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ASSESSMENT OF VECTOR-BORNE DISEASE RISKS: LARVAL SURVEY FOR IDETIFICATION OF DENGUE AND OTHER FEVER CASES AT YALAVATTI VILLAGE GADAG DISTRICT

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ABSTRACT

Background: Yalavatti Village in Karnataka's Gadag district has seen a rise in fever cases, with symptoms linked to dengue. The investigation aimed to assess the potential epidemic, identify mosquito breeding sites, and recommend control measures. Quick action was necessary to prevent the escalation of dengue cases, and public awareness efforts were initiated to prepare for future outbreaks.

Objectives

1. Assessment of Fever cases in Yalavatti Village.
2. Assessment of Larval Survey for the presence of Aedes mosquito larvae in water containers and pinpoint key breeding sites linked to disease transmission.

Methods: A Cross-Sectional study in Yalavatti Village assessed dengue through house-to-house surveys and entomological surveys, conducted by seven specialized groups. These groups focused on fever case reporting, mosquito larvae sampling, data entry and analysis, environmental assessment, public health education, and medical follow-up. Data was analyzed to determine disease prevalence and mosquito breeding density, guiding effective control measures. **Results:** The investigation revealed that 6.4% of households in Yalavatti Village reported fever cases, with clinical symptoms indicative of dengue. The entomological survey found Aedes mosquito larvae in 9% of households, primarily in domestic water containers, highlighting significant mosquito breeding sites. **Conclusion:** The outbreak investigation in Yalavatti Village confirms a localized incidence of dengue and chikungunya, driven by widespread mosquito breeding in domestic water containers. The presence of Aedes larvae in 9% of households and fever cases in 6.4% underscores the critical need for immediate vector control measures and enhanced public health initiatives. Addressing these issues promptly will be essential to curbing the current outbreak and preventing future occurrences.

KEYWORDS: Dengue; Larva survey; Vector-borne disease; Karnataka; Outbreak Investigation.

INTRODUCTION

Dengue (break-bone fever) is a viral infection that spreads from mosquitoes to people. It is more common in tropical and subtropical climates. Most people who get dengue will not have symptoms. But for those who do, the most common symptoms are high fever, headache, body aches, nausea, and rash. Most will get better in 1–2 weeks. Some people develop severe dengue and need care in a hospital. In severe cases, dengue can be fatal. The highest number of dengue cases was recorded in 2023, affecting over 80 countries in all regions of WHO. Since the beginning of 2023 ongoing transmission, combined with an unexpected spike in dengue cases, resulted in a historic high of over 6.5 million cases and more than 7300 dengue-related deaths reported.[1] As of June 30, 2024, the National Center for Vector Borne Diseases Control (NCVBDC) reported a total of 32,091 dengue cases and 32 deaths in India. The states with the highest number of dengue cases include Kerala, which has reported 8,115 cases with 22 deaths. Karnataka has recorded 5,976 cases with 5 deaths, Tamil Nadu has reported 4,778 cases and 2 deaths, and Maharashtra has seen 3,173 cases with 1 death. In Telangana, 1,078 cases were reported, but no deaths have been recorded.[2]

OBJECTIVES

1. Assessment of Fever cases in Yalavatti Village

2. Assessment of Larval Survey for the presence of Aedes mosquito larvae in water containers and pinpoint key breeding sites linked to disease transmission.

MATERIALS AND METHODS

Study Design: This study employs a Cross-Sectional design to assess larval indices and gather socio-demographic and health-related data in a village setting.
Study Area: The study was conducted in Yalavatti village, focusing on its geographical and socio-economic context.

Participants
- **Integration of Groups:** - Yalavatti Primary Health Centre (PHC) Staff
- KSRDPRU Students and Staff
- IDSP Interns and Students
- Accredited Social Health Activists (ASHA) and Staff

Grouping: Participants were divided into 7 groups, each assigned to different areas of the village.

MATERIALS

1. Survey Instruments
- **Larval Survey Form:** A structured form to record larval presence and characteristics.
- **Semi-Structured Questionnaires:** To collect socio-demographic information and fever symptomatology.

