A Qualitative Study of Mosquito Nest Eradication Behavior Using the Health Belief Model Approach in Bandarsari Village, Padang Ratu District, Central Lampung Regency

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ABSTRACT: Dengue Hemorrhagic Fever (DHF) remains a serious public health issue in Indonesia. Bandarsari Village in the working area of Surabaya Community Health Center is the location with the highest DHF incidence rate. Primary prevention through Mosquito Nest Eradication (MNE) with the 3M Plus strategy heavily relies on community participation, whose behavior is influenced by individual perceptions. This phenomenological qualitative study aims to explore the perceptions of the community and health workers regarding MNE using the Health Belief Model (HBM) framework. The research was conducted in September 2025 in Bandarsari Village, involving 11 key informants selected purposively, including the Village Head, Village Midwife, Program Manager, Hamlet Heads, and Neighborhood Association Heads. Data were collected through in-depth interviews and Focus Group Discussions (FGD), then analyzed using thematic analysis with data validity ensured through source triangulation. The analysis revealed six main themes aligned with the HBM constructs: perceptions of susceptibility and severity that were adequate yet reactive, high perceived benefits of MNE, strong socio-behavioral barriers (such as low sustained motivation and lack of community motivators), action cues dependent on case occurrences and external socialization, and still low self-efficacy at the community level for independent preventive actions. Critical findings indicate that the success of MNE is not solely determined by environmental factors and knowledge but is significantly influenced by psychosocial dynamics and community self-confidence. This study reinforces the need for a comprehensive intervention framework that not only focuses on education but also builds community self-reliance through approaches that address behavioral barriers, enhance collective self-efficacy, and establish a structured and sustainable system of action cues within DHF prevention programs.

KEYWORDS: Dengue Hemorrhagic Fever, Health Belief Model, Mosquito Nest Eradication Behavior.

INTRODUCTION

Dengue Hemorrhagic Fever (DHF) is a vector-borne disease that continues to be a significant public health challenge globally, particularly in tropical and subtropical regions. According to the World Health Organization (2023), approximately 3.9 billion people across 129 countries are at risk of dengue infection. In Indonesia, DHF remains endemic with fluctuating incidence rates. Data from the Ministry of Health of the Republic of Indonesia (2023) indicates that Central Lampung Regency is among the areas with consistently high DHF cases, with Bandarsari Village in the Padang Ratu District reporting the highest incidence within the working area of Surabaya Community Health Center.

The primary vector control strategy for DHF prevention is Mosquito Nest Eradication (MNE) through the 3M Plus approach: draining water containers, covering water storage, recycling used goods, plus additional measures such as larvicide application and biological control. However, the success of MNE programs is heavily dependent on sustained community participation, which is often inconsistent despite adequate knowledge levels. This phenomenon indicates a gap between knowledge and preventive behavior, suggesting that behavioral determinants extend beyond cognitive awareness.

The Health Belief Model (HBM), developed by Rosenstock (1974) and expanded by subsequent researchers, provides a comprehensive framework for understanding health behaviors. HBM posits that health-related behavior is influenced by perceived

susceptibility to illness, perceived severity of consequences, perceived benefits of preventive action, perceived barriers to action, cues to action that trigger behavior, and self-efficacy or confidence in one's ability to perform the behavior. This model has been widely applied in various health contexts, including dengue prevention studies in Malaysia, Thailand, and other Southeast Asian countries.

Despite the availability of prevention programs, including the innovative "Jumpa Besanmu" (Friday Morning Mosquito Nest Eradication) initiative in Bandarsari Village, DHF cases remain persistently high. This suggests that understanding the community's perceptions, beliefs, and psychosocial factors influencing MNE behavior is crucial for designing more effective interventions. Therefore, this study aims to explore community and health worker perceptions regarding MNE behavior through the lens of the Health Belief Model, identifying specific facilitators and barriers that influence preventive actions in an endemic DHF area.

MATERIALS AND METHODS

Study Design and Setting

This qualitative study employed a phenomenological approach to explore the lived experiences and perceptions of community members and health workers regarding MNE behavior. The study was conducted in December 2025 in Bandarsari Village, Padang Ratu District, Central Lampung Regency, an area identified as having the highest DHF incidence rate within the Surabaya Community Health Center catchment area.

Participants and Sampling

Purposive sampling was used to select 11 informants who could provide rich information about MNE practices and DHF prevention in the community. Informants included the Village Head, Village Midwife, Program Manager from the health center, Hamlet Heads from various sub-villages, and Neighborhood Association Heads. These individuals were selected based on their direct involvement in DHF prevention programs, their leadership roles in the community, and their knowledge of local health practices.

