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PREVENTIVE METHODS FOR VECTOR BORNE DISEASES CONTROL (FILARIAS) IN SLUM AREAS.

Ch. Suneetha[1*], Osama Asanousi Lamma[2], MSSR Tejaswini[3], Jaffar Shaik[4]

[1,3]Department of Environmental Science, Acharya Nagarjuna University, Guntur 522510, Andhra Pradesh, India.
[2]Research Scholar, Department of Environmental Science, Acharya Nagarjuna University, Guntur 522510, Andhra Pradesh, India.
[4]Department of Biochemistry, Acharya Nagarjuna University, Guntur 522510, Andhra Pradesh, India.

ABSTRACT

Our country facing serious issues in health sector due to population pressure, urbanization, environmental pollution and fast depletion of natural resources leads poor sanitation in urban environment. Breeding source and vector habitats are the main reason for re-emergence of VBD in the country. One of the most common problems associated with the poorly designed Landfills and poorly managed solid waste is that it leads to attraction of large number of vectors such as female culex etc., which is responsible for the proliferation of breeding sites of mosquitoes causing Vector borne diseases such as, Filariasis. The present study was carried out through survey and conducted for about 250 houses in six prone areas of vectors in Vijayawada. Here identification of vectors was carried out in fresh water, drains, drainage using sampling techniques. This helped in detection of mosquitoes. Subsequently control measures were carried out in peri-domestic places.

KEY WORDS: Landfills, Urbanization, Vector Born disease.

INTRODUCTION

Vector borne diseases like filaria and dengue are major problem in India. Poor environmental sanitation and high population density are the major factors causing these problems. Remote sensing is an advanced technology to apply and identify the vector habitats with maximum accuracy. The distribution of vector-borne diseases is largely determined by the availability of suitable habitats. The environmental factors like climate, rainfall, soil, altitude and human population are very important parameter that responsive to spread of the diseases [1,2]. The life of mosquitoes was influenced by variations in climatic conditions, and hence there is diversity in distribution and habitats of different vector species. Pemola and Jauhari (2006) have also reported that climate variability and breeding of mosquitoes are considered to be one of the important environmental contributors for disease transmission. In urban environment major factors for vector surveillance are garbage, sanitary waste, drainage, open water storage activities and landscape ecology etc. Type of ditch or drain, best suited for a particular situation, will depend upon topography, source of water and landscape ecology will be an important factor for VMC in city area. These factors are increased by increasing level of human population [3].

The highest density of human population leads to increasing the vector abundance and increased the contact between humans where the diseases incidence and transmission highly occur. In forest environment soil and agricultural irrigation is an important factor for vector habitats. The soil drainage capacity determines internal hydro-mechanics. So the distribution pattern of soil plays a major role for mosquito breeding pools and can influence the development of the mosquito species. Mosquito species prefer to establish at various heights where optimum ecological requirements which favor their survival are met [4,5].

LYMPHATIC FILARIASIS

Bancroftian filariasis (*Wuchereria bancrofti*) is prevalent in Andhra Pradeshbut disease has been recorded in only seven districts, namely (Krishna, Nalgonda, Khammam, Prakasham, Guntur, West Godavari).

Corresponding Author:- **Ch. Suneetha** E-mail: shaikjaffar2008@yahoo.com

This reporting is based on indigenous transmission evidenced by clinical cases and microfilariae carriers in the communities. The mosquito vector, *Culex quinquefasciatus* is a common household mosquito and constitutes a major source of nuisance throughout the rural/urban areas of the region. It has been repeatedly incriminated with a high rate of infection (6.1%) and infectivity (4.6%) of the L3 parasite of *W. bancrofti* in disease-endemic districts, and recorded breeding in a variety of polluted water bodies, for example, open drainage, sewage water collections and ditches, often in close proximity to human habitations.

