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Attitudes, awareness, and knowledge of *Wolbachia-aedes aegypti* technology in Yogyakarta: a survey

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Abstract. In 2014, Yogyakarta initiated the release of male *Wolbachia*-Aedes mosquitoes as a supplementary measure to vector control efforts, targeting the suppression of Aedes aegypti mosquitoes in designated study areas. Concurrently, with the ongoing expansion of the Randomized Control Trial of *Wolbachia* in Yogyakarta to encompass broader regions, a household-based survey was conducted between January and June 2024 across two Project *Wolbachia* study sites. The survey utilized a structured questionnaire to gauge current public sentiments and identify the need for enhanced public messaging and engagement. Factors influencing awareness, attitudes, and knowledge towards *Wolbachia*-Aedes technology were examined using Pearson's Chi-square test and binary logistic regression analysis. Among the 1000 respondents, 80.8% reported a Randomized Control Trial of *Wolbachia* in Yogyakarta awareness. However, the level of detailed knowledge about *Wolbachia*-Aedes technology was notably lower, indicating significant knowledge gaps that necessitate improved communication and educational efforts to counter misinformation. The survey revealed that prolonged exposure to the project correlated with higher awareness, while higher educational attainment was linked to better knowledge levels. Additionally, younger age groups and individuals with higher education levels demonstrated greater project acceptance. Trust and acceptance levels towards the project were generally high among the population. The public's favorable perception of the project underscores the success of the current public communication strategies and will support the program's future expansion.

1. Introduction

Dengue has significantly increased across all regions of the World Health Organization (WHO) recently, with 390 million infections thought to occur annually in the world, of which 96 million (between 67 and 136 million) manifest symptoms[1]. Asia shoulders roughly 70% of this global burden and frequently experiences severe outbreaks[2]. Yogyakarta, a Southeast Asian city, is no exception to this trend. Its dense urban environment and tropical climate create ideal conditions for Aedes aegypti mosquitoes, the primary vector for dengue, facilitating the disease's spread. In 2013, Yogyakarta recorded its most severe dengue outbreak, with more than 35,000 cases of dengue fever and also dengue hemorrhagic fever, resulting in about 32 fatalities[3], [4]. Factors such as reduced herd immunity from years of low incidence and hidden breeding sites for Aedes mosquitoes contribute to the city's vulnerability to dengue[5]. The limited efficacy of Dengvaxia, the only commercial dengue vaccine, highlights the critical need for effective vector control as the main strategy for managing outbreaks. Innovative, sustainable methods to reduce the Aedes aegypti population are urgently needed in Yogyakarta[3].

One promising method is the incompatible insect technique (IIT), tested in various countries, including Thailand, the USA, Australia, and Yogyakarta. This technique involves releasing male Aedes aegypti mosquitoes infected with *Wolbachia* bacteria into the wild[6]. When mating with local females, these males produce non-viable eggs due to cytoplasmic incompatibility[7]. Regular releases of these *Wolbachia*-infected males aim to significantly lower the Aedes aegypti population to levels insufficient for sustaining dengue transmission. Since 2016, the National Environment Agency (NEA) has been conducting a phased field study, the "Randomized Control Trial of *Wolbachia* in Yogyakarta," to test the effectiveness of this approach and develop strategies for deployment in high-density housing areas. The initiative began with 39 housing blocks and expanded to 144 by 2019[4]. This IIT

strategy complements traditional vector control methods like eliminating breeding sites, insecticide space-spraying, and vector monitoring.

Engagement activities have included information sessions, roadshows, exhibition booths in high-traffic areas, and tours of mosquito production facilities. Information brochures have been distributed to households, and posters and banners have been placed in prominent locations to raise awareness [3]. Despite the widespread benefits of *Wolbachia*-Aedes releases, including to adjacent areas, the deployment logistics make it impractical to allow individual residents to opt-out, unlike other studies that release mosquitoes only in fully consenting areas.

