RESEARCH ARTICLE

Dengue in Wardha City: Addressing Social and Clinical Challenges

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ABSTRACT

Dengue fever, a major public health concern in tropical and subtropical areas, is a critical issue in Wardha city. The purpose of this study was to analyze Wardha inhabitants' awareness, knowledge, and habits about dengue illness. The survey, which took place between November 2023 and April 2024, used a structured questionnaire and was delivered to a representative sample of 50 participants from various wards of the city. The questionnaire inquired about respondents' knowledge of dengue symptoms, mechanisms of transmission, preventative measures, and attitudes toward local dengue control initiatives. Preliminary data show that, while many locals are aware of dengue and its symptoms, there are significant gaps in knowledge about effective preventative techniques, as well as widespread misunderstandings regarding transmission. The poll also found that education level, social background, and access to health information had a substantial influence on awareness and preventative measures. Furthermore, the survey found diverse degrees of community engagement in dengue management operations, with many respondents advocating for more thorough and accessible teaching campaigns. These findings show the critical need for targeted educational initiatives and increased community engagement in Wardha city to improve dengue prevention and control. Public health experts and politicians are encouraged to use these findings to create and execute more effective, context-specific dengue control measures.

Keywords: Dengue, Clinical challenge, Social challenge, Treatment.

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INTRODUCTION

Dengue fever, a mosquito-borne viral illness caused by the dengue virus and transmitted primarily by the *Aedes aegypti* mosquito, represents a significant public health challenge in tropical and subtropical regions worldwide. With the global incidence of dengue has increased dramatically in recent decades, understanding its epidemiology at a local level is crucial for implementing effective control measures.[1,3] In this context, Wardha, a district in Maharashtra, India, is a pertinent case study due to its recurrent dengue outbreaks and the associated public health implications. Wardha's unique geographical and socioeconomic landscape contributes to its vulnerability to dengue. The district is characterized by a mix of urban and rural settings, each with distinct risk factors that influence dengue transmission dynamics. Urban areas often grapple with issues like high population density, inadequate sanitation, and stagnant water, which provide breeding grounds for mosquitoes. Rural areas, on the other hand, may face challenges related to water storage practices and limited access to healthcare facilities. These factors necessitate a comprehensive approach to understanding and mitigating the risk of dengue in Wardha[4]. The dengue virus (DENV) is a member of the Flaviviridae family, which is responsible for over 70 significant human disease-causing viruses, most of which are found in inter-tropical areas, home to 3.9 billion people. It is an arboreal illness that is largely spread to people by mosquito bites, particularly those from the *Aedes* genus, which is primarily responsible for the disease's transmission by *A.* (Stegomyia) *aegypti* (Linnaeus, 1762) and, in rare instances, *A.* (Stegomyia) *albopictus* (Skuse)[5]. There are four serotypes of the dengue virus: DENV-1, DENV-2, DENV-3, and DENV-4. All four serotypes may infect humans. The initial infection with DENV may not cause any symptoms or only cause a slight fever, but if it gets severe, it can lead to coagulopathy, increased vascular fragility, and increased permeability. This condition is known as dengue hemorrhagic fever (DHF), and it can then progress to hypovolemic shock, which is known as dengue shock syndrome (DSS). These two conditions have the potential to be lethal and pose a danger to life. When identified early and treated appropriately, the majority of DF illnesses are self-limited and have a low death rate (< 1%).[6] Following therapy, the death rate for certain