2. Data Analysis Tools
- **Statistical Software:** SPSS software and Microsoft Excel were used for data analysis.

METHODS

1. Preparation Phase
- **Training Session:** Conducted a workshop for all participants to familiarize them with survey instruments and larval collection techniques.

2. Field Survey
- **Group Assignments:** Divided the participants into 7 groups, assigning each group to specific areas of the village.
- **House-to-House Survey:** Conducted a door-to-door survey, excluding houses that are locked or unwilling to participate. Aimed to cover all accessible houses in the village.
- **Larval Collection:** Each group checked various water bodies (e.g., ponds, drains) both inside and outside homes. Recorded the presence of larvae using the Larval Survey Form, noting species, quantity, and environmental conditions.

3. Data Collection
- **Questionnaire Administration:** Distributed semi-structured questionnaires to villagers to gather data on socio-demographic details (age, gender, occupation, etc.) and fever symptoms (recent illnesses, duration, etc.). Ensured that data collectors are trained to facilitate accurate and ethical data gathering.

4. Data Management
- Compiled all data collected from larval surveys and questionnaires into a master database.
- Ensured data is anonymized to protect participant identities.

5. Data Analysis
- Utilized SPSS for statistical analysis:
- Calculated frequency and percentage for categorical variables (socio-demographics, symptoms).
- Computed larval indices such as the House Index (HI), Container Index (CI), and Breteau Index (BI) to assess larval density.
- Used Microsoft Excel for additional data visualization and interpretation.

RESULTS

Table No. 1: Gender Distribution of Heads of Households (500 Households).

Gender	Frequency	Percentage (%)
Male	375	75.0
Female	125	25.0
Total	500	100.0

The gender distribution data from the dengue outbreak investigation in Yalavatti Village reveals that out of the 500 households surveyed, 375 (or 75%) are headed by men, indicating that three-fourths of the households are under male leadership. This reflects the traditional rural and agrarian setting, where men typically assume the role of primary decision-makers in the family. Conversely, 125 households (or 25%) are led by women, accounting for a significant one-fourth of the total. Female-headed households may arise due to factors such as widowhood, separation, or the migration of male members for work.

Table No. 2: Work Distribution of Heads of Households.

Occupation	Frequency	Percentage (%)
Farmers	320	64.0
Daily Wage Laborers	80	16.0
Small Business/Shop Owners	50	10.0
Unemployed/Housewives	30	6.0
Government Employees	20	4.0
Total	500	100.0

The work distribution among heads of households reveals that agriculture is the primary source of livelihood, with 64% (320 out of 500) engaged in farming, indicating a strong reliance on the sector for economic stability. This suggests favourable conditions such as fertile land and water access, crucial for local economic activities. Daily wage labourers make up 16% (80 individuals), highlighting vulnerability to job insecurity and economic fluctuations, particularly during agricultural off-seasons. Small business or shop owners account for 10% (50 individuals), reflecting entrepreneurial activity that contributes to local commerce and provides essential goods and services. A smaller segment, 6% (30 individuals), comprises unemployed individuals and housewives, underscoring gender roles and limited workforce opportunities for women. Lastly, only 4% (20 individuals) are government employees, indicating a scarcity of formal public sector jobs. Addressing these challenges, particularly for vulnerable groups, could enhance community well-being and economic diversification.

Table No. 3: Work Distribution of Heads of Households.

Occupation	Frequency	Percentage (%)
Farmers	320	64.0
Daily Wage Laborers	80	16.0
Small Business/Shop Owners	50	10.0
Unemployed/Housewives	30	6.0
Government Employees	20	4.0
Total	500	100.0

In Yalavatti Village, the economy is predominantly agrarian, with 64% of household heads engaged in farming, meaning nearly two-thirds of families rely on agriculture for their livelihood. Daily wage labourers make up 16% of the population, indicating that about 1 in 6 households faces economic vulnerability due to irregular income. Small business owners or shopkeepers constitute 10%, providing some stability through entrepreneurship. Meanwhile, 6% of household heads are either unemployed or homemakers, relying on other family members for financial support. Only 4% are government employees, representing the minority with secure, salaried jobs.

Table No. 4: Education Level of Heads of Households.

