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PREVALENCE OF *AEDES AEGYPTI* IN DENGUE AFFECTED AREAS OF COIMBATORE DISTRICT, URBAN AND RURAL AREAS, TAMIL NADU STATE (INDIA)

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ABSTRACT

Entomological investigations carried out in Coimbatore district which recorded 25 cases of Dengue fever during April to June, 2003 revealed wide spread prevalence of *Aedes aegypti* - the vector of Dengue/ DHF. House index , Container index and Breteau index in Coimbatore Corporation area, Mettupalayam town and rural areas was recorded as 24.9%,16.6% & 31.6 %; 34.0%, 26.0% & 50; 36.1%, 22.9% & 47.8% respectively. The average House, Container and Breteau indices of these areas recorded were 36.1%, 22.9% and 47.8% respectively. The breeding of *Aedes* mosquito were mainly found in Earthen pots (35.4%), Cement tanks (31.6%), Grinding stone (28.2%) Flower pots (25.0%), Plastic container (10.8%) and Tin containers (9.6%). The indices recorded in Urban, semi urban and rural areas were above the critical index of 10%.

INTRODUCTION

In India Dengue/Dengue Haemorrhagic Fever (DF/DHF) has been restricted to urban and semi-urban areas of the country (Kalra et al. 1968, Yadav and Narasimham 1992). However, over the years, large scale development activities, viz rapid growth of the transport system through networks of railways and roads, industrial and building activities, provision of safe piped drinking water, electricity, overall improvement in civic amenities and socio-economic conditions of rural masses, have resulted in the establishment and proliferation of *Aedes aegypti* mosquito in urban and rural areas alike (Abdul Kadar et al. 1967, Chausak and Andjaparidze 1996, Katyal et al. 1997). After first case of Dengue in 1988 (Singh et al. 2000) no case was reported in Coimbatore district during 1999, 2000 and 2001. However, 25 cases of showing characteristic signs of dengue i.e. high fever, abdominal pain, abdominal pain, headache, rash in a few cases accompanied by bleeding in vomits, stools or from gums were reported during April, May and June 2003. Serogical tests detected igm and igg antibodies to dengue virus. to supplement these findings, an entomological survey was organized in 5 wards of Coimbatore corporation area, one locality in Mettupalayam town and 4 villages of Coimbatore district from 14th - 20th July, 2003 to record the prevalence of *Aedes aegypti* vector in the Urban/Semi urban town and rural areas.

STUDY AREA

Coimbatore is an industrial city spread in an area of 105.60 sq.k.m with a population of 9,15,600 as per 1998 Census record. The city is divided into 72 wards. The Coimbatore district is facing a shortage of water, and therefore, it is provided at an interval of 4-5 days for one to two hours thereby people are forced to adopt water storage practices. In the study area people are in the habit of using Grinding stones for rice invariably lying in open. The water accumulating therein becomes the potential breeding ground for *Aedes*.

Mettupalayam, a growing town, is situated about 9 km South East of the foot hills of Nilgiris and is surrounded by agricultural fields and scrub jungles.

The villages were having the pucca and thatched houses with intermittent tap water supply forcing the people to adopt water storage practice.

MATERIALS AND METHODS

Out of the 25 total dengue cases, 7 were reported from 5 wards of Coimbatore corporation area while 18 cases from the rural areas. Therefore, a total of 11 localities (6 in Coimbatore corporation area, 1 in Mettupalayam town and 4 in rural area) namely Bharti Nagar (Ward No. 23, 24), Grey town (ward No.27), ATT colony (ward no.27), Ganeshan street (ward No.69), Maniyakaram pallayam

(ward no.72), Bharti Nagar Mettupalayam, Jiwa Nagar Sirumugai village, Kuttayar village, Idikarai village and Sengalipallyam village were selected for survey of dengue vector (*Aedes aegypti*) using standard techniques. Door to door search was made using single larval technique (Katyal et al. 1996) to find the *Aedes* larval breeding in all the wet containers present in and around the house.

