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Perception and behavioural intention towards dengue preventive practices among slum-dwellers in a municipality area of West Bengal: A qualitative study using Health Belief Model

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ABSTRACT

Objective: To explore perceptions and behavioural intentions towards dengue preventive practices (DPP) using the Health Belief Model (HBM) among slum dwellers in Berhampore Municipality, Murshidabad of India.

Methods: Our study, conducted in two selected slums of Berhampore between January and March 2024, explored varied perceptions and intentions in respect to six theoretical constructs: Perceived severity, perceived susceptibility, perceived benefit and barriers, cues to action and self-efficacy with a phenomenological approach. The study participants were purposively selected adult slum dwellers (⩾18 years), representing certain socio-demographic characteristics (age, sex, occupation *etc*). After obtaining informed consent, each participant was interviewed with a priorly-framed in-depth interview guide based on six theoretical constructs of HBM. All in-depth interviews were also audio-taped. With 20 such interviews data saturation was reached, and content and thematic analysis was applied for presenting and interpreting the findings.

Results: Despite favorable perceptions of severity and benefits, the intention of those slum dwellers to adopt DPP remains below the desired level, with low perceived susceptibility to dengue, certain perceived barriers, and misconceptions likely being the reasons.

Conclusions: The nature and pattern of DPP among slum dwellers, along with prevailing perceptions and barriers, indicate that though participants were aware of dengue's severity and the benefits of prevention, they still remained unsure about taking necessary actions. This signifies the need to strengthen targeted interventions and apply participatory learning for action techniques.

KEYWORDS: Dengue; Health Belief Model; Preventive practices; Slum-dwellers; Qualitative study; West Bengal

1. Introduction

Dengue fever, transmitted by Aedes mosquitoes, remains a significant public health concern throughout the world with an estimated 390 million cases annually and 3.9 billion people being at risk[1−3].The burden of dengue has been on the rise in India including West Bengal. In 2022, India reported 230 000 dengue cases, resulting in 303 fatalities. West Bengal alone accounted for 67 271 cases and 30 deaths[4].

Dengue is predominantly a peri-urban disease. Urban slums are

Significance

Health Belief Model assesses behavioral intention towards a health problem based on six constructs: perceived severity, and susceptibility to health problem, perceived benefit and barrier for preventive measures, cues to actions and self-efficacy. High perceived barriers and low perceived benefits hinder sustainability of dengue prevention efforts. Persistent mosquito nuisance and low perceived susceptibility affect motivation and self-efficacy thereby impeding translation of intent into action. This study underscores the need for a meticulously planned, community-based participatory strategy to augment their self-efficiency in dengue prevention.

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more vulnerable due to adverse environmental conditions, coupled with low awareness about the disease and its preventive measures. Various preventive measures for dengue, though well identified and prioritized for implementation from the programmatic perspectives, adoption and appropriate practice of such measures varies among population groups and by geographical diversity. Reasons and factors might also be diverse. On the other hand, occurrence and consequences of dengue are still increasing in West Bengal, India. This prevailing situation needs thorough assessment and linking to interventions. The current context demands in-depth understanding of the behavioural attributes and intension of beneficiaries towards dengue preventive practices (DPP) through a lens of socio-behavioural framework.

Behavioural acceptance for certain health measures is influenced by socio-cultural attributes and perception towards both the disease and the measures. Thus, exploring those aspects will help in developing behavioural change models to address the gap between perceptions and practices. Health Belief Model (HBM), a well-established theoretical approach is used widely in public health to explore and predict the factors influencing individuals' decisions to adopt preventive behaviours and to design effective interventions[5–8]. HBM assesses individuals' attitude and intention towards a health problem based on six constructs: Perceived severity, perceived susceptibility, perceived benefit, perceived barrier, cues to actions and self-efficacy. Various public health issues have been explored through HBM, both globally and in India. Perception towards preventive measures related to dengue, along with other vector borne diseases was also studied utilising the HBM framework[9–12]. However, very limited research work has been found in our country regarding behavioural intention towards DPP.