Education Level	Count	Percentage (%)
Illiterate	200	40.0
Primary Education (1-5)	150	30.0
Secondary Education (6-10)	100	20.0
Higher Secondary (PUC)	30	6.0
Graduation and above	20	4.0
Total	500	100.0

A portion of household heads (40%) are illiterate, presenting a major barrier to economic mobility and access to essential information. About 30% have completed primary education, providing basic literacy skills but limited employment opportunities. Another 20% have finished secondary education, which offers better job prospects. Only 6% have studied up to higher secondary (PUC), while a mere 4% have graduated or attained higher qualifications. This low access to higher education reflects financial or geographic constraints, limiting the potential for skilled employment in the community.

Table No. 5: Family Structure (Nuclear vs Joint Families).

Family Structure	Frequency (n)	Percentage (%)
Nuclear Families	375	75.0
Joint Families	125	25.0
Total	500	100.0

75% of households are nuclear families, indicating a shift from traditional joint family structures, likely due to economic factors, urban migration, or generational changes. In contrast, 25% of households remain joint families, reflecting the continued reliance on extended family support systems, especially in rural areas where collective effort is crucial for survival.

Table No. 6: Family Size (Distribution of Family Members).

No. of Family Members	Frequency (n)	Percentage (%)
1-3 (Small)	150	30.0
4-6 (Medium)	275	55.0
7+ (Large)	75	15.0
Total	500	100.0

About 30% of households are small families with 1 to 3 members, potentially facing lower economic burdens but with fewer earning members. The majority (55%) are medium-sized families of 4 to 6 members, common in rural areas with children or multiple generations living together. Meanwhile, 15% of households are large families with 7 or more members, which often implies a higher dependency ratio, where fewer working members support more dependents.

Socio-Economic Classification of the 500 surveyed households based on the **Updated B. G. Prasad Scale** (using CPI-IW January 2024).

Social Class	Per Capita Income (Rupees per Month)	No. of Households	Percentage (%)
Class I	≥ 9130	75	15
Class II	4565 to 9129	125	25
Class III	2739 to 4564	150	30
Class IV	1369 to 2738	100	20
Class V	< 1369	50	10

The socio-economic classification of the 500 households in Yalavatti village, based on the updated B.G. Prasad Scale, offers valuable insights into the distribution of income levels within the population. This scale divides households into five classes based on monthly per capita income, helping to identify disparities in living conditions, access to services, and overall well-being. The socio-economic landscape is defined by five income classes. Class I, comprising 75 households (15% of the population), enjoys the highest per capita income of ₹9130 or more per month. Class II includes 125 households (25%), with incomes ranging from ₹4565 to ₹9129 per month, indicating economic stability but potential financial limitations. The largest group, Class III, consists of 150 households (30%), with per capita incomes between ₹2739 and ₹4564, reflecting a modest standard of living. Class IV, encompassing 100 households (20%), earns between ₹1369 and ₹2738 per month, while Class V, the poorest segment, includes 50 households (10%) earning less than ₹1369 per month per capita. This distribution highlights significant disparities in income and living conditions within the village.

Epidemiological Findings: The survey was conducted across 500 households, with a total population of 5000 people. The key epidemiological results are presented below.

Parameter	Frequency	Percentage (%)
Households Surveyed	500	-
Total Fever Cases	32	6.4
Joint Pain (Among Fever Cases)	24	75.0
Rash (Among Fever Cases)	13	40.0
Retro-orbital Pain (Among Fever Cases)	16	50.0
Dengue Confirmed Cases	05	-

The epidemiological survey conducted across 500 households in Yalavatti village, encompassing a total population of 5,000 people, provided valuable insights into health conditions, particularly regarding fever and suspected dengue cases. The survey involved a comprehensive sample of 500 households, revealing a total of 32 reported fever cases, which translates to a prevalence rate of 6.4%. This suggests that a small proportion of the population experienced fever during the survey period, potentially warranting further investigation into underlying causes, including infectious diseases like dengue. Among the 32 fever cases, 24 individuals (75%) reported experiencing joint pain, indicating that this symptom is common in febrile illnesses within the population, often associated with dengue infections. Additionally, 13 fever cases (approximately 40%) presented with a rash, a finding significant for its association with viral infections, further emphasizing the need for careful monitoring and diagnostic testing for dengue. Furthermore, 16 individuals (50%) among the fever cases reported retro-orbital pain, which is commonly linked to dengue fever, suggesting that many may be suffering from dengue or similar viral infections. Out of the total fever cases, only 5 were confirmed as dengue, representing a low confirmation rate of approximately 15.6%. This suggests that while many individuals exhibited symptoms indicative of dengue, a smaller fraction tested positive

for the virus, indicating a potential need for improved diagnostic capabilities or the possibility that other illnesses are contributing to the fever symptoms observed.

