

A study of impact assessment of the health education to control dengue disease in the Thar Desert of Rajasthan, India

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Abstract-Dengue is a remains public health problem since the period of Second World War and challenging as it is an endemic in more than 100 counties. Multi dimensional approaches are trying to control problems by controlling of mosquitoes, invention of vaccine, as well as effective medicines directly at the virus. Therefore, this study was under taken to access the knowledge, attitude and practices regarding the dengue in the Indian Thar Desert. Information was collected on pre tested schedules from the 514 (Urban 321 and Rural 193) respondents who consented to participate in study. This study found inadequate awareness, attitude and practices regarding dengue before the educational session and significant improvement found after the educational session. This study indicates that the health educational intervention is an effective tool for prevention and control of the dengue in community.

Keywords: Desert, dengue, urban and rural, health education, effective, control

I. INTRODUCTION

Dengue is serious public health problem globally and increasing trend of morbidity and mortality threatening the disease control program. Currently, dengue affects over 2.5 billion people living in dengue endemic areas, which comprises 40% of the world's population¹. According to estimations of the WHO, 50-100 million dengue infections occur every year, leading to 500 000 cases of severe disease that need hospitalisation¹. However, recent estimations speak of approximately 400 million dengue infections annually². The magnitude of problem is also reported by epidemiological studies in progressive mode of disease world wide as a result more than 100 countries are endemic in present scenario³. It is more prevalent in the developing countries including India. The first major wide spread epidemics of DHF/DSS occurred in India in 1996 involving areas around Delhi⁴ and Lucknow⁵ and then it spread to all over the country⁶. Rajasthan is one of the dengue endemic States in India⁷⁻¹⁰. Dengue disease continues to involve newer areas, newer populations and is increasing in magnitude, epidemic after epidemic¹¹. Indian Thar desert was known earlier as an either non problematic or less problematic vector born diseases. Subsequently, developmental activities and effects of Indira Gandhi Nahar Pariyojana (IGNP) in this region are bringing the change in the climate and as a result emerging new diseases. Among the vector born diseases *malaria*, *dengue* and *chickngunia* are on the top. Dengue is caused by dengue virus and transmitted by mosquitoes. Frequent and increasing occurrence of Dengue Hemorrhagic Fever (DHF) and Dengue Shock Syndrome (DSS) are all causes for great concern all over the world for the control of the disease¹²; as regard to India as well as great Indian Thar desert where an increased frequency of the infection has been observed in past more than one decade and recent years. Dengue fever continues to be a major public health problem in Thar Desert, with highly significant impact on venerable group of children. If it is looked point of view prevention and control it is found unfortunate that no major steps have been taken to promote awareness and precautionary attitude in the community with regards to dengue fever despite the ostensible burden of disease in the desert part of Rajasthan. Health education is a major tool for prevention and control of the National Dengue Control Program (NDCP), and is delivered to communities and schools. Therefore, the present study has been under taken to know the impact of health education on the prevention and control of Dengue Hemorrhagic Fever (DHF) and Dengue Shock Syndrome (DSS) in the desert.

II. MATERIAL AND METHOD

2.1 STUDY AREA AND SUBJECT

Jodhpur district is a gate way of the Indian Thar Desert. It lies between 26° 17' N, latitude and 73° 1' E longitude. Being a divisional head quarter of the desert region and second largest populated city in the state of Rajasthan health facilities are more better as compare to other part of the Thar desert. Therefore, people come from different part of the desert to avail these facilities. Umaid Hospital is excusably is meant for the maternal and child health only which is comes under the Dr. Sampurnanand medical collage Jodhpur administratively. Therefore Umaid hospital was selected to conduct this study. This hospital is providing all kind of health facilities to the children up to the age of 14 years parents bring the children from the rural and urban areas of the different part of the desert come for the diagnosis and treatment. Therefore, this interventional study was conducted among the parents who utilized this health facilities for their children during the period of February 2015 to October 2016 and agree to participate in the study voluntarily. All the 514 parents were the evaluated throughout the study. The intervention was based and

concentration on the various aspects of dengue during the pre- intervention assessment. Following the pre- assessment and educational intervention program was done among the selected subjects. Lecture, pamphlets, powerpoint presentation and instruments of evaluation on teaching and learning materials was used in group discussions. After three months post interventional assessment was done and same questioner was used for the data collection.

