Bangladesh

Community engagement to reduce dengue transmission in Dhaka

Case study prepared by:
Uzzal Kumar Roy, Atikur Rahman and Nur-A-Safrina Rahman

Focus

The dengue virus is spread by aedes mosquitoes and is the most rapidly spreading vector-transmitted disease in the world (Brauer *et al.*, 2016). In the last 50 years, the global incidence of dengue has increased by a factor of 30. An estimated 390 million cases are now diagnosed annually in more than 130 countries, affecting more than two billion people in the tropics and subtropics (World Health Organization (WHO), 2000).

In Bangladesh, dengue cases have risen from 10,148 with 26 deaths in 2018, to almost 70,000 cases with more than 300 deaths in 2023 (Haider *et al.*, 2021). Also, the pre-monsoon aedes survey showed the density of mosquitoes and the number of potential dengue hotspots in 2023, were at the highest levels for five years.

Favourable climate conditions in the country have led to an unusual shift in the transmission of dengue and other vector-borne diseases, even outside traditional seasons. But a number of other factors have contributed to this rise, including building and lifestyle changes, inadequate water management, poor water storage and rainwater pooling in outdoor containers (Kesetyaningsih *et al.*, 2018).

The impact on health is severe. Dengue virus infections may be asymptomatic, but they can also cause dengue fever, dengue haemorrhagic fever and dengue shock syndrome – all of which include high fevers and bleeding that can cause severe dehydration and organ failure. There is no treatment or widely available vaccine for dengue, and so it is critical that efforts are made to reduce the disease's prevalence by eliminating vector habitats and promoting interventions that can protect the public. But this is only possible with community cooperation.

Dhaka, the largest and most populous city in Bangladesh with a population of almost 16 million, has the greatest number of dengue cases and is the geographical focus of this case study. The study's objectives are to:

1. Assess the community's awareness of dengue using a knowledge, attitude and practice (KAP) survey, and evaluate the efficacy of community-based teaching programmes in selected areas of Dhaka South City Corporation (DSCC);
2. Motivate policy makers to scale up successful interventions (gleaned from the evaluation) in urban areas.

Methods

The study investigated the knowledge, attitudes and practices (KAP) of 384 adult study participants around dengue. All the participants were permanent residents in a selected zone in DSCC.

Participants were selected using convenience sampling (i.e. people who were available to the researchers). These participants were then interviewed face-to-face using a semi-structured questionnaire, comprising five sections which were designed to assess:

1. Respondents' demographic data;
2. Their knowledge about dengue and how it is transmitted (categorized as poor, average, good or excellent);
3. Their attitudes towards practices that mitigate the spread of the disease (categorized as positive, neutral or negative);
4. Practices that respondents themselves had used or were using to mitigate against dengue (categorized as good, fair or poor);
5. Sources of information they used or had used to learn about the disease and its prevention.

After the questionnaire, participants received a structured teaching programme (about 40 minutes in length). The programme included information (pamphlets and flyers) on disease awareness and prevention, and face-to-face counselling in which participants were offered more personalized strategies to help them prevent dengue. Participants were then asked to share this information with their family and friends.

One month after the initial assessment, participants' households were revisited and the same questionnaire was used to assess changes in KAP. Progress was also measured through direct observation on dengue preventive practices (e.g. proper use of mosquito nets and elimination of stagnant water sources). The purpose of maintaining the timeframe between the pre- and post-tests was to ensure that participants had retained the information from the structured teaching programme.

Statistical Package for the Social Sciences (SPSS) data analysis software was then used to perform a series of analyses on the pre- and post-test data to ascertain a significant increase or decrease in participants' knowledge, attitudes and practices before and after the teaching programme. Spearman rank correlation coefficients (t-tests) were also calculated to observe whether there were statistically significant differences in pre- and post-test results.

Results

The 384 participants had a mean age of 39 years and were grouped into five age groups: 18-29, 30-39, 40-49, 50-59 and over 60 (Figure 1a).

The majority of the participants had completed secondary education 39.4% (Figure 1b) and 13.2% had experienced dengue fever in the past (Figure 1c).