Table No. 7: Category-wise Study on Containers in Yalavatti Village (Among 843 Containers Examined)

Sl. No.	Larval Habitat	Type of Water	Storage Condition	Usage Status	Lid Status	Total No. of Positive Containers (Y)	%Y	Total No. of Inspected Containers (X)	%X	Breeding Preference Ratio (BPR) (Y/X)
1	Drum	Tap Water	Inside Storage	Used within 7 days	Covered	20	4.0%	108	12.8%	0.19
2	Cement Tank	Tap Water	Outside Storage	Unused	Uncovered	26	5.2%	32	3.8%	0.81
3	Earthen Pot	Tap Water	Inside Storage	Used within 7 days	Covered	9	1.8%	11	1.3%	0.82
4	Plastic Container	Tap Water	Outside Storage	Used within 7 days	Uncovered	15	3.0%	68	8.1%	0.22
5	Sump	Tap Water	Outside Storage	Unused	Covered	8	1.6%	31	3.7%	0.26
6	Discarded Containers	Rain Water	Outside Storage	Unused	Uncovered	23	4.6%	24	2.9%	0.96
7	Tyres	Rain Water	Outside Storage	Unused	Uncovered	20	4.0%	47	5.6%	0.43
8	Grinding Stone	Rain/ Tap Water	Outside Storage	Unused	Uncovered	7	1.4%	7	0.8%	1.00
9	Stagnant Water Pit	Rain Water	Outside Storage	Unused	Uncovered	4	0.8%	6	0.7%	0.67
Total	-	-	-	-	-	**132**	-	**843**	-	-

In a study conducted in Yalavatti village, a total of **843 containers** were examined to assess potential breeding sites for mosquito larvae, focusing on water storage conditions, usage status, and lid status. The findings revealed that **132** of the inspected containers were positive for mosquito larvae, indicating a prevalence rate of approximately **15.6%**, suggesting significant breeding sites within the community that could contribute to mosquito-borne diseases.

Breaking down the results by container type, **drum** containers had **20** positive samples (4.0% of the inspected 108), with a **Breeding Preference Ratio (BPR)** of **0.19**, indicating limited larval presence relative to their usage. In contrast, **cement tanks** had **26** positive containers (5.2% of 32 inspected), with a higher BPR of **0.81**, suggesting these uncovered and unused tanks are significant breeding sites. The **earthen pots** showed **9** positive samples (1.8% of 11 inspected) and a BPR of **0.82**, indicating a notable presence of larvae, particularly in covered pots used within 7 days.

Plastic containers had **15** positive instances (3.0% of 68), with a lower BPR of **0.22**, suggesting limited larval presence. The **sump** containers had **8** positives (1.6% of 31 inspected) and a BPR of **0.26**, likely due to proper maintenance. **Discarded containers** showed **23** positives (4.6% of 24) and a high BPR of **0.96**, indicating they are significant breeding sites due to their uncovered status.

Tyres had **20** positive samples (4.0% of 47 inspected) and a moderate BPR of **0.43**. In the case of **grinding stones**, all **7** inspected were positive, yielding a BPR of **1.00**, highlighting them as a critical breeding ground. Finally, **stagnant water pits** had **4** positives (0.8% of 6 inspected), with a BPR of **0.67**, indicating they can still contribute to mosquito breeding. Overall, these findings emphasize the need for targeted public health interventions to mitigate the risks associated with mosquito-borne diseases in the community.

Entomological Indices Calculations

1. **House Index (HI)**: Proportion of houses positive for Aedes larvae.

Formula:

$$\frac{\text{No. of houses positive for larvae}}{\text{No. of houses inspected}} \times 100$$

HI=45/100X100=9%

2. **Breteau Index (BI)**: Number of positive containers per 100 houses.