Surveys of the prevalence of filariasis in these districts have revealed a significantly higher microfilaria rate (4.7–10.3%) in tea garden tribes (descendants of migrated tribes from West Bengal, Bihar, Madhya Pradesh, Odisha and Uttar Pradesh), as against the indigenous populations living in close vicinity to a tea garden, which could be attributed to variation in sociocultural living conditions and host–parasite response [6,7]. The microfilaria rates, however, were consistently higher in males than females. In these communities, cases of chronic filariasis with involvement of the genitals were more common than those involving the lower extremities. For control of filariasis, beginning in 2005, seven endemic districts were subjected to annual rounds of mass drug administration (MDA) of diethylcarbamazine + albendazole in eligible population groups, that is, excluding children aged <2 years, pregnant women and seriously ill persons. Additional measures included home-based management of lymphoedema cases and scaling up of hydrocele operations in the identified.

Filarial endemic city is steadily declining to meet the national goal of filarial elimination by 2015. The state health department is continuously strengthening health-care services for better case management, coupled with mass awareness campaigns for disease prevention [8,9]. For control of disease vectors, interventions are applied by recurrent anti-larval measures in urban areas, combined with sanitary measures including filling ditches, pits and low-lying areas, de-weeding, de-silting, application of larvivorous fish, and, for control of the adult mosquito population, thermal fogging operations carried out on a continuing basis. One of the most common problems associated with the poorly designed Landfills and poorly managed solid waste is that it leads to attraction of large number of vectors such as, culex etc which is responsible for causing diseases such as, filariasis. A survey was conducted for about 250 houses in six prone areas of vectors in Vijayawada. These areas mainly included Singh nagar Vombay Colony, Chintugunta. Ranigarithota, One Town, areas near Chlorea hospital which includes hilly mountains areas, Vidhyadharipuram, etc.

MATERIALS AND METHODS

Study Area

The mosquito larval survey was conducted from may 2014-june 2014 in Singh nagar Vombay Colony, Chintugunta. Ranigarithota, One Town, areas near Chlorea hospital which includes hilly mountains areas, Vidhyadharipuram, etc Krishna district, (10° 47′ 40.56″ N, 78° 41′ 6″ E) Andhra Pradesh, India. Krishna district lies at the heart of Andhra Pradesh. The district has an area of 8,727 square kilometers Krishna river flows through the length of the district and is the principal source of irrigation and water supply. The annual rainfall in the region is about 1028 mm and is contributed to by the Southwest monsoon. The main hill range of the district known as Kondapalli runs between Nandigama and Vijayawada with a length of about 24 km. The other smaller hill ranges are Jammalavoidurgam, Mogalrajapuram and Indrakiladri hills

Larval Collection

During the survey, all the containers and reachable tree holes. Larvae collection was carried outdoors by dipping, using pipette or dipper depending on container type and location. In this study, “outdoor” refers to the outside of building but confined to its immediate area. The number, type and water condition of containers which serve as a potential breeding site was examined and recorded using container index (CI). Number of container positive Container index = × 100Number of container inspected The collected larvae and pupae were kept in the laboratory for adult emergence. The emerged adult mosquitoes were then pinned and identified.

For collection Larvae Culex vector

We identified 25 potential larval habitat sites at MLS). Only three (12%) of 25 were anthropogenic. Median volume for natural sites (3.01 liters, Range: 0.07 – 280.57, n= 22) was smaller but not significantly different ($\chi 2$= 0.17, df= 1, P= 0.68) than the median volume of anthropogenic sites (4.96 liters, Range: 0.27 – 118.58, n= 3). While no anthropogenic sites contained evidence of mosquitoes, five (23%) of 22 naturally-occurring sites contained Cx. quinquefasciatus. Ae. albopictus was not identified in any larval habitat at MLS. We located 11 tree holes containing water, all in koa, but there was no evidence of mosquito presence. All naturally-occurring sites that contained Cx. quinquefasciatus were in stream drainages discovered during ground surveys [11,12].

