

Dengue Fever Perception among Undergraduate Students at a Public Sector University, Rawalpindi



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Abstract

Background: Dengue is the most widely distributed mosquito-borne viral disease in the world. It continues to spread rapidly because of climate change, rapid urbanization, and population growth. In the world population ranking Pakistan stands at number 6th position, having subtropical position. Due to growing cases, this study is undertaken to evaluate the perception of Dengue fever among the university students. Engagement of students and community to improve participation and mobilization for vector control is a key element to regulate the control interventions and strategies.

Methods: A descriptive cross-sectional study was carried out at National University of Medical Sciences Rawalpindi during July-Nov 2022 including 346 participants. Online survey was conducted using close ended structured questionnaire by using nonprobability convenience method. The age, gender, living status, accommodation status, and residential area of the students together with perceptions of undergraduate students regarding Dengue's knowledge and prevention was recorded. Based on students' correct answers, overall knowledge level assessment and prevention awareness level was calculated. Association of categorical variables were analysed using chi-square test. Statistical data analysis was carried out using commercially available software.

Results: Out of 346 students, 58.6% had knowledge of dengue and 84.9% were aware about its prevention. The multi-variate analyses revealed that positive relationship exists between Dengue's knowledge with age, gender, and residential area and between Dengue's prevention awareness with age and gender ($p < 0.05$).

Conclusion: The overall knowledge and awareness of students regarding Dengue fever was found to be adequate, being higher among male than female students. The collaborative effort by all stakeholders can contribute towards enhancing the knowledge and awareness among students which will further reduce the risk of disease.

Keywords: Dengue fever, perception, awareness, undergraduate students, public sector university

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Introduction

Among the mosquito-borne diseases, Dengue is the most common, life-threatening, viral infection having physical and mental effect on humans. Dengue infection is a highly communal disease in peri-domestic tropical and subtropical countries such as Pakistan (1). WHO reported that global incidence of the disease in last decade has rapidly extended to almost 40% of the world's population thus imposing considerable burden in terms of socioeconomics (1). It has now become a major public health dilemma, annually affecting approximately 390 million people worldwide with 96 million are clinically apparent, and a half million requiring hospitalization with approximately 2.5% fatality (1). Although it is difficult to have a true global picture of dengue due to inadequate low levels of reporting, disease surveillance, and misdiagnosis, still based on the present projection of global distribution of Dengue, 6.1 billion people or 60% of the world population will be at risk by the end of year 2080 (2).

Aedes aegypti or yellow fever mosquito is considered to be common vector for dengue viruses' transmission with *Aedes albopictus* as a second most transmitting mosquito that feeds on various vertebrates species³. Dengue fever together with dengue haemorrhagic fever, a severe form, can be caused by either of its four serotypes, DEN-1, DEN-2, DEN-3, or DEN-4. Any of the infection can give partial immunity to all other serotype infection with lifetime immunity towards that particular infection (3). With incubation period between 3 to 15 days (3), infection of Dengue fevers can take form of either asymptomatic infection, dengue haemorrhagic fever or dengue shock syndrome (3).

Vector management is the primary approach against infectious diseases, such as dengue, malaria and other overlooked tropical ailments (4). It can be managed by involving communities that imparts awareness and health promotion. The knowledge, attitude and behaviour of the community are the key players to control and eliminate vector borne diseases (5). The understanding of the community

about the Dengue's propagation and mosquito reproduction sites, is crucial in the fight against the disease (6).

In the world population ranking, Pakistan stands at number 6th position, having subtropical position (6). Having appropriate climatic conditions

being in south Asia, a number of vector borne diseases are present like Dengue, the outbreaks of which has been reported since 1994 (7,8). Although it is present throughout the year, it is reported maximum in post-monsoon period due to favourable climatic conditions for mosquito breeding (9).

Quoting National Institute of Health (NIH) Islamabad, Pakistan Red Crescent Society (10) stated that in Pakistan 22,938 dengue fever cases were reported in 2017, 26,138 in 2018, 24,547 in 2019, and 3,442 cases in 2020. For the year 2021 (from 1 January to 25 November), a total of 48,906 cases including 183 deaths were reported in the country. Cases of Dengue are on the rise in the twin cities of Islamabad and Rawalpindi during October and November. The dengue larvae were collected from 53 different locations during the anti-dengue surveillance indicating a lack of awareness in the community (10). Due to growing cases, this study is undertaken to evaluate the perception of Dengue fever among the undergraduate students at a Public Sector University in Rawalpindi. The research will serve as a tool to generate new strategies within the community and among the students and will also facilitate in formulation of pragmatic recommendations that can impart awareness about the severity and prevention of the disease.