2.2 SURVEY NETWORKS

The interview technique was used for collecting the data. A set of questionnaires were prepared and pre tested in the field and modifications were made accordingly. Questionnaires were prepared in English but it was communicated in Hindi or in local dialect *i.e.* in 'Marwadi' for avoiding the communication gap between the investigator and informant. The questions were in objective in nature with several options for answers. Information was collected on socio-demographic and other characteristics such as age, sex, education, occupation, socio-economic, Socio-cultural and health practices, migration and human behavior. Prasad's classification was used to categories the respondents into different social classes. This was then revised by Kuppuswamy by using the sum of scores of education, occupation and per capita income in five different social classes and it is revised time to time, *i.e.* upper (I), upper-middle (II), lower-middle (III), upper-lower (IV) and lower (V) ¹³. Information such as the number of fever cases, collection and examination of blood, and the status of the blood sample pertaining to the fever cases (for the examination of the dengue virus) from the selected subjects, was obtained from the health records of the Hospital.

2.3 ETHICAL CONSIDERATIONS

The study was approved by the scientific advisory committee and by the departmental ethical committee of the centre. Before commencing the study, report was established with the hospital officials such as doctors, compounders, nurses, lab technicians, computer data handlers, community leaders, heads of family, parents and the participants. Individual participation was voluntarily. Participants had the freedom to withdraw from the study at any time without giving the reason. The study's aims, objectives and methodology were carefully explained to all the participants. Before collecting the information, written or verbal consent to participate in the study was obtained. The collected information was kept confidential and used only for the scientific analysis, interpretation and to draw the inferences.

III. RESULTS

3.1 SOCIO-DEMOGRAPHIC CHARACTERISTICS

Table 1 depicts the socio-demographic characteristics of the study subjects. About three fourth 375 (73.0%) respondents were male and 139 (27.0%) female. Out of the total 514 respondents more than eighty percent (419 (81.5%)) were less than 45 years of age. Majority (52.7%) were the either literate or primary, middle and above level of education. Non- Hindus were the 29.2%. Among the Hindus 59.6% were the General caste, 32.1% other backward caste and 8.2% scheduled caste and scheduled tribes. Nearly half (49.0%) respondents had their monthly family income either rupee 5000 or more.

3.2 HOUSEHOLD UTILITIES AND WATER STORAGE PRACTICE

Most of the rural respondents owned a radio set, camel cart and cycle. However, very few owned a fridge, water tap within the house, television set, motorcycle, jeep and tractor. About ninety percent (88.7%) respondents of both the area were having 'tanka' in the household for the storage of water with the capacity of 5000 to 10,000 liters. Tanka is a "well" like structure where temperature of water maintain between 20-30°C all round the year and this temperature is suitable for breeding of *An. Aedes Aegypti* which is dominating species of the area and responsible for desert dengue. In the rural areas, all most three fourth (79.3%) houses were storing water generally in pots for their drinking purposes as well as domestic uses in spite of the tanka. Around half of the respondents (52.1%) were having 6-8 pots, 34.2% were having more than 8 and 16.3% were having less than 6 pots for storing of water and all the pots were kept together. More than ninety percent (94.2%) were the earthen pots with the capacity of 25 liters or more used by the 17.8% of households were not emptied before filling them a fresh. In urban areas most of the houses had Kheli/Paranda outside the houses for the drinking water purpose of the cattles, dogs and birds. More than three fourth of the urban respondents were not completely empty their desert coolers and refilled again and again without cleaning 10-15 days. These practices provided the places for the breeding of dengue vector.

