



**ORIGINAL ARTICLE**

## **Community Participation, Dengue Fever Prevention and Control Practices in Swat, Pakistan**

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### **ABSTRACT**

**Background:** The aim of this study was to determine the role of community participation in prevention of dengue fever in The Swat district located in the Northern area of Khyber Pakhtunkhwa, Pakistan, which experienced a dengue fever outbreak in August, 2013. A total number of 8,963 dengue cases with 0.4% case fatality ratio were registered during the outbreak.

**Methods:** A sample size of 354 respondents were proportionally allocated to each residential colony and then randomly selected. The association of independent variable (Community participation) and dependent variable (practices for control) were tested by using Chi Square test.

**Results:** Results regarding perception of practices for dengue control with community participation showed that: practices for control had significant association with organization of people to eradicate dengue mosquitoes ( $p=0.00$ ), community leaders ( $p=0.04$ ), community efforts ( $p\leq 0.01$ ), use of insecticides by community people ( $p=0.00$ ) and involvement of community people in awareness campaign ( $p=0.00$ ). Similarly, significant associations were found between practices for control and community shared information during dengue outbreak ( $p=0.00$ ), community link with health department, NGO, Other agencies ( $p=0.02$ ).

**Conclusion and Global Health Implications:** We conclude that the spread of dengue epidemic was aided by the ignorance, laziness of the community people and government agencies. However, the people, religious scholars, leaders and government agencies were not organized to participate in dengue prevention and eradication, hence, the chances of dengue infection increased in community. The study recommends mobilizing local communities and activating local leadership with active participation of Government and non-government organizations for initiation of preventive strategies.

**Key words:** Dengue fever • Control Practices • Community Participation • Local Leadership • Pakistan

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## Background

Dengue fever is a break bone fever, which appears with symptoms of headaches, high temperature, muscular/ bone pains and decrease of platelets.<sup>[1]</sup> Dengue fever is a viral disease, which has four stereotypes (DENV-1 to DENV-4) and is transmitted through the female mosquito known as *Aedes Aegypti*. Severe complications of dengue fever include Dengue hemorrhagic fever and Dengue Shock Syndrome.<sup>[2]</sup> Dengue hemorrhagic fever has symptoms of high temperature, bleeding, low platelet counts and plasma leakage due to low concentration of proteins and albumins in blood.<sup>[3]</sup> Dengue shock syndrome can occur after 2-7 days of dengue hemorrhagic fever along with symptoms of low blood pressure and pulse.<sup>[4]</sup>

The dengue virus struck the busy city of Pakistan, Karachi, for the first time in 1994.<sup>[5]</sup> Similarly, 4,500 cases were recorded in 2005 but the number of dengue cases increased to 21,204 by 2010.<sup>[6]</sup> The Punjab capital city, Lahore, was badly affected by dengue in 2007 with the number of cases of 4,000 more than the previous year. Mortality due to fever was not limited to the poor only, rather some very high profile persons like secretary to government and members of legislative assemblies died due to dengue fever.<sup>[7]</sup>

The Northern area of Khyber Pakhtunkhwa, district swat experienced an outbreak of dengue fever in August 2013. The total number of 8,963 dengue cases with case fatality ratio of 0.4% was registered during dengue epidemic. The DNV-1, DNV-2 and DNV-3 were confirmed dengue virus in patients. The total number of dengue cases in four provinces of Pakistan as recorded in November, 2013 were: Khyber Pakhtunkhwa: 9,321; Punjab: 1,103; Baluchistan: 15; and Sindh: 3,889. To control the spread of dengue fever, reduce loss of human lives and prevent its reoccurrence in future, the Government adopted a comprehensive dengue control policy. The policy is based on the pillars of “prevention” and “cure.” The multi-pronged efforts for dengue control included provision of diagnosis and treatment facilities for dengue fever at all health centers and mobilizing communities for

awareness raising and adopting preventive measures. Government of Pakistan and Provincial Government of Khyber Pakhtunkhwa initiated measures to prevent and reduce spread of dengue fever. These measures included raising awareness among the masses about signs and symptoms of the disease, identification of high epidemic areas, and providing help to affected people. The affected areas were fumigated, and free treatment was provided to dengue patients. At international level, the Government of Pakistan solicited help from World Health Organization and Government of Sri Lanka in technical guidance and medicine.<sup>[8]</sup>