Methodology

A cross-sectional descriptive and inferential study was conducted from July to November 2022. The study protocol was approved by the Institutional Review Board & Ethical Committee of NUMS (IRB No: O6/IRB&EC/NUMS/12 dated 29 August 2022). Informed consent was confirmed by the IRB. Proper consent was taken from the study participants and their confidentiality was also assured.

Sample Size: 346 students in different undergraduate programs from a Public Sector University in Rawalpindi

Inclusion Criteria: Willing non-medical university students studying in different undergraduate graduate programs in a Public Sector University in Rawalpindi.

Exclusion Criteria: Non-consenting students.

Keeping in view previously conducted similar awareness studies (6,11-22), an online close-ended structured questionnaire was formulated and shared among the students using nonprobability convenience method. The questions were based on "correct", "incorrect" and "unaware" responses ("unaware" option was counted as an incorrect response). The questionnaire was modified after conducting a pilot study on 20 students to pre-test the questionnaire to remove vagueness and ambiguities.

Students' biodata that included age, gender, accommodation status (day-scholar, boarder), residential area (urban, rural), and residential city was collected in part A of the questionnaire. Questions in the second part were related to the perceptions of undergraduate students regarding knowledge (25 questions) and prevention (11 questions) awareness of Dengue fever. Based on correct scoring of the students, against 25 questions, the overall

knowledge level assessment was calculated in three categories: poor (between 0 and 7 correct scores), moderate (between 8 and 16 correct scores) and good (between 17 and 25 correct scores). Similarly, against 11 questions, prevention level assessment was also calculated in three categories: poor (between 0 and 2 correct scores), moderate (between 3 and 7 correct scores) and good (between 8 and 11 correct scores). Categorical variables were analysed using chi-square test and the calculated p-values determined the positive or negative association type. Statistical data analysis was carried out using commercially available software (SPSS version 26).

Results

Questionnaire was distributed to 350 students; however, four students did not give consent. Remaining 346 students comprising of 64 male and 282 female students between the ages of 18 to 23 years, participated in the study. Majority of the students were days scholars (61.6%) from the surrounding area of the university (66.1% belonging from in Islamabad, Rawalpindi, Taxila and Wah). 300 (86.7%) out of 346 participants belong to urban living areas.

Table 1 and 2, respectively, tabulate the results of multi-variate analysis of categorical variables that was carried out using chi-square test to ascertain the positive or negative associations between participants' knowledge and prevention awareness regarding dengue and four different variables. Table 3 and 4 give the frequency and percentage students' responses (correct, incorrect, and unaware) against various statements that can judge their Dengue knowledge and prevention awareness, respectively.

Table 1. Statistical test results for association of knowledge awareness with different variable

Variables	Chi-Square Value	p-value
Knowledge * Age	352.725	0.001
Knowledge * Gender	28.834	0.001
Knowledge * Accommodation Status	8.207	0.513
Knowledge * Residential Area	100.680	0.000

Table 2. Statistical test results for association of Prevention awareness with different variable (n=346)

Variables	Chi-Square Value	p-value
Prevention Awareness * Age	141.295	0.000
Prevention Awareness * Gender	71.486	0.000
Prevention Awareness * Accommodation Status	7.727	0.172
Knowledge * Residential Area	7.296	0.200

The overall knowledge level assessment was calculated based on correct scoring of the students. Regarding knowledge about Dengue, it was found that out of 346 students, on 16 (4.6%) students had poor knowledge whereas 255 (73.7%) students had moderate knowledge and 75 (21.7%) students had good knowledge. Similarly, good awareness about prevention was found in students wherein 230 (66.5%) students had good, 101 (29.2%) had moderate and 15 (4.3%) had poor prevention awareness.

Table 3. Response Count of Students with respect to Dengue Knowledge (n=346)