3.3 PERCEPTION ABOUT DENGUE

Majority of the respondent (75.3%) consider dengue fever to be 'Damagi Tav' in the local dialect, Marwari. They explained Damagi Tav as raised forehead temperature (hot forehead) compared to a normal temperature of the body having the more warm of the forehead. Dengue was perceived as relatively serious illness and much severe as compare to measles, difficulty in breathing and tuberculosis (66.7%)

3.4 IMPACT AND DIETARY HABIT

The impact of dengue on the health was clearly visible as more than three fourth (78.4%) of the dengue patients reported their working capacity being reduced during indisposition. Some respondent (17.3%) further explained that they felt weak inside and

dull in appearance. This led the Thar desert duelers folk to follow certain taboos as more than half (56.6%) of the respondents avoided fried foods but preferred 'Rabadi' (local preparation made from the locally grown and old variety of millet flour and yogurt), 'Khichadi' (a semi-liquid preparation from the mixture of rice and pulses), 'Thuli' (a semi-liquid preparation from wheat daliya) and papaya (*Carica papaya*) and 'Mateera' (fruits of a cucurbitaceous plant akin to watermelon).

3.5 PRACTICES FOR DENGUE TREATMENT

It was found that (56.1%) cases initiate treatment from third day onwards at the health facility. Treatment seeking behavior and health facility utilization by desert population is an important factor for the policy implications in the national dengue control program. Factors which influence which treatment sources people seek when symptoms occur include socio-cultural factors like beliefs and household decision making to seek care, social networks, gender and economic status. Self diagnosis (53.8%) was common among the respondents. Source of information about the dengue

Table-2 shows that source of information is an effective tool to give the correct information to the community about the disease. The correct information about the disease effects on the perception, attitude and makes the correct health practices. Out of 514 respondents 321(62.5%) from urban and 193(37.5%) were from the rural area. Out of 321 urban respondents 302(94.1%) and out 193 rural respondents 175(90.6%) heard about dengue as a disease. In urban, audio-visual media 127(39.6%), print media 94(29.3%), IEC materials 43(13.4%), health personal 24(7.6%) and relatives or friends 14(4.3%) were the main source of information. In the rural, audio-visual media 46(23.8%), print media 67(34.7%), IEC materials 19(9.8%), health personal 32(16.6%) and relatives or friends 11(5.7%) were the main source of information.

IV. IMPACT ASSESSMENT OF HEALTH EDUCATION ON THE DENGUE

Table-3 states that, 287(55.8%) of the respondents had told that dengue was transmitted by mosquitoes and very few 15 (5.2%) of them could reply about the dengue mosquitoes are day biters before the educational intervention, the level of knowledge was increased to 397(77.2%) among the respondents after the educational intervention about transmission for dengue is a mosquitoes bite and 38(9.6%) behavior of the vector bites. About the impact of seasons on the occurrence of disease 217(42.2%) of the respondents had told that dengue can occurs in rainy season before educational intervention, the level of knowledge was increased to 312(60.7%) after the educational intervention. Nearly sixty percent (300(58.3%) respondents knew that water accumulation is breeding place of mosquitoes before educational intervention, the level of knowledge was increased to 394(76.7%) after educational intervention. Regarding the sign and symptoms of the disease before intervention assessment, respondents reported the following as being most commonly associated sign and symptoms with dengue as fever 271(52.7%), headache 121(23.5%), Rashes 28(5.4%), bleeding 30(5.8%), abdominal pain 50(9.7%) and nausea and vomiting 14(2.7%), the level of knowledge was increased to fever 351(68.3%), headache 109(21.2%), Rashes 20(3.9%), bleeding 9(1.8%), abdominal pain 15(2.9%) and nausea and vomiting 10(1.9%) after educational intervention. Dengue is caused by its viruses and curable disease was known by 338(65.8%) respondents before educational intervention, the level of knowledge was increased to 436(84.8%) after educational intervention.