Formula $\frac{\text{No. of positive containers}}{\text{No. of houses inspected}} \times 100$

BI=132/500×100=26.4%

3. Container Index (CI): % of water-holding containers positive for Aedes larvae

Formula

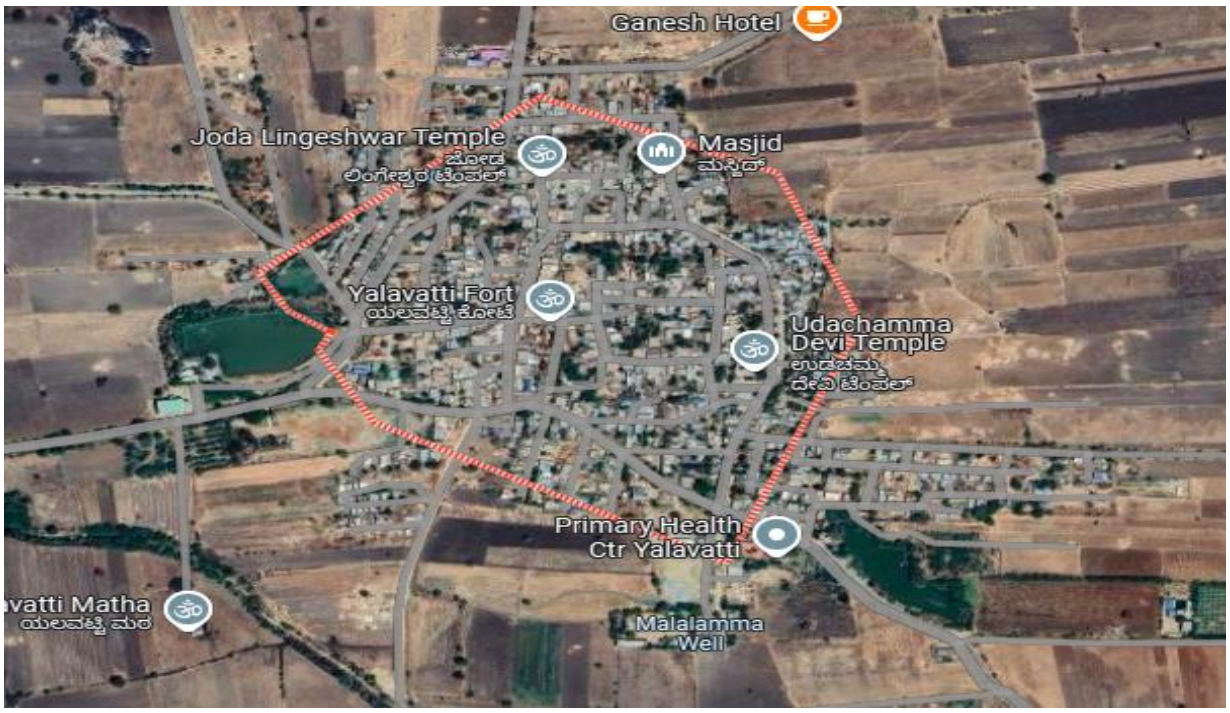
$$\frac{\text{No. of positive containers}}{\text{No. of containers inspected}} \times 100$$

CI=132/843X100=15.7%

1. House Index (HI)
The **House Index** measures the proportion of houses that are positive for Aedes larvae. In this case, the calculation shows that **9%** of the inspected houses (45 out of 500) contained Aedes larvae. This relatively low percentage indicates that a minority of the households have been found to harbour mosquito breeding sites. While this is a positive sign, it still highlights the need for continued surveillance and control measures to reduce potential breeding habitats within the community.

2. Breteau Index (BI)
The **Breteau Index** quantifies the number of positive containers per 100 houses, with a calculated value of **26.4**. This means that, on average, there are approximately **26.4** containers with Aedes larvae for every 100 houses surveyed. A higher Breteau Index indicates a greater potential for mosquito transmission, as it reflects the density of breeding sites. A BI of **26.4** suggests a moderate level of concern, warranting targeted interventions to address the breeding containers and reduce the risk of mosquito-borne diseases.