The present study aimed to explore the perception and intention to adopt dengue preventive practices applying the Health Belief Model among adult slum-dwellers of Berhampore Municipality of Murshidabad, West Bengal of India.

2. Methods

2.1. Study design and theoretical framework

We conducted a qualitative study with phenomenological approach during January to March 2024. We applied the theoretical construct of HBM for the stated objectives.

2.2. Study area or setting

The community-based study was conducted in two purposively selected urban slums under Berhampore municipality of Murshidabad district, West Bangal of India. The slums are within the urban field practice area of the department of Community Medicine, Murshidabad Medical College.

2.3. Selection and sampling of study participants

Adult residents (⩾18 years), living for at least one year in the selected slums were considered as study subjects while critically ill, impaired cognitively or mentally challenged or unwilling participants were excluded. Study participants were recruited purposively ensuring representation from both slums, sex, different age groups and occupations. There was no fixed sample size a priori; sampling was flexible in nature and constantly evolving till data saturation achieved.

With the help of field level health workers in the slum areas, potential participants were identified, approached and invited for participation at a mutually convenient place and time. Eligible subjects were recruited one after another till data saturation with a total of 20 participants.

2.4. Study tools, techniques and data collection

We prepared an in-depth interview (IDI) guide, primarily based on the six constructs of HBM and with inputs from experts in the field. The guide initially designed in English was translated in vernacular and back-translated for linguistic equivalence. After explaining the study purpose, we took informed consent from each participant and interviewed using the IDI guide. No other person was present except two researchers; One researcher undertook the IDI and other one audio-taped with consent. Time for each IDI ranged from 40 to 45 minutes to complete. Field notes were taken during the interview and/or immediately after completion of each interview. Written word-for-word transcripts and audio recordings were transformed into verbatim texts and simultaneously checked and confirmed with the participants' feedback. Data saturation was reached after 20 IDIs. After each IDI session, misconceptions found about DPP were addressed to the concerned participants.

2.5. Data analysis

Content and thematic analysis was adopted in this study. Concurrent preliminary content analysis was done during the data collection process for deciding data saturation point. Finally, two researchers did content analysis from text transcripts to identify primary and secondary codes. Similar codes were merged into different categories from which subthemes were identified and grouped within the major themes based primarily on six constructs of HBM, which are decided in advance for thematic analysis in the study. QSR's NVivo Ver. 14 was used for analysis.

2.6. Ethical considerations

Ethics approval was obtained from the Institutional Ethics Committee of concerned Medical College, West Bengal (No MSD/MCH/PR/208/2024 dated 24.01.2024). Data confidentiality and anonymity was maintained.

3. Results

Twenty participants of IDIs in the study equally represented both the selected slum areas, among which, nine were male. By occupation, seven were homemakers, four were working outside from home, four were students, and five were retired or staying at home. Regarding age groups, 11 were young adults (18-39 years), four were middle-aged (40-59 years), and five were elderly (≥60 years).

Perceptions and behavioural intentions as evolved through content analysis are presented under the six pre-identified themes based on construct of HBM. Various subthemes as emerged under each theme were also presented with representative quotes (Table 1). In addition, Sunburst hierarchical map displayed the themes, sub-themes with their relative weightages (Figure 1).

3.1. Description of themes and sub themes

3.1.1. Perceived severity

Participants mostly perceived dengue as a severe disease, sharing perceptions related to various aspects, such as it being potentially fatal and carrying a high risk of mortality, prolonged and intense

Table 1. Themes and subthemes of Health Belief Model about perceptions and behavioural intentions towards dengue preventive practices.

