Original Research Article

Evaluation of Indoor Vector Surveillance Regarding Dengue in Shahdara, Lahore

Ms Yasmeen Ghafoor
Nurse Manager, Govt. Teaching Hospital, Shahdara, Lahore, Pakistan

*Corresponding Author:
Ms Yasmeen Ghafoor
Email: yasmeenghafoor15@gmail.com

Abstract: The objectives of the study are to find out the evaluation of dengue indoor vector surveillance done by the teams of Shahdara, Lahore and awareness of health hazards of dengue fever. It was a cross sectional descriptive study. The study was done in UC 3 & 4 of Shahdara, Lahore. There were total of 100 households selected through simple random sampling. The interviewers were assessed using pre designed questionnaire containing questions about dengue team performance and awareness of the household members regarding dengue. Our study suggested a good level of performance of dengue team (83%) as answered by the people. Regarding awareness in general public revealed only little adequate knowledge (8%) but awareness of protective measures was high (71%).Awareness about mosquito as a vector was 73% in our study. Awareness level regarding use of any measure of protection was high (71%) in our study. The respondents were asked about their knowledge about Dengue. Many of them stated that they got knowledge from electronic and print media. The teams were lacking in knowledge and training. These members were not having identity cards or proper uniform. In fact there is acute shortage of the workers in the field. The indoor teams spend less time inside the house and they seem to be in a hurry. Proper checking of all the breeding places will certainly insure the increase in efficacy of the surveillance.
Keywords: Dengue, Surveillance, Evaluation, population

INTRODUCTION

Dengue is infectious mosquito borne viral disease. Dengue is characterized by episodes of fever, joint pain and muscles pain. It is the life threatening fever and it's transmitted through the Aedes mosquito and indoor vector of person. This also called dandy fever.

Dengue mosquito can conceal and breed in goods that are traded. An infected person may also spread the virus of this disease to mosquitoes in a new region. Usually the areas where building construction and the lack of piped water leads to pools of water, mosquitoes bloom.

Dengue is the commonest arthropod borne viral infection in the human body. Dengue is caused by a virus named as FLAVIVIRUS. There are 4 different types of antigenic of dengue virus. These all are transmitted by the Aedes Aegypti biting in day time. Mosquitoes may infective about 15 days after feeding on an infected person and remain so for the rest of their lives [2].

Mild infections are common observed by dengue viral from which two clinical types are well known: First is the classic dengue fever which characterized by the abrupt beginof fever, headache, facial flushing, retro bulbar pain and skin rashes may also occur. These rashes are short-lived, appear on the limbs and then spread to involve the entire body. Cough in dengue is uncommon. This fever subsides after four days and temperature back to normal in a couple of days. This saddleback procedure is considered characteristic. It is also observed that dengue fever is the self limiting disease.

Second is the hemorrhagic fever is a harsh form of dengue fever and supposed to be the outcome of 2 or more chronological infections with different dengue serotypes. Usually children may effect from this fever. This kind of fever has a meek start often with symptoms of upper respiratory area infection, high fever accompanied by the facial flushing & headache [2]

This fever followed to the immediate start of shocks and hemorrhage in the skin and often from ears which is known as dengue shock syndrome.

Dengue effected personnel should be advised to sleep inside the impregnated net and topical repellents. Aegypti mosquitoes may be destroyed by sprays. Treatment of dengue mosquitoes is indicative and supportive. Body sponging is required to keep the body temperature low.

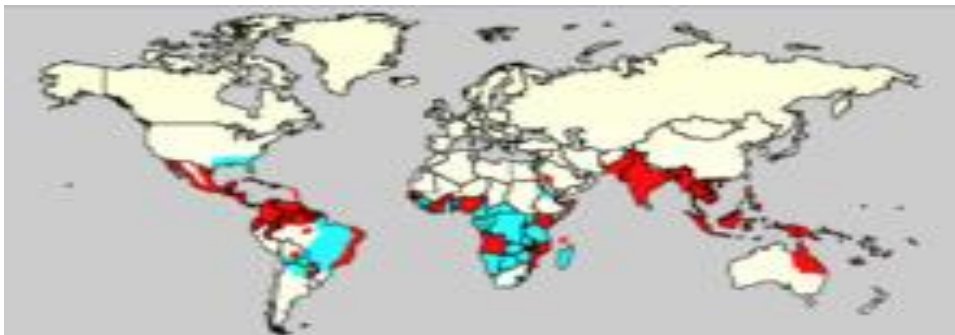**Fig-1:** *Aedes aegypti & Aedes. albopictus*

