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COMMUNITY-BASED SURVEY OF MOSQUITO CONTROL AWARENESS IN DENGUE-HIT UNION COUNCILS RAJJAR AND MC1, DISTRICT CHARSADDA

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Abstract

Background: In 2025, as dengue fever tightened its grip on the Union Councils of Rajjar and MC1 in District Charsadda, a silent epidemic of misinformation and knowledge gaps ran parallel to the viral outbreak. The community's ability to fight back was blindfolded by a lack of crucial understanding, creating an urgent need to map the landscape of public awareness.

Objective: This study was designed as a diagnostic mission to measure the community's knowledge of mosquito control and pinpoint the demographic factors—such as education and access to information—that shaped this understanding during the peak of the outbreak.

Methods: We conducted a rapid, household-based survey of 400 residents, systematically selected from both Union Councils. Using a questionnaire, we assessed awareness of dengue transmission, breeding sites, and prevention. Responses were scored and classified into 'Good,' 'Satisfactory,' or 'Poor' knowledge categories.

Results: The data reveals a community dangerously in the dark: nearly half (48.7%) of residents had 'Poor' knowledge of dengue control. While superficial measures like mosquito coils were common (82.5%), fewer than a third (32.5%) consistently practiced the most critical step—covering water containers. Education and guidance from health workers emerged as powerful lifelines, significantly linked to better knowledge ($p<0.01$).

Conclusion: This study is more than data—it is a distress signal. It uncovers a critical vulnerability at the heart of the outbreak response: a profound gap between basic awareness and life-saving action. Our findings demand an immediate shift to hyper-local, behavior-focused education campaigns that

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equip the people of Rajjar and MC1 with the practical knowledge to protect their own homes and health.
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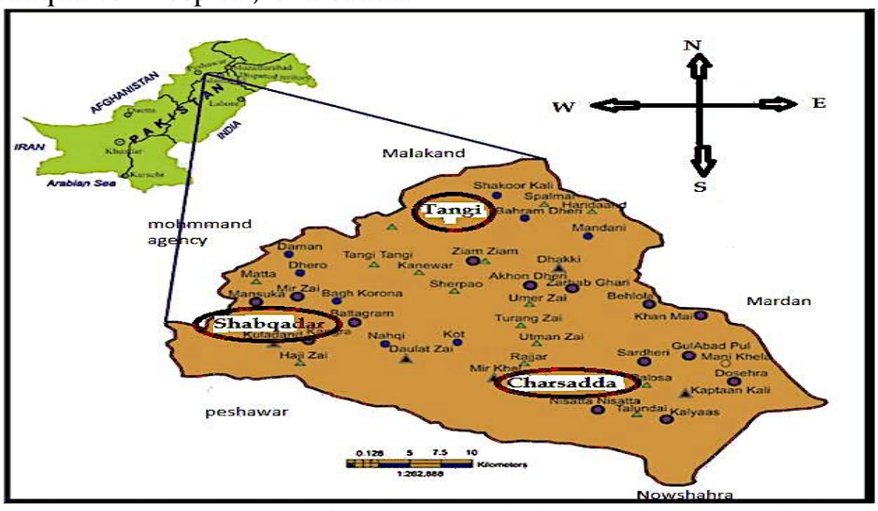
INTRODUCTION

Mosquito-borne diseases pose an escalating threat worldwide. The Aedes aegypti mosquito, vector for dengue, chikungunya, and Zika, makes prevention crucial. (WHO launches global strategic plan to fight rising dengue and other Aedes-borne arboviral diseases, 2024) The World Health Organization stresses community-driven prevention—mainly the removal of breeding sites and personal protection—as the most effective defense. (WHO launches global strategic plan to fight rising dengue and other Aedes-borne arboviral diseases, 2024) This issue is particularly urgent in Southeast Asia, where outbreaks burden healthcare systems and result in significant loss of life. (Bangladesh deaths from dengue cross 400 as outbreak worsens, 2024) In these settings, the efforts of homemakers—who manage water storage, waste, and sanitation—are critical to mosquito control. Guided by Nola Pender's Health Promotion Model, this study investigates the link between awareness and preventive action among homemakers in Jagadevipeta, Nellore. By assessing their knowledge, we aim to identify specific areas of strength and weakness to inform nursing interventions that help translate awareness into meaningful action for community health.