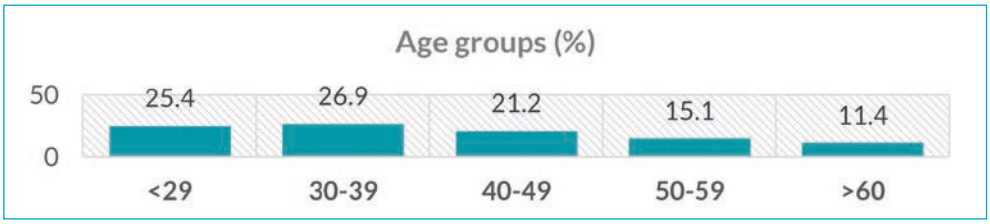


Figure 1a: Age distribution of the respondents where the mean age of respondents was 39 years

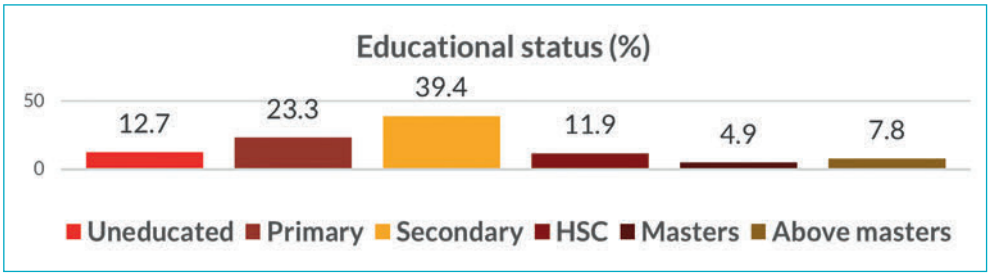
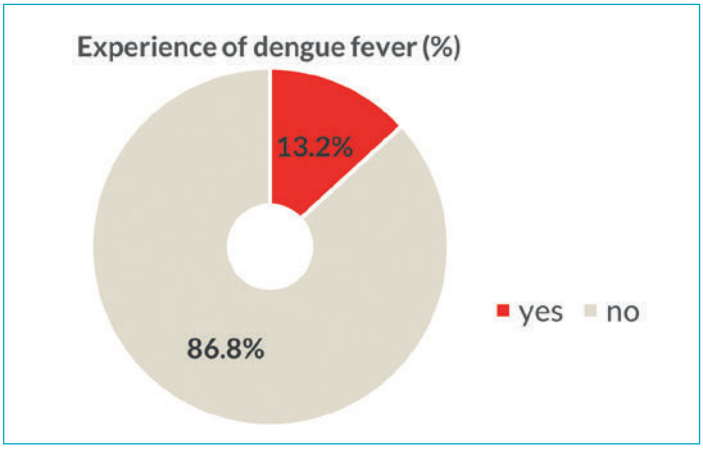


Figure 1b: Distribution of the respondents by educational status

Figure 1c: Distribution of the respondents by history of dengue fever



Following the structured teaching programme, mean knowledge scores increased, with large percentage gains in good and excellent knowledge and significant decreases in poor and average knowledge about dengue (Table 1).

Level of knowledge	Pre-test	Post-test	% Change
Poor knowledge (1-3 scores)	12.5%	0.5%	-12
Average knowledge (3-5 scores)	69.7%	3.1%	-66.6
Good knowledge (6-8 scores)	17.8%	46.9%	+29.1
Excellent knowledge (9-11 scores)	0%	49.5%	+49.5

Table 1: Comparison of knowledge level between pre-test and post-test

After the second KAP, 63.8% of the participants were found to have positive attitudes about dengue prevention – an increase of 17.3% from the pre-test (Table 2).

Level of attitude	Pre-test	Post-test	% Change
Positive (32–40 scores)	46.5%	63.8%	+17.3
Neutral (24–31 scores)	29.7%	24.1%	-5.6
Negative (8–23 scores)	23.8%	12.1%	-11.7

Table 2: Distribution of attitude levels toward dengue prevention

Pre-test results showed that a majority of respondents (34.8%) already engaged in good preventative behaviours, but this proportion increased to almost 60% after the teaching programme and counselling was administered (Table 3).

Level of practice	Pre-test	Post-test	% Change
Good (9–12 scores)	34.8%	59.9%	+25.1
Fair (6–8 scores)	39.4%	25.1%	-14.3
Poor (0–5 scores)	25.8%	15.0%	-10.8

Table 3: Distribution of practice level in dengue prevention

Television was the most common way people learned about dengue. This was followed by information provided by city corporation employees and newspapers (Figure 4).