RESULTS AND DISCUSSION

In the study area, a total of 570 houses were searched and 204 were found to be positive for *Aedes* breeding, thereby giving the House index as 36.1%. Similarly, a total of 1191 containers were searched for *Aedes* breeding and 273 were found to be positive for *Aedes* thus giving the container index as 22.9%. The Breteau index was calculated as 47.8. Locality wise House, Container and Breteau indices are given in Table 1. Results revealed that out of the 11 localities surveyed, house index of 10 localities was more than the critical index of 10.0%. Both urban and rural areas of Coimbatore district were therefore, vulnerable for Dengue outbreak as *Aedes* indices are much higher.

House index, Container index and Breteau index in Mettupalayam town were recorded as 34.0%, 26.0% and 50% respectively. This area was also vulnerable for Dengue epidemic and silent transmission of Dengue was going on in the district (Singh et al. 2000). However, till now no case of dengue has been reported from Mettupalayam town.

The overall main containers found positive for *Aedes* mosquitoes were Earthen pots (35.4%) Cement tanks (31.6%), Grinding stones (28.2%), Flowerpots (25.0%), Plastic containers (10.8%) and Tin containers (9.6%) (Table 2).

The results of Coimbatore District as a whole revealed that grinding stones were the most preferred container for *Aedes* breeding. As the people are in the habit of using the Grinding stones for grinding the rice and keeping them in the open as a result rain water accumulates in them which in turn become the potential breeding source for *Aedes*. Cement tanks were the other most preferred container for *Aedes* breeding because water in them was replenished periodically, making them the perennial breeding ground. Besides, other containers positive for *Aedes* breeding in order of preference were; Earthen pots, Flowerpots, Plastic container and Tin containers (Table 2).

In Coimbatore Corporation area, Cement tanks were found to be the most preferred container for *Aedes* breeding because water in them was replenished periodically, making them the perennial breeding sites. Grinding stones were found to be the next most preferred container for *Aedes* breeding. Besides, other containers found positive for *Aedes* breeding in order of preference were; Earthen pots, Tin containers and Plastic containers (Table 3).

Table1. Locality wise House, Container and Breteau indices in Coimbatore Corporation, Mettupalayam town and Rural areas of Coimbatore district

LOCALITY	HOUSE INDEX			CONTAINER INDEX			BRETEAU INDEX
	HS	+VE	HI (%)	CS	+VE	CI (%)	
Coimbatore Corporation							
1. Bharti Nagar Ward No. 24	53	16	30.2	98	18	18.2	34
2. Bharti Nagar ward no. 23	52	22	42.3	106	32	30.2	61.5
3. Grey town ward No.27	15	1	6.7	37	2	5.4	13.3
4. ATT colony ward no.27	20	5	25.0	28	5	17.9	25
5. Ganeshan steet ward No.69	63	12	19.0	99	16	16.2	25.4
6. Maniyakaram pallayam ward no.72	62	10	16.1	138	11	8.8	17.7
TOTAL	265	66	24.9	506	84	16.6	31.6
Mettupalayam							
7. Bharti Nagar	50	17	34.0	96	25	26.0	50
TOTAL	50	17	34.0	96	25	26.0	50
Rural Area							
8. Jiwa Nagar Sirumugai village	77	37	48.0	134	48	35.8	62.3
9. Kuttayar village	53	19	35.8	100	29	29.0	54.7
10. Idikarai village	64	26	40.6	187	39	20.8	60.9
11. Sengalipallyam village	61	39	63.9	168	48	28.5	78.6
TOTAL	255	121	47.4	589	164	27.3	64.3
GRAND TOTAL	570	204	36.1	1191	273	22.9	47.8

