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## The Influence of Socialization and Making Ovitrap to Improve PKK Women's Knowledge of Dengue Prevention With Wolbachia

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**Abstract:** Dengue fever presents a critical health challenge in Semarang City, marked by a notable increase in cases and fatalities in recent years. Bandarharjo Subdistrict, located along the coast, is particularly vulnerable due to its susceptibility to high tides, which create stagnant water breeding grounds for *Aedes aegypti* mosquitoes, primary vectors of dengue. This study aimed to enhance dengue prevention knowledge among PKK women through Wolbachia-based strategies and ovitrap-making practice. This research was conducted in May 2024 and used a quasi-experimental design with 37 married women participating in pretest-posttest assessments. Results indicated a significant improvement in knowledge scores post-intervention (p-value < 0.001) among PKK women. The study highlights the urgent need for targeted community health interventions amidst rising dengue cases, underscoring the role of education and practical training in mitigating disease transmission. Future research should focus on longitudinal studies to assess the sustainability and broader public health impacts of Wolbachia-based interventions in endemic regions.

**Keywords:** *Aedes spp.*, Dengue fever, Wolbachia, DHF prevention, PKK women

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### 1. Introduction

Dengue fever remains a major health issue in the city of Semarang. Based on data from the Semarang City Health Office in 2022, there were 865 cases of dengue with 33 deaths reported. This number reflects an increase in cases nearly threefold and an increase in deaths almost fourfold compared to 2021. However, the number of dengue cases in Semarang decreased to 404 with 16 deaths in 2023.

Bandarharjo Subdistrict is one of the coastal areas of Semarang, part of the North Semarang District. Most of its territory is located in an area prone to high tides (rob) along the coastline. The fluctuation of sea water levels is also a factor contributing to an increase in dengue cases, as stagnant water in house basements serves as a common breeding habitat for mosquitoes (Mavrouli et al., 2022). Puskesmas Bandarharjo ranks second with the highest number of dengue cases in Semarang City in 2022 (Mardiyanti & Siwiendrayanti, 2024).

Dengue fever is one of the endemic diseases in all tropical and some subtropical regions transmitted by the dengue virus through *Aedes aegypti* mosquitoes (Pakaya et al., 2023). The characteristics of *Aedes aegypti* mosquitoes include their black and white striped pattern on the legs and body, their preference for biting humans during the daytime, their ability to breed in small, stagnant water sources such as flowerpots and discarded containers, and their role as vectors for transmitting diseases such as dengue, Zika, and chikungunya

viruses (Supriyono et al., 2023). Transmission of dengue can occur rapidly within a region (Hajrah et al., 2023). In fact, within one month, the number of dengue cases in endemic areas can reach dozens of infected individuals (Hajrah et al., 2023).

The effects of dengue can vary depending on the severity of the infection. Common symptoms include high fever, severe headache, pain behind the eyes, joint and muscle pain, rash, and mild bleeding (such as nosebleeds or easy bruising) (Masyeni et al., 2024). In some cases, particularly severe forms of Dengue Hemorrhagic Fever (DHF) can be more serious and potentially life-threatening. These severe forms can lead to severe bleeding, organ damage, fluid accumulation in the lungs, and shock (Masyeni et al., 2024).

Early detection and proper medical care are crucial in managing dengue fever and preventing complications. The increase in dengue cases in Semarang City is very concerning, thus preventive efforts against the disease are necessary. Prevention of dengue can be done in various ways, including eliminating mosquito breeding sites, using mosquito repellents or insecticides, implementing community-wide mosquito control measures, and promoting awareness and education about mosquito bite prevention and symptoms of dengue fever (Khaidir et al., 2024). Furthermore, dengue prevention can also be achieved through making ovitraps using simple tools available at home (Tomia et al., 2023).

The use of ovitraps is an alternative and effective method to reduce the number of *Aedes spp* mosquitoes (Jaffal et al., 2023). An ovitrap is a trap designed to collect eggs laid by *Aedes spp* mosquitoes, with a fine mesh on top that prevents the mosquitoes from flying away after hatching into adults (Tomia et al., 2023). Ovitrap can be constructed using simple materials include used plastic containers from bottled water, black plastic, mesh cloth, tape, scissors/cutter, and water. To attract mosquitoes to the ovitrap, a solution of sugar water and yeast is needed (Prayogo et al., 2023).

Although socialization related to dengue fever and making ovitraps using simple materials has been conducted in several areas in Semarang City, this training has not yet been conducted among the community in Bandarharjo Subdistrict. Therefore, this research aims to determine the level of knowledge regarding dengue prevention among PKK women in RW 06, Bandarharjo Subdistrict, Semarang City.