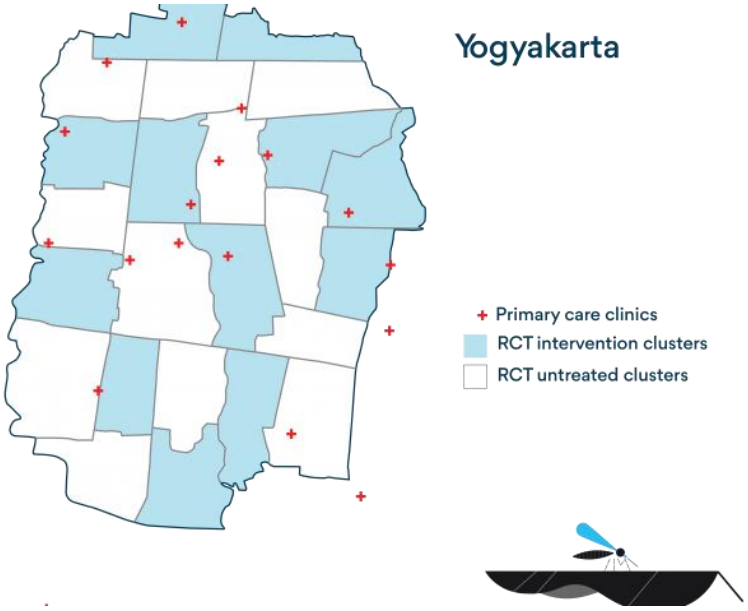

Figure 1: Map of Yogyakarta indicating places where the randomized control trial (RCT) of project *Wolbachia* Yogyakarta was conducted. Reference World Mosquito Program 2021.

More than 90% of families in the research regions expressed no worries about the mosquito releases, according to surveys done during the project's early phase. Over 70% of households in the study areas were aware of the experiment. From 12 regencies, 15,941 households were roughly targeted for the previous survey from 2015-2020. A proactive and open feedback management system was put in place at this time to uphold responsibility and confidence among community stakeholders [5], [8], [9], [10]. Responses included reports of more mosquito sightings because of the male *Wolbachia*-Aedes mosquitoes being released, as well as complaints about the annoyance value of the enlarged mosquito population. In order to keep mosquitoes out of their homes, residents had to close their windows and doors[3]. They also had to apply pesticides and repellents more often to lessen the number of male *Wolbachia* aedes mosquitoes that swarmed inside[11].

This study presents a unique method by examining the long-term effect of the Randomized Control Trial of *Wolbachia* in Yogyakarta, concentrating on the community's awareness, understanding, and acceptance of the *Wolbachia*-Aedes mosquito releases. In contrast to other research, this study looks at the impact of extended project exposure as well as the influence of sociodemographic variables, such age and education, on public perceptions of the new vector control strategies. The research emphasises the need for focused communication tactics to improve public awareness and support for long-term dengue preventive initiatives by highlighting significant knowledge gaps and misunderstandings. The results give unique insights into the scalability of *Wolbachia*-based therapies in urban settings, making it a crucial addition to worldwide vector control research.

In light of these problems, it is critical to evaluate public opinion after five years and identify areas in which public participation and message need to be strengthened. In order to assess public awareness, knowledge, and attitudes regarding the Randomized Control Trial of *Wolbachia* in Yogyakarta, this study included a follow-up home perception survey.

2. Methods

2.1. Study area and method for gathering survey data

Surveys of household opinions were carried out at two research locations for the Randomized Control Trial of *Wolbachia* in Yogyakarta between January and June of 2024. These locations may be found in Yogyakarta's eastern and northern regions, Tampines and Yishun, respectively. Both neighborhoods, which are made up of apartments and business spaces created by the Housing Development Board, have comparable housing conditions and sorts.

Using the Qualtrics® online sample size calculator, ninety was found to be the minimum sample size required for each category (with a 10% margin of error and a 95% confidence interval). In order to improve the representativeness and quality of the data, 1000 households were polled at each location, a proportionate increase in the number of homes examined each site.

Based on a randomized household list, a random household was chosen at random from each block. Surveys were conducted with one respondent per household, after informed permission. If, because of linguistic issues, no respondents were available or willing to participate, the next home on the list was selected. Every survey was carried out with participants' agreement.

