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Assessing the Effectiveness of Knowledge and Attitudes on Household/Urban Pesticides Use: Basis for a Health Advocacy Intervention

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Abstract

Dengue continues to pose a serious public health challenge in the Philippines, particularly in urban communities where year-round mosquito presence and frequent household/urban pesticide use increase both disease transmission and chemical exposure risks. While pesticide application is commonly used for mosquito control, improper handling and limited consumer chemical literacy undermine dengue prevention efforts and expose households to health hazards. This study examined the effectiveness of a Health Advocacy Intervention in improving residents' knowledge and attitudes toward safe household/urban pesticide use and dengue prevention in Santa Rosa City, Laguna. An experimental randomized controlled trial design was employed involving sixty (60) adult residents from selected barangays, who were randomly assigned to either an Intervention Group or a Control Group. Both groups completed validated knowledge and attitude assessments prior to the intervention. The Intervention Group received a structured Information, Education, and Communication (IEC)–based health advocacy program focused on pesticide safety, label comprehension, and the Department of Health (DOH) 5S dengue prevention strategy, while the Control Group received no intervention. Post-tests were administered three weeks after the pre-test. Results indicated that baseline knowledge levels in both groups were generally low, while baseline attitudes were positive but not optimal. Following the intervention, participants in the Intervention Group demonstrated statistically significant improvements in both knowledge and attitudes ($p < 0.05$), achieving high knowledge levels and very positive attitudes toward safe pesticide use and dengue prevention. No significant changes were observed in the control group. The findings confirm the effectiveness of the Health Advocacy Intervention and underscore the value of integrating chemical safety education into community-based dengue prevention programs to promote safer and more sustainable public health practices.

Keywords: pesticide use, dengue prevention, health advocacy, knowledge, attitude

Introduction

Dengue remains a major public health concern in tropical and subtropical regions, particularly in the Philippines, where year-round mosquito activity sustains frequent outbreaks. The World Health Organization estimates that 100–400 million dengue infections occur annually worldwide, placing nearly half of the global population at risk (WHO, 2024). In the Philippines, over 208,000 dengue cases were reported as of September 2024, representing a 68% increase from the previous year (DOH, 2024). Within

the CALABARZON region, Santa Rosa City, Laguna consistently records one of the highest dengue incidences, a trend linked to rapid urbanization and dense residential development.

Household and urban pesticide use remains a common dengue control practice; however, national surveillance data show that these products are also among the leading causes of poisoning, particularly among children and young adults (UP-PGH NPMCC, 2024). Improper handling, excessive use, and limited consumer understanding of pesticide safety pose significant health risks and may contribute to insecticide resistance, thereby reducing the effectiveness of chemical-based vector control (FDA, 2024; Carrera et al., 2024). Although national programs such as the DOH 5S Strategy emphasize environmental management and mosquito control, relatively little attention is given to household-level chemical safety and consumer literacy.

Existing studies support community-based dengue interventions, yet few focus on consumer chemical literacy and safe household pesticide use as primary outcomes, particularly using rigorous experimental designs. Moreover, local research remains largely descriptive, providing limited evidence on the causal impact of health advocacy interventions on knowledge and attitudes.

To address these gaps, this study evaluates the effectiveness of an IEC-based Health Advocacy Intervention in improving residents' knowledge and attitudes toward safe household and urban pesticide use and dengue prevention in Santa Rosa City, Laguna. Using a randomized controlled trial design, the study aims to generate evidence to support the integration of chemical safety education into community-based dengue prevention strategies and inform public health policy and practice.