## **2. Materials and Methods**

This research was conducted in RW. 6 Bandarharjo Subdistrict, North Semarang District, Semarang City in May 2024. We employed a quasi-experimental design with a pretest-posttest approach (Ferro et al., 2023). The sample consisted of 37 participants, all of whom were women. Purposive sampling was utilized as the sampling technique (Rahman, 2023). This study included married women of productive age, specifically those between 20 and 60 years old, as its criteria.

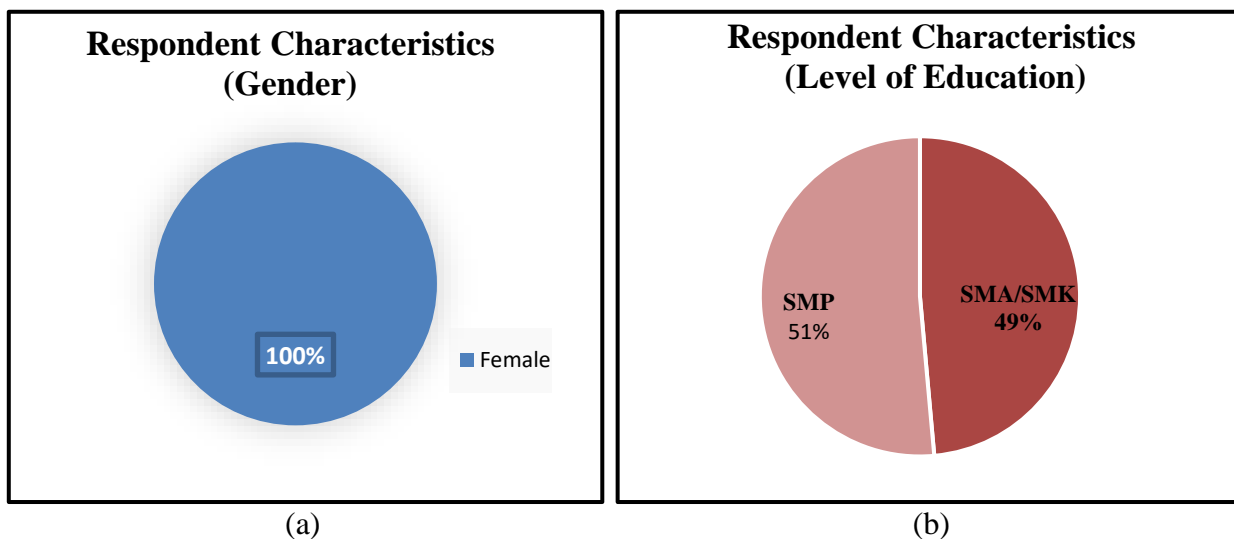
Primary data were collected using a questionnaire to assess the initial knowledge level of PKK women regarding dengue fever prevention using Wolbachia technology. The research instrument used was a closed-ended questionnaire with 10 questions. Additionally, methods employed in this study included discussions, leaflets, and practical sessions on making simple ovitraps. The training on making simple ovitraps aimed to enhance the knowledge of PKK mothers in preventing dengue fever in their environment.

The researcher distributed questionnaires to respondents before and after the socialization activities. Normality of the data was tested using the Shapiro-Wilk test due to the sample size being less than 100 (Iriyanto et al., 2023). Data analysis was conducted using the Wilcoxon signed-rank test to examine the differences in knowledge among PKK women before and after receiving information on dengue fever prevention using Wolbachia technology (Ambarwati & Sulastri, 2023).

### 3. Results and Discussion

#### 3.1 Respondent Characteristics

In figure 1(a), it showed that all of 37 respondents (100%) were female. Figure 1(b) showed a comparison of the respondents's level education, which did not differ significantly. There were 18 respondents (51%) with a last educational attainment of Junior High School (SMP) and 19 respondents (49%) with Senior High School/Vocational School (SMA/SMK). This was consistent with research indicating that a majority of PKK women in Semarang had educational levels equivalent to SMP and SMA/SMK (Salsabila, 2023).



**Fig.1.** (a) Characteristics of the respondent's gender; (b) Characteristics of the respondent's educational level

#### 3.2 Level of Knowledge of PKK Women Regarding Dengue Prevention Using Wolbachia

**Table 1.** Level of Knowledge of PKK Women Regarding Dengue Prevention Using Wolbachia

Group	Knowledge	n	%
Pre-test	Poor	11	29.73
	Fair	20	54.054
	Good	6	16.216
Post-test	Poor	0	0
	Fair	5	13.514
	Good	32	86.486
	Total	37	100

Based on table 2 above, before the socialization on dengue fever prevention with Wolbachia technology and ovitrap-making practice, it was found that there were 11 respondents (29.7%) with inadequate knowledge, 10 respondents (54%) with sufficient knowledge, and 6 respondents (16%) with good knowledge. After the event, surprisingly, there were no respondents with inadequate knowledge. All respondents experienced an increase in knowledge. According to the data, there were 5 respondents (13.5%) with sufficient knowledge and 32 respondents (86.4%) with good knowledge.