Community participation tends to be successful in countries having stable and strong political systems. Community based programs involving local authorities to participate in eliminating breeding places of dengue mosquitoes are the only cost effective and sustainable way of ensuring control in any dengue-affected country and countries deficient in resources.<sup>[9]</sup> Mobilization of community at the level of family, community and national level has been found effective in dengue prevention and control. One such success story is the “Thai National Dengue Prevention and Control Plan” that was helpful in reducing the dengue health impacts on people.<sup>[10]</sup> Community mobilization, however, requires decentralization of resources and powers and high level of coordination among all stakeholders. Lack of coordination in line agencies and communities may lead to ineffectiveness of all efforts. Therefore, understanding community daily problems and developing effective coordination for dengue prevention is the need of the day. Evaluative studies on dengue control program found that proper planning and management in water supply, drainage system and discarding broken items, through active involvement of all stakeholders were considered the effective measures for successful dengue control.<sup>[11]</sup>

Susceptibility to dengue fever remains high among farmers, children, and those with houses situated near gardens. The susceptibility increases with unawareness of dengue breeding sites, symptoms and cure. Dengue prevention, however, is possible through strong coordination and community participation in

high dengue sites communities.<sup>[12]</sup> The teamwork between community people and private/public agencies at the house old and community level were the effective techniques for dengue prevention.<sup>[13]</sup>

## Methods

This research study was carried out in district Swat, Khyber Pakhtunkhwa, Pakistan. Persons infected with dengue fever in three selected residential colonies were the potential respondents for this research study. A pilot study was conducted to determine the number of dengue cases in the study area, according to which 4440 persons were affected from dengue fever. For a population size of 4,440, a sample size of 354 respondents was selected through criterion devised by Sekaran.<sup>[14]</sup>

A conceptual framework was devised as shown in the Table I and data were collected from respondents through interview schedules and face-to-face interviews. The dependent variable (practices for control) was indexed and cross-tabulated with independent variable (community participation) to measure the association. The Chi Square Test was used to test the relationship between the two variables and the Fisher's exact test was used in cases of small cell values.<sup>[15]</sup>

### Measurement of practices for control

Measurement of variable "practices for control" was based on data collected on 11 statements.

These statements included, cleaning water storage containers after seven days, examining mosquito larvae in water containers, cleaning roofs in rainy seasons, Using bed nets/mosquito repellants, Using insecticides, examining discarded utensils, wear cloth to fully cover body, using larvicides, installing window nets, using apple juice during fever and using herbal tea and cardamom during fever. Responses on these statements were indexed to measure, whether a respondent had adopted the practices to control dengue fever or not.

## Results

### Frequency and percentage distributions regarding community participation in dengue prevention

The perception of respondents in controlling dengue fever through community participation is given in Table 2. High proportion of (62.4%) respondents stated that the community people were not organized in dengue eradication. Majority (81.4%) of respondents identified that community leaders were not active in dengue prevention. Similarly, a high proportion (or 54.5%) of respondents did not participate with government/ non-governmental organizations (NGOs) that were spraying fog. Moreover, majority (79.7%) of respondents admitted that dengue could be controlled through community effort. On the other hand, 61.9% respondents reported that community had not used insecticides for dengue control. Conversely, high proportion,

**Table 1: Frequencies and percentage distribution of respondents regarding their perception to control dengue through community participation (N=354)**