Figure 1. Different Breeding containers for Culex vectors

Identification of Collected Larvae

The collected specimens were preserved in plastic vials for further identification. Immature forms of mosquito larvae were collected by dipper method [8], reared in metal trays in the laboratory and fed with larval feed.

Figure 2. Identification of Collected Larvae

VECTOR CONTROL MEASURES

1. Source reduction
2. Anti larval activities a] Biological b] Chemical
3. Anti Adult mosquite measures a] indoor spray
   b] Outdoor spray
4. Health education on protection

1**) SOURCE REDUCTION**

To void water stagnations by filling low lying areas. It is carried out in two ways

1. Elimination or reduction of breeding sites primarily involving engineering methods.
2. Environmental manipulation.

Elimination or reduction of breeding sites

a) **Drains Surface ditches**. Proper choice of side slopes and grades can reduce maintenance

b) **Vertical drains:** When water is held on the surface by an impervious stratum which is known to overlie one that is previous, it may be economical and effective to utilize vertical drainage

The Insectides like Alphacypermethrin 5% & Pythreum 10% are used in control of vector Culex. Pyrethrin can kill insects rapidly at very low concentrations. It has what is known as a fast "knockdown." Generally flying insects are killed quickly is an organophosphate larvicide used to treat water infested with disease-carrying insects About 0.250 kg of Alphacypermethrin, 125kg of Pythreum are used of prepare 10liters of suspension. This have 10 to 12of (Alphacypermethrin) & 10 to 12(Pythreum) As Residual effects in weeks [13]. The Dosage per square Metre of active Ingredient are 25mg for both these Insectides, the Frequency of application is 24-48 hrs. Placing Oil balls in all medium and large stagnated water bodies was done.

ANTI ADULT MOSQUITO MEASURES:

A) **INDOOR SPRAY:**

1) **Indoor Residual Spray:** conducted malathion 25% solution spray on the surface of the walls of every house existing in high risk areas of vector borne diseases like, Filaria etc.

Figure 3. Indoor Residual Spray

2) **Pyrethrum space spray**: conducted Pyrethrum indoor space spray in all the houses situated in and around of Filarasis and high risk areas for the control of vector borne diseases.

B} **OUT DOOR SPRAY**: conducted malathion fogging operation once in aweek at high risk areas of malaria and Dengue fevers to control mosquitoes with hand fogging machines and vehicle mounted machines.

Figure 4. Out Door Spray

Conducted health awareness camps in all high areas of Filarasis with all corporation Malaria staff District Malaria staff, Corporation, NMS, Community organizers under the supervision of health Educator and the following Measures are highlighted.

Table 1. Observations

Name of the Vector	Vector-Borne Disease	Causative Agent	Breeding areas	Feeding Habits	Characteristic of Larvae	Life Span
Culex	Filarasis	*Wuchereria Bancrofti Brugia malayi*	Tanks, Cisterns, Bottles, Tins,Claypots Plastic containers	fed primarily on birds,. Culex salinarius Coquillett and Coquillettidia perturbans (Walker) fed mainly on mammals, with fewer blood meals taken from birds	It can lays 200-500 eggs It can travel Upto 11kms Tail of the Larvae is up and head is inside	10 - 12 DAYS

Table 2. First Week

Areas of Vectorculex	Identified	Controlled
Vombay Colony(singh nagar)	13	10
Rani Garithota	12	8

Table 3. Second Week

Areas of Vectorculex	Identified	Controlled
Chintugunta Area	7	5
Ayodhya Nagar	15	13

