A CLINICO-EPIDEMIOLOGICAL STUDY OF MALARIA IN URBAN SLUMS AND RURAL AREAS OF KANPUR

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Abstract:

Research Question:- What is the magnitude of malaria in the study area
Objectives:- 1. What is the prevalence of malaria in urban slums and rural areas
2. To assess the influence of environmental factors in occurrence of malaria
3. To observe different clinical presentation of malaria
Study Design:- Cross sectional study
Setting:- The study was performed in five urban slums and two rural areas of kanpur.
Statistical Analysis:- Chi-square test
Result:- The overall malaria problem in study area was 8.57% cases in total fever cases.The maximum percentage of cases (54.71%) were in age group 15 yrs and above.Total 62.62% of malaria cases were residing in kachcha houses in study population. The prevalence of malaria was 88.68% where waste water drainage system was of open type. The different symptomatics were chills (71.69%) rigor (60.37%), body ache (92.45%), nausea (33.96%),vomiting (18.86%).

Introduction :

Malaria is one of the oldest recorded diseases in the world. It was known to the ancients.

There are over hundred species of malaria parasite Plasmodium but only four species have man as their natural vertebrate host. They are P.falciparum , P.vivax , P.malariae and P. ovale. Of the four species , plasmodium falciparum causes the severest form of malaria. It causes the highest case fatality with cerebral malaria accounting for 80 % of these deaths.

The World Health Organization had estimated that before the malaria control programmes were launched in the various countries in the last few years there were about 1150 million persons at risk from malaria out of total world population.

At present, 100 countries in the world are covered in malarious zone, almost half of which are in SUB – SAHARAN AFRICA with 90% of the case load each year, mostly due to P.falciparum . Worldwide incidence of malaria is about 300-500 million clinical cases each year and 1.5 to 2.7 million deaths. Among all infectious diseases, malaria continues to be one of the biggest contributors to disease burden in terms of deaths & sufferings. Directly or in association with acute respiratory infections &anemia, malaria kills more than 1 million children each year under the age of five mainly. These childhood deaths are mainly from cerebral malaria and anemia. These rates are even higher in rural & remote areas where patients have restricted access to health services. Because of the combined effects of the nutritional deficiencies & malaria many women in malarious regions are anemic.

This led to the zeal to work out the study of magnitude of malaria problem in urban slums and rural areas of Kanpur.

Material & Methods.

The present study has been carried out by door to door visit in the community. Data have been collected from urban slums and rural area of Kanpur for a period of

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6 months from July 2001 to December 2001covering approximately 10,000 population having 5000 each of urban slums and rural areas.

Unit of study was fever cases within 15 days of the visit to area. Cases were identified after house to house survey of all households in the study population with the help of local health worker in the area.

All informations were recorded in a predesigned and pretested proforma regarding all fever cases. Specific informations about fever were noted in detail like type of fever (whether continuous, intermittent etc.,) periodicity, duration of fever, any associated symptoms present with the fever.

Other informations like their sleeping habits at night, dressing habits (whether body exposed above waist or not exposed) were noted. Inquiry about use of any anti-mosquito measures was done and noted down. Their medication history was also taken (whether taking any medication or type of medicines eg.Homoeopathic Ayurvedic etc. or not taking any medicines at all etc.).

Thin and thick blood smear slides were made from fever cases in the field ,fixed and subsequently stained and examined the same day for the presence of malaria parasite and species.

Thorough clinical examination was done to detect pallor ,splenomegaly etc.

Observation:

During the present study it was observed that 8.57% of malaria cases were present among all febrile cases. Further more the observations gave glimpse that this pattern is not different in urban slums (8.33%) & rural

TABLE - I

OCCURRENCE OF CONFIRMED CASES OF MALARIA

Cases	Urban slums		Rural areas		Total	
	No.	%	No.	%	No.	%
Fever cases	348	6.94	270	5.34	618	6.14
Malaria cases	29	8.33	24	8.88	53	8.57

TABLE – II

AGE AND SEX WISE DISTRIBUTION OF MALARIA CASES

Age group (years)	Urban						Rural						Grand Total			
	Male		Female		Total		Male		Female		Total					
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0 - 1	15	4.31	1	5.89	-	-	1	3.45	12	4.44	-	-	-	-	-	-	1	1.89
1 - 4	51	14.66	2	11.76	1	8.33	3	10.35	37	13.70	2	12.50	1	12.50	3	12.50	6	11.33
5-15	112	32.18	5	29.41	4	33.33	9	31.03	75	27.78	4	25.00	4	50.00	8	33.33	17	32.07
>15 yrs	170	48.85	9	52.94	7	58.33	16	55.17	146	54.08	10	62.50	3	37.50	13	54.16	29	54.71
Total	384	100	17	100	12	100	29	100	270	100	16	100	8	100	24	100	53	100

areas (8.88%) (Table I)

