

# Knowledge and Awareness of Community People on Dengue Fever Infection: A Cross-Sectional Study

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## ABSTRACT

**Objective:** Pakistan has been suffering from epidemics of dengue infection in last two decades. One of the reasons of yearly high number of cases is due to lack of awareness and knowledge about prevention of dengue infection. The current study aimed to assess the level of knowledge and awareness of dengue infection common population of Karachi.

**Material and Methods:** A cross-sectional survey-based study was carried out over a period of three months. First section comprised of demographic characteristics of participants, section two comprised of 7- items about the knowledge of dengue infection, while section three comprised of 5- items related to awareness and perception of dengue infection among participants.

**Results:** A total of 201 participants were enrolled in the study with mean age of 26.9 years. Female participants were more as compared to male participants. Most of the participants belonged to low- or middle-income socio-economic status and had no history of dengue infection in the past. Less than half (39.8%) participants responded correctly that dengue mosquito breed in stagnant clean water. Around three-fourth population think that the chances of bite of mosquito is more in night time or dusk as compared to correct option of dawn. Around 37.3% participants were unaware that there is no vaccine available for the prevention or treatment of dengue infection. Around 30% respondents responded that antibiotics can be used for the treatment of dengue infection.

**Conclusion:** The level of knowledge in the current study was observed to low as compared to the previous studies. The level of awareness and knowledge among common population needs to be improved among common population

**Keywords:** Dengue, Knowledge, Awareness, Mosquito, Perception

## INTRODUCTION

Dengue is persistently expanding and has affected several regions of South East Asian nations. Pakistan has many crowded cities and is also at high risk due to badly maintained infrastructure, such as inadequate sanitation, comprehensive vaccination programs, and unclean drinking water that cause the spread of illnesses. Dengue, a virus spread by mosquitoes, has reported numerous cases each year.<sup>1</sup> The DEN-1, DEN-2, DEN-3, and DEN-4 serotypes of the dengue virus are four distinct but related members of the Flaviviridae family of RNA viruses. Lifelong immunity against that particular serotype is provided by infection with one serotype, but only partial protection against the other serotypes.<sup>2</sup>

In 1994, Pakistan experienced its first dengue case; today, the disease is endemic nationwide. Dengue cases during the post-monsoon period are at their highest, and the recent floods have made matters worse by sharply raising morbidity and mortality. *Aedes Aegypti* acquire and spread viruses while sucking blood. They eat during the day and snooze indoors in dim areas or outdoors in cool, shady areas. Female mosquitoes lay their eggs in bodies of water, containers, and other locations like schools and homes. An egg matures in 10 days. They reproduce in exposed, stored water collection systems including water coolers, barrels, drums, jars, pots, buckets, flower vases, plant saucers, tanks, and abandoned bottles and tins.<sup>3</sup>

Clinical manifestations encompass high grade fever that may last for 5 to 6 days and may be accompanied by any of the following symptoms: chills, retro-orbicular discomfort, photophobia, backache, excruciating joint and muscle pain, nausea, and abdominal pain. Considering that there is no specific treatment, supportive care is offered. Keep the patient's body temperature below 39°C and administer paracetamol four times per day; avoid giving ibuprofen and mefenamic acid. Encourage the patient to

maximize their consumption of fluids (such as water, juices, and milk).<sup>4</sup>

Dengue cases in Pakistan were reported by the National Institute of Health (NIH), Islamabad, as 22938, more than 3200, 24547, and 3442 cases in 2017, 2018, 2019, and 2020, and 48906 cases in November 2021.<sup>5</sup> Due to the steadily rising number of dengue cases, it is critical to pay close attention and alter attitudes toward dengue prevention. This can be done by increasing awareness of dengue fever and changing practices and attitudes in this area.<sup>6</sup> The purpose of the study was to evaluate Karachi residents' knowledge about dengue, its causes, symptoms, and prevention as dengue epidemics became a danger.

## MATERIALS AND METHODS

This cross-sectional study was carried out over a time period of three months i.e., from August 2022 to October 2022, among the residents of Korangi district of Karachi, Pakistan, after approved by Institutional Review Committee of Iqra University North Campus (IU/IRC/22), Karachi, Pakistan. The study only included adult participants with age 18 years and above. The participants with age less than 18 years or above 85 years were excluded from the study. The sample size was calculated utilizing an online calculator. The sample size was calculated using 90% confidence level with a response distribution of 50% and margin of error of 7%. The minimum sample required for the study was calculated as 196 participants.<sup>7</sup> The convenience sampling technique was utilized. The current study was carried out by adopting a validated questionnaire published by Bota et al.<sup>8</sup> The first section of study was about the demographic characteristics of participants such as age, gender, occupation, socio-economic status, history of dengue among study participants and their immediate family members. The second section of the study focused on the knowledge about dengue infection and comprised of 7-items. The third section of the

study was about the attitude and perception of the study participants about the dengue infection and comprised of 5-items. Data was gathered using a survey that used a questionnaire. This questionnaire was created using Google Forms, provided to participants in printed form, and explained to them. Data analysis was done by using SPSS version 26.