Themes and subthemes	Quotes
Perceived severity	
High mortality	"Dengue patients' need treatment from the beginning; otherwise condition worsens ...and they may die."[P10, M, 41]
Prolonged sufferings	"In dengue, people suffer for many days....., make them so weak, that it takes long time to recover" [P15, F, 37]
Treatment difficulty	"I heard that Dengue is very difficult to treat.... it has no medicine, we can only take paracetamol" [P14, M, 22]
Loss of earnings	"People can't go to work....and for poor people if you can't do your work, then it's a big problem (of earning)" [P2, F, 31]
Perceived susceptibility	
Environmental vulnerability	"So many mosquitoes here.... open drains all around, dirty water accumulating...Dengue can be caused by a single dengue mosquito bite" [P2, F, 31] "Today, houses are built very close to one another....no light and air entering.... dark environment ....helps mosquito breeding increases" [P4, M, 68]
Occurrence of dengue	"Recently one of my friend had fever, ...was detected dengue positive, and died within a few days"[P9, F, 27] "Listen, I've been here (in this slum) for many years... I am hearing about dengue in other areas.... But we don't have anyone from here. Some people (authority) unnecessarily spread fear amongst us..." [P3, F, 62]
Mosquito density	"There is so much mosquitoes in the jungle behind us. See, here too (pointing to a mosquito)." [P16, M, 23]
Misconceptions	"I think those mosquitoes that come from the Jongol(bushes) only and suck blood (rokto khay) can cause dengue." [P8, M, 21]
Perceived benefit	
Regularity of use	"If we use mosquito nets every day, it is very good .... not only dengue, using regular mosquito nets can protect us from other diseases" [P4, M, 68] "If we clear the accumulated water regularly, it is good for us"[P9, F, 27]
Unconventional methods	"We use the smoke by burning paper made egg tray inside our house. I have seen mosquitoes die by smoke of egg tray. So, I must say it is useful." [P13, M, 19]
Short-lasting effect	"Mosquitoes do not die with 'all- out' (repellent) or incense sticks, they faint for a while, and come back to life when their('all-out' or incense sticks) action are over."[P7, F, 28]
Perceived barriers	
Physical discomfort	"If mosquito killing incense or coil is used in a closed space, then I suffer from breathing trouble" [P4, M, 68] "Under mosquito net, it feels warmer. .... also with fan witched on, not so many mosquitoes come...." [P18, M,62]
Alternative measures	"In summer, electric fan runs, so we do not use mosquito net, but use incense sticks." [P13, M, 19]
Cost	"If we use incense stick too much, we have to buy it more frequently... it is costlier for us" [P11, F, 34]
Household works	"I can't do regularly, as too many household works there, since we have cattle also..."[P1, F, 29]
Cues to action	
Government responsibility	"We cannot do much....it's their (government) job....we can follow their instruction only. If government make us aware more, then we will do it together. If people are aware, we can survive" [P8, M,21]
Community involvement	"If others (households/neighbours) become more active, then we can do it better ..." [P10, M, 41]
Self-efficacy	
Habituation of living	"Whatever measure I take, the mosquitoes will remain as they were. So, there is no point in thinking so much about it... we used to it... [P17, M, 43]

Note: P: Participant number; F: Female; M: Male; Last number: Age of the participant.