2.2. Data collection

A structured questionnaire was used to administer 1000 surveys through face-to-face interviews across all 12 regencies. The questionnaire had closed-ended questions on demographics, knowledge, attitudes, and opinions regarding the project and technology. Before beginning the surveys, all surveyors had training to ensure they understood the goals, procedures, requirements, and questions.

2.3. Measures

Eleven questions were used to assess the participants' knowledge of *Wolbachia*-Aedes technology, and the number of right answers was added together to determine the "general knowledge (GK)" score. Three categories were used to group GK scores: "Low" (3-4), "Mid" (4-7), and "High" (8-11). In order to gauge their perceived knowledge of the subject, participants also completed questionnaires. The number of "Yes" answers to six questions was used to calculate their "perceived knowledge (PK)" score. Similar classifications were made for PK scores: "Low" (0-2) points, "Mid" (3-4) points, and "High" (5-6) points.

Participants were assessed using a 5-point Likert scale (one strongly disagreeing, and five highly agreeing). Trust in the initiative. The composite measure of Trust in the Project was created by averaging the items under the trust construct since their internal consistency was deemed adequate ($\alpha = 0.850$). To gauge participant acceptance of the Randomized Control Trial of *Wolbachia* in Yogyakarta, a simple question asking participants how long they could tolerate an increase in mosquitoes in their surroundings was used. There were five alternatives available to participants, with durations ranging from one month to over a year. Along with answering questions about their gender, age group, and greatest level of education, participants were also asked about their general opinion of dengue as a problem in Yogyakarta, their level of trust in the National Environment Agency (NEA), and whether they thought the NEA worked in the best interests of the locals.

Table 1. Formatting sections, subsections, and subsubsections.

Study Sites	Sites with >5 years of *Wolbachia* Aedes released	Number of Surveys (Minimum Sample Size)
Kulon Progo	V	90 (200)
Sleman	V	120 (200)
Kota Yogyakarta	V	150 (200)
Bantul	V	125 (200)
Gunung Kidul	V	153 (200)
Total	1000	

2.4. Statistical analysis

More significant awareness, high general knowledge, trust, and acceptance were among the outcome variables that were examined in relation to the relationships between General Knowledge (GK) and Perceived Knowledge (PK) scores as well as demographic characteristics like gender, age, education levels, and duration of exposure to Project *Wolbachia*. For the research, IBM SPSS Statistics (Version 25) was employed.

While the GK and PK values were classified using Pearson's Chi-square test, the total GK and PK scores were analyzed using Pearson's correlation. The influence of important demographic characteristics on every outcome was later assessed via the use of multivariable logistic regression analysis. The independent variables in the multivariable logistic regression model were confined to those having a Pearson's Chi-square test p-value of less than 0.20. This strategy strengthens the findings' robustness and reliability by ensuring that only the most essential components are incorporated in the final analysis

3. Results

Table 2 provides specifics on the research participants' socio-demographics. The distribution of exposure duration to Project *Wolbachia* was evenly split, with 50% of participants having been exposed for less than five years and the remaining 50% for more than five years. Additionally, the participant distribution across study sites revealed a slightly higher representation from the more significant Gunung Kidul site, comprising 55% of the sample, compared to 45% from 1000 households as the research's sample size.

Table 2: Sociodemographic characteristics of the 1000 research participants.

Categories	Household Participant Distribution
Sex	
Male	396 (39.6%)
Female	604 (60.4%)
Age (Natural life Years)	
≤ 20	71 (7.1%)
21 - 30	131 (13.1%)
31 - 40	177 (17.7%)
41 - 50	155 (15.5%)
51 - 60	159 (15.9%)
> 60	307 (30.7%)
Standard of Education	
Lower Basic School Certificate & Lower	247 (24.7%)
Junior and/or Senior High School	323 (32.3%)
Diploma (College or Pre-University study)	215 (21.5%)
University Degree	215 (21.5%)
Length of Exposure to *Wolbachia*	
> 5 Years	500 (50%)
≤ 5 years	500 (50%)

3.1 awareness of randomized control trial of Wolbachia in Yogyakarta

Of the participants, 74.8% (n = 748) were aware of the *Wolbachia* Randomized Control Trial in Yogyakarta. Posters and banners at research sites, as well as advertising leaflets given to every household, were how most people (46.8%) learned about the initiative. Other sources included mainstream media, including TV news and radio (30.2%), and active participation, such as radio programs, roadshows, and door-to-door sessions (13.4%).