METHODOLOGY

A **cross-sectional, community-based study** was quickly deployed to assess community knowledge during the active dengue season [e.g., June-August] 2025. This rapid approach provides essential, actionable insights for outbreak response. The study focused on two main outbreak sites—**Union Council Rajjar** and **Union Council MC1,** District Charsadda, Khyber Pakhtunkhwa—selected for their high case numbers reported by the District Headquarter Hospital, Charsadda.



https://www.researchgate.net/figure/Map-of-district-Charsadda_fig1_308785986

STUDY POPULATION & SAMPLING

A cross-sectional study was conducted among 400 adult permanent residents aged 18 and above from two Union Councils, selected through a two-stage cluster sampling method to

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ensure both speed and community representation. First, 10 mohallas/villages were randomly chosen from each Union Council, followed by the systematic selection of 20 households from each mohalla. Data collection was carried out over a two-week period using a structured questionnaire divided into three parts: socio-demographic details (Community Portrait), a 15-item knowledge assessment on transmission cycles, breeding sites, and control measures (Knowledge Litmus Test), and sources of outbreak information (Information Network). The questionnaire, administered in Pashto by trained local enumerators after obtaining informed consent, assigned one point per correct answer, categorizing knowledge levels as good (≥80%), satisfactory (50-79%), or poor (<50%). All responses were anonymized to ensure confidentiality, and data analysis using SPSS Version 26 included descriptive statistics (frequencies and percentages) to summarize demographics and knowledge levels, alongside inferential statistics (Chi-square tests) to identify significant associations between knowledge scores and variables such as education and information sources, with a p-value of <0.05 considered statistically significant.

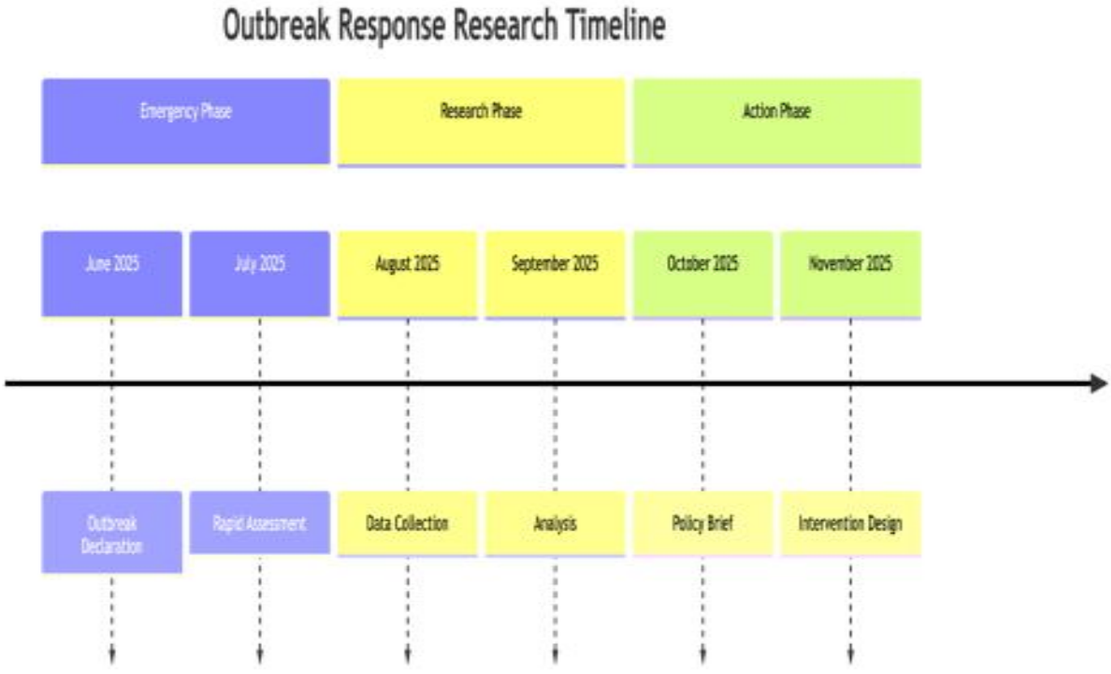

TABLE 1: SOCIO-DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS (N=400)