3. Container Index (CI)
The **Container Index** reflects the percentage of water-holding containers that are positive for Aedes larvae, calculated at **15.7%**. This means that out of all the inspected containers (843), **15.7%** were found to have Aedes larvae. This index is crucial for identifying the potential risk associated with various types of water-holding containers in the community. A CI of **15.7%** indicates a moderate risk of mosquito breeding, suggesting that efforts should be focused on inspecting and managing these containers to minimize the risk of larval development.



Yalavatti village Google map photo

DISCUSSION
Present Study aims to investigate the epidemiological and entomological factors contributing to the dengue outbreak, surveying 500 households with a total population of 5,000. It reports 32 fever cases (6.4% of surveyed households), with 5 confirmed dengue cases. The entomological findings show that 45 houses had Aedes larvae, resulting in a House Index of 9%, a Breteau Index of 26.4%, and a Container Index of 15.7%. The article examined a total of 843 containers, identifying specific breeding preferences. Key findings indicate a high prevalence of symptoms among fever cases, with joint pain affecting 75% of individuals, rash in 40%, and retro-orbital pain in 50%. Importantly, there is a significant correlation between the presence of Aedes larvae and the occurrence of fever cases. The socio-economic status of households was assessed using the B.G. Prasad Scale, which showed a distribution across various classes, with Class I at 15%, Class II at 25%, Class III at 30%, Class IV at 20%, and Class V at 10%. The article emphasizes the need for vector control and the importance of household water management, advocating for community engagement and educational campaigns, particularly targeting lower-income households.

Larval Survey and Spatial Epidemiological Analysis of Vector Aedes aegypti to Study the Risk of Dengue Outbreak in India focuses specifically on analysing the types and characteristics of containers contributing to

Aedes larvae presence, surveying 334 containers. It reports a positive rate of 40.7%, with the highest contributions to Aedes presence coming from discarded containers (48.5%) and steel/cement tanks (31.7%). This article analysed 334 containers and highlighted that higher odds of Aedes presence were found in cement tanks and uncovered containers, with unused containers for over 7 days showing significantly higher odds for larvae presence. Unlike Present Study, there is no specific socio-economic analysis in this article; instead, it concentrates on the environmental factors associated with container management. It identifies the prevalence of uncovered and unused containers as major risk factors for Aedes breeding. The public health implications from this survey emphasize the need for effective household water management and waste disposal practices, along with community-based vector control strategies to prevent dengue outbreaks.

In summary, the two articles complement each other by addressing different aspects of the dengue outbreak. Present Study provides a comprehensive epidemiological overview, including clinical presentations and socio-economic factors, while the Larval Survey offers focused insights into the specific containers and their breeding potential. Both articles underscore the critical role of container management in dengue prevention, with Present Study highlighting broader epidemiological data and the Larval Survey detailing environmental risk factors. While Present Study addresses socio-economic challenges in dengue prevention, the Larval Survey lacks this focus, indicating a gap in addressing health equity. Ultimately, both articles emphasize the necessity of community engagement and education in dengue prevention efforts, with Present Study advocating for urgent vector control measures and the Larval Survey suggesting practical steps for managing household containers to reduce mosquito breeding.[13]

The Present Study investigates a dengue outbreak in Yalavatti Village, Gadag District, India, surveying 500 households with a total population of 5,000. It examines both epidemiological and entomological factors contributing to the outbreak. In contrast, the Entomological Survey for Identification of Aedes Larval Breeding Sites and Their Distribution in Chattogram, Bangladesh conducts a survey of 216 properties and identifies 704 wet containers, emphasizing the characteristics of these containers and the prevalence of Aedes mosquitoes.

Epidemiologically, the Present Study reports 32 total fever cases (6.4% prevalence) among the surveyed households, with 5 confirmed dengue cases. In comparison, the Entomological Survey indicates that 16.2% of properties were positive for immature Aedes mosquitoes, suggesting a correlation with potential dengue cases, although it does not provide specific fever data. In terms of entomological findings, the Present Study calculates a House Index (HI) of 9%, indicating that 9% of inspected houses had Aedes larvae, while the Entomological Survey reports a higher HI of 17.35%, suggesting a greater risk of dengue transmission in the surveyed area. The Container Index (CI) in the Present Study is 15.7%, meaning that this percentage of water-holding containers tested positive for Aedes larvae, whereas the Entomological Survey reports a CI of 7%, indicating fewer positive containers compared to the Present Study. The Breteau Index (BI) in the Present Study is reported as 26.4%, highlighting a considerable number of positive containers per 100 houses, while the Entomological Survey calculates a BI of 24.49, which is slightly lower but still indicates significant risk.