Fig-2: World wide distribution of aedies agypti-----Red Epidemic areas
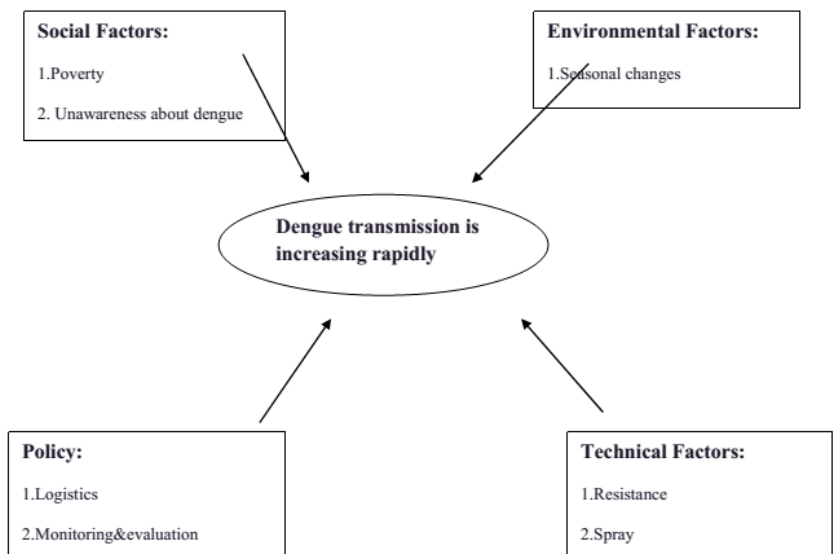

Fig-3: Conceptual Framework

As far as dengue is concerned Lahore is one of the high risk districts. In past the confirmed dengue reported cases are as under. End of 2012, there were 119 patients, in 2013, 112 patients, in 2014, 97 patients in 2015, there were 146 confirmed dengue patients. In 2016, till date (29.10.2016) the total number was 474.

Close watch on *A.aegypti* density is important in determining factors related to dengue transmission, in order to prioritize areas and seasons for vector control. Selection of appropriate surveillance strategies are based upon outcome/objective, also taking into consideration time, resources, and infestation levels [3]

Furthermore, vector surveillance is required to carry on the control measures and detect any increase in vector density.

The most used indicators for vector surveillance are: [3]

Larval surveys:
House index (HI): percentage of houses infested with larvae or pupae.

Container index (CI): percentage of water-holding containers infested with larvae or pupae.

Breteau index (BI): number of positive containers per 100 houses inspected.

Pupae surveys:
Pupae index (PI): number of pupae per 100 houses inspected.

Adult surveys:
Estimating adult population density using ovitraps, sticky traps, human landing collections or any similar traps.

Symptoms of Dengue Fever
Symptoms, which usually begin four to six days after infection and last for up to 10 days, may include:

- Sudden, high fever
- Severe headaches
- Pain behind the eyes
- Severe joint and muscle pain
- Fatigue
- Nausea
- Vomiting
- Skin rash, which appears two to five days after the onset of fever
- Mild bleeding (such a nose bleed, bleeding gums, or easy bruising)

Sometimes, symptoms are mild and can be mistaken for those of the flu or another viral infection.

Younger children and people who have never had the infection before tend to have milder cases than older children and adults. However, serious problems can develop. These include dengue hemorrhagic fever, a rare complication characterized by high fever, damage to lymph and blood vessels, bleeding from the nose and gums, enlargement of the liver, and failure of the circulatory system. The symptoms may progress to massive bleeding, shock, and death. This is called dengue shock syndrome (DSS).

People with weakened immune systems as well as those with a second or subsequent dengue infection are believed to be at greater risk for developing dengue hemorrhagic fever.