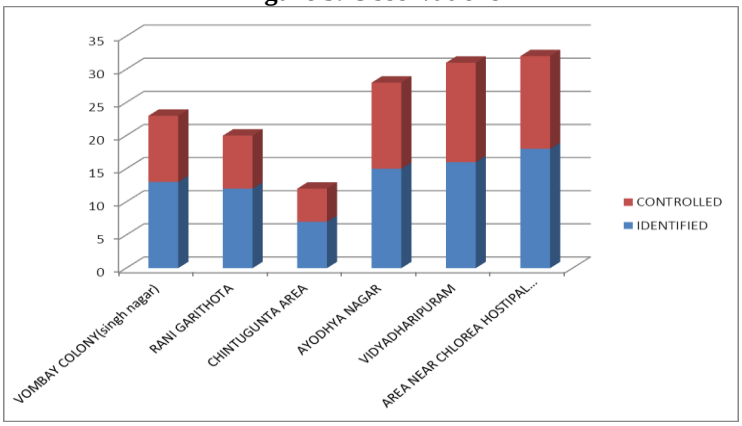
Table 4. Third Week

Areas of Vectorculex	Identified	Controlled
VIDYADHARIPURAM	16	15

Table 5. Fourth Week

Areas of Vectorculex	Identified	Controlled
AREA NEAR CHLOREA HOSTIPAL ONE TOWN (hilly areas)	18	14

Figure 5. Observations



RESULT

FILARASIS

First Week

About 13 larvae of Culex vectors were being identified in Vombay colony colonynear singh nagar. . Out of these we were able to control 10 mosquitoes. When as in Ranigarithota 12 mosquitoes larvae hence being identified using various sampling methods. About 7 larvae of Culex vectors were being identified in Chintugunta Area.

Out of these we were able to control 5 mosquitoes. Whenas in Ayodhya Nagar 15 mosquitoes larvae hence being identified using various sampling methods. We were able to kill 13 mosquitoes About 16 larvae of Culex vectors were being identified in. Out of these we were able to control 15 mosquitoes. About 18 larvae of Culex vectors were being identified in. Area near Chlorea Hostipal One Town (hilly areas).

Out of these we were able to control 14 mosquitoes. The Insectides like Alphacypermethrin 5% & Pythreum 10% are used in control of vector Culex. Space spraying of pyrethrum extract (2%) in 50 houses in and around every malaria and Filarasis positive cases to kill the infective mosquitoes is done. conducted malathion fogging operation once in a week at high risk areas of malaria and filarsis fevers to control mosquitoes with hand fogging machines and vehicle mounted machines . 1} Indoor Residual Spray: conducted malathion 25% solution spray on the surface of the walls of every house existing in high risk areas of vector borne diseases like Malaria Dengue, Filaria etc. The X axis represents areas in which project was carried out, it mainly includes, Singh nagar Vombay Colony, Chintugunta. Ranigarithota,One Town, areas near Chlorea hospital which includes hilly mountains areas, Vidhyadharipuram. Y Axis represents the number of vector of Filarasis that is being indentified and controlled. The total number of malaria vector indentified is 81. Out of this 64 vectors were controlled using different controlled measures.

CONCLUSION

Cx. quinquefasciatus were collected from unused well and mud pot containing high organic matter were found in the waste tyre and tree holes. The morphology and taxonomy of the adult mosquitoes wereidentified based on the examination of the taxonomic keys. *Aedes*adult mosquito has exposed patterns of the torax formed by black, white or silvery scales. The legs were often black with white rings. In Krishna district was due to the storage of water in cement tanks and plastic container. From this investigation, it is clear that there are many chances of mild dengue viral infection spreading in the sampling location. Among all type of containers surveyed, cement cistern (59.25%), mud pot (53.84), tyre (42.85), unused well (33.33), plastic container and vessels (25%) were positive for the mosquito larvae.

The collected mosquito larvae included Culex vectors *Cx. quinquefasciatus* were collected from unused well and mud pot containing high organic matter morphology was observed by following characters. The proboscis was without pale band. Legs were dark brown and pale posteriorly. The hind femur was with pale stripe on anterior surface and narrow pale band in abdominal tergite segments. Tarsal segments were without basal pale bands.

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CONFLICT OF INTEREST:

The authors declare that they have no conflict of interest.

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