Characteristic	Category	Rajjar UC (n=200)	MC1 UC (n=200)	Total (n=400)
Gender	Male	110 (55%)	105 (52.5%)	215 (53.8%)
	Female	90 (45%)	95 (47.5%)	185 (46.2%)
Age Group	18-30	85 (42.5%)	90 (45%)	175 (43.8%)
	31-45	75 (37.5%)	70 (35%)	145 (36.2%)
	>45	40 (20%)	40 (20%)	80 (20%)
Education	No Formal	60 (30%)	80 (40%)	140 (35%)
	Primary	70 (35%)	65 (32.5%)	135 (33.8%)
	Secondary	50 (25%)	40 (20%)	90 (22.5%)
	Higher	20 (10%)	15 (7.5%)	35 (8.7%)

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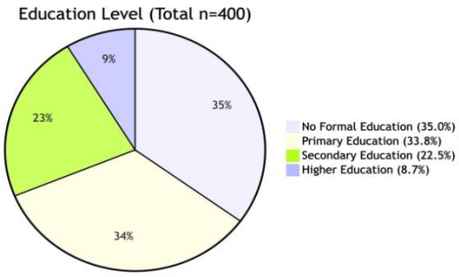
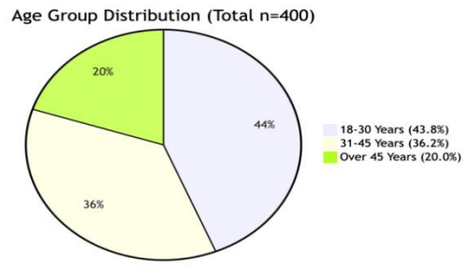




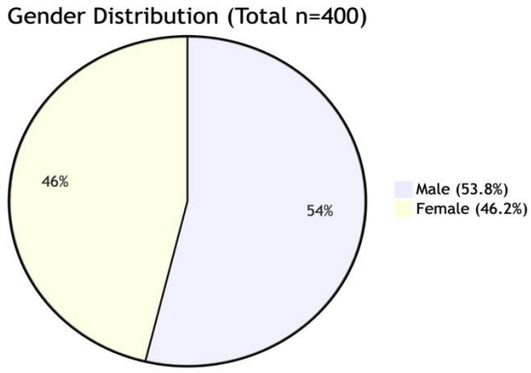
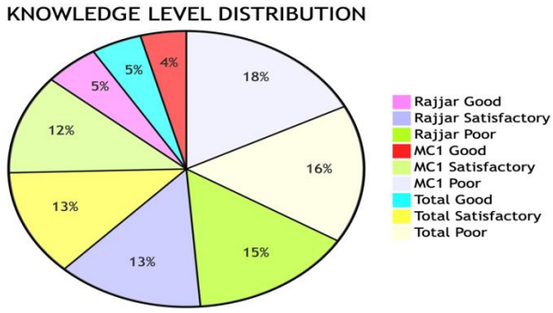


TABLE 2: KNOWLEDGE LEVELS ON DENGUE AND MOSQUITO CONTROL

Knowledge Level	Score Range	Rajjar UC (n=200)	MC1 UC (n=200)	Total (n=400)
Good	≥80%	30 (15%)	25 (12.5%)	55 (13.8%)
Satisfactory	50-79%	80 (40%)	70 (35%)	150 (37.5%)
Poor	<50%	90 (45%)	105 (52.5%)	195 (48.7%)