Diagnosing Dengue Fever
Health care professionals use blood tests to check for presence of infection in human body. There is no medicine specifically for this infection. If any person infected with dengue, he/she should use over-the-counter pain relievers to reduce your fever, headache, and joint pain. But, aspirin can cause more bleeding and should be avoided.

Treatment for Dengue Fever
As for as treatment of dengue fever is concern currently no specific treatment to treat dengue infection. A person having dengue fever should use pain relievers with and avoid with aspirin, which can cause bleeding.

Preventing Dengue Fever
Currently no vaccination invents to prevent dengue fever. Most easy way to prevent the disease is to prevent bites by infected mosquitoes, particularly if you are living in or traveling to a tropical area.

Global burden of dengue
Since last decade frequency of growth in dengue severely around the world. Mostly the genuine numbers of dengue cases are unreported and many cases are misclassified. A recent survey shows that approximately 350 million dengue infections per year (95% credible interval 284–528 million), of which 96 million (67–136 million) manifest clinically (with any severity of disease) [4].

On the other hands not only is the number of cases escalating as the disease spreads to new areas, but explosive outbreaks are occurring.

Year of 2015 was characterized by huge dengue outbreaks worldwide, Philippines reporting more than 150, 000 cases and Malaysia more than 100, 000 supposed cases of dengue, representing a 59.5% and 16% increase in case numbers to the previous year, respectively.

Transmission

The *Aedes aegypti* mosquito is the KEY vector of dengue. This virus is transmitted to human body via the bites of infected female mosquitoes. After virus incubation for 4–10 days, an infected mosquito is capable of transmit the virus for the rest of its life.

These mosquitos found in urban habitats and breed mostly in artificial containers. Its peak biting periods is early in the morning and in the evening before sunset.

This is secondary dengue vector in Asia, has spread to more than 20 countries in the European Region, largely due to the international trade in used tyres and other goods (e.g. Air coolers, water tubs etc).

Treatment

There is no specific treatment for dengue fever. Treatment of dengue is indicative and supportive. Body sponging and antipyretic is generally required to maintain the body temperature below 40°C. Aspirin is strictly avoided for this temperature. Maintenance of the patient's body fluid volume is critical to severe dengue care [2]

Blood transfusion is recommended in case of constant shock.

Rationale of the Study

Dengue is an emerging disease which has recently occupied most of the major cities of Pakistan. Lahore had faced a devastating outbreak in 2011, since then Government and other donor agencies are working for the purge of the mosquito during and after rainy season.

In this regard vector surveillance plays a vital role. Indoor vector surveillance is nearly ignored because of social and Islamic constraints. Although it's well said prevention is better than cure. So this study is designed to look into this matter and note down the accuracy of indoor vector surveillance teams visiting UC No. 3 &4 of Shahdara, Lahore.

OBJECTIVES

The objectives of the study are to find out the:-

1. Evaluation of dengue indoor vector surveillance done by the teams of Shahdara UC 3 & 4, Lahore.
2. Awareness of health hazards of dengue fever.

MATERIAL AND METHODS

Study Design

The study was a cross-sectional descriptive study.

Study Setting

The study was conducted among households of UC No. 3 & 4 Shahdara, Lahore.

Study Duration

The study was conducted for a period of 04 weeks after the acceptance of synopsis.

Sample Size

$$n = \frac{z^2_{1-\alpha/2}P(1-P)N}{d^2(N-1) + z^2_{1-\alpha/2}P(1-P)}$$

Where,
P = 0.50
d = 0.10
N = 7500
n = 95

Sampling Technique

Simple Random sampling technique using random number tables.

Inclusion

1. Households consenting for interview and indoor checking.

Exclusion

1. Households not consenting for interview and indoor checking.

METHODOLOGY

Data Collection Procedure

The procedure of data collection consist on Semi-structured Interview questionnaire comprise the questions for evaluation of indoor vector surveillance regarding dengue.

Data Analysis

After completion of questionnaires, data will entered in the computer software of analysis. SPSS 20 were used for this, frequency & percentages were calculated for the qualitative variables.

Ethical Considerations

The respondents are prior informed for reason of study. The confidentiality of information was ensured.

