Behavioral Risks Factors Associated With Spread of Dengue Infections: A Community Based Study

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Abstract

Objective: To determine the behavioral risks factors associated with spread of dengue infections in a rural community of Gulshan-e-Iqbal town, Karachi, Pakistan.

Method: A questionnaire based cross sectional survey was conducted during September 2013- February 2014 in union councils of Gulshan-e-Iqbal town, Karachi. The sample size was 350. Systematic random sampling was used for selecting the study subject, from each household taken as one unit. Sample was taken from a total of 3225 houses to achieve total sample of 350 households. All the data was entered and analysed by using SPSS software version 15. Means with standard deviation for numerical variables and proportions for categorical variables are presented. Chi square test was performed to find the association of behavioral risks factors with spread of dengue infections in a rural community of Karachi, Pakistan.

Results: Dengue infection was clinically diagnosed in 203 (58%) patients and were hospitalized during August 2012 to February 2013. Among all patients, higher frequency was found in the middle age group 37 to 54 years i.e. 44% (n=154).The behaviors of self-mosquito bite protection ($p<0.01$), self-prevention in breading mosquitoes ($p<0.01$), density of vegetation ($p<0.01$), behaviors regarding lack of self-efficacy in controlling vector ($p<0.01$) and lack of preventive measure in community ($p<0.01$) were significantly associated with transmission of dengue infections.

Conclusion: The behavioral risks factors associated with spread of dengue infections in a rural community included lack of preventive measure in community, lack of comprehension of Health belief models, lack of knowledge,lack of self- prevention in breading mosquitoes, high density of vegetation and lack of self-efficacy in controlling vector.

Keywords: Risk factors, behavior, dengue transmission, community-based research,infection control.

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Introduction

Globally Dengue is a major public health problem. Currently Dengue infection is endemic in some tropical developing countries[1]. The number of outbreaks has been increased and Dengue infection has become endemic in 100 countries. The endemic continents are Africa and America, Southeast Asia and the Western Pacific[2]. Dengue infection has multifactorial origin and include increased rate of urbanization, uncontrolled vectors, non-use of repellent, self-mosquito bite protection, self-prevention in breading mosquitoes, density of vegetation, lack of self-efficacy in controlling vector, lack of preventive measure in community, health belief model, lack of knowledge, uncovered households water containers[3-7]. In some geographic areas dengue virus (DENV) infections are subclinical or unapparent. Seroprevalence rates in communities may be high despite low detectable clinical cases.

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Severe disease is increased in secondary infections and becomes serious public health problem at community level[2].

Community behaviour along with individual health belief represents behavioral risk factors in the transmission of dengue infections. The types of surveillance depend on the variability in dengue infection within the community. Self-efficacy at individual and community level in dengue prevention behavior is very important. Self-efficacy was also measured by a simple questionnaire in the community[8].

Health behaviors refer to beliefs and methodologies of the population directed to maintain health, preventing diseases and timely detection of deviation from the normal for standard health care behaviors. These beliefs have wide variations in the cultures. Human responses are modifiable by various risk factors. These modifiable risk factors include perception, reasoning, habits and skills to execute controls of the diseases[2,9,10]. The individual and community behaviors for illness and treatment in response to symptoms of disease have variations. The human belief model to avoid a disease by an individual includes belief by them: personal susceptibility to disease, the occurrences of disease would have a reasonable severity on his/her life, particular action will benefit by reducing susceptibility to diseases, overcoming some factors like cost and pain will not reduce the chances of developing a disease[11].

The purpose of this study is to determine the behavioral risks factors associated with spread of dengue infections during September 2013 to February 2014 in a rural community of Gulshan-e-Iqbal town, Karachi, Pakistan.

Method

This was a cross-section survey conducted in Gulshan-e-Iqbal town, Karachi. The sample size for the research is 350. Sample size was calculated by OpenEpi software[12]. Escobar-Mesa[13] have shown 70% of the cases concentrated in some localities associated with behavioral risks factors and spread of Dengue infections in the community. In order to calculate sample size 70% risk was taken to determine the sample size both in exposed and non-exposed groups. The level of significance was 5% and confidence level 95% with the power of study 80% the sample size was 323. Therefore, the final sample size calculated is 350 with the addition of refusal by the patients. The final total sample size calculated was 350.

Systematic random sampling was used for selecting the study subject, with each household taken as one unit. The probability systematic sampling technique was used in this study. Sample was taken from a total of 3225 houses to achieve total sample of 350 households[13]. The information was collected directly through face to face interviews. All the participants of the study were informed about the study and informed consent was obtained from each participant. All the data was entered and analysed by using SPSS software version[14,15]. Means with standard deviation for numerical variables and proportions for categorical variables are presented. Chi square test was performed to find the association of behavioral risks factors with spread of dengue infections in a rural community.

Results

Dengue infection was clinically diagnosed in 203 (58%) patients and they were hospitalized during August 2012 to February 2013. Among all patients, higher frequency was found in the middle age group 37 to 54 years i.e. 44% (n=154), 54% (n=189) were females and 46% (n=161) were males. Patients with monthly income ≤ 10,000 were found 77% (n=269).

Among all, 18% patients were illiterate, 40% had primary or less education, 16% had only 10 years of education, only 10% were graduates and 16% were postgraduates as shown in (Table1.).