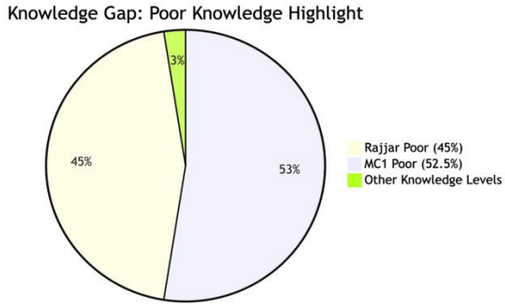


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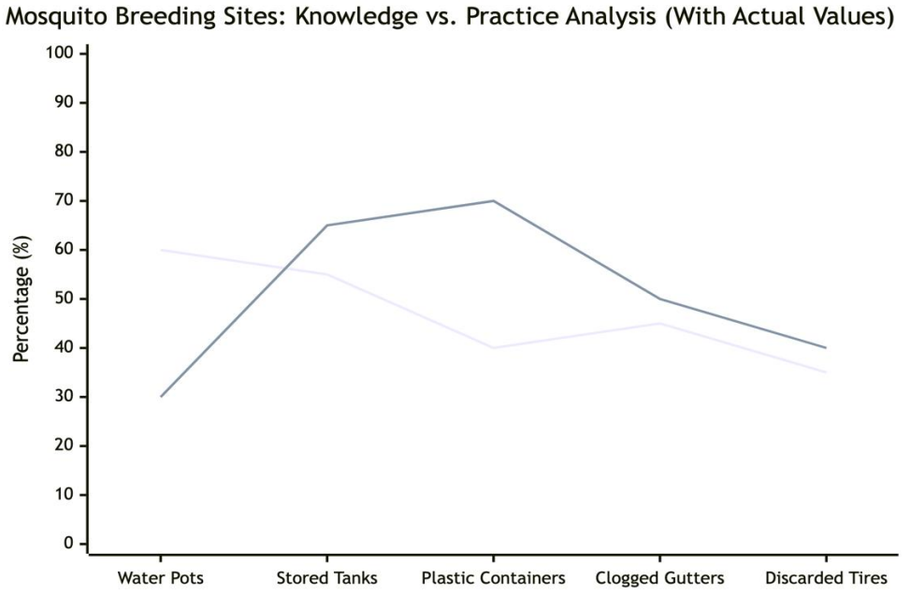
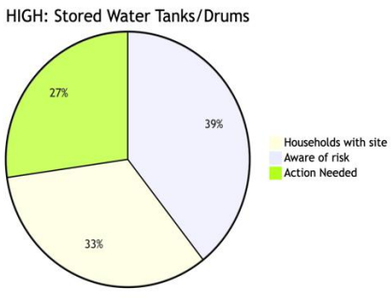
TABLE 3: IDENTIFICATION OF MAJOR MOSQUITO BREEDING SITES (KNOWLEDGE VS. OBSERVED PRACTICE)

Potential Breeding Site	% Who Correctly Identified it as a Risk	% of Households Where Site was Observed Present
Stored Water Tanks/Drum (uncovered)	65%	55%
Discarded Tires	40%	35%
Water Pots for Animals/Plants	30%	60%
Clogged Gutters/Drainage	50%	45%
Plastic Containers/Bottles	70%	40%





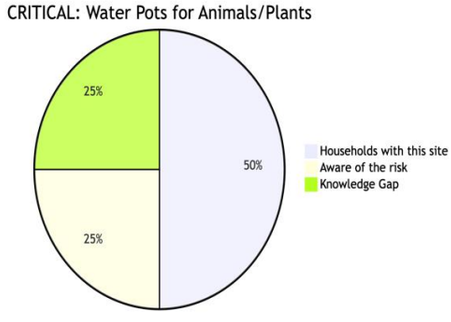


TABLE 4: COMMON MOSQUITO CONTROL PRACTICES ADOPTED BY HOUSEHOLDS

Preventive Practice	Rajjar UC (n=200)	MC1 UC (n=200)	Total (n=400)
Use of Mosquito Nets/Bed Nets	60%	55%	57.5%
Use of Coils/Mats/Vaporizers	80%	85%	82.5%