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individuals with severe disorders (such DHF/DSS) may range from 2 to 5%; if treatment is not received, the rate can reach 20%. According to epidemiological surveys, around 390 million individuals worldwide get DENV infection each year, leading to 500,000 hospital admissions and 20,000 fatalities. This means that the virus infects almost two-fifths of the global population.[7] The Eastern Mediterranean, Southeast Asia, Africa, the Western Pacific, and South America are its primary distribution zones. A possible 2.5 billion individuals are at risk of catching dengue fever; of the 100 million cases of dengue fever that are recorded annually, up to 500,000 progress to the potentially deadly DHF or DSS stages of the virus. Most occurrences of DHF and DSS result from a secondary infection or subsequent viral infection of a different serotype. At now, there is a lack of complete understanding of the processes and underlying causes of dengue severity and pathogenicityl.[8] Based on current understanding, the prevalence of DHF/DSS is associated with many virology and host immune system variables. Furthermore, the range of *Aedes* mosquitos is significantly impacted by climate change, which in turn affects the transmission of DENV. Taken together, these data suggest that the relationship between dengue frequency and the emergence of severe dengue symptoms is complex.[9] In order to provide an overview and up-to-date information on dengue etiology, diagnosis, treatment, and prevention, we performed a systematic review in this work. According to epidemiological surveys, around 390 million individuals worldwide get DENV infection each year, leading to 500,000 hospital admissions and 20,000 fatalities. This means that the virus infects almost two-fifths of the global population. The Eastern Mediterranean, Southeast Asia, Africa, the Western Pacific, and South America are its primary distribution zones.[10] A possible 2.5 billion individuals are at risk of catching dengue fever; of the 100 million cases of dengue fever that are recorded annually, up to 500,000 progress to the potentially deadly DHF or DSS stages of the virus. Most occurrences of DHF and DSS result from a secondary infection or subsequent viral infection of a different serotype. At now, there is a lack of complete understanding of the processes and underlying causes of dengue severity and pathogenicity. Based on current understanding, the prevalence of DHF/DSS is associated with many virology and host immune system variables. Furthermore, the range of *Aedes* mosquitos is significantly impacted by climate change, which in turn affects the transmission of DENV.[11] Taken together, these data suggest that the relationship between dengue frequency and the emergence of severe dengue symptoms is complex. In order to provide an overview and up-to-date information on dengue etiology, diagnosis, treatment, and prevention, we performed a systematic review in this work. Dengue fever presents with a range of symptoms, including high fever, severe headache, pain behind the eyes, joint and muscle pain, rash, and mild bleeding manifestations. Severe forms of the disease, such as dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS), can lead to significant morbidity and mortality if not managed promptly. The cyclical nature of dengue outbreaks, coupled with the co-circulation of multiple dengue virus serotypes, complicates control efforts and underscores the need for continuous surveillance and research.[12] Wardha has experienced several dengue outbreaks over the past decade, reflecting broader trends observed across India. The region's climate, marked by seasonal monsoons, creates ideal conditions for mosquito breeding. Additionally, socioeconomic factors such as poverty, lack of education, and inadequate infrastructure further exacerbate the spread of dengue. Given these challenges, a detailed survey of dengue in Wardha is essential to inform targeted interventions and public health strategies.[13] In this study, we analyzed the information from the literature regarding clinical manifestation, pathogenesis, diagnosis, treatment, prevention and control of DF/DHF. The literature review was performed following the PRISMA guidelines to select eligible articles. References were selected from several databases, including PubMed, Web of Science and Google Scholar. Search results were limited to articles published in the English language. The paper selection period spanned literature from 1980 to 2023, and the keyword search encompassed dengue, dengue virus, serotype, dengue fever, dengue hemorrhagic fever, dengue shock syndrome, clinical manifestation, epidemiology, treatment, vaccines, and control strategy. The selected articles were reviewed to assess their relevance, case numbers and quality of methodology. Two independent reviewers assessed the level of data quality from the selected literature. In this study, literature with a small sample size was excluded, defined as any study involving fewer than 100 participants diagnosed with dengue virus infection. Disagreements were resolved by joint discussion and consensus. Ethics approval and informed consent were not required for this study.

MATERIALS AND METHODS

Material and Study

The survey form was prepared by using Google Form.

General Procedure

A Google form was prepared containing both open-ended and close ended question. Google form include a total of 23 questions containing check box answers. Questions were selected based on the community's prearrange for dengue awareness. Google form was sent to the community at the initial study stage. Then, form wear was sent to a total of 50 patients of the community participating in community wear from diverse regions of India and contained male and female populations. Information on consumer preference and experience with health intends to be gathered survey. A wide range of topics, including usage habits, perceived efficacy, preferred scents, attitudes toward natural components, and overall satisfaction, were covered by the survey questions.

To ensure alignment with the study's focus on dengue. The survey questions were developed based on the research objectives and the literature review. Clear, succinct, and pertinent questions were used in their design to ensure that participants could easily understand them and provide thoughtful answers. There were both closed-ended and

open-ended questions to collect qualitative information (e.g., particular experiences or preferences). Regardless of age, gender, or geography, anyone who suffers from dengue was included in the survey's target demographic. A wide range of demographic backgrounds was used to recruit participants to representative patients and improve the health of the patients. To reach as many people as possible, convenience for giving information was used to select survey respondents. Online resources, such as social media and forums, were combined with traditional means of recruiting in person. Participants were able to finish the survey at their convenience thanks to the use of an online survey platform for data collection. Instructed to answer the questions truthfully and as completely as possible, participants received a link to the survey. Appropriate sample size for analysis was ensured by spreading out the data collection across a predetermined time frame. Statistical software, such as SPSS or Excel, was used to process quantitative data obtained from closed-ended questions it computed descriptive statistics, such as frequencies and percentages, and carried out inferential analysis, such as chi-square tests. Thematic analysis approaches were applied to qualitative data obtained from open-ended questions to find recurrent themes and patterns within the response.