Table II shows age and sex wise distribution of malaria cases. In total study population, maximum cases 54.71% were found in age group 15 years and above, followed by 5 – 15 years (32.07%) and 1 – 4 years (11.33%). The minimum prevalence has been noted in 0 – 1 year

TABLE – III

DISTRIBUTION OF MALARIA CASES ACCORDING TO ENVIRONMENTAL VARIABLES

Environmental	Urban Slums				Rural areas				Total	
variables	Fevers cases		Malaria cases		Fever cases		Malaria cases			
	No.	%	No.	%	No.	%	No.	%	No.	%
Construction of house										
Kachcha	52	14.94	17	58.62	153	56.66	16	66.66	33	62.26
Semi pucca	208	59.77	8	25.59	60	22.22	5	20.84	13	24.53
Pucca	88	52.28	4	13.79	57	21.11	3	12.50	7	13.21
$X^2 = 9.23$, df - 1, $P < 0.05$, H.S.					$X^2 = 4.16$, df - 1, $P < 0.05$, Significant					
Overcrowding										
Present	231	66.38	19	62.52	195	72.22	17	70.83	36	67.92
Absent	117	33.62	10	34.48	75	27.78	7	29.17	17	32.08
$X^2 = 2.79$, df. - 1, $P < 0.05$, Not significant					$X^2 = 4.16$, df. - 1, $P < 0.05$, Significant					
Ventilation										
Adequate	108	31.03	8	27.59	98	36.30	5	20.83	13	24.53
Inadequate	240	68.97	21	72.41	172	63.70	19	79.17	40	75.47
$X^2 = 5.82$, df. - 1, $P < 0.05$, Significant					$X^2 = 8.16$, df. - 1, $P < 0.05$, Significant					
Natural lighting										
Adequate										
Inadequate	136	39.08	7	21.14	180	66.67	7	29.17	14	26.41
	212	60.92	22	75.86	90	33.33	17	70.83	39	73.59
$X^2 = 7.75$, df. - 1, $P < 0.05$, Significant					$X^2 = 4.16$, df. - 1, $P < 0.05$, Significant					
Water supply										
Wells	-	-	-	-	60	2.22	10	41.66	10	18.87
Hand pumps	219	62.93	14	48.38	232	85.93	9	37.50	23	43.39
Tap water	129	37.07	15	51.72	73	27.04	5	20.84	20	37.74
Waste water drainage										
Closed	46	13.22	4	13.79	27	10	2	8.33	6	11.32
Open	302	86.78	25	86.21	243	90	22	91.67	47	88.68
$X^2 = 15.2$, df. - 1, $P < 0.05$, H.S.					$X^2 = 16.60$, df. - 1, $P < 0.05$, H.S.					

age. The same pattern is found in urban slums and rural areas too.

Malaria transmission is intimately associated with the environmental variables of dwellings as table III shows that majority of malaria cases were residing in Kachcha houses, in both urban slums (58.62%) and rural areas (66.66%) .The total study population (62.26%) of malaria cases were residing in Kachcha houses both in urban slums (58.62%) and rural areas (66.66%) [total 62.26%].

Overcrowding was present in both urban slums (65.52%) and rural areas (70.83%) as well as total population (67.92%).

Inadequate ventilation promotes various vectors inside the dwellings due to favourable conditions as table III reveals that occurrence of disease was 72.41% in inadequately ventilated urban slums and 79.17% in rural areas.

Adequacy of natural lighting and ventilation of dwelling is parallel to each other. The inadequate ventilation results in inadequate lighting in the dwelling. Both variables give favourable shelter to vector of malaria. The table VIII shows an evidence that occurence of malaria was 75.47% in ill ventilated houses which is approximately in confirmity with the findings in dwellings with inadequate lighting (73.59%).

The prevalence of malaria was 88.68% where water drainage system was of open type.

The disease malaria is very specifically recognised by specific characteristics of festigium. Different species of parasite present its festigium by different ways. It was noted that continuous fever was present in 45.23% while intermittent and remittent fever were recorded 45.28% and 9.44% respectively (Table IV).

TABLE – IV

OCCURRENCE OF TYPE OF FEVER IN MALARIA CASES

Type of fever	Urban Slums				Rural areas				Total	
	Fever cases		Malaria cases		Fever cases		Malaria cases			
	No.	%	No.	%	No.	%	No.	%	No.	%
Continuous	163	46.83	10	34.48	144	53.33	14	58.33	24	45.28
Intermittent	127	36.49	16	55.17	101	37.4	8	33.33	24	45.28
Remittent	58	16.66	3	10.35	25	9.27	2	8.34	5	9.44
Total	398	100	29	100	270	100	24	100	53	100

TABLE – V

PERIODICITY OF FEVER IN MALARIA CASES

Tpe of fever	Urban Slums				Rural areas				Total	
	Fever cases		Malaria cases		Fever cases		Malaria cases			
	No.	%	No.	%	No.	%	No.	%	No.	%
Daily	167	47.98	12	41.37	132	48.88	6	25.00	18	33.96
Alternate day	78	22.41	10	34.48	57	21.12	10	41.67	20	37.74
Irregular	103	29.61	7	24.15	81	30	8	33.33	15	28.30
Total	348	100	29	100	270	100	24	100	53	100

Table V shows that occurrence of fever daily, alternate day and irregular, was approximately similar i.e. 33.96%, 37.74% and 28.30% respectively in study population.