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Covering Water Storage Containers	35%	30%	32.5%
Regular Emptying of Water Containers (weekly)	40%	35%	37.5%
Cooperation with Health Dept. Fogging	90%	88%	89%

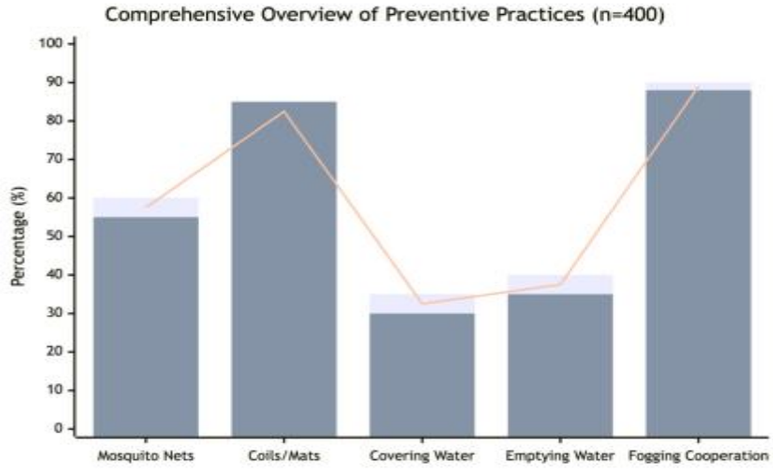

TABLE 5: ASSOCIATION BETWEEN SOCIO-DEMOGRAPHIC FACTORS AND GOOD KNOWLEDGE LEVEL

FACTOR	CATEGORY	GOOD KNOWLEDGE (%)	P-VALUE
UNION COUNCIL	Rajjar	15.0%	0.45
	MC1	12.5%	
EDUCATION	No Formal	5.0%	**<0.001**
	Primary	10.0%	
	Secondary	25.0%	
	Higher	45.0%	
SOURCE OF INFO	Health Worker	35.0%	**0.01**
	TV/Radio	20.0%	
	Social Media	15.0%	

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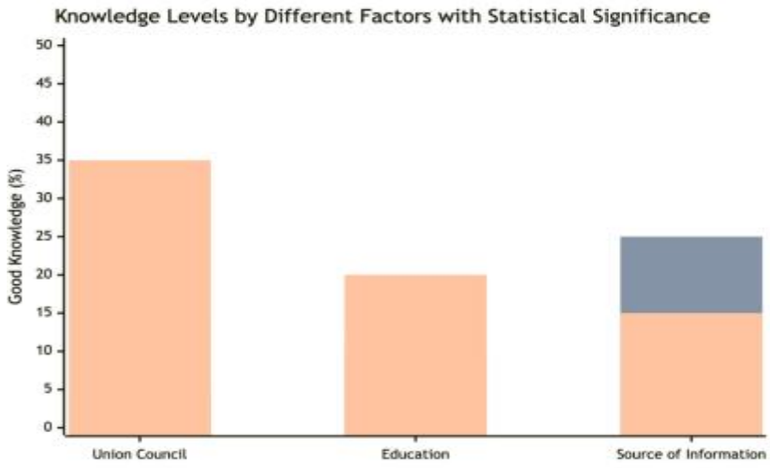