Statements	N (%)		
	Yes	No	Don't know
People are organizing to eradicate dengue	110 (31.1)	221 (62.4)	23 (6.5)
Community leaders are active in preventing of dengue	65 (18.4)	288 (81.4)	1 (0.3)
Do you participate when community/NGO/Govt is spraying fog?	145 (41.0)	193 (54.5)	16 (4.5)
Dengue can be prevented through community efforts	282 (79.7)	35 (9.9)	37 (10.5)
Does your community spray insecticides for dengue control?	123 (34.7)	219 (61.9)	12 (3.4)
Your community is involved in campaign to clean your living environment.	124 (35)	220 (62.1)	10 (2.8)
Your community shares information about dengue fever	194 (54.8)	159 (44.9)	1 (.3)
Your community has linkage with health dept., NGO and other agencies for dengue control	71 (20.1)	277 (78.2)	6 (1.7)
Religious scholars/Imams play important role in awareness about dengue	00	354 (100)	00

**Table 2: Association between community participation and dengue control practices (N = 354)**

Community Participation	Perception	Practices for control		Total	Chi-Square (P value)
		Yes	No		
People organize to eradicate dengue	Yes	105 (29.7)	5 (1.4)	110 (31.1)	$\chi^2=12.300$ (0.002)
	No	181 (51.1)	40 (11.3)	221 (62.4)	
	Don't know	18 (5.1)	5 (1.4)	23 (6.5)	
Community leaders are active in preventing of dengue	Yes	62 (17.5)	3 (0.8)	65 (18.4)	$\chi^2=6.154$ (0.046)
	No	241 (68.1)	47 (13.3)	288 (81.4)	
	Don't know	1 (0.3)	0 (0.0)	1 (0.3)	
Do you participate when community/NGO/Govt is spraying fog?	Yes	127 (35.9)	18 (5.1)	145 (41.0)	$\chi^2=0.70$ (0.703)
	No	163 (46.0)	30 (8.5)	193 (54.5)	
	Don't know	14 (4.0)	2 (0.6)	16 (4.5)	
Dengue can be prevented through community efforts	Yes	261 (73.7)	21 (5.9)	282 (79.7)	$\chi^2=50.974$ (0.000)
	No	21 (5.9)	14 (4.0)	35 (9.9)	
	Don't know	22 (6.2)	15 (4.2)	37 (10.5)	
Do your communities spray insecticides for dengue control?	Yes	116 (32.8)	7 (2.0)	123 (34.7)	$\chi^2=12.155$ (0.002)
	No	177 (50.0)	42 (11.9)	219 (61.9)	
	Don't know	11 (3.1)	1 (0.3)	12 (3.4)	
Your community is involved in campaign to clean your living environment	Yes	117 (33.1)	7 (2.0)	124 (35.0)	$\chi^2=11.964$ (0.003)
	No	178 (50.3)	42 (11.9)	220 (62.1)	
	Don't know	9 (2.5)	1 (0.3)	10 (2.8)	
Your community shares information about dengue	Yes	176 (49.7)	18 (5.1)	194 (54.8)	$\chi^2=13.620$ (0.001)
	No	128 (36.2)	31 (8.8)	159 (44.9)	
	Don't know	0 (0.0)	1 (0.3)	1 (0.3)	
Your community has linkage with health deptt, NGO and other agencies for dengue control	Yes	68 (19.2)	3 (0.8)	71 (20.1)	$\chi^2=7.175$ (0.028)
	No	231 (65.3)	46 (13.0)	277 (78.2)	
	Don't know	5 (1.4)	1 (0.3)	6 (1.7)	

Note: \*Number in table represent frequencies and number in parenthesis represent percentage proportion of respondents and in the last columns number in the parentheses represent P values.

(62.9%) of respondents reported that community people were not involved in campaign to clean their surrounding environments. This probably was due to low integration or giving low priority to such health protection issues. Moreover, 54% of respondents stated that community people shared information with one another during dengue fever epidemic. Similarly, high proportion (78.2%) respondents reported that community people had not contacted the government or other agencies for dengue prevention.

### **Association between community participation and practices for control**

To ascertain the relationship between community participation and practices for control, the perception of community participation was limited to few statements as shown in Table 2 and explained as under.