3.2 knowledge of randomized control trial of Wolbachia in Yogyakarta

38.4% of participants overall expressed confidence in their project knowledge, earning "High" perceived knowledge (PK) ratings. Two categories were created out of the remaining people: "Low" (41.0%) and "Mid" (20.6%). For the factual understanding of *Wolbachia* technology and the project, only 17.2% of participants received "High" general knowledge (GK) ratings; the other participants received "Mid" (40.2%) and "Low" (42.6%) ratings.

In comparison to those who were unaware of the project (mean PK score = 0.4, SD = 1.0; mean GK score = 1.8, SD = 2.0), those who were aware of the Randomized Control Trial of *Wolbachia* in Yogyakarta had higher

PK scores (mean = 4.1, SD = 1.8) and higher GK scores (mean = 5.2, SD = 2.6). In Figure 2, the distribution of scores is presented. In order to prevent bias, individuals who were informed of the experiment were asked to compare their perceived knowledge of *Wolbachia* technology with their general knowledge to those who were not.

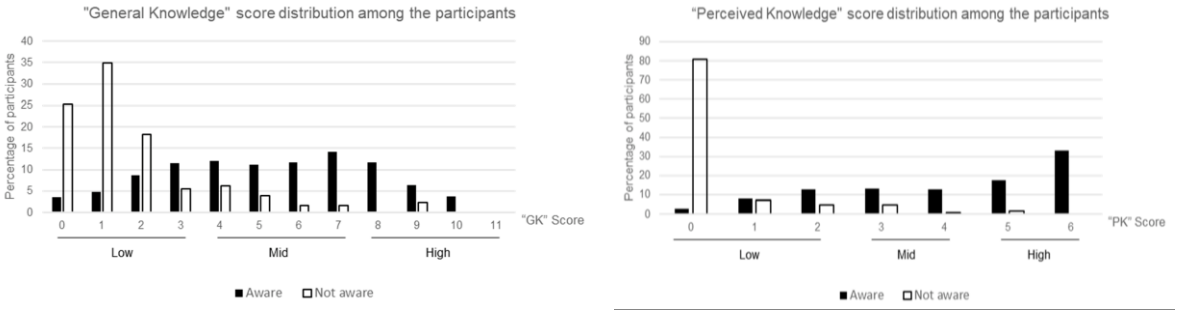

Figure 2. Graphical distribution of General Knowledge (L) Score against Perceived Knowledge (L) for the *Wolbachia* Control Trials in Yogyakarta

Regarding perceived knowledge (PK), most participants (76.5%) who were informed about the research showed a degree of confidence in their knowledge, placing them in the "Mid" to "High" range. General knowledge (GK) of the project was rated between "Mid" and "High" by 71.4% of those who had heard of it. An overview of the participants' performance in the PK and GK assessments. The mean scores for PK and GK showed a moderate connection ($r = 0.512$, $p < 0.01$). A substantial connection was found when this link was further examined using the classified PK and GK scores and Pearson's chi-squared test ($X^2(4,748) = 74.41$, $p < 0.001$). Notably, inadequate general knowledge was also demonstrated by 59.1% of individuals who reported having poor perceived knowledge. Conversely, mid-level general knowledge was also present in 58.3% of those with mid-level perceived knowledge.

Table 3. Factors related to socio-demography are linked to elevated levels of consciousness, understanding, confidence, and approval of Project *Wolbachia*-Yogyakarta.