DISCUSSION

This community-based assessment, conducted amidst an active dengue firefight in District Charsadda, uncovers a critical chasm between what the community knows and what it does, revealing systemic vulnerabilities in our public health armor. The following discussion interprets these urgent findings, weaving them into the broader tapestry of global evidence to chart a path forward. The most striking finding of this study is the profound knowledge deficit that cripples our first line of defense. The revelation that nearly half (48.7%) of the community possesses 'Poor' knowledge during an active outbreak is a public health siren call. This is not an isolated failure. A concurrent study in Pakistan's Khyber Pakhtunkhwa province found an almost identical proportion of the population was dangerously uninformed, confirming this is a regional crisis in risk communication that requires immediate, system-level redress [**9**]. Perhaps the most critical insight from our data is the stark "Knowledge-Practice Gap." While a majority of households (82.5%) engaged in self-protection like using mosquito coils—a finding consistent with studies in Lahore that reported high usage of personal protective measures [**10**]—the implementation of the most effective environmental control was critically low. Only 32.5% of households consistently covered their water storage, despite 65% knowing it was a primary breeding site. This demonstrates that knowing is not the same as doing. This chasm is a well-documented global phenomenon; research from Indonesia confirmed that even perfect knowledge of breeding sites rarely translates into consistent container management without targeted behavioral interventions [**11**]. This suggests our public health strategy must evolve from merely disseminating information to actively engineering environments and habits that make the correct action the easiest one. Our analysis unequivocally identifies **education** as the single most powerful engine of knowledge. The dramatic gradient, where the proportion of respondents with good knowledge skyrocketed from 5.0% among those with no formal education to 45.0% among those with higher education, paints a clear picture. This powerful correlation is strongly supported by a national meta-analysis on dengue in Pakistan, which confirmed that a higher educational level is the most consistent and significant predictor of better knowledge across diverse populations [**12**]. This underscores that formal education builds the foundational health literacy and critical thinking skills necessary to decode and act upon complex public health advice, an effect also observed in studies from neighboring India [**13**]. In our hyper-connected age, the *source* of information proved to be a decisive

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factor. Local health workers emerged as the most effective communicators, with households relying on them being twice as likely to have good knowledge compared to those using social media. This finding validates the irreplaceable value of trusted, interpersonal contact. A successful community-based trial in Vietnam demonstrated that interventions led by local health collaborators were far superior to mass media campaigns in sustaining proper container management, precisely because they foster accountability and provide tailored guidance [**14**]. This human-centric approach is more critical than ever, as evidenced by research noting the challenges of combating misinformation on digital platforms [**15**]. A final, concerning finding was the community's "prevention blind spot." While 70% correctly identified discarded plastic containers as a risk, less than half recognized water pots for animals and plants as major breeding sites. Alarmingly, these very sites were the most frequently observed larval habitats in our household inspections. This indicates that our public health messages are missing the mark, creating a dangerous false sense of security. This mirrors findings from Sri Lanka, where commonly known sites like tires received attention, but perennial, "natural" sites in gardens were consistently overlooked, constituting the most productive larval habitats [**16**]. Our messaging must therefore become more nuanced and context-specific, moving beyond generic lists to target the real-world breeding grounds unique to our communities, a strategy that has proven effective in similar agrarian settings in Bangladesh [**17**]

Conclusion

Based on the findings of this study, we conclude that the fight against dengue in Charsadda is being lost at the community level. Despite the outbreak, nearly half of the residents lack basic knowledge about how the disease spreads and how to stop it. There is a dangerous disconnect between what people know and what they do; while many use mosquito coils for personal protection, very few take the most critical step of covering water containers where mosquitoes breed. The most powerful tools for change are clear: formal education dramatically increases understanding, and information delivered directly by local health workers is far more effective than mass media. To protect our communities, we must immediately launch practical, door-to-door education campaigns led by health workers, focusing on showing families how to eliminate breeding sites in and around their own homes

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Conflict of Interest Statement

The authors hereby declare that there are no conflicts of interest, whether financial or personal, that could have influenced the work reported in this manuscript.

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Authors' Contributions

Fawad Khan: Conceptualization, Original Draft, Writing – Review & Editing, Project Administration.
Muhammad Sulaman Shah: Investigation, Data Curation, Validation,
Amjid Akhtar: Editing.,Data Collection
Asiya Khan: Review
Dr Jalal Uddin: Editing.
Dr Habib Ahmad Khan: Review & Editing.
Dr Wasi Ullah: Resources, Supervision,
All authors have read and approved the final version of the manuscript.

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