The level of knowledge about curability was significant in both areas Before intervention assessment, Government hospital 271(52.7%), Government dispensary 52(10.1%), private hospital 93(18.1%), private clinic 40(7.8%), herbal medicine, home remedy and quacks 58(11.3%) of respondents knew about the place of treatment of dengue, the level of knowledge was increased to Government hospital 310(60.3%), Government dispensary 59(11.8%), private hospital 105(20.4%) and private clinic 28(5.4%), herbal medicine, home remedy and quacks 12(2.3%) preferred source of treatment of Dengue after educational intervention. The level of knowledge about preferred source of treatment of Dengue was significant in both areas 334(65.0%) respondents were aware about the prevention of dengue before educational intervention, the level of awareness of prevention was increased to 442(86.0%) after educational intervention. The level of knowledge about prevention of dengue was significant in both areas Before educational intervention knowledge of the preventive practices, stop water collection 29(5.6%), used full sleeves shirts 30(5.8%), spraying DDT 13(2.5%), fogging 15(2.9%), used mosquito net 36(7.0%), used of repellents 26(5.1%), spraying kerosene/petrol oil 23(4.5%), clean surrounding 28(5.4%), and burning Neem (*Melia azadirachta indica*) leaves 16(3.1%) were main mosquitoes control methods in both areas. The level of awareness of preventive practices was increased to stop water collection 54(10.5%), used full sleeves shirts 62(12.1%), spraying DDT 22(4.3%), fogging 30(4.3%), used mosquito net 68(13.2%), use of repellents 47(9.1%), clean surrounding area 46(8.9%), spraying kerosene/petrol oil 32(6.2%), and burning Neem (*Melia azadirachta indica*) leaves 27(5.3%) were main mosquitoes control methods in both areas after educational intervention.

V. DISCUSSION

The Indian Thar Desert was known for its specific characteristics such as scarcity of water, low rain fall, high temperature and either free from the vector born diseases or very less in the area. In other words it might be called that vector borne disease dengue was also insignificant for public health importance. During the period of four to five decade developmental activities took place such as Indira Gandhi Nahar Pariyojna (IGNP), changed of railway track from metre gauge to broadened gauge, broadened roads in four and six lines, advanced road transports, change of cropping patterns in agriculture and job opportunities brought the many fold increase in the in and out migrations of the people in the area. Thus dengue viruses and its vectors entered in the area. Due to mismanagement of water and less immune population against the dengue viruses several epidemics occurred in the past

and lost several lives also. The desert population was unaware and new for the dengue. The current situation warrants multi dimensional approach to control the disease. The present study is one of the efforts. More the ninety percent (92.8%) respondent had heard about the dengue which is transmitted by the mosquitoes. Other authors also reported 87.3% respondents were made similar observation in 1998 from the other parts of the country¹¹. This gap might be fast communication was also taken place in the desert also. It was observed that all the sources of knowledge were more among urban respondents as compared to the rural respondents. This is established fact that urban population most better off as compared to rural. This fact was also reflected in present study also. Similar observations made by other studies also¹⁵. Out of all the studied source of knowledge the most common source of knowledge about dengue was audio- visual media 173(33.7%) was observed in both the area after educational intervention. In urban area respondents were reported that audio-visual media (39.6%) was a most source of knowledge about dengue which was larger proportion as compared to rural area (23.8%). Studies conducted by the other authors also reported similar observations. This might be reason that the respondents of the urban area had more means better education facilities and contact with well informed individuals regarding the information about the dengue as compare to the respondents of the rural area¹⁶. The present study revealed that after given the health education more than three fourth (77.2%) respondents were awarded that mosquitoes are transmitting dengue from one to another in the communities. A study conducted in 2010 in Pakistan reported that more than ninety percent (93.0%) respondents knew that dengue is transmitted by mosquitoes. This difference might be due to education level and belief of the respondents¹⁷. About half (52.7%) of the respondents were told the recognition of dengue was fever. It could be increased by 68.3% after the post health education followed by other symptoms as headache, bleeding, rashes, abdominal pain, nausea and vomiting. Similar findings are reported from Grenada¹⁸, Kamphaeng Phet, Thailand¹⁹ and Delhi, India¹⁴⁻¹⁵. Before giving the intervention regarding the breeding places of the dengue mosquitoes the level of knowledge was 58.4% and after the intervention it was increased 76.7%. It is one of the important point of three component of man, mosquito and virus. If one of the three one who isolate for completing the chain cycle could not be completed and disease may not be transmitted in the community. Therefore, vector control is one of the important components of the dengue control program. If accumulated water sites removal not possible for this a study reported to control the breeding by using fish and suggested this as community intervention²⁰. After intervention bearing full sleeve shirts, use of repellents and mosquito nets increased almost double as personal protection against the mosquitoes bite.