Category	N	High awareness of Project			High General Knowledge of *Wolbachia* Technology (GK Scores 8–11 Points)			High Trust in Project			High Acceptance towards Project		
		n (%)	OR (95% CI)	*p*	n (%)	OR (95% CI)	*P*	n (%)	OR (95% CI)	*P*	n (%)	OR (95% CI)	*P*
Sex													
Male	600	296 (74)	Ref		75 (18.8)	Ref		75 (18.8)	Ref		254 (63.5)	Ref	
Female	400	453 (75.5)	1.058 (0.841 - 1.331)	0.615		1.058 (0.841 - 1.331)	0.615	97 (16.2)	0.835 (0.611-1.141)	0.265	417 (69.5)	1.323 (0.971 - 1.803)	0.091
Age													
>40	620	468 (75.5)	Ref		97 (16.2)	Ref		106 (17.1)	Ref		428 (69.0)	Ref	
≤ 40	380	281 (73.9)	0.922 (0.712 - 1.195)	0.538		0.922 (0.712 - 1.195)	0.538	66 (17.4)	1.018 (0.724-1.432)	0.913	243 (64.0)	0.782 (0.587 - 1.042)	0.095
Level of Education													
Senior High and Below	570	411 (72.1)	Ref		112 (26.0)	Ref		60 (10.5)	Ref		394 (69.1)	Ref	

University	430	338 (78.6)	1.482 (1.125 - 1.953)	0.006		1.482 (1.125 - 1.953)	0.006	112 (26.0)	3.103 (2.175-4.428)	0.000	394 (69.1)	0.845 (0.639 - 1.118)	0.243
Length of Exposure to *Wolbachia*													
≤ 5 years	500	346 (69.2)	Ref		72 (14.4)	Ref		72 (14.4)	Ref		326 (65.2)	Ref	
> 5 years	500	403 (80.6)	1.874 (1.443 - 2.432)	0.001		1.874 (1.443 - 2.432)	0.001	100 (20.0)	1.485 (1.052-2.097)	0.025	326 (65.2)	1.215 (0.915 - 1.614)	0.180

Remarkably, the majority of individuals (49.5%) who reported having high perceived knowledge only had mid-level general knowledge scores. This disparity raises the possibility that participants misunderstood the project or exaggerated their degree of expertise.

3.3 Trust in randomized control trial of Wolbachia in Yogyakarta

Most participants (77.4%) said Yogyakarta was seriously plagued by dengue. Of this group, 59.4% thought dengue was under control despite being a dangerous illness. The majority of participants (64.6%) said that the government was doing a good enough job of managing the dengue outbreak locally. The National Environment Agency (NEA) enjoys a high level of public trust, as evidenced by the majority of respondents who think that the agency operates in the best interests of inhabitants (83.2%) and will make every effort to assist citizens (81.6%).

Regarding NEA's involvement in the initiative of *Wolbachia* specifically, 79.2% of participants said they trusted NEA to oversee the initiative, and 77.4% said they would accept it if NEA suggested releasing *Wolbachia*-Aedes mosquitoes (Table 4). The remaining individuals disagreed (4.4%, n = 44) or had a neutral position (18.2%, n = 182) with the discharge of male *Wolbachia*-Aedes mosquitoes.

Of the 44 participants, 34 reported being aware of Project *Wolbachia*, making up a tiny minority that opposed the release of *Wolbachia*-Aedes mosquitoes. Even still, just ten individuals said they knew how *Wolbachia* technology operated. This group's General Knowledge (GK) scores were likewise rather low, averaging 2.59 out of 11, which was considerably lower than the average GK scores of 4.44 out of 11 among those who did not object. Furthermore, this group of responders did not believe they had a significant chance of catching infectious illnesses spread by mosquitoes, such as dengue.

3.4 Acceptance towards randomized control trial of Wolbachia in Yogyakarta

Participants were asked how long they would endure having more mosquitoes in their communities as a result of the *Wolbachia* Randomized Control Trial in Yogyakarta in order to gauge their acceptance levels of the initiative despite potential inconveniences. Slightly over half (56%) of the participants said they would be willing to tolerate seeing more mosquitoes for at least six months in order to reduce the chance of getting dengue (Table 3).