Table 2. Infestation of *Aedes aegypti* by Containers in Coimbatore District

LOCALITY	HOUSE INDEX			CONTAINER INDEX			BRETEAU INDEX
	HS	+VE	HI (%)	CS	+VE	CI (%)	
Coimbatore Corporation							
1. Bharti Nagar Ward No. 24	53	16	30.2	98	18	18.2	34
2. Bharti Nagar ward no. 23	52	22	42.3	106	32	30.2	61.5
3. Grey town ward No.27	15	1	6.7	37	2	5.4	13.3
4. ATT colony ward no.27	20	5	25.0	28	5	17.9	25
5. Ganeshan steet ward No.69	63	12	19.0	99	16	16.2	25.4
6. Maniyakaram pallayam ward no.72	62	10	16.1	138	11	8.8	17.7
TOTAL	265	66	24.9	506	84	16.6	31.6
Mettupalayam							
7._Bharti Nagar	50	17	34.0	96	25	26.0	50
TOTAL	50	17	34.0	96	25	26.0	50
Rural Area							
8. Jiwa Nagar Sirumugai village	77	37	48.0	134	48	35.8	62.3
9. Kuttayar village	53	19	35.8	100	29	29.0	54.7
10. Idikarai village	64	26	40.6	187	39	20.8	60.9
11. Sengalipallyam village	61	39	63.9	168	48	28.5	78.6
TOTAL	255	121	47.4	589	164	27.3	64.3
GRAND TOTAL	570	204	36.1	1191	273	22.9	47.8

Table 3. Infestation of *Aedes aegypti* by Containers in Coimbatore Corporation

Type of Containers	Number of Containers with water		Percentage Positive	Breeding Preferences Ratio (BPR) (Y/ X)
	Examined (x%)	With *Aedes* larvae (y%)		
Tin Container	164 (32.4)	17 (20.2)	10.3	0.62
Tyre	2 (0.39)	0 (0.0)	0.0	0.0
Plastic Containers	84 (16.6)	8 (9.5)	9.5	0.57
Earthen pot	9 (1.7)	1 (1.1)	11.1	0.64
Cement Tank	205 (40.5)	49 (58.3)	23.3	1.43
Flower Pots	1 (0.19)	0 (0.0)	0.0	0.0
Grinding Stone	41 (8.10)	9 (10.7)	21.9	1.3
Total	506	84		

Data in Parentheses represent percentages

In Mettupalayam town area Grinding stones were found to be the most preferred containers for *Aedes* breeding followed by Earthen pots. Besides other containers positive for *Aedes* breeding in order of preference were; Cement tanks, Flower pots, Tin containers and Plastic containers (Table 4).

In Rural areas, Earthen pots were found to be the most preferred containers for *Aedes* breeding followed by Cement tanks. Besides other containers positive for *Aedes* breeding in order of preference were; Grinding stones, Flower pots, Plastic containers and Tin containers (Table 5).

In view of the high larval indices recorded from all the study areas and possibility of an impending outbreak of Dengue/ DHF, strict preventive measures like IEC, source reduction and pyrethrum space sprays were undertaken to minimize the breeding potential of *Aedes aegypti* and to keep the vector density below the critical level that resulted in prevention of any major outbreak of Dengue fever/DHF and its spread to the adjoining areas.

Table 4.Infestation of *Aedes aegypti* by Containers in Mettupalayam Town

Type of Containers	Number of Containers with water		Percentage Positive	Breeding Preferences Ratio (BPR) (Y/ X)
	Examined (x%)	With *Aedes* larvae (y%)		
Tin Container	14 (14.5)	3 (12.0)	21.4	0.82
Tyre	2 (2.0)	0 (0.0)	0.0	0.0
Plastic Containers	18 (18.7)	1 (4.0)	5.5	0.21
Earthen pot	2 (2.0)	1 (4.0)	50.0	2.0
Cement Tank	46 (47.9)	15 (60.0)	32.6	1.25
Flower Pots	11 (11.4)	3 (12.0)	27.2	1.05
Grinding Stone	3 (3.1)	2 (8.0)	66.6	2.5
Total	96	25		

Table 5. Infestation of *Aedes aegypti* by Containers in rural areas of Coimbatore District

Type of Containers	Number of Containers with water		Percentage Positive	Breeding Preferences Ratio (BPR) (Y/ X)
	Examined (x%)	With *Aedes* larvae (y%)		
Tin Container	92 (15.6)	6 (3.6)	6.5	0.23
Tyre	1 (0.16)	0 (0.0)	0.0	0.0
Plastic Containers	83 (14.0)	11 (6.7)	13.2	0.47
Earthen pot	20 (3.3)	9 (5.4)	45.0	1.63
Cement Tank	292 (49.5)	108 (65.8)	36.9	1.32
Flower Pots	0 (0.0)	0 (0.0)	0.0	0
Grinding Stone	101 (17.1)	30 (18.2)	29.7	1.06
Total				

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