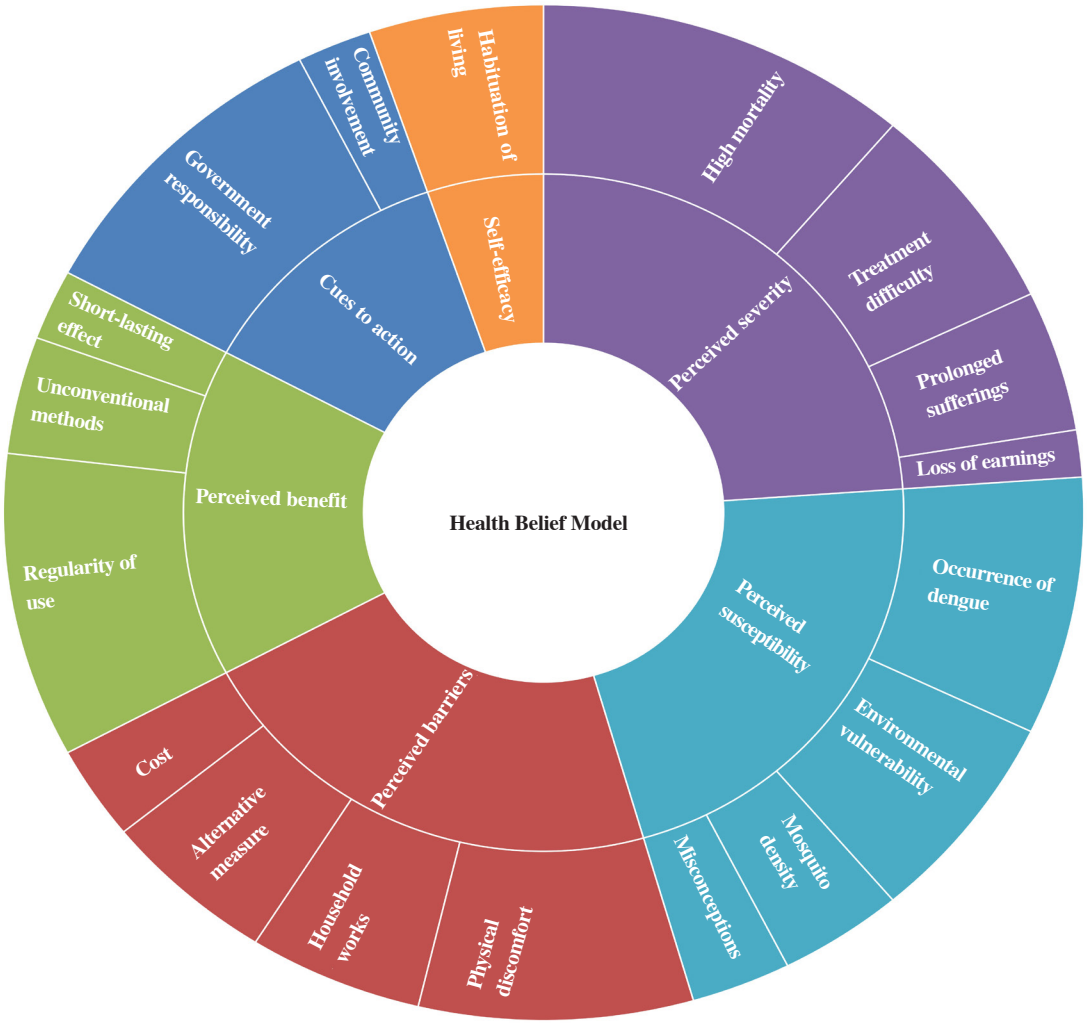


Figure 1. Sunburst diagram depicting themes and subthemes about perceptions and behavioural intentions towards dengue preventive practices.

sufferings with complications, no specific treatment (medicine) except symptomatic relief ('with paracetamol') *etc*. Additionally concerns of cost of treatment, potential loss of earnings due to long period of absence from work were also expressed. Paradoxically, few participants perceived dengue as less severe like any other fever, which can be easily manageable by home-available remedies like papaya.

3.1.2. Perceived susceptibility

Perceived susceptibility refers to individuals' perceptions on the risk of developing dengue. IDIs revealed varied perceptions among the participants. Most of the participants perceived that the chance of getting dengue was very slim; low occurrence of dengue in that area, maintenance of personal cleanliness, less chance of mosquito bite, few misconceptions (like only mosquitoes from jungle can cause dengue) led to such perception. The perception of being at risk of getting dengue also prevailed, which was related to environmental vulnerability conditions (such as presence of bushy areas, open drains, and densely populated dowelling areas), and a lack of awareness about dengue prevention in the neighbourhood. Additionally, personal experiences of dengue and its consequences among relatives and friends also influenced perception of susceptibility.