3.5 Sociodemographic elements linked to increased knowledge, awareness, trust, and acceptance of the project

Analytical techniques were used to examine the relationships between sociodemographic factors and intended outcomes, including bivariate and multivariate analysis. The bivariate analysis revealed that individuals with higher education levels (pre-university and above) and longer exposure to the project (> 5 years) had higher odds ratios (OR) of 1.37 (95% CI: 0.91, 2.08) and 1.83 (95% CI: 1.21, 2.76), respectively. This indicates that these participants were more likely to have greater awareness levels. The multivariable analysis showed that prolonged exposure to the initiative was the sole significant independent predictor of greater awareness levels, with an adjusted odds ratio of 1.80 (95% confidence interval: 1.19, 2.72; p = 0.005). The bivariate analysis found that higher levels of education (pre-university and above) and longer project exposure were associated with higher general knowledge scores (GK scores between 8 and 11 points) regarding *Wolbachia* technology. The odds ratios (ORs) were 2.99 (95% CI: 1.84, 4.87) for higher education levels and 1.49 (95% CI: 0.93, 2.38) for longer project exposure. The multivariable analysis confirmed that greater education levels were significantly associated with higher knowledge levels, with an adjusted odds ratio of 2.95 (95% CI: 1.81, 4.79; p < 0.001).

Participants who showed a strong desire to endure a higher number of mosquito sightings for a minimum of six months in order to decrease the risk of dengue were also examined. The bivariate analysis revealed that individuals who were younger (≤40 years), had higher levels of education (pre-university and university), and had longer project exposure were more likely to have high acceptance levels. The odds ratios (ORs) for these

associations were 0.40 (95% CI: 0.28, 0.58; $p < 0.001$), 0.40 (95% CI: 0.28, 0.58; $p < 0.001$), and 0.77 (95% CI: 0.54, 1.10), respectively. In the multivariable analysis, including all three demographic characteristics, it was shown that younger age and higher education levels were predictors of greater acceptance. The adjusted odds ratios (ORs) for younger age and higher education levels were 0.55 (95% CI: 0.36, 0.84; $p = 0.006$) and 0.55 (95% CI: 0.36, 0.83; $p = 0.005$), respectively. Furthermore, there was a continuous correlation between higher levels of education and increased acceptability of the initiative. There was no notable link seen between sociodemographic factors and belief in the program.

4. Discussion

Project *Wolbachia* was known to the majority of respondents (69–72%) in a previous home opinion survey conducted in study regions[3], [4]. We found that a similar high majority of respondents (74.8%) knew about the project at the research locations at this work; respondents who had been exposed to the project for more than two years were more aware of it than those who had only been exposed for one year (80.4% and 69.2%, respectively). This finding was positive since it showed that awareness levels had remained consistent over time despite the site being expanded to encompass roughly three times as many households. This study discovered that longer project exposure was independently linked to increased awareness; this finding may have resulted from longer stretches of more intensely publicized campaigns in the study region. This study also revealed high levels of support (77.4%) and trust (79.2%) for the initiative. The NEA's community outreach and involvement activities in the Randomized Control Trial of *Wolbachia* in Yogyakarta are reflected in these outcomes.

It is noteworthy to understand that prolonged contact with the project was not autonomously related to better echelons of awareness on *Wolbachia*-Aedes technology, despite the intuitive conclusion that longer exposure was associated with higher awareness levels[8]. Rather, it was shown that greater levels of education (pre-university and above) were positively correlated with increased comprehension of *Wolbachia* technology. More years of formal schooling have increased respondents' likelihood of being better readers and, thus, more knowledgeable about current events and emerging technology. This is in line with several knowledge, attitude, and practice studies on dengue and its prevention that have been done[12]. Perceived knowledge (PK) ratings showed that most respondents (76%) who knew about the project were confident in their understanding of the subject. However, most of those who scored highly on perceived knowledge only received "Mid-level" general knowledge (GK) ratings, indicating that individuals may have some misunderstandings or overestimate their degree of knowledge[13]. Several studies where people overestimate their expertise also show a poor or non-existent association between perceived and real knowledge. Just 22.2% of those aware of the initiative had a high GK score, indicating that more communication efforts should concentrate on closing the population's knowledge gap. The majority of respondents to this survey provided erroneous answers to the following questions, highlighting the necessity for future communications to stress these essential topics.