Chi-square analysis shows that behavior regarding use of repellent was significantly associated with the transmission of dengue infections ($p<0.01$). The behaviors of self-mosquito bite protection ($p<0.01$), self-prevention in breading mosquitoes

(p<0.01), density of vegetation (p<0.01), behaviors regarding lack of self-efficacy in controlling vector (p<0.01) and lack of preventive measure in community (p<0.01) were significantly associated with transmission of dengue infections. The procedure of percentage calculations was based on column percentages for dengue infection confirmed and absent which were placed in columns and behaviors were the responses as agreed and disagreed for the prevention of dengue infection in rows.

Individuals behavior about health belief models (p<0.01), about lack of knowledge (p<0.01) and uncovered water container households (p<0.01) were also found significantly associated factors with transmission of dengue infections as shown in (Table 2).

Discussion

Dengue infection was clinically diagnosed in 203 (58%) patients and they were hospitalized for further treatment. Females were found more with Dengue infection in the study. The Dengue spread was more common in patients with low-income < 10,000 about 77% (n=269) and low literacy rate. The survey also showed that behavior regarding use of repellent was significantly associated with the transmission of dengue infections at p<0.01.

The behaviours of self-mosquito bite protection, self-prevention in breading mosquitoes, density of vegetation, behaviors regarding lack of self-efficacy in controlling vector, and lack of preventive measure in community were significantly associated with transmission of dengue infections at p<0.01[14-16].

The complexity of Dengue is closely related to the behavioral risk factors, characteristics of the environment and spatial heterogeneity of living conditions in the rural areas. This survey also showed that the behavioral risk factors included environmental factors, individual behaviours and community behaviours also. The macro-geographic level of *Aedes aegypti* distribution in rural area is an important factor and found associated with the spread of infection in the community. The factors were also seen in other studies[17].The studies also show that at meso-geographic level the house aggregations and household drinking water supplies were of risk in the rural areas. The potable uncovered water storage significantly contributed in *Aedes aegypti* breeding. *Aedes aegypti* breeding showed high preference to the plastic drums in the rural areas. This survey also showed that risk areas of diseases are associated with changing habitats[18-20].

This survey also shows that public health programs are needed to control vector in the rural areas. Study have shown improved environmental sanitation can also reduce the threat of the spread of dengue infection in the community[21].

Health status, water supply and sanitation need to be looked after before the rain seasons in the community. The biological complexities of vector-borne disease and primary health care systems have been found more significant in lowering the spread of infection[22-24].Community support and participation is essential but specialized technical skills are also required for behavior change regarding use of repellent, self-mosquito bite protection, self-prevention in breading mosquitoes, density of vegetation, behaviours regarding lack of self-efficacy in controlling vector and lack of preventive measure in community. The transmission of dengue infections has been based on individual's behaviours about health belief models, lack of knowledge and water container in households. This study identifies possible social interventions for prioritizing and monitoring vector control[25].

Behavioral risks factors associated with spread of dengue infections in this community based study included factors related to individual behaviors and community responses. Health belief models encompassing self-control of vector and use of strategies to reduce the factors resulting in spread of dengue infection in the rural community.

Conclusion

The behavioral risks factors associated with spread of dengue infections in a rural community in-

cluded lack of preventive measure in community, lack of comprehension of Health belief models, lack of knowledge, lack of self-prevention in breading mosquitoes, high density of vegetation and lack of self-efficacy in controlling vector.

Conflict of interest

Authors have no conflict of interests and no grant/ funding from any organization.

Table 1. Demographic Characteristics (n= 350)

	Number	%
Dengue Fever		
Negative	147	42%
Positive	203	58%
Age Group		
18 - 36	119	34%
37 - 54	154	44%
55 - 72	77	22%
Sex		
Male	161	46%
Female	189	54%
Ethnicity		
Sindhi	140	40%
Punjabi	63	18%
Pushto	63	18%
Baluchi	63	18%
Muhajir	21	6%
Marital status		
Unmarried	160	46%
Married	161	46%
Divorced/widow	29	08%
Family income per month		
≤ 10,000	269	77%
> 10,000	81	23%
Education status		
Illiterate	63	18%
Primary or less	140	40%
Matric	56	16%
Graduate	35	10%
Postgraduates	56	16%
Occupation		
Yes	203	58%
No	147	42%

Table 2. Association of behavioral risk factors associated with transmission of dengue infections (n = 350)

Characteristics	Dengue Fever Positive n (%)	Negative n (%)	p-value
Use of repellent			
Agree	39 (20.5)	66 (41.2)	< 0.01
Disagree	151 (79.5)	94 (58.8)	
Self-Mosquito bite protection			
Agree	3 (1.6)	99 (61.9)	<0.01
Disagree	187 (90.4)	61(38.1)	
Self- prevention in breading mosquitoes			
Agree	51(26.8)	87 (54.4)	< 0.01
Disagree	139 (73.2)	73 (45.6)	
Density of vegetation			
Agree	51(26.8)	87 (54.4)	< 0.01
Disagree	139 (73.2)	73 (45.6)	
Lack of self-efficacy in controlling vector			
Agree	51 (26.8)	97 (60.6)	< 0.01
Disagree	139 (73.2)	63 (39.4)	
Lack of preventive measure incommunity			
Agree	51 (26.8)	94 (58.8)	< 0.01
Disagree	139 (73.2)	66 (41.2)	
Health belief models			
Agree	51 (26.8)	74 (46.2)	< 0.01
Disagree	139 (73.2)	86 (53.6)	
Lack of Knowledge			
Agree	51 (26.8)	96 (60)	< 0.01
Disagree	139 (73.2)	64 (40)	
Water containers house holds			
Agree	51 (26.8)	160 (100)	< 0.01
Disagree	139 (73.2)	0 (0)	

*p-value calculated by Chi-square test at significant level < 0.05

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