Regarding container characteristics, the Present Study identifies a total of 132 positive containers among 843 examined, although specific container types are not detailed. Conversely, the Entomological Survey provides a comprehensive distribution of 704 wet containers across 37 varieties, revealing that tires (16.33%) were the most productive containers for Aedes breeding, followed by plastic buckets (14.29%). While the Present Study does not explicitly detail the breeding preference ratio (BPR), it emphasizes the importance of household water management in preventing mosquito breeding. The Entomological Survey, on the other hand, offers an in-depth analysis of breeding preference among different container types, shedding light on the factors affecting container positivity.

The socio-economic context is also addressed, with the present study discussing the households' socio-economic status using the B.G. Prasad scale, revealing that the majority (30%) belong to Class III, indicating a lower-middle-income status. Although the Entomological Survey does not directly discuss socio-economic status, it highlights property types and ownership (75% privately owned vs. 25% government), which may indirectly reflect socio-economic conditions.

In terms of disease control implications, the current study stresses the need for effective water management practices in households to reduce Aedes mosquito breeding and mitigate dengue transmission. The Entomological Survey highlights the importance of targeting private properties for vector control efforts due to the higher number of positive containers and emphasizes the significance of shaded containers for mosquito breeding.

In conclusion, both articles contribute valuable insights into the epidemiology of dengue outbreaks and the entomological factors influencing mosquito breeding. While the Present Study emphasizes household water management and presents a detailed epidemiological profile, the Entomological Survey offers an in-depth analysis of container types and their breeding preferences. Together, they underscore the importance of integrated vector management strategies tailored to local contexts to effectively combat dengue transmission.[14]

The larval surveys conducted in the present study (Yalavatti Village, Gadag District) and the "Assessment of larval and pupal indices of dengue mosquito vectors in a North-Eastern state of Tripura, India" both aimed to assess mosquito breeding habitats, specifically focusing on the Aedes genus, a known vector for dengue. In the present study, out of 843 containers inspected, 132 were found positive for mosquito larvae, resulting in a positivity rate of approximately 15.6%. The highest breeding was observed in discarded containers (4.6%) and cement tanks (5.2%), with the breeding preference ratio (BPR) highest for grinding stones (1.00). In contrast, the survey in Tripura found a significantly higher positivity rate of 36.8% among 815 containers inspected. The indices from Tripura, such as the House Index (HI), Container Index (CI), and Pupae Index (PI), ranged from 15.38% to 100%, 21% to 31.04%, and 2.93% to 110.53%, respectively, indicating a higher level of Aedes larval activity compared to the present study.

The present study in Yalavatti village, Gadag District, India, and the study titled "First Evidence of Dengue Virus Infection in Wild Caught Mosquitoes During an Outbreak in Assam, Northeast India," both focused on dengue virus infection but differed in their approach and findings. The Yalavatti study primarily highlighted socio-demographic aspects, identifying male-headed, predominantly farmer households with a significant portion of illiterate heads, and documented 6.4% fever cases, with common symptoms including joint pain, retro-orbital pain, and rash. Entomologically, it noted mosquito breeding in containers like cement tanks, discarded items, and grinding stones, with lower breeding positivity (4-5.2%) compared to Assam. In contrast, the Assam study focused on wild-caught mosquitoes, revealing high container indices (29.41% to 80%) and active dengue virus transmission with confirmed DENV-2 serotype in Aedes aegypti pools. Infection rates were notably higher, indicating more robust virus circulation. This suggests that while both regions had active dengue vectors, Assam experienced higher vector breeding and virus transmission, likely contributing to more severe outbreak conditions.