During the ovitrap-making practice, the respondents were seen enthusiastically participating and actively asking questions. This aligns with research conducted by (Rahmah et al., 2023), they found socialization can improve respondent's knowledge levels. Moreover, other studies mention that practicing making ovitraps among children can improve their knowledge and skills in preventing dengue fever in their environment (Sukeesi et al., 2024).

### 3.3 The Influence of Dengue Prevention Using Wolbachia on The Knowledge Level of PKK Women

**Table 2.** Normality Test Result (*Shapiro-Wilk*)

Test	Statistic	df	P-value
Pre-test	0,926	37	0.017
Post-test	0,869	37	< 0.001

Based on Table 3 above, the Shapiro-Wilk test results for the pre-test values showed a p-value of 0.017, indicating normal data distribution. However, the post-test values showed a p-value of <0.001, indicating non-normal data distribution. Since the data showed normality for the pre-test but not for the post-test, the Wilcoxon signed-rank test, a non-parametric test, was used for the difference test. The results obtained showed a p-value of <0.001 (<0.05), indicating a significant difference in knowledge among PKK women before and after the socialization about dengue prevention with Wolbachia and ovitrap-making practice.

Previous research found that the level of public knowledge regarding Wolbachia in Indonesia was still low (Suharyo & Musyafira, 2023) and the government still needs to enhance socialization regarding Wolbachia technology to the community (Ramadhana, 2024). This is in line with research conducted in 2024

that practical demonstrations of making simple ovitraps can enhance the audience's understanding (Mayadilani et al., 2024). According to earlier studies, the installation of ovitraps in the environment effectively reduces the incidence of dengue fever (Tomia et al., 2023). Furthermore, another advantage of non-hazardous and environment friendly (Priyadi & Kamsul, 2023).

#### 4. Conclusion

This study has demonstrated a significant improvement in PKK women's knowledge scores following the conducted activities (p-value <0.001). The findings showed the effectiveness of the socialization and ovitrap-making initiatives in enhancing awareness and understanding of Wolbachia-based dengue fever prevention strategies among PKK women. Future research should further explore the sustained impact of such programs on public health outcomes.

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#### Conflict of Interest

There are no competing interests associated with the publication of this article.

#### References

- Ambarwati, I., & Sulastri, S. (2023). The Influence of Health Education Using Media Booklets About the Importance of Hemoglobin Levels to Increase Knowledge of Pregnant Women in the Work Area of the Ngemplak Public Health Center. *Contagion: Scientific Periodical Journal of Public Health and Coastal Health*, 5(3), 824-833.
- Ferro, M. M., Pegueroles, A. F., Lorenzo, R. F., Roy, M. Á. S., Forner, O. R., Jurado, C. M. E., Julià, N. B., Benito, C. G., Hernández, R. H., & Alcaraz, A. B. (2023). The effect of a live music therapy intervention on critically ill paediatric patients in the intensive care unit: A quasi-experimental pretest–posttest study. *Australian Critical Care*, 36(6), 967-973.
- Hajrah, U., Akmal, D., Abdillah, A. D., & Nugraha, F. (2023). Spatial pattern analysis on incidence of dengue hemorrhagic fever (DHF) in the Leuwigajah, West Java, Indonesia. *Spatial Information Research*, 31(3), 359-367.
- Iriyanto, D., Suarna, N., & Dana, R. D. D. R. D. (2023). Peningkatan Mutu Pembelajaran Gerak Dasar Tari Kelas Vii Melalui Video Animasi 2D Menggunakan Metode Addie. *Jurnal Teknoif Teknik Informatika Institut Teknologi Padang*, 11(1), 16-23.
- Jaffal, A., Fite, J., Baldet, T., Delaunay, P., Jourdain, F., Mora-Castillo, R., Olive, M.-M., & Roiz, D. (2023). Current evidences of the efficacy of mosquito mass-trapping interventions to reduce *Aedes aegypti* and *Aedes albopictus* populations and *Aedes*-borne virus transmission. *PLOS Neglected Tropical Diseases*, 17(3), e0011153.
- Khaidir, Y., Sastrawan, S., & Setiawan, S. (2024). Efforts to Control Dengue Hemorrhagic Fever (DHF) in Mataram City. *Journal of Midwifery and Nursing*, 6(1), 7-15.