3.1.3. Perceived benefit

Overall favourable perceptions about the benefit of preventive measures were expressed by the participants. Some participants viewed several government initiatives such as regular cleaning of drains, spraying activities, door-to-door fever survey *etc*. as highly effective and beneficial preventive measures for dengue. Significance of awareness campaigns in augmenting the overall effect of the preventive measures were also realised and shared. However, measures at personal and household level, such as the elimination of stagnant water, maintenance of general cleanliness, use of mosquito nets/coils/repellents, were perceived beneficial only when adopted regularly and consistently. Additionally, some of them also viewed that, spraying activities and mosquito coils/repellents were useful but less beneficial due to their short-lasting effect.

One participant even acknowledged the effectiveness of mosquito nets not only in preventing dengue but also in warding off other

mosquito borne diseases like malaria. However, few participants identified unconventional methods, such as the application of smoke from paper-made egg trays, as effective alternatives in mitigating mosquito-related risks.

3.1.4. Perceived barrier

Most prominent barrier emerged was the difficulty in regular and consistent use of personal and household protective measures. Though being aware of the benefits of personal/household level measures, few participants identified daily/regular use of such measures as a barrier. Some of the indicative opined reasons or constraints included physical discomfort (breathing trouble suffocation in coils), inconvenience to use (feeling warm within mosquito net), alternate measures (electric fan in summer days), costs, and pressure of daily household works *etc*.

3.1.5. Cues to action

Participants felt that it was mostly government's responsibilities to control the dengue. So, they were reluctant to take any actions proactively. However, few of them indicated their willingness to engage in cleanliness practices within their neighbourhood community conditional to involvement/participation of other members/families. Interest in cooperating and participating with the government-initiated dengue related awareness campaigns and activities were also expressed by the participants.

3.1.6. Perceived self–efficacy

Perceived self-efficacy of the participants to sustain dengue preventive measures were somehow on the lower side. Despite implementing preventive measures, the mosquito abundance in the area—combined with the low perceived benefits of personal preventive actions, multiple barriers to these measures, and insufficient cues for action—collectively contributed to demotivation toward sustaining dengue prevention efforts and a prevailing lack of confidence that reinforced low self-efficacy.

4. Discussion

This qualitative study with HBM explored some critical insights of perceptions and dynamics of behavioural intentions towards DPP among slum-dwellers.

Slum-dwelling people mostly had some basic knowledge regarding causation-transmission and symptoms of dengue and were also aware of the preventive measures. Information, education and communication activities by local health personnel or authorities, awareness generation thorough television, print and social media might have influenced the knowledge level, even though some misconceptions still persist.

Having knowledge and awareness does not always reflect into favourable practices. There are many interplaying factors in behavioural changes. We observed and felt the same phenomenon in this qualitative exploration. Other researchers also reported similar observations[11,12]. Study by Chinnakali P *et al.*[13] in New Delhi reported that despite presence of high-level awareness, there were poor dengue fever control measures among participants. Another study by KusumaYS among slum-dwellers in New Delhi observed mismatch between awareness and behavioural practice[14].

Attitude and perception towards a disease influence its preventive practices. Urban slums with various environmental vulnerability conditions (accumulation of garbage, indiscriminate throwing of waste and containers, potholes and other places around the house for artificial collection of water, closely-built houses, lack of awareness) become highly potential for vector (aedes mosquitoes), which has been reflected in participant's responses in this study as well. Owing to high density of mosquito, it becomes nothing but a nuisance to them rather than potential health threats. In addition, dengue, along with other mosquito-borne diseases was not a new disease to them. They were living with it for so many years, which made them accustomed to such situation, where despite high mosquito densities, reported dengue cases were less in number. That blunt out the perceived susceptibility to those diseases and their potential consequences. Though most of them viewed dengue as a severe disease, risk of getting dengue was somehow in the lower side as per their perception. So, perceived threat to dengue was also low. This observation of our study is congruent with the study conducted in Malaysia by Wong LP, which also reported that participants considered mosquitoes rather harmless like any other insects[15]. Another study by Suarez MR in Villavicencio, Columbia also reported that participant perceived mosquitoes as a part of daily life[16].