Data Collection

Data were collected through two primary methods: in-depth interviews and Focus Group Discussions (FGD). Semi-structured interview guides were developed based on the six constructs of the Health Belief Model, covering perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy. Interviews were conducted in Indonesian language, audio-recorded with participants' consent, and transcribed verbatim. The FGD involved hamlet heads and provided opportunities for participants to discuss and elaborate on shared experiences and divergent perspectives regarding MNE practices.

Data Analysis

Thematic analysis was employed to identify, analyze, and report patterns within the data. The analysis followed Braun and Clarke's six-phase framework: familiarization with data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the report. Data validity was ensured through source triangulation, comparing information from different informant groups including community leaders, health workers, and program managers. Themes were organized according to the HBM framework to maintain theoretical consistency.

Ethical Considerations

The study received ethical approval from the research ethics committee. All participants provided informed consent before participation. Confidentiality and anonymity were maintained throughout the study, with participants identified only by codes in transcripts and reports.

RESULTS

The thematic analysis revealed six major themes corresponding to the Health Belief Model constructs. These themes provide insights into the complex interplay of perceptions, beliefs, and contextual factors that influence MNE behavior in Bandarsari Village.

Perceived Susceptibility: Reactive Rather Than Proactive Awareness

Participants demonstrated adequate awareness that anyone could contract DHF regardless of age, with vulnerability primarily determined by immune status and environmental conditions. High-risk locations were identified as marketplaces, areas with accumulated used goods such as tires and bottles, and households with stagnant water. However, a critical finding was that

heightened awareness of susceptibility was predominantly reactive, triggered by the occurrence of DHF cases in the vicinity rather than maintained as continuous vigilance. As one community leader noted, people only take action after cases emerge, indicating that perceived susceptibility increases significantly in response to immediate threats rather than as a baseline health concern.

Perceived Severity: Recognition of Danger With Uneven Distribution

DHF was widely recognized as a serious disease with potentially fatal consequences, particularly during the critical phase when platelet counts drop drastically. Informants who had direct experience caring for family members with DHF expressed strong perceptions of severity, describing the disease as requiring hospitalization, causing significant physical weakness, and potentially resulting in death if not promptly treated. However, the perception of severity was not uniformly distributed across the community. Some residents still underestimated the disease, and the post-illness impact, while acknowledged, was not a primary consideration in preventive decision-making. The understanding of severity was more acute among those with personal or close proximity experience with DHF cases.

Perceived Benefits: High Confidence in MNE Effectiveness

There was strong consensus among participants regarding the effectiveness of MNE and the 3M Plus strategy in DHF prevention. Community members and health workers alike believed that maintaining environmental cleanliness, regularly draining water containers, covering storage, and eliminating breeding sites were beneficial preventive measures. The "Jumpa Besanmu" program, an innovative initiative promoting regular Friday morning MNE activities, was perceived as conceptually beneficial in encouraging community participation. Health education and outreach efforts through various channels including posyandu, village officials, posters, and social media were recognized as important in increasing community knowledge and awareness about DHF prevention.

Perceived Barriers: Socio-Behavioral and Systemic Obstacles

Multiple barriers to effective MNE implementation were identified. The most prominent socio-behavioral barriers included low sustained awareness and motivation, lack of community motivators or champions to drive continuous action, and limited technical knowledge about mosquito breeding sites. Many residents practiced surface-level cleanliness such as sweeping and mopping but were unaware of hidden breeding sites in broken pottery, small water puddles behind houses, or unused containers. Economic activities also hindered participation, as working residents had limited time for community prevention activities. Systemic barriers included inadequate infrastructure support, particularly the lack of independent fogging equipment at the health center requiring inter-agency coordination that delayed response times. A critical behavioral barrier was the reactive rather than preventive mindset, where the "Jumpa Besanmu" program, designed as preventive routine, was implemented more vigorously only after cases occurred.

Cues to Action: External Triggers and Case-Dependent Mobilization

Action cues in Bandarsari Village were predominantly external and institutional rather than internalized individual motivations. Health center socialization through various channels including direct outreach to village officials, posters, social media, and WhatsApp groups served as important reminders. However, the most powerful cue to action was the occurrence of DHF cases in the neighborhood, which triggered immediate collective response and heightened community mobilization. The "Jumpa Besanmu" program was designed to serve as a structured, routine cue, but its effectiveness remained dependent on external reinforcement rather than autonomous community initiative. As health workers noted, the ideal scenario where community members proactively engage in prevention without needing directives had not yet been fully realized.