RESULTS AND DISCUSSION

Gender Distribution

This bar chart illustrates the gender distribution of respondents based on male and female as shown in Figure 1.

Female

The number of females who participated in the survey is higher, with approximately 32 respondents.

Male

The male respondents are fewer in number, with around 18 participants

Age

This study consider age group 5 to 40 years of age as shown in Figure 2.

Socioeconomic Factors

In this pie chart, we illustrate the socioeconomic factor there 68% of people have responded that dengue fever is have significant public health concern in the region, and 18% of

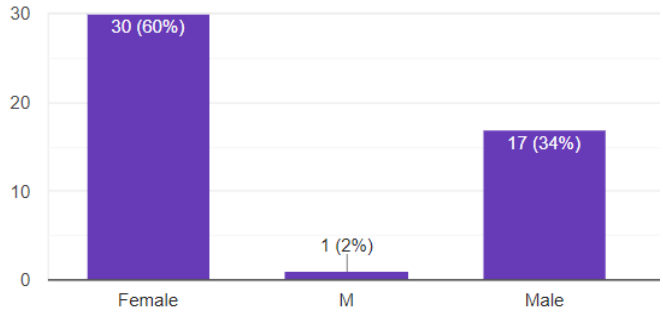

Figure 1: Gender distribution

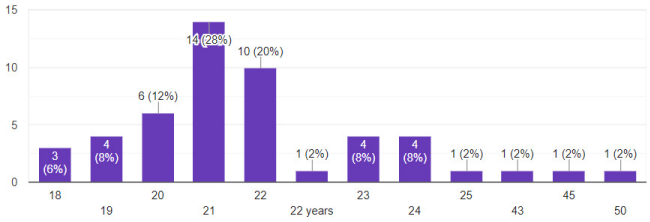

Figure 2: Age-wise distribution

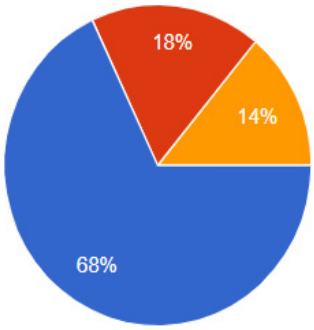

Figure 3: Illustration of socioeconomic factors

the people have a negative response toward the concern as shown in Figure 3.

Community Capacity and Engagement

Effective dengue prevention requires strong community engagement and support from local authorities. Surveys in various regions underscore the importance of this collaboration. There are 46% of the people accept that there's enough public awareness about dengue fever. And 34% of people are aware of it, but they do not have much idea and 20% of people denied this as shown in Figure 4.

METHODOLOGY

Study Design

The study employs a cross-sectional design to survey a representative sample of the population in Wardha. Both quantitative and qualitative data collection methods are used to ensure a comprehensive understanding of dengue dynamics in the district.

Sampling

A multi-stage sampling technique is employed to select participants. Initially, the Wardha district is divided into urban

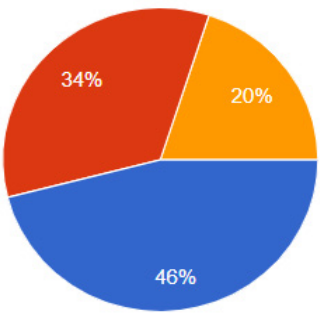

Figure 4: Community capacity and engagement

and rural strata. From each stratum, wards or villages are randomly selected, followed by systematic random sampling of households within these areas. The sample size is calculated to ensure statistical significance, considering the estimated prevalence of dengue and the desired confidence level.

Data Collection

Data is collected through structured interviews, focus group discussions, and direct observations. The survey questionnaire includes sections on:

Demographic information

Age, gender, education, occupation, and household size.

Health history

Incidence of dengue fever and other mosquito-borne diseases.

Environmental factors

Living conditions, water storage practices, waste management, and presence of mosquito breeding sites.

Knowledge, attitudes, and practices (KAP)

Awareness of dengue transmission, symptoms, prevention methods, and treatment-seeking behavior.