Estimated Cost of the Project

Estimated Cost of Project and Items Used

Sr. No.	Name of Item	Quantity	Approx. Cost (RS)
1.	Transportation	Multiple	10000
2.	Assistant	1*10 Weeks	10000
3.	Communication	Multiple	1500
4.	Paper 80 Grams	04 Rims	2000
5.	Photocopy	600 Pages	1500
6.	Book Binding	5 Copies	5000
Total			**30000**

Outcome & Utilization

The study will help as a monitoring tool for the government and planning agencies. It will also help to check the efficacy of staff appointed for vector surveillance.

Plan of work

Gantt chart

Weeks	2	4	6	8	10	12
Preparing Research Protocol	▓					
Preparing Questionnaire	▓					
Data/Sample Collection	▓	▓				
Data Analysis			▓	▓		
Compiling and Writing				▓	▓	▓

Table I: Descriptive Statistics

Variables	Age in years	Family income (Rupees)	Number of visits
Mean	37.46	19330	2.18
Std. Deviation	9.698	11561.041	0.539
Minimum	16	5000	1
Maximum	80	70000	3

Table shows the mean age of respondents was 37.46±9.698 years. Mean family income of respondents was 19330±11561.041rupees. Mean number of visits was 2.18±0.539times.

Table II: Socio-Demographic Characteristics

Age (Years)	Frequency	Percentage
<25	11	11
26-35	34	34
35-50	50	50
>50.	5	5
Total	**100**	**100**
Sex		
Male	98	98
Female	02	02
Total	**100**	**100**
Education		
Illiterate	40	40
Literate	60	60
Total	**100**	**100**
Occupation		
Laborer	59	59
Business	25	25
Government/Private Job	14	14
House Wife	02	02
Total	**100**	**100**

Family Members		
1 – 3	08	08
4 – 6	59	59
7 – 9	29	29
> 9	04	04
Total	**100**	**100**
Monthly Income		
< 20,000	78	78
20000 – 35000	14	14
35000 – 50000	05	05
> 50000	03	03
Total	**100**	**100**

Table II shows the Socio-Demographic Characteristics of the respondents;

From total 100 respondents, age in years shows that 11 (11%) were less than 25 years, 34 (34%) were between 26-35 years, 50 (50%) were between 35 to 50 years while 05 (5%) were more than 50 years of age.

Sex of respondents were found that 98 (98%) were males and only 02 (2%) were females.

Educational status shows that 40 (40%) were illiterate and 60 (60%) were literates. Respondent's occupational status shows that 59 (59%) were laborers, 25 (25%) owns a business, 14 (14%) having government/private job and 02 (2%) were house wives. Number of family members shows that out of total 100 respondents, 08 (8%) had 1 to 3 family members, 59 (59%) had 4 to 6 members, 29 (29%) had 7 to 9 members whereas only 4 (4%) had more than 9 members.

Monthly Family income status shows that 78 (78%) were having less than 20000 PKR income, 14 (14%) were having between 20000 to 35000 monthly income, 05 (5%) had between 35000 to 50000 rupees and only 03 (3%) had more than 50000 PKR family income per month.

Table III: Dengue Team Evaluation

Team Visits (Previous Month)	Frequency	Percentage
1 – 2	75	75
> 2	25	25
Total	**100**	**100**
Wearing Uniform/ID Card		
Yes	98	98
No	02	02
Total	**100**	**100**
Surveillance Kit		
Yes	98	98
No	92	02
Total	**100**	**100**
Physically Checked Roof Top		
Yes	66	66
No	34	34
Total	**100**	**100**
Overhead Water Tank and Water Reservoirs		
Yes	90	90
No	10	10
Total	**100**	**100**
Checked Air Coolers		
Yes	36	36
No	64	64
Total	**100**	**100**
Checked Scrap Material/Building Material		
Yes	99	99

No	01	01
Total	**100**	**100**
Larvae Detected		
Yes	46	46
No	54	54
Total	**100**	**100**
Well Trained and Have Sound Knowledge		
Yes	93	93
No	07	07
Total	**100**	**100**
Satisfied with Team		
Yes	90	90
No	10	10
Total	**100**	**100**
Team Provided Dengue Literature		
Yes	62	62
No	38	38
Total	**100**	**100**
Overall Performance		
Poor	17	17
Good	83	83
Total	**100**	**100**