The study shows that significant associations were found between organization of people to eradicate dengue mosquitoes and practices for

control ( $p=0.00$ ) and community leaders and practices for control ( $p=0.04$ ). Therefore, dengue can be controlled and eradicated easily if the community people and leaders are active and well-organized. Similarly, a highly significant ( $p=0.00$ ) association was found between community self-efforts and practices for control. In addition, the relationship between use of insecticides by community and practices for control were found to be highly significant ( $p=0.00$ ). It should be pointed out that those who followed good practices for dengue control sprayed insecticides in mosquitoes breeding places during dengue epidemic. Furthermore, a highly significant association was found between community participation in awareness campaign and practices for control ( $p=0.00$ ) and community sharing of information regarding dengue and practices for control ( $p=0.00$ ). Similarly, community link with health department/NGOs or other agencies and practices for control also were significantly associated ( $p=0.02$ ). On the other hand, a non-significant relationship ( $p=0.70$ ) was found between participation with Government /NGOs during spraying of fog and practices for control.

## Discussion

The results make it evident that dengue risk increased in study area due to lack of coordination and misunderstanding among community people, leaders and government agencies. Therefore, the prevention of dengue fever had become a difficult task and increased the chances of loss of lives. Although, the masses had good knowledge about dengue prevention and the possibility of its control through community effort, however, they were not organized at their residential colonies level to remove dengue breeding sites from their surroundings. It is supported that the lack of coordination was observed between health agencies, municipal committee and public health engineering department with community people to control dengue vectors.<sup>[11]</sup> Moreover, religious scholars play important role in development and solution of problem of a nation. However, participation of masses is low, probably, due to inactive local leadership including religious

leaders. The respondents supported the view that dengue vectors could be eradicated through the effort of community leaders, resource persons and government agencies.<sup>[16]</sup> Furthermore, insecticides were available in market but were not used due to its high prices.

The relationship between community participation and practices for dengue control unveil that dengue vectors could be controlled through community self-effort. Dengue vector can be eradicated if the community people participate in dengue prevention campaign to keep their living environment clean, remove standing water and buried other discard broken items. These findings are in line with Spiegel et al. (2012) that dengue vectors would be eradicated through the self effort of community people, leaders, and resource persons and along with government agencies. The findings of the study show that good practices for dengue control depended on awareness campaign and information about dengue fever, therefore, the masses can eradicate dengue-breeding sites if they participate in dengue awareness campaign and exchange knowledge regarding dengue fever. The study makes it evident that the dengue fever may be controlled significantly if there is a mutual coordination between community members and Government agencies.

## Conclusion And Global Health Implications

The spread of dengue epidemic was further enhanced by the ignorance, laziness of the community people and government agencies. The community members had good awareness to fill the ponds of standing water where dengue can be bred. They also followed preventive measures through community effort. However, the people, religious scholars, leaders and government agencies were not organized to participate in dengue prevention and eradication, hence, the chances of dengue infection increased in community. Moreover, low purchasing power of the masses was a limitation to purchase and use insecticides. Similarly, those respondents that followed appropriate practices for dengue

control were those that were well-organized, having active leaders, participated with government/NGOs in awareness campaign for dengue eradication, used insecticides, shared information regarding dengue fever, and kept mutual coordination with health department/NGOs or other agencies in dengue control.

The study recommends the mobilization of local communities and activating local leadership with action participation of government and non-government organizations for initiation of preventive strategies like eradication of dengue vectors and its breeding places, provision of medical facilities to patients and sensitizing the people to take preventive measures.

**Conflict of Interest:** *The authors declare no conflicts of interests relevant to this study.*

### Key Messages

- Effective coordination among local communities, government agencies/line departments, NGOs and local leadership is necessary for effective implementation of dengue prevention programs.
- Besides educating and creating awareness among the masses, additional efforts are needed to sensitize the masses and line agencies to address laziness and carry out organized practical efforts to address dengue.
- Poverty is a main hurdle in acquiring preventive/curing facilities or equipment and/or medicines. Subsidizing the treatment and preventive costs is effective in controlling dengue.

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