Methods

This study employed a randomized controlled trial design to evaluate the effectiveness of an IEC-based Health Advocacy Intervention on residents' knowledge and attitudes toward safe household and urban pesticide use in Santa Rosa City, Laguna. A total of 60 adult residents (≥18 years) from three dengue-prone barangays were selected through multi-stage random sampling and randomly assigned to either an Intervention Group (n = 30) or a Control Group (n = 30). Both groups completed a pretest assessing baseline knowledge and attitudes, after which the Intervention Group received the health advocacy intervention while the Control Group received no intervention. Post-testing was conducted after a three-week interval. Data were collected using a content-validated, researcher-developed questionnaire consisting of a 10-item knowledge test and a 4-point Likert-scale attitude measure (Cronbach's $\alpha = 0.915$). Descriptive statistics summarized outcomes, while paired and independent t-tests were used to assess within- and between-group differences at a 0.05 significance level. Ethical approval and barangay permissions were secured, informed consent was obtained, and confidentiality was maintained throughout the study.

Results

At baseline, both the Intervention Group and Control Group demonstrated low to moderate levels of knowledge regarding safe household and urban pesticide use and dengue prevention, with the majority of respondents classified under low or moderate knowledge categories. Baseline knowledge levels were comparable between groups. Baseline attitudes in both groups were generally positive, with stronger ratings for self-protection and proper pesticide use and weaker emphasis on environmental control measures such as fogging and search-and-destroy activities.

Three weeks after the intervention, the Intervention Group showed substantial improvements in both knowledge and attitudes. Most participants attained high knowledge levels, and none remained in the low category. Attitudes improved to a very positive level across all indicators, with the highest gains observed in self-protection practices and safe pesticide use. In contrast, the Control Group showed minimal to no change in knowledge and attitudes over the same period.

Statistical analysis confirmed these patterns. Knowledge scores in the Intervention Group increased significantly from pre-test to post-test (mean 4.43 to 7.00; $p < 0.001$), while no significant change was observed in the Control Group. Similarly, attitude scores in the Intervention Group improved significantly (mean 3.17 to 3.80; $p < 0.001$), whereas changes in the Control Group were not statistically significant. These findings indicate that the observed improvements in knowledge and attitudes were attributable to the Health Advocacy Intervention.

Discussion

This study evaluated the effectiveness of an IEC-based Health Advocacy Intervention in improving residents' knowledge and attitudes toward safe household and urban pesticide use and dengue prevention in a high-risk urban setting. At baseline, both groups demonstrated limited knowledge and unevenly positive attitudes, indicating substantial gaps in household-level understanding of pesticide safety despite ongoing dengue prevention efforts. These findings are consistent with existing literature showing that community awareness of chemical risks often remains inadequate even in dengue-endemic areas.

Following the intervention, the Intervention Group exhibited significant improvements in both knowledge and attitudes, while the Control Group showed no meaningful changes. These results suggest that structured health advocacy, when delivered through targeted IEC materials, can effectively address deficiencies in chemical literacy and strengthen receptiveness to safe practices. The marked improvement in attitudes toward self-protection and proper pesticide use indicates that interventions focusing on personally actionable behaviors may be particularly effective in promoting behavior-relevant cognitive change.

The absence of improvement in the Control Group reinforces the conclusion that passive exposure to general dengue messaging or the mere passage of time is insufficient to produce measurable gains in knowledge or attitudes. The observed between-group differences further support the value of experimental, advocacy-based interventions in generating causal evidence for public health education strategies.

Overall, the findings highlight the importance of integrating chemical safety education into dengue prevention programs and underscore the potential of health advocacy interventions to enhance household-level prevention efforts in rapidly urbanizing, dengue-prone communities.

Conclusion

This study demonstrates that an IEC-based Health Advocacy Intervention is effective in improving residents' knowledge and attitudes toward safe household and urban pesticide use and dengue prevention in a high-risk urban community. Participants exposed to the intervention showed significant gains in knowledge and more positive attitudes compared with those who did not receive the intervention, while no meaningful changes were observed in the control group. These findings indicate that structured, targeted health advocacy can address gaps in consumer chemical literacy and enhance receptiveness to safe and preventive practices. Integrating chemical safety education into community-based dengue

prevention programs may therefore strengthen household-level protection and support more sustainable vector control efforts in dengue-prone urban settings.

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