No	Variables	Correct		Incorrect		Unaware	
		Number	%age	Number	%age	Number	%age
1.	Dengue is a serious disease	271	78.3%	59	17.1%	16	4.6%
2.	Dengue is an inherited disease	201	58.1%	127	36.7%	18	5.2%
3.	Dengue Fever is a viral disease	206	59.5%	124	35.8%	16	4.6%
4.	Dengue is a treatable disease	304	87.9%	26	7.5%	16	4.6%
5.	Dengue fever is a communicable disease.	211	61.0%	122	35.3%	13	3.8%
6.	Dengue Fever is common in all age groups	124	35.8%	132	38.2%	90	26.0%
7.	Dengue fever is more common in males	133	38.4%	138	39.9%	75	21.7%
8.	Dengue fever is common in children	129	37.3%	134	38.7%	83	24.0%
9.	Dengue haemorrhagic fever is the most dangerous stage of dengue fever.	257	74.3%	8	2.3%	81	23.4%
10.	Dengue mosquito bites primarily during daytime	123	35.5%	124	35.8%	99	28.6%
11.	Primary vector for Dengue fever is Aedes Aegypti	274	79.2%	24	6.9%	48	13.9%
12.	Aedes Aegypti can be easily identified by naked eye.	269	77.7%	28	8.1%	49	14.2%
13.	Most common household breeding sites flowerpots, coolers, tyres, plastic pot	329	95.1%	17	4.9%	0	0.0%
14.	Dengue mosquito breeds mostly in man-made containers	329	95.1%	17	4.9%	0	0.0%
15.	Dengue Mosquito lays eggs in clean water	174	50.3%	164	47.4%	8	2.3%
16.	Dengue mosquito lives in urban habitat	150	43.4%	97	28.0%	99	28.6%
17.	Dengue cannot be transmitted through Droplet Infection	198	57.2%	83	24.0%	65	18.8%
18.	Dengue fever route of transmission is through vector bite	214	61.8%	76	22.0%	56	16.2%
19.	Incubation period of dengue fever is 4-10 days	248	71.7%	16	4.6%	82	23.7%
20.	Dengue Fever has four serotypes	191	55.2%	16	4.6%	139	40.2%
21.	Single strain immunity does not give immunity from other strains	166	48.0%	94	27.2%	86	24.9%
22.	Recovery from infection by one Dengue virus provides lifetime immunity against that particular virus serotype	173	50.0%	92	26.6%	81	23.4%
23.	No medication with high fluid intake is the treatment of Dengue	131	37.9%	116	33.5%	99	28.6%
24.	Known Symptoms of Dengue fever are fever, rash, nausea and aches.	132	38.2%	91	26.3%	123	35.5%
25.	Every dengue fever patient needs hospitalization	166	48.0%	164	47.4%	16	4.6%

Table 4. Response Count of Students with respect to Awareness of Dengue Prevention (n=346)

No	Variables	Correct		Incorrect		Unaware	
		Number	%age	Number	%age	Number	%age
1.	Dengue fever is a disease which can be prevented.	330	95.4%	8	2.3%	8	2.3%
2.	Dengue fever prevention is mainly by controlling the vector	328	94.8%	11	3.2%	7	2.0%
3.	Dengue fever prevention at community level can reduce spread of disease	329	95.1%	9	2.6%	8	2.3%
4.	Community has a major role in preventing Dengue fever.	281	81.2%	17	4.9%	48	13.9%
5.	Using Dengue prevention methods at home has a major role in its prevention	305	88.2%	18	5.2%	23	6.6%
6.	Routinely checking most common household breeding sites can prevent Dengue like flowerpot, coolers, plastic pots.	224	64.7%	81	23.4%	41	11.8%
7.	Using Dengue prevention methods at home like closing doors and windows can effectively prevent Dengue	313	90.5%	25	7.2%	8	2.3%
8.	Dengue is effectively prevented by using mosquito nets	188	54.3%	66	19.1%	92	26.6%
9.	Dengue can be prevented by use of insecticides	313	90.5%	25	7.2%	8	2.3%
10.	Dengue is effectively prevented by using topical mosquito repellents	330	95.4%	8	2.3%	8	2.3%
11.	Dengue is effectively prevented by Fumigation	328	94.8%	11	3.2%	7	2.0%

Discussion

Association between participants' knowledge and prevention awareness regarding dengue and participants' four different variables was measured using Chi-Square test. The results indicate that relationship exists between the knowledge of Dengue and age, gender, and residential area ($p < 0.05$), whereas it is absent in accommodation status ($p > 0.05$). Relationship was also found between the Dengue's prevention awareness with age and gender ($p < 0.05$) but was absent from accommodation status and residential area ($p > 0.05$).

The analysis of the collected data indicated that the knowledge of students about the Dengue was just adequate (58.6%). Results revealed that 78.3% of the students had sufficient knowledge about the gravity of the disease. Studies (6,11) carried out in Pakistan also confirm almost similar results as are with few other carried out in Southeast Asia (12–14,18). Adequate knowledge about the origin of the disease (59.5%) was recorded in this study which were almost similar to the results recorded by Ahmed et al (11). in other studies carried out in Pakistan. Treatability of Dengue was correctly answered by 87.9% of the respondents which was also confirmed by Hossein et al (18) in their study carried out in Bangladesh. Only 124 (35.8%) of students knew about the affected age group. Low percentage (23%) was recorded for this variable in another study carried out in the province of Punjab, Pakistan. However, study by Abbasi et al (6) on awareness about Dengue among University students in Azad Kashmir reported a higher percentage (72%) as was done by other studies carried out in Malaysia (14) which also recorded higher knowledge about this variable in 97.6% of the respondents. 79.2% of the students in our study reported that mosquito (*Aedes Aegypti*) is the primary vector of the disease. Almost all the studies (6,11–14,18–20) reported similar results of high percentages.

