over 60% of standing pupal crop was recorded from cement tanks only.

Fig. 2.4.1: HI, BI and CI in Jabalpur