**RESULTS**

A total of 201 participants were enrolled in the study. The mean age of the participants was observed as 26.89 ± 7.9 years. Around 57.2% participants (n= 115) were less than 25 years while the 42.7% participants were more than 25 years of age. A total of 109 (54.2%) participants were female while 92 (45.8%) participants were male. Around two-third participants were from middle- or low-income socioeconomic status. Majority of the participants had no history of dengue infection in past. The demographic characteristics are summarized in table 1.

Majority of the respondents (84.1%) responded correctly that dengue infection is caused due to special mosquito “aedes”. Less than half (39.8%) participants responded correctly that dengue mosquito breed in stagnant clean water. Around three-fourth population think that the chances of bite of mosquito is more in night time or dusk as compared to correct option of dawn. The overall responses of 7- items related to knowledge of participants and comparison among male and female, participants with age less than 25 or more than 25 years, and medical or non-medical occupation are summarized in table 2.

Majority of the participants responded that dengue can be prevented. Around 37.3% participants were unaware that there is no vaccine available for the prevention or treatment of dengue infection. Around 30% respondents responded that antibiotics can be used for the treatment of dengue infection. The responses of 5-items related to the attitude and perception of dengue infection among participants are summarized in table 3.

Table 1: Demographic characteristics of study participants (n=201)

Characteristics	Statistics
Age (Mean+sd)	26.89+ 7.88 years
Gender	
Male	92 (45.8%)
Female	109 (54.2%)
Occupation	
Medical	114 (56.7%)
Non-Medical	87 (43.3%)
Socio-economic status	
Low income (less than 50 k / month)	78 (38.9%)
Middle income (51- 100 k / month)	65 (32.3%)
High income (> 100 k rupees / month)	58 (28.9%)
Have you ever suffered from dengue infection?	
Yes	28 (13.9%)
No	173 (86.1%)
History of dengue infection in any immediate family member	
Yes	31 (15.4%)
No	170 (84.5%)

Table 2: Comparison of Knowledge variables regarding dengue fever among different study populations (n=201)