Only 35.5% of the students knew about the biting time of Dengue mosquito. Mixed responses on this have been recorded in other studies; studies (6,15) reported higher percentages, studies (14,16,18,20) reported medium percentages and studies (11,12,21) reported low percentages. Students in our study had good knowledge (95.1%) about the breeding sites. Studies (11–17) carried out on the urban population reported similar results in contrast to those carried out in rural areas (18,21). Half of the respondents of this study correctly indicated that Dengue mosquito lay eggs on clean water (50.3%). Same was reported in other studies (6,11,16,17) carried out in Pakistan.

Knowledge about the disease, its symptoms, and medication was found to be lower than adequate in the respondents. A little more than half (57.2%) of the students knew about the transmissibility of the disease. Similar results were reported in another research (6,18). Only 55.7% students reported correctly about the incubation period of the dengue disease. Wan Rosli et al (14) reported only 61.2% of the respondents in their study knew about the incubation period. Similarly, 55.2% and 50% of the students knew about the serotypes and immunity about the Dengue virus, respectively. Almost similar results were recorded by other studies (14,15). Low percentage of the respondent

was found about the correct symptoms of the disease (38.2%). The studies (6,11,17) conducted in Pakistan report a little higher percentage. Studies carried out in Southeast Asia reported mixed knowledge level about their respondents. Some studies (12,13,20,22) reported low level (between 25–45%) while other studies (14,18,19,21) reported medium level (between 50–65%). 37.9% of the students in this study report correctly about the medication requirements during the infected time period. Other studies (11,14) reported a higher level of knowledge (72.6% and 71.3% respectively). Almost all the studies (11–17) reported correctly the requirement of hospitalization of the patients, however, only less than half of the students (48%) in this study were in knowledge about this aspect.

The analysis of the collected data indicated that the students had a better overall perception about the prevention of Dengue (84.9%). With regards to preventability of the disease, 95.4% of the students answered correctly. A higher percent about this fact was found in other studies (6,18) as well. Efforts to prevention of Dengue's spread at community level was acknowledged by 95.1% of the students as was done in other studies (12,14). 81.2% of the respondents also recognized that Dengue can be prevented by routinely checking and draining the common breeding sites. This fact has been seconded by other studies (6,11,14,16,17,20,21) as well. Fact that by keeping the doors and windows closed can prevent the spread of Dengue was supported by 64.7% of the students as was done in other studies (18,21). A good awareness about the use of preventive aids was found in students of this study; 87.3% confirmed that use of mosquito nets is an effective measure. Other studies (14,19,21) also confirmed similar results. 84.1% of the students confirmed repellents as good measures. Similar findings were found in other studies (6,11,14,17,19). Moreover, use of repellent as an effective measure has also been advised by US CDC (23). Lastly, other studies (6,17,18) informed that their respondents had good knowledge about prevention through fumigation as was found in our study where 86.4% students confirmed the same.

The overall knowledge level assessment was calculated based on correct scoring of the students. Majority of the students had adequate knowledge about Dengue with good awareness about prevention. Other studies (13,15,16,20,21,24,25) reported results that indicated that majority of the respondents had moderate knowledge of about the disease. Moreover, it was also found that male students had better knowledge (100% had moderate to good) about Dengue as compared to female students (94.3% had moderate to good knowledge). Similar results were obtained while analysing prevention awareness.

The educational programs in other countries focus on public health to increase the perception of Dengue fever among the students. Although Government of Pakistan has initiated various dengue awareness programs, however, research to check the peoples' awareness level has not been conducted to establish the requirement of launching further educational campaigns. Due to limited resources, the research in Pakistan is only focused on the specific segments of population as done in this study. Even though the subjects of this study had knowledge of dengue, still, the students are to be properly educated in healthcare programmes.

As the study results confirmed that better knowledge and preventive measures can reduce the dengue's risk, it is recommended that all the stakeholders that include government as well as non-governmental organizations together with civil society must collaborate efforts to address the spread of dengue. Furthermore, it is recommended that parting proper education to masses towards the nature of the disease, its symptoms, transmission modes, measures to prevent it in the communities would prove beneficial. Engagement with the community to improve participation and mobilization for vector control is a key element. Strict vector monitoring and surveillance should be carried out to regulate the control interventions and strategies. The same should be covered thoroughly in the future campaigns and training workshops.

The study limitations include a few points. First, the study was limited by the small sample size. Secondly the study has been carried out on the students at a single public sector university, the results would be more generalizable if students from multiple Institutes would have been involved along with the comparison of students from private with public universities.

Conclusion

The overall knowledge and awareness of students regarding Dengue fever was found to be adequate, being higher among male than female students. The collaborative effort by all stakeholders can contribute towards enhancing the knowledge and awareness among students which will further reduce the risk of disease.

Acknowledgment

We are highly obliged to NUMS academic departments for their support and contribution in completion of the research paper.

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