Similar perceptions also emerged in our study among slum dwellers, highlighting the need for targeted and focused interventions to address these misconceptions. Some measures to prevent human-mosquito contact in general, such as personal protection (mosquito net/ repellents), clearance of mosquito breeding places (stagnant water, garbage, bushes), are practised in the area. However, according to their view, even after implementing sufficient control measures both at the personal/family level and by government health authorities, mosquito density and abundance did not decrease. These in turn decreased the perceived benefit and demotivated them to continue with those measures.

Also, due to low perceived effectiveness in regular practicing of clearance of accumulated water, or any other larvicidal measures, they viewed these measures as extra burden along with their daily household works. Although they recognized some benefits from these measures, the perceived barriers including physical discomfort, environmental or residential constraints, and the need for alternative arrangements ultimately outweighed the perceived advantages. This explains the irregularities in use of those measures.

Besides this conflict between perceived benefit and barriers, there was a perception regarding responsibility of action – it was viewed as onus of government/authority along with combined responsibility of other members of the neighbourhood/community. This interpretative observation indicates the intention and readiness of the community for a collaborative participatory action.

Thus, we observed that high perceived barriers made it difficult for individuals to sustain preventive behaviours. Additionally, low perceived benefits and low perceived susceptibility to dengue diminished their motivation for consistent preventive actions. The persistence of mosquito nuisance despite adherence to preventive practices might have lowered their confidence to sustain their efforts. These factors might have collectively diminished self-efficacy, shrinking the probability of continuation of such efforts over time. However, expressions/views/opinions indicate towards a level of motivation for necessary actions, but lacking a driving force to convert the intention to specific actions. Understanding the inner strengths and constraints of the people, a well-planned thrust is pending to engage them in undertaking and adopting those measures and make them self-efficient.

Despite some limitations in the HBM, such as not focusing on individual attitudes and habitual behaviours, it remains a widely accepted model for predicting behavioural intention. The study area being confined to only two urban slums is a major limitation of this study. Geographical diversification might have provided further insights into the behavioural intention and captured greater variability as people's perception towards health-related conditions vary in the diverse socio-cultural context of the communities. Nevertheless, to our best knowledge, this study, though on a small scale, is one of its first kind in our country which explored perceptions and behavioural intentions on dengue preventive practices and their attributes, which gives immense scope for further quantitative or mixed method research, given the challenges in Dengue control universally across the country.

5. Conclusions

Perceptions and behavioural intentions towards dengue preventive practices among slum-dwellers are mixed - both favourable and unfavourable. The participants were in either precontemplative or contemplative stages of behavioural change, acknowledging the severity of dengue and the benefits of preventive practices but still undecided about implementing necessary changes. Beyond conventional activities of information, education and communication, shared and participatory approach, especially participatory learning for action technique may be adopted in the area for converting the intentions to actions and developing self-efficiency.

Conflict of interest statement

The authors claim there is no conflict of interest.

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Data availability statement

The data supporting the findings of this study are available from the corresponding author upon request.

Authors' contributions

Roy AK, and Ghosh R conceptualized and developed the study design, reviewed the literatures, took part in proposal development, led the data collection and data entry, took part in data analysis and interpretation, manuscript writing and review. Das DK conceptualized and developed the study design, took part in data analysis and interpretation, manuscript preparation and review. Akbar F took part in proposal development, manuscript preparation and review. All read and approved the final version of manuscript.

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