	Overall N (%)	Male (n= 92) vs Female (n= 109)		Age < 25 years (n= 115) vs Age >25 years (n= 86)		Medical (n= 114) vs Non- medical (n= 87)	
Have you heard about dengue?							
Yes	196 (97.5%)	88 (95.7%) vs 108(99.1%)	0.18	112 (97.1%) vs 84 (97.7%)	0.86	112(98.2%)vs 84(96.6%)	0.65
No	5 (2.5%)	4 (4.3%) vs 1 (0.9%)		3 (2.6%) vs 2 (2.3%)		2(1.8%)vs 3(3.4%)	
What is the cause of dengue fever?							
A special mosquito “Aedes”	169 (84.1%)	82 (89.1%)vs 87 (79.8%)	0.08	94(81.7%)vs 75(87.2%)	0.34	95(83.3%)vs 74(85.1%)	0.85
Australian tiger mosquito	10 (5.0%)	3(3.3%)vs 7(6.4%)		7(6.1%) vs 3(3.5%)		5(4.4%)vs 5(5.7%)	
A virus	18 (9.0%)	6(6.5%)vs 12(11.0%)		12(10.4%)vs 6(7.0%)		12(10.5%)vs 6(6.9%)	
A fly	4 (2.0%)	1(1.1%)vs 3(2.8%)		2(1.7%) vs2(2.3%)		2(1.8%)vs 2(2.3%)	
How do dengue mosquito and its bite look like?							
A small dark mosquito having white stripes on its legs	156 (77.6 %)	71(77.2%)vs 85(78.0%)	0.94	85(73.9%) vs 71(82.6%)	0.17	86(75.4%)vs 70(80.5%)	0.49
Marking in form of a lyre on its thorax	17 (8.5%)	7(7.6%) vs 10(9.2%)		10(8.7%) vs7(8.1%)		10(8.8%)vs7(8.0%)	
Bite is painless	28(13.9%)	14(15.2%)vs 14(12.8%)		20(17.4%)vs 8(9.3%)		18(15.8%)vs 10(11.5%)	
Where does the dengue mosquito breed?							
Flowing dirty water	19(9.5%)	9 (9.8%) vs 10( 9.2%)		14 (12.2%) vs 5(5.8%)		10 (8.8%) vs 9 (10.3%)	
Flowing clean water	459(22.4%)	27(29.3%) vs 18 (16.5%)		20 (17.4%) vs 25(29.1%)		21(18.4%)vs24(27.6%)	
Stagnant dirty water	41(20.4%)	12(13.0%) vs 29 (26.6%)		32 (27.8%) vs 9(10.5%)		34(29.8%)vs 7(8.0%)	
Stagnant clean water	80(39.8%)	32 (34.8%) vs 48 (44.0%)	0.19	39 (33.9%) vs 41(47.7%)	0.04	39(44.8%) vs 41(36.0%)	0.25
Puddles	2(1.0%)	2 (2.2%) vs 0 (0.0%)		1 (0.9%) vs 1 (1.2%)		1(0.9%)vs 1(1.1%)	
Garbage	4(2.0%)	2 (2.2%) vs 2(1.8%)		3 (2.6%) vs 1(1.2%)		2(1.8%)vs 2(2.3%)	
Plant pot trays	7(3.5%)	5 (5.4%) vs 2(1.8%)		4 (3.5%) vs 3 (3.5%)		4(3.5%)vs3(3.4%)	
Empty buckets	3(1.5%)	3 (3.3%) vs 0 (0.0%)		2 (1.7%) vs 1(1.2%)		1(0.9%)vs 2(2.3%)	
Where does the dengue mosquito prefer living?							
Underneath furniture	36(17.9%)	14 (15.2%) vs 22 (20.2%)		25 (21.7%)vs11 (12.8%)		22(19.3%)vs14(16.1%)	
Sheltered places	87(43.3%)	39 (42.4%) vs48 (44.0%)		51 (44.3%)vs 36 (41.9%)		50(43.9%)vs37(42.5%)	
Indoors	78(38.8%)	39 (42.4%) vs 39 (35.8%)	0.38	39(33.9%)vs39(45.3%)	0.11	42(36.8%)vs 36(41.4%)	0.56
Dengue mosquito usually bites at what time?							
Dusk	41(20.4%)	16 (17.4%) vs 25(22.9%)		15 (13.0%) vs 26 (30.2%)		20 (17.5%)vs 21 (24.1%)	
Dawn	51(25.4%)	26 (28.3%) vs 25(22.9%)	0.42	25 (21.7%) vs 26 (30.2%)	0.19	27 (23.7%)vs 24 (27.6%)	0.62
Night	109(54.2%)	50 (54.3%) vs 59(54.1%)		75 (65.2%) vs 34 (39.5%)		67 (58.8%)vs 42 (48.3%)	
How is dengue transmitted?							
An infected dengue mosquito bite	178 (88.6%)	80 (87.0%)vs 98 (89.9%)	0.51	103 (89.6%)vs 75 (87.2%)	0.65	104 (91.2%)vs 74(85.1%)	0.19
By contacting a dengue patient	16 (8.0%)	9 (9.8%)vs 7 (6.4%)		7 (6.1%)vs 9 (10.5%)		7 (6.1%) vs 9 (10.3%)	
By drinking dirty water	7 (3.5%)	3 (3.3%)vs 4 (3.7%)		5 (4.3%)vs 2 (2.3%)		3 (2.6%)vs 4 (4.6%)	

Table 3: Comparison of attitude and perception regarding dengue fever among different study populations (n=201)

	Overall N (%)	Male (n= 92) vs Female (n= 109)	P- value	Age < 25 years (n= 115) vs Age >25 years (n= 86)	P- value	Medical (n= 114) vs Non- medical (n= 87)	P- value
Can dengue be prevented?							
Yes	194(96.5%)	89(96.7%)vs 105(96.3%)	0.95	111(96.5%)vs83(96.5%)	0.89	109(95.6%) vs 85(97.7%)	0.70