Table IV: Awareness Level of Respondents

Family Member Suffered with Dengue	**Frequency**	**Percentage**
Yes	31	31
No	69	69
Total	**100**	**100**
Breeding Places of Mosquitoes		
Yes	75	75
No	25	25
Total	**100**	**100**
Regularly Check Breeding Places		
Yes	66	66
No	34	34
Total	**100**	**100**
Information about Shape of Dengue Mosquito		
Yes	73	73
No	27	27
Total	**100**	**100**
Biting Habit of Mosquito		
Yes	43	43
No	57	57
Total	**100**	**100**
Protection from Dengue		
Yes	74	74
No	26	26
Total	**100**	**100**
Wearing Full Sleeve Shirt		
Yes	71	71
No	29	29
Total	**100**	**100**
Don't Wear Knickers		
Yes	37	37
No	63	63
Total	**100**	**100**

Use Nets While Sleeping		
Yes	09	09
No	91	91
Total	**100**	**100**
Use Mosquito Repellent Oils		
Yes	06	06
No	94	94
Total	**100**	**100**
Keep Your Environment Dry		
Yes	35	35
No	65	65
Total	**100**	**100**
High Grade Fever		
Yes	81	81
No	19	19
Total	**100**	**100**
Severe Headache		
Yes	65	65
No	35	35
Total	**100**	**100**
Nausea & Vomiting		
Yes	25	25
No	75	75
Total	**100**	**100**
Retro-orbital Pain		
Yes	05	05
No	95	95
Total	**100**	**100**
Severe Joint & Muscle Pain		
Yes	14	14
No	86	86
Total	**100**	**100**
Skin Rashes		
Yes	22	22
No	78	78
Total	**100**	**100**
Bleeding from Nose		
Yes	39	39
No	61	61
Total	**100**	**100**
Fatal Complications of Dengue		
Yes	38	38
No	62	62
Total	**100**	**100**
Hazardous & Dangerous Effects		
Yes	69	69
No	31	31
Total	**100**	**100**
Awareness Level		
Inadequate	92	92
Adequate	08	08
Total	**100**	**100**

DISCUSSION

This study was conducted to assess dengue surveillance team performance and public awareness regarding dengue infection. Our study suggested a good level of performance of dengue team (83%) as answered by the people. Regarding awareness in

general public revealed only little adequate knowledge (8%) but awareness of protective measures was high (71%). The reason may be high prevalence of dengue in our region, so people are practicing some measures against mosquito. In our study 81% identified fever, severe headache65% and hazardous and dangerous effects69%.

Awareness about mosquito as a vector was 73% in our study. This awareness was also high in study. In our study 43% identified correct biting habit in contrast to 85%. Knowledge about protective measures in our study was wearing full sleeve shirt (71%), don't wear knickers (37%), Use nets while sleeping (9%), use mosquito repellent oils (6%). Regarding awareness of fatal complications of dengue, 38% think it to be fatal disease and 69% think its hazardous. This could be because they are very much aware about dengue management. Awareness level regarding use of any measure of protection was high in our study because majority of respondents were literate, of middle class and young, but low cost methods were more preferred and no methods like checking coolers or flower pots for mosquito breeding, discarding waste items that can hold water were less checked because of poor knowledge about them. Use of full sleeves and trousers was relatively low as compared to knowledge; reason may be hot climate in our area.

CONCLUSION

Disease and Vector surveillance is the most effective part in fighting against any vector borne disease. Surveillance helps in knowing the areas of high density infestation, period of vector population and changes in geographical distribution and density of vector. It assists the authorities for early warning of diseases. It also helps to evaluate the control Programme, obtain relative measurements of Vector population and facilitate proper and timely decision for intervention.

The purpose of Indoor and Outdoor Vector is not only to eradicate the breeding places of vector but also to educate the people about the hazards of vector borne disease. The main components of vector surveillance are health education, Communication, Social Mobilization, advocacy Institutional & Capacity Building Research and Development for high-risk areas.