Self-Efficacy: Differential Confidence Levels

Self-efficacy varied significantly between different community actors. Health workers and village leaders demonstrated high confidence in their ability to conduct and promote MNE activities. However, at the broader community level, self-efficacy for independent preventive action remained relatively low. Many residents expressed that they could maintain cleanliness and participate when mobilized, but sustained independent initiative without external prompting was limited. The absence of systematic training and capacity building for community cadres and local leaders was identified as a factor constraining collective self-efficacy. Role modeling by leaders was recognized as important in building community confidence, but this had not been sufficiently leveraged to create a culture of autonomous prevention.

DISCUSSION

This study provides important insights into the behavioral dynamics of DHF prevention in an endemic area through the Health Belief Model framework. The findings reveal that while cognitive awareness of DHF risks and prevention methods exists, the translation into consistent preventive behavior is hindered by multiple psychosocial and structural factors.

The reactive nature of perceived susceptibility aligns with findings from similar studies in Trinidad and Tobago and Malaysia, where community response to DHF prevention intensifies primarily after case occurrences. This pattern suggests that perceived threat, while present, has not been internalized as continuous health vigilance. According to HBM theory, perceived susceptibility and severity combine to form perceived threat, which should motivate preventive action. However, our findings indicate that this threat perception remains largely contingent on proximal cues rather than sustained health consciousness. This has significant implications for intervention design, as it suggests that awareness campaigns alone may not be sufficient to maintain preventive behavior in the absence of immediate cases.

The high perceived benefits of MNE contrasted with significant perceived barriers presents a classical HBM tension. Community members believe in the effectiveness of preventive measures but face substantial obstacles to consistent implementation. The socio-behavioral barriers identified, particularly low sustained motivation and lack of community champions, highlight the critical role of social support and community mobilization in health behavior change. Research from Malaysia and Thailand has similarly emphasized that successful dengue prevention programs require not just individual behavior change but transformation of social norms and collective action patterns.

A particularly significant finding is the technical knowledge gap regarding mosquito breeding sites. While residents practice visible cleanliness, they often miss hidden breeding locations such as water-filled broken containers, roof gutters, and flower pots. This suggests that education interventions must move beyond general hygiene messaging to specific, practical training on mosquito ecology and breeding site identification. The effectiveness of MNE programs depends critically on this detailed technical understanding, not just general cleanliness practices.

The dependence on external cues to action and low community-level self-efficacy are interconnected findings that point to a fundamental challenge: the need to build autonomous, self-sustaining preventive capacity. Current interventions, including the "Jumpa Besanmu" program, while conceptually sound, have not yet succeeded in creating internalized motivation and routine preventive habits. This aligns with self-determination theory, which posits that sustainable behavior change requires the development of intrinsic motivation rather than reliance on external pressures or incentives.

The study reveals that successful DHF prevention is not merely a technical or educational challenge but fundamentally a social-psychological transformation process. Interventions must address not just knowledge deficits but also build collective efficacy, establish sustainable social support systems, create routine action structures that become habituated, and develop community leadership and peer influence networks. The HBM framework proves valuable in identifying these multiple determinants, but its application must be expanded beyond individual-level cognitive factors to encompass community-level social dynamics and structural enablers.

Study limitations include the focus on a single village which may limit generalizability to other contexts. Additionally, the cross-sectional nature of the study captures perceptions at one point in time rather than tracking behavioral change processes longitudinally. Future research should examine intervention strategies that specifically target the identified barriers and test approaches for building sustainable community self-efficacy and autonomous preventive practices.

CONCLUSION

This qualitative study demonstrates that DHF prevention through MNE in Bandarsari Village is influenced by a complex interplay of perceptions, beliefs, and psychosocial factors as conceptualized in the Health Belief Model. While perceived susceptibility, severity, and benefits are generally adequate, they are overshadowed by significant behavioral barriers, reactive response patterns, dependence on external action cues, and low community-level self-efficacy. The success of MNE programs requires more than knowledge dissemination and must encompass comprehensive approaches that address socio-behavioral obstacles, strengthen collective efficacy, develop autonomous motivation, and create sustainable systems of preventive action.

Recommendations include developing targeted interventions that provide specific technical training on mosquito breeding site identification, establishing community champion networks to sustain motivation, creating structured routine prevention schedules that become habituated rather than case-triggered, implementing capacity building programs for local leaders and cadres, and designing evaluation systems that measure not just knowledge but actual behavioral consistency and community self-reliance. Future DHF prevention programs should integrate these psychosocial and structural considerations alongside traditional health education approaches to achieve sustainable behavior change and disease control.

This research contributes to the growing body of evidence emphasizing that effective vector control requires understanding and addressing the human behavioral dimensions that determine the success or failure of technical interventions. The Health Belief Model provides a valuable framework for identifying these behavioral determinants, but its application must be contextualized within local social dynamics and structural realities to design truly effective and sustainable public health interventions.

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