No	7(3.5%)	3(3.3%)vs 4(3.7%)		4(3.5%)vs 3(3.5%)		5(4.4%)vs 2(2.3%)	
Is vaccination available for dengue?							
Yes	39(19.4%)	21(22.8%)vs 19(17.4)		20(17.4%)vs 19(22.1%)		20(17.5%)vs 20(23.0%)	0.47
No	126(62.7%)	54(58.7%)vs 72(66.1%)	0.38	66(57.4%)vs 60(69.8%)	0.04	74(64.9%)vs 52(59.8%)	
Don't Know	36(17.9%)	17(18.5%)vs 18(16.5%)		29(25.2%)vs 7(8.1%)		20(17.5%)vs 15(17.2%)	
How can dengue be treated?							
By using antibiotics	60(29.9%)	21(22.8%)vs 39(35.8%)		36(31.3%)vs 24(27.9%)		31(27.2%)vs 29(33.3%)	
Anti-pyretic	124(61.7%)	62(67.4%)vs 62(56.9%)	0.15	71(61.7%)vs 53(61.6%)	0.95	77(67.5%)vs 47(54.0%)	0.035
Never use pain killers	17(8.5%)	9(9.8%)vs 8(7.3%)		8(7.0%)vs 9(10.5%)		6(5.3%)vs 11(12.6%)	
What are the symptoms for dengue?							
Prolonged high fever	131(65.2%)	62(67.4%)vs 69(63.3%)	0.56	68(59.1%)vs 63(73.3%)	0.048	69(60.5%)vs 62(71.3%)	0.041
Muscular pain	13(6.5%)	7(7.6%)vs 6(5.5%)		10(8.7%)vs 3(3.5%)		7(6.1%)vs 6(6.9%)	
RASH	9(4.5%)	3(3.3%)vs 6(5.5%)		6(5.2%)vs 3(3.5%)		7(6.1%)vs 2(2.3%)	
Bleeding (from nose and other areas)	16(8.0%)	5(5.4%)vs 11(10.1%)		9(7.8%)vs 7(8.1%)		10(8.8%)vs 6(6.9%)	
Headache, nausea and vomiting	32(15.9%)	15(16.3%)vs 17(15.6%)		22(19.1%)vs 10(11.6%)		21(18.4%)vs 11(12.6%)	
What are the symptoms for dengue?							
PCR	102(50.7%)	45(48.9%)vs 57(52.3%)		72(62.6%)vs 30(34.9%)		64(56.1%)vs 38(43.7%)	
ELISA	99(49.3%)	47(51.1%)vs 52(47.7%)	0.67	43(37.4%)vs 56(65.1%)	<0.01	50(43.9%)vs 49(56.3%)	0.04

## DISCUSSION

Pakistan is located in the subtropical region and has been previously affected by various vector borne diseases such as dengue, malaria, leishmaniasis etc. in 2011, there was a major outbreak of dengue in Pakistan with more than 350 reported deaths. In 2022, around 6000 cases of confirmed diagnosed dengue infection were reported in Karachi alone. Among these 600 reported cases, around 1100 cases were reported in the Korangi district of Karachi.<sup>8</sup> One of the factors in increased cases of dengue infection can be poor knowledge and awareness of dengue infection. The current study aimed to assess the knowledge and awareness of dengue infection among common population of Korangi district, Karachi. The knowledge of dengue infection among study participants was observed to be good. The awareness level about dengue infection was observed to be insufficient among participants less than 25 years and participants with non-medical occupation.

In current study, around 97.5% participants claimed that they know about dengue infection. Similar results were reported by Ahmed et al., (2008) in which 89.9% participants claimed that they know about dengue infection.<sup>9</sup> The study also stated that around one-fifth participants were aware that the dengue mosquito breed in the stagnant clean water. In current study, the awareness about dengue mosquito breed was reported in around 40% participants. This knowledge about stagnant clean water was found to be statistically significant less among participants with age less than 25 years as compared to participants with age more than 25 years. Although statistically insignificant, but the knowledge about mosquito breed in clean water was found to be in participants with non-medical background. Similar results were also reported by Hussain et al., (2021) in which around 43% participants were aware of the clean water breeding of dengue mosquito.<sup>10</sup>

In current study, around half of the participants wrongly believed that the dengue mosquito usually bites in the night time as compared to the right option of sunset/sunrise. These results were in contrast to the study by Madiha et al., (2010) in which around 46% participants had the correct knowledge of dengue mosquito bite usual timings.<sup>11</sup> Similar results were also reported by Husaain et al., (2021) in which around 43% participants had knowledge about usual timings of dengue mosquito bite.<sup>10</sup>

Currently, there is no licensed therapeutic drug available in market for the treatment of dengue infection. The treatment for dengue infection is mostly supportive and symptomatic.<sup>12</sup> Acetaminophen should be used for the symptomatic management of high-grade fever in dengue infection. Corticosteroids and antibiotics need to be avoided during the course of dengue infection. Moreover, non-steroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen, diclofenac, piroxicam, aspirin, meloxicam, and celecoxib should also be avoided during the days of dengue infection.<sup>13</sup> In current study, around 40% participants responded that the dengue infection can be treated by using

antibiotics or pain killers. While, 60% participants responded correctly by choosing anti-pyretics as the choice of drug for management of dengue infection. In contrast, Khan et al., (2021) reported an increased level of knowledge and awareness in the northern region of Pakistan, in which only one-fourth of participants were ill-informed about not using antibiotics and NSAIDs during dengue infection.<sup>14</sup>

## CONCLUSION

The level of knowledge in the current study was observed to low as compared to the previous studies. The level of awareness and knowledge among common population needs to be improved through rigorous social media, print media and electronic media campaigns, and awareness session especially among areas with more poverty.

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