This research was to evaluate the indoor vector surveillance done by the teams in UC 69, SHAHDARA Lahore. The respondents were also asked about their knowledge and awareness about dengue.

Union Council No. 3 & is a central part of the city Lahore. It is urban and thickly populated area. Mostly middle and lower middle class people live here. There are 12 indoor teams working in this UC. Each team comprises of 2 female and one male worker. These females visit inside the house and check the breeding places of the mosquitos while male member provide security to the females and also conduct surveillance in the areas where females could not reach. Hence the indoor teams play pivotal role in the whole system.

Apart from few short coming, the surveillance of indoor teams was found satisfactory but still needs some improvement.

The respondents were asked about their knowledge about Dengue. Many of them stated that they got knowledge from electronic and print media. The teams were lacking in knowledge and training. These members were not having identity cards or proper uniform. In fact there is acute shortage of the workers in the field. The indoor teams spend less time inside the house and they seem to be in a hurry. Proper checking of all the breeding places will certainly insure the increase in efficacy of the surveillance.

RECOMMENDATIONS

After careful consideration of the Disease and Vector Surveillance by the indoor teams in UC -3 &4 SHAHDARA, Lahore, the following recommendations are given for better working of these teams:

1. The teams must be provided ID cards & Proper uniform. In addition to this Surveillance kits are also essential for the Surveillance Teams.
2. The teams should spend more time in the house and check all the breeding places in the house.
3. Proper training and capacity building is most necessary.
4. These should provide proper knowledge and awareness about the vectors.
5. The workers should be better qualified so that they can have better knowledge.

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DATA COLLECTION PROFORMA/QUESTIONNAIRE FOR EVALUATION OF INDOOR VECTOR SURVEILLANCE IN UC NO.69, SHAHDARA, LAHORE.

Name of the Interviewer: _____

Serial No: _____ House No._____

Name: _____ Age (Years): _____

Occupation: _____ Income (Rs.): _____

Education: _____ Number of Family members:_____

Contact No. _____ Knock the door and say words of prayer as Assalam o Alaikum, and introduce yourself and clearly explain the purpose of visit and get informed consent from the owner of the house for interview.

SR #	QUESTION TO HOUSEHOLD OWNER /OBSERVATION	ANSWER		SCORES
		YES	NO	
1.	Did any type of health team visit your house to check dengue vector (Mosquito) in previous days?			
2.	How many times team visited your house during last month?			
3.	Any female also included in team?			
4.	Were Team members self-introductory, by wearing any special uniform and identity card?			
5.	Was team equipped with surveillance kit (Torch, Lens, dippers and beakers etc.)			
6.	Did team physically check roof top of your house?			
7.	Did team check overhead water tank and water reservoirs placed in the house?			
8.	Did team check air coolers in your house?			
9.	Did team check backyards, lawn, scrap material / building material (if exist in the house) and other suspected containers properly?			
10.	Did team detect larva in any container at your house?			
11.	Do you feel that team members were well trained and having sound knowledge regarding dengue?			
12.	Are you satisfied with the performance of the Team?			
13.	Did team provide any dengue related literature?			
	AWARENESS			
14.	Did any of your family members got Dengue in previous years?			
15.	Do you know about the breeding places of mosquitoes?			
16.	Do you check the breeding places in your house?			
17.	Did the team give you information about the shape of dengue Mosquito?			
18.	Do you know about the biting habit of mosquito?			
19.	Knowledge about protection from Dengue?			
I.	➢ Wearing full sleeve shirts.			
II.	➢ Don't wear knickers.			
III.	➢ Use nets while sleeping.			
IV.	➢ Use mosquito repellent oils.			
V.	➢ Keep your environment dry.			
20.	Any knowledge about symptoms of Dengue Fever?			
I.	➢ High Grade Fever			
II.	➢ Severe Headache			
III.	➢ Nausea and Vomiting			
IV.	➢ Retro orbital Pain			
V.	➢ Severe joint and muscle pain.			
VI.	➢ Skin Rashes			
VII.	➢ Bleeding from nose			
21.	Do you know about the fatal complications of Dengue?			
22.	Do you know about the hazardous and dangerous effects of Dengue?			