Utilization of health facility in the study population after health education preferred government hospital was 60.3% (59.8% urban and 61.1% rural). A study conducted in Delhi in 1998 by Gupta *at el* reported 81.0% urban and 52.1% rural people¹⁴. Delhi being a capital of India and metropolitan city government health facilities like AIIMS are good one and duellers are more aware as compare to present study. The attitude of people regarding the whether the dengue is preventable disease 86.0% respondents after the health education were optimized. Vector control is one of important component of dengue control program so that this view was explored among the studied respondents about various methods which are used for the vector control before and after health education. There was improvement about the stop water collection, used full sleeves shirts, mosquito net, repellants, clean surrounding, spraying DDT in dueling places, used kerosene/petrol oil in stagnant water places and covering lids in water storages pots. A study conducted in Brazil on the public knowledge and attitudes concerning dengue reported a gap between knowledge and practices about vector prevention²¹. A study from the Northeast Thailand also demonstrated so many hindrances towards dengue control including insufficient control agents and inadequate knowledge of control methods²². This can also be accomplished by better understanding the sociology and determinants within the community, as these can greatly affect the habitat types and behaviors within a specified community²³. It is one of the most effective measures removals of breeding sites such as stagnated water. Similar observation are made in a study reported a significant reduction of dengue vectors and dengue hemorrhagic fever cases in areas having clean-up campaigns before and during rainy seasons²⁴. Numerous studies have shown the effect of health education and campaigns for community participation in source reduction of container mosquitoes^{25,26,27,28}. Another study found health education can change the attitude of peoples to accept themself as being responsible for the dengue vector control programme²⁹. Although public health educational campaigns do not always have an immediate effect on the population of mosquitoes³⁰, Window and door screens, Window curtains treated with insecticide and proper covering of the water container are also effective tools to reduce densities of dengue vectors to low levels and potentially affect dengue transmission³¹. Thus the findings of the study clearly depicted that the study population was using adequate preventive methods with hope controlling the dengue vector breeding and the spread of disease in the community³². Multifaceted interventions are more effective than single interventions because a larger variety of barriers for change can be addressed³³.

VI. CONCLUSION

The present study concludes based on its result that health education is one of the essential and important component for the control of diseases such as dengue in the desert part of Rajasthan and people of the region can better understand the transmission, prevention, and methods of mosquitoes control. Health educational intervention is an effective tool for knowledge attitude and practice, prevention and control, the Dengue as disease. Based on the study findings, it is recommended that future campaigns should involve more aggressive health education in liaison with urban and rural community of desert areas. The community involvement in the prevention and control of dengue is essential, it is also noticed that dengue control program will not be effective while health education is poorly resourced and irregular. It is suggested that there are the need for sustained routine education in desert area for dengue prevention and control, and the need for approaches to ensure the translation of knowledge into practice.

VII. ACKNOWLEDGEMENT

Authors are very thankful to the staff of Umaid hospital and all the respondents for the consent, cooperation and help at each step for the successfully completion of this study.

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TABLE 1: DEMOGRAPHIC CHARACTERISTICS OF THE RESPONDENTS

Variables	Urban		Rural		Total	
	No.	%	No.	%	No.	%
Age (yrs)						
<20	24	7.5	51	26.4	75	14.6
20-29	65	20.2	56	29.0	121	23.5
30-39	156	48.6	49	25.4	205	39.9
40-49	37	11.5	23	11.9	60	11.7
>50	39	12.1	14	7.3	53	10.3
Sex						
Male	235	73.2	140	72.5	375	73.0
Female	86	26.8	53	27.5	139	27.0
Education						
Illiterate	121	37.7	122	63.2	243	47.3
Literate	98	30.5	37	19.2	135	26.3
Primary	65	20.3	19	9.8	84	16.3
Middle and above	37	11.5	15	7.8	52	10.1
Occupation						
Agriculture	15	4.7	84	43.5	99	19.3
Animal keeping	36	11.2	40	20.7	76	14.8
Labour	87	27.1	20	10.4	107	20.8
Artisans job	37	11.5	25	13.0	62	12.1
Service	67	20.9	5	2.6	72	14.0
Others	79	24.6	19	9.8	98	19.0
Religion						
Hindus	231	72.0	135	68.9	364	70.8
Non-Hindus	90	28.0	60	31.1	150	29.2
Caste						
GC	61	26.4	36	27.1	97	59.6
OBC	73	31.6	54	40.5	127	32.1
SC/ST	97	42.0	43	32.3	140	8.2
Household income per month (Rs)						
<5000	126	39.3	136	70.5	262	51.0
5000 – 10,000	162	50.5	47	24.3	209	40.7
>10,000	33	10.2	10	5.2	43	8.3