- Mardiyanti, D., & Siwiendrayanti, A. (2024). Analisis Risiko Penularan DBD Berdasarkan Lingkungan Fisik, Perilaku Menguras TPA dan House Index di Kelurahan Tanjung Mas. *Jurnal Kesehatan Tambusai*, 5(1), 2423-2436.
- Masyeni, S., Wardhana, I. M. W., & Nainu, F. (2024). Cytokine profiles in dengue fever and dengue hemorrhagic fever: A study from Indonesia. *Narra J*, 4(1).
- Mavrouli, M., Mavroulis, S., Lekkas, E., & Tsakris, A. (2022). Infectious Diseases Associated with Hydrometeorological Hazards in Europe: Disaster Risk Reduction in the Context of the Climate Crisis and the Ongoing COVID-19 Pandemic. *International Journal of Environmental Research and Public Health*, 19(16), 10206. <https://www.mdpi.com/1660-4601/19/16/10206>
- Mayadilani, A. M., Nurvita, S., Chotimah, S. N., Sumantiawan, D. I., Dewi, V. N., Antidi, M. F. D., & Yudistira, A. R. (2024). Sosialisasi Demam Berdarah Dan Praktek Pembuatan Ovitrap Sederhana Di Kelurahan Bandarharjo Semarang. *Jurnal Kemitraan Masyarakat*, 1(2), 16-22.
- Pakaya, R., Daniel, D., Widayani, P., & Utarini, A. (2023). Spatial model of Dengue Hemorrhagic Fever (DHF) risk: scoping review. *BMC Public Health*, 23(1), 2448.
- Prayogo, D. N. H., Isnawati, I., Noraida, N., & Irfai, M. (2023). The Attractive Ability Of Types Of Attractants Against Aedes sp. Mosquito Eggs Using Ovitrap. *JURNAL KESEHATAN LINGKUNGAN: Jurnal dan Aplikasi Teknik Kesehatan Lingkungan*, 20(1), 23-30.
- Priyadi, P., & Kamsul, K. (2023). Application of Lethal Ovitap as A Media For Controlling DHF Large Vectors in The Working Area of Sukarami Health Center, Palembang City in 2022. *Abdi Dosen: Jurnal Pengabdian Pada Masyarakat*, 7(1), 249-253.
- Rahmah, S., Rhyanti, C., Ari, R., Hansel, H., Sukma, A. B., Hapsari, D., Halim, E., Miamaretta, A., & Dwicahyani, S. (2023). Improving Hypertension Prevention and Knowledge Level in Jatisari Village, Pakisaji District. Proceedings of the 2nd Lekantara Annual Conference on Public Administration, Literature, Social Sciences, Humanities, and Education, LePALISSHE 2022, 29 October 2022, Malang, East Java, Indonesia,
- Rahman, M. M. (2023). Sample size determination for survey research and non-probability sampling techniques: A review and set of recommendations. *Journal of Entrepreneurship, Business and Economics*, 11(1), 42-62.
- Ramadhana, A. (2024). *Perbedaan Tingkat Pengetahuan Tentang Program Wolbachia Pada Masyarakat Umum Antara Kabupaten Sleman dan Kota Yogyakarta Universitas Muhammadiyah Yogyakarta*].
- Salsabila, A. (2023). *Pengaruh Promosi Kesehatan Dengan Brainstorming Booklet (Rainbo) Terhadap Tingkat Pengetahuan Ibu-Ibu PKK Tentang Stunting di Desa Wonosari Pegandon Kendal Universitas Islam Sultan Agung Semarang*].
- Suharyo, S., & Musyafira, Y. M. (2023). Pengetahuan Siswa SMA Labschool UPGRIS Kota Semarang Tentang Pencegahan Demam Berdarah Dengan Wolbachia. *JURNAL RISET RUMPUN ILMU KEDOKTERAN*, 2(1), 91-102.
- Sukei, T. W., Sa'dani, O. S., Rachmawati, W. S., & Fitri, R. Y. (2024). Efektivitas Pelatihan Pembuatan Ovitrap di Sanggar Belajar Ami Kulim Penang Malaysia. *Jurnal Kesehatan dan Pengelolaan Lingkungan*, 5(1), 33-39.
- Supriyono, S., SOVIANA, S., MUSYAFFA, M. F., NOVIANTO, D., & HADI, U. K. (2023). Morphological characteristic of dengue vectors Aedes aegypti and Ae. albopictus (Family: Culicidae) using advanced light and scanning electron microscope. *Biodiversitas Journal of Biological Diversity*, 24(2).

Tomia, S., Hadi, U. K., & Hartati, E. B. R. (2023). Effectiveness of Ovitrap as a Control Tool Population *Aedes Spp.* In Areas Endemic to Dengue Fever Ternate City. *Valley International Journal Digital Library*, 307-313.