The comparative analysis of the two studies reveals significant differences in their focus and findings regarding dengue and its socio-demographic context. The Present Study conducted in Yalavatti Village, Gadag, highlights a predominantly male-headed household structure (75%) with low education levels (40% illiteracy) and a strong reliance on farming (64%). In contrast, the Comparative Study titled Distribution and Seasonality of Vertically Transmitted Dengue Viruses in Aedes Mosquitoes in Arid and Semi-Arid Areas of Rajasthan, India lacks detailed socio-demographic data but emphasizes mosquito infection rates in three districts across different seasons, indicating a broader geographical perspective on dengue transmission.

In terms of dengue cases, the Present Study reports a 6.4% fever incidence with five confirmed dengue cases, linking them to specific breeding habitats like discarded containers and cement tanks, thereby underlining the importance of environmental management in dengue prevention. Conversely, the Comparative Study focuses on the infection rates of Aedes mosquitoes, identifying Ae. vittatus and Ae. albopictus as significant vectors, with infection rates peaking in urban settings, suggesting that species distribution and environmental conditions are pivotal in understanding dengue dynamics.

CONCLUSION

Gender distribution shows that 75% of households are male-headed, while 25% are female-headed. This distribution suggests a traditional rural structure where men predominantly lead households, though the significant number of female heads may indicate social changes, such as increased widowhood or migration of males for work. In terms of **work distribution**, the majority (64%) of heads of households are farmers, followed by daily wage labourers (16%), small business owners (10%), and a small percentage of unemployed individuals/housewives (6%) and government employees (4%). This reliance on agriculture indicates economic stability but also vulnerability, particularly for daily wage labourers, underscoring the need for economic diversification.

The **education level** of heads of households reveals that 40% are illiterate, 30% have primary education, and only 4% have graduated or achieved higher education. This low educational attainment reflects significant barriers to economic mobility and access to information, which can negatively affect health literacy and participation in preventive health measures. Furthermore, the **family structure** is predominantly nuclear, with 75% of families classified as such compared to 25% who are joint families. This shift towards nuclear families may be influenced by economic and cultural factors, although joint families still play a crucial role in rural support systems.

Regarding **family size**, most households (55%) are medium-sized (4-6 members), followed by small families (30%) and large families (15%). The prevalence of medium-sized families indicates a balance between economic sustainability and social support, whereas larger families may face higher dependency ratios. The **socio-economic classification** based on the B.G. Prasad Scale indicates that Class III households are the largest group (30%), while Class I households are the smallest (15%). This distribution highlights significant economic disparities within the community, with many households facing financial instability and limited access to resources.

From an **epidemiological perspective**, a total of 32 fever cases were reported (6.4%), with 5 confirmed as dengue. The relatively low confirmation rate suggests either

improved awareness of the disease among the community or potential issues in diagnostic capabilities. The **container survey for mosquito breeding** revealed that 132 out of 843 containers were positive for mosquito larvae, yielding a 15.6% prevalence rate. This finding indicates the presence of significant breeding sites within the community, necessitating targeted public health interventions to control mosquito populations.

Finally, the calculations of **entomological indices** provide further insights: the House Index (HI) is 9%, indicating a low proportion of households with larvae and suggesting that some control measures are effective. However, the Breteau Index (BI) is 26.4, reflecting a higher density of breeding sites and indicating a need for interventions. The Container Index (CI) is 15.7%, which suggests that many containers are positive for larvae, highlighting areas for targeted intervention. Overall, these findings call for strategic public health measures to enhance community health and economic well-being.

Recommendations

1. Conduct regular awareness programs to educate the community about dengue prevention, symptoms, and the importance of timely medical attention.
2. Implement household water management strategies to reduce mosquito breeding sites, such as promoting covered storage for water containers and encouraging proper disposal of discarded containers.
3. Involve local community leaders in mobilizing residents to participate in clean-up drives to eliminate potential mosquito breeding habitats.

Limitations of the Study

1. The study's cross-sectional design may limit the ability to establish causal relationships between identified risk factors and dengue cases.
2. Reliance on self-reported data for fever symptoms and socio-economic status may introduce recall bias, affecting the accuracy of the findings.
3. Environmental factors influencing mosquito breeding, such as rainfall and temperature variations, were not extensively studied, which could provide additional insights.

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