Data Analysis

Quantitative data is analyzed using statistical software, with descriptive statistics summarizing demographic and environmental characteristics. Chi-square tests and logistic regression analyses are conducted to identify associations between risk factors and dengue incidence. Qualitative data from focus group discussions are transcribed, coded, and thematically analyzed to extract key insights into community perceptions and behaviors.

Incidence and Distribution

Preliminary results indicate that dengue cases are unevenly distributed across Wardha, with higher incidence rates in urban areas compared to rural ones. The temporal distribution of cases shows peaks corresponding to the monsoon season, highlighting the seasonality of dengue transmission. These findings underscore the importance of seasonal surveillance and timely interventions to mitigate outbreaks.

Risk Factors

Key environmental risk factors identified include

- *Water storage practices*

Inadequate water storage methods lead to mosquito breeding. Many households store water in open containers, which become prime breeding sites for *Aedes* mosquitoes.

- *Waste management*

Accumulation of solid waste and stagnant water in urban areas. Poor waste management practices create environments conducive to mosquito proliferation.

- *Housing conditions*

Poor housing with inadequate protection against mosquitoes, such as the absence of window screens and bed nets. In both urban and rural areas, housing conditions significantly impact exposure to mosquito bites.

Behavioral Risk Factors Include

Low use of preventive measures

Limited use of mosquito repellents, bed nets, and insecticide sprays. Many residents are either unaware of or do not prioritize these preventive measures.

Delayed treatment seeking

Delay in seeking medical care upon onset of symptoms, often due to lack of awareness or financial constraints. Early treatment is critical for managing dengue effectively, and delays can lead to complications.

Recommendations

Based on the survey findings, the following recommendations are made to enhance dengue prevention and control in Wardha:

Strengthen vector control programs

Implement regular and systematic mosquito control measures, including insecticide spraying and removal of mosquito breeding sites, particularly before and during the monsoon season.

Enhance health education campaigns

Develop and disseminate targeted educational materials to raise awareness about dengue transmission, symptoms, and prevention. Utilize local media and community leaders to amplify the reach of these messages.

Improve sanitation and waste management

Collaborate with municipal authorities to improve waste management systems and promote community-led cleanliness drives.

Encourage community participation

Foster community engagement through local health committees and volunteer networks to monitor and manage mosquito breeding sites.

Strengthen healthcare services

Ensure that healthcare facilities are equipped to diagnose and treat dengue promptly. Training healthcare workers on dengue management and ensuring the availability of necessary medical supplies are critical steps.

Conduct regular surveillance

Establish a robust surveillance system to monitor dengue incidence and promptly identify outbreaks. This will facilitate timely interventions and minimize the impact of dengue outbreaks.

CONCLUSION

The dengue survey conducted in Wardha city provided a complete analysis of dengue fever prevalence, contributing causes, and required actions to limit its impact. The survey revealed a high prevalence of dengue cases, with certain densely populated and low-income areas appearing as major hotspots. These findings are consistent with broader

epidemiological patterns documented worldwide, particularly in regions with similar meteorological and environmental characteristics. Children and young adults were identified as the most affected demographics, emphasizing the critical need for focused public health interventions.[3] Environmental factors contributed significantly to the spread of dengue in Wardha. Heavy rains and insufficient drainage systems resulted in stagnant water, which provided excellent breeding grounds for the *A. aegypti* mosquito, the major vector of dengue transmission. The poll also revealed major gaps in community awareness and prevention strategies. Many households were ignorant of the simple steps needed to minimize mosquito reproduction, such as avoiding standing water and using insect repellents. This lack of awareness and practice contributes do the high dengue prevalence in the survey areas. Wardha's public health infrastructure was determined to be insufficient for successfully managing and controlling the dengue outbreak. The low availability of diagnostic facilities and medical supplies, combined with insufficient vector control methods, hampered the rapid diagnosis and treatment of dengue cases. This scenario was worsened by socioeconomic inequities, with lower-income communities having higher rates of infection due to poorer living conditions and less access to healthcare. The study suggested a number of strategies to solve these difficulties. It is critical to improve public health infrastructure, such as diagnostic facilities, vector control programs, and sanitation and waste management systems. Community education and engagement are also essential. Launching large-scale awareness efforts to educate locals about dengue prevention and encouraging community-based activities can drastically reduce mosquito breeding areas. Policy frameworks must be created and executed to offer guidelines for environmental management, healthcare, and emergency response. Inter-sectoral coordination is required to develop a unified dengue control plan. This entails developing collaboration amongst diverse sectors, including health, education, and urban development. Continuous research and monitoring are also recommended to track dengue cases and vector populations, which will guide public health interventions and policy decisions.

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