While alternate day periodicity was maximum in rural areas (41.67%). The periodicity was daily in majority of cases in urban slums (41.37%). The irregular presentation in urban slums and rural areas was 24.15% and 33.33% respectively.

TABLE – VI

DURATION OF FEVER IN MALARIA CASES

Duration of fever	Urban Slums				Rural areas				Total	
(days)	Fevers cases		Malaria cases		Fever cases		Malaria cases			
	No.	%	No.	%	No.	%	No.	%	No.	%
1 - 5	293	89.19	17	58.62	215	79.62	13	54.16	30	56.60
6 - 10	40	11.40	11	37.93	41	15.18	11	4.58	22	41.50
11 - 15	9	2.58	1	3.45	6	2.22	-	-	1	1.88
> 15	6	1.72	-	-	28	10.37	-	-	-	-
Total	348	100	29	100	270	100	24	100	53	100

The duration of fever depends on the type of species of Plasmodium involved as well as the type of medication taken. But it is clearly evident that 56.60% of patients had fever for 1 – 5 days. The mean duration of fever was approximately 6 days.

TABLE – VII

PRESENTATION OF ASSOCIATED SYMPTOMS IN MALARIA CASES (MULTIPLE RESPONSE)

Associated	Urban Slums				Rural areas				Total	
symptomatics	Fevers cases		Malaria cases		Fever cases		Malaria cases			
	No.	%	No.	%	No.	%	No.	%	No.	%
Chills	234	67.24	20	68.96	165	61.11	18	75.0	38	71.69
Rigor	145	41.66	17	58.62	79	29.25	15	62.5	32	60.37
Headache	348	100	29	100	248	91.85	24	100	53	100
Bodyache	312	89.65	27	93.10	231	85.55	22	91.66	49	92.45
Nausea	102	29.31	12	41.37	109	40.37	6	25.00	18	33.96
Vomiting	70	20.11	7	24.13	40	14.81	3	12.50	10	18.86

Malaria is easily recognised by its specific symptomatic presentation, due to its specific characteristics even general people also at times make the diagnosis of disease on clinical basis. The different symptomatics as revealed in table VII are chills (71.69%) rigor (60.37%), headache (100.00%), body ache (92.45%), nausea (33.96%),vomiting (18.86%). No other symptoms like diarrhoea, respiratory insufficiency, convulsions etc. was found .

Discussions :

The prevalence of fever was 6.14% in the total study population. The blood smear could be collected was 94.20% in the study population and prevalence of

malaria cases after smear examination was 8.57% This finding correlates with the studies carried out by **J. Sandell** et al (1991) which showed 84.24% blood slide collection rate in Gorakhpur, Uttar Pradesh

Majority of malaria cases (54.71%) were found in adolescents and adults while 45.29% cases occurred in less than 15 yrs of age. Regarding sex wise distribution, overall prevalence of malaria in females was 37.74% in study population, 41.38% in urban slums and 33.33% in rural areas.

According to data from NMEP (National Malaria Eradication Programme, 1986) population distribution of malaria by age was 0 – 1 yr – 2.5%, 1-4 yrs – 10.1%, 5-15 yrs – 29.4%, 15 yrs and above – 58.0%.

The illventilated and illlighted house provide ideal indoor resting placcce for mosquitoes as it was evident from our study that ventilation was inadequate in both urban slums ($c^2 = 5.82$, df – 1, $P < 0.05$, Significant) (72.41%) and rural areas (79.17%) ($c^2 = 8.16$, df – 1, $P < 0.05$, Significant). The natural lighting was also inadequate in urban slums ($c^2 = 7.75$, df – 1, $P < 0.05$, significant) (75.86%).

The periodicity of fever in malaria cases depends upon the species of plasmodium as alternate day in P. vivax and P. falciparum, every 3rd day in P. ovale and every 72 hours in P. malarae. But this periodicity may vary in various conditions like mixed infections, medication, immune status,. Associated with other infections etc.

Conclusions and Recommendations:-

Thus it can be concluded that the problem of malaria is equally prevalent in urban slums and rural areas because the eco-environmental variables are same in both the areas.

So both the areas need community based strategy to control vector of malaria so that malaria no longer remains public health problem.

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