TABLE 2: SOURCES OF INFORMATION DIFFERENT AREAS

Source of information	Urban		Rural		Total	
	No	. (%)	No.	(%)	No.	(%)
Audio-visual media	127	39.6	46	23.8	173	33.7
Print Media	94	29.3	67	34.7	161	31.3
IEC Materials	43	13.4	19	9.8	62	12.1
Health Personnel	24	7.6	32	16.6	56	10.9
Relatives/ Friends	14	4.3	11	5.7	25	4.8
Don't know	19	5.8	18	9.4	37	7.2
TOTAL	321	100.0	193	100.0	514	100.0

TABLE 3: FACTORS OF DENGUE IN URBAN AND RURAL AREAS

	Urban (N=321)				Rural (N=193)			
	Pre		Post		Pre		Post	
	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Transmission of dengue								
Mosquitoes	187	58.3	254	79.1	100	51.8	143	74.1
Insect bite	36	11.2	11	3.4	29	15.0	6	3.1
Flies	42	13.1	17	5.3	26	13.5	9	4.7
Dirty Water	27	8.4	21	6.5	16	8.3	14	7.3
Don't know	29	9.0	18	5.6	39	20.2	21	10.9
Season for dengue								
Rainy season	163	50.1	209	65.1	54	28.0	103	53.4
Winter season	85	26.5	67	20.9	77	39.9	46	23.0
Summer season	38	11.8	21	6.5	43	22.3	40	20.7
Don't know	35	10.9	24	7.5	19	9.8	4	2.1
Breeding /place of mosquitoes								
Artificial Water collection	215	67.0	255	79.4	85	44.0	139	72.0
Rainy water	79	24.6	46	14.3	77	39.9	39	20.2
Don't know	27	8.4	20	6.2	31	16.1	15	7.8
Symptoms of dengue								
Fever	172	53.6	222	69.2	99	51.3	129	66.8
Body ache /Headache	81	25.2	63	19.6	40	20.7	46	23.8
Bleeding	13	4.0	5	1.6	17	8.8	4	2.1
Rashes	20	6.2	14	4.4	8	4.1	6	3.1
Abdominal pain	24	7.5	10	3.1	26	13.5	5	2.6
Nausea and Vomiting	11	3.4	7	2.2	3	1.6	3	1.6
Curability of dengue								
Yes	228	71.0	280	87.2	110	57.0	156	80.8
No	93	29.0	41	12.8	83	43.0	37	19.2
Preferred place of treatment								
Government Hospital	169	52.6	192	59.8	102	25.8	118	61.1
Government Dispensary	32	10.0	23	7.2	20	10.4	36	18.7
Private Hospitals	68	21.2	75	23.4	25	13.0	30	15.5
Private Clinics	25	7.8	21	6.5	15	7.8	7	3.6
Quacks or traditional methods	27	8.4	10	3.1	31	16.1	2	1.0
Dengue is preventable disease								
Yes	204	63.6	267	83.2	130	67.4	175	90.7
No	117	36.4	54	16.8	63	32.6	18	9.3
Methods of Mosquitoes Control								
Stop water collection	20	6.2	35	10.9	9	4.7	19	9.8
Used full sleeves shirts	18	5.6	37	11.5	12	6.2	25	13.0
Fogging	13	4.0	23	7.2	2	1.0	7	3.6
Spray DDT	10	3.1	17	5.3	3	1.6	5	2.6
Used mosquito net	23	7.2	39	12.1	13	6.7	29	15.0
Used Repellents (Mortine or odomos)	19	5.9	31	9.7	7	3.6	16	8.3
Spraying kerosene/petrol oil	15	4.7	19	5.9	8	4.1	13	6.7
Clean surrounding	17	5.3	24	7.5	11	5.7	22	11.4
Burning Neem leaves	7	2.2	12	3.7	9	4.7	15	7.8
Don't know	179	55.8	84	26.2	119	61.7	42	21.8