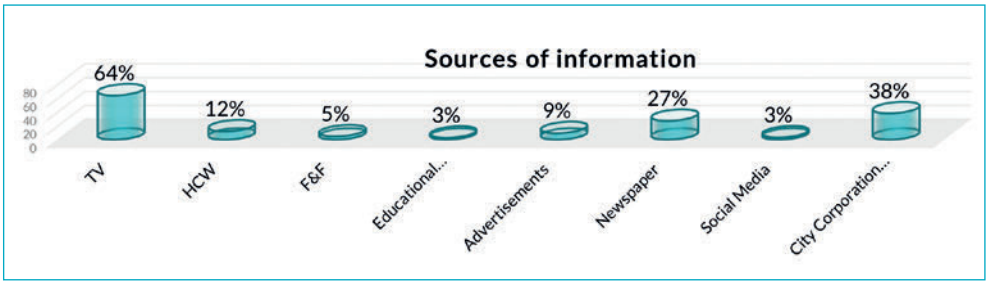


Figure 4: Sources of information on dengue

Independent t-test results (the SPSS data analysis, mentioned above) for KAP mean scores before and after the teaching programme indicated a statistically significant (greater than 0.05) increase in both knowledge and practice about dengue and how to prevent it (Table 4).

Criteria	Pre-test Mean±SD	Post-test Mean±SD	Probability (p) value
Knowledge	4.51±1.33	8.42±1.56	0.023*
Attitude	41.2±1.7	44.1±3.2	0.439
Practice	7.1±0.55	9.3±0.93	0.039*

Table 4: Independent t-test results for KAP mean scores before and after the teaching programme indicated a statistically significant probability (*p below 0.05) of an increase in both knowledge and practice (SD = standard deviation)

Results also showed that increased levels of knowledge were linked with higher levels of education, and that those with dengue experience were more likely to follow good practices. The link between knowledge and attitude was moderately positive, while weaker links were found between knowledge and practice and attitude and practice.

Overall, positive changes in the level of dengue prevention practice were found during the observation period. Comparing data from before and after the study, re-

sults showed that the incidence of dengue in the area significantly declined from the previous year - from 791 to 102 cases.

Lessons learned

The study revealed a number of key lessons:

1. With relevant guidance, people can improve their dengue knowledge, their attitudes about the illness and their preventative behaviours.
2. Disseminating correct information and education about the disease, changes people's perceptions and makes them better able to protect themselves and their families from potential health risks.
3. The media (television, radio, newspapers and social media) can play an important role in raising awareness and disseminating information about dengue symptoms, its mode of transmission and the preventative measures people can take. Additionally, the media may be utilized to communicate updates on outbreaks, educational programmes and other efforts to curb the spread of the disease.
4. With ongoing education, people's positive attitudes to dengue prevention continue to grow.
5. A person's level of education influences their understanding and perspective on health. It is crucial, therefore, to take educational background into account when planning future awareness campaigns (i.e. ensure awareness information is appropriate for its audience).
6. Knowledge, attitude and practices were all shown to have a positive correlation. This supports the idea that knowledge and attitude about a specific health issue, like dengue, are important factors in how people act and what they do to prevent and control diseases.

The importance of the discovery that knowledge of dengue affects attitude and behaviour in dengue control cannot be underestimated. When people have access to up-to-date and thorough information on a subject such as dengue, they are better able to generate favourable and well-informed opinions and take precautions against infection.

Overall, the interventions used in the study were cost-effective and scalable and therefore appropriate for other parts of Bangladesh and other developing countries in collaboration with urban public health authorities.

Limitations of the study

1. Participants were chosen based on their availability and accessibility to the study team, rather than being randomly selected from a larger population. As a result, there was no hypothesis or assumption that the post-intervention survey would reveal any changes.
2. Selection bias and social desirability bias are possible biases in case studies. Additionally, a direct causal link between the observed outcomes and the impact of the study itself could not be statistically identified due to limitations in the study design.

Conclusion

In conclusion, dengue awareness is essential for reducing the incidence of the disease and positively impacting health outcomes. This can be achieved by investing in education and awareness programmes and utilizing mass media to reach large numbers of people with dengue related information.

Bibliography

Brauer, F., Castillo-Chavez, C., Mubayi, A. and Towers, S. Some models for epidemics of vector-transmitted diseases. *Infectious Disease Modelling*. 2016 Oct 1;1(1):79-87.

Haider, N., Chang, Y.M., Rahman, M., Zumla, A. and Kock, R.A. Dengue outbreaks in Bangladesh: Historic epidemic patterns suggest earlier mosquito control intervention in the transmission season could reduce the monthly growth factor and extent of epidemics. *Current Research in Parasitology & Vector-Borne Diseases*. 2021 Jan 1;1:100063.

Kesetyaningsih, T.W., Andarini, S., Sudarto, S. and Pramoedyo, H. Determination of environmental factors affecting dengue incidence in Sleman District, Yogyakarta, Indonesia. *African Journal of Infectious Diseases.* 2018 Mar 13;12(1S):13-25.

World Health Organization. Dengue/dengue haemorrhagic fever: situation in 2000. Weekly Epidemiological Record= *Relevé* épidémiologique *hebdomadaire*. 2000;75(24):193-6