1. *Wolbachia* is a bacteria, and Aedes mosquitoes carrying the *Wolbachia* virus are not genetically altered.
2. Barely Aedes aegypti mosquitoes are the focus of *Wolbachia*-Aedes suppression.
3. To permanently lower the dengue mosquito population, male *Wolbachia*-Aedes mosquitoes must be released regularly.

Given the public opposition to the use of genetically altered mosquitoes for infection management in other nations, the myth that the project included the release of genetically altered insects may weaken support from the community[14]. Additionally, if people believe incorrectly that "*Wolbachia*-Aedes suppression targets many species of mosquitoes," they can lose interest in mosquito management and grow complacent. A previous study and risk assessment had identified this public complacency as a possible danger point, even though only a small percentage of respondents displayed complacency[6], [15]. Such false information may also cause the public to question the project's viability, as they could incorrectly believe that fewer mosquito bites from other species will occur[15]. The participants' lack of knowledge on the necessity of continuous releases to effectively decrease the Aedes aegypti mosquito population over an extended period of time may be partially attributed to the misconception that *Wolbachia*-Aedes technology is a panacea and their misunderstanding of how the technology operates. This affects the degree to which locals accept the project and any potential inconvenience[7], [16], [17]. As a result, dispelling these myths is essential as they might compromise the project's viability.

This research also revealed high levels of project trust. This could be because Yogyakarta's administration is typically seen with high levels of confidence and assurance by the populace (Yogyogarta was placed second out of 12 nations in recent research on public confidence in government)[1], [8]. Younger age and better education levels were connected with higher acceptance levels in our study, even if no sociodemographic characteristic was substantially associated with high levels of trust in the project, showing composed backing amid the respondents.

Even while a sizable portion of participants (77.4%) were in favor of the study, only somewhat less (56%) were prepared to tolerate an increase in mosquito sightings for at least six months in exchange for a decreased risk of dengue. Therefore, we hypothesized that if the project lasts more than six months, the remaining 44% of the participants might not be as hospitable. According to some of the feedback, residents' hesitation to have *Wolbachia*-Aedes releases that last longer than six months in their neighborhood may be due to nuisances caused by male *Wolbachia*-Aedes mosquito sightings and inconveniences like having to close doors and windows to prevent an influx of mosquitoes and additional insecticide and repellent spraying to reduce swarming of male *Wolbachia*-Aedes indoors. One strategy to control community expectations is to present the study as a scientific endeavor that is informed by field data on the Aedes aegypti mosquito population and that investigates potential reductions in mosquito releases during periods of low mosquito population. This might inspire long-term project support and urge locals to take proactive measures to stop mosquito breeding.

It is important to remember that, despite the project's high levels of support and trust, a tiny minority (4.4%) opposed the release of mosquitoes containing *Wolbachia*. Despite having a low average GK score, this group may be aware of the project but may not completely understand the purpose and advantages of the technology. According to one research, susceptibility to *Wolbachia* technology—a vector control method being tested in Malaysia—was impacted by knowledge. Thus, even if the project is well known, it is crucial that the general public understands the technology in a true and correct manner in order to guarantee that the project will be positively pushed[3]. Interestingly, every respondent who expressed opposition to the initiative in this survey also believed that their chance of contracting infectious illnesses spread by mosquitoes, such dengue and Zika, was low[18]. These respondents' low perception of the risk of infectious illnesses spread by mosquitoes may be a result of Yogyakarta's extensive and generally effective vector management program, which has reduced the Aedes home index to a low of around 2%. It may be worthwhile to do a follow-up study to learn more about the potential impact of the perceived danger of mosquito-borne illnesses on support for these innovative vector control methods.

Our results showed that, in addition to pointing out knowledge gaps that need to be filled in order to help debunk myths and misconceptions, there is a need for better public outreach to educate the public about the drawbacks of utilizing *Wolbachia*-Aedes technology and the need for consistent weekly releases in order to control mosquito populations and sustain Aedes aegypti mosquito suppression. Second, the public has to be informed that when the mosquito population is reduced to a manageable level, the quantity of mosquitoes released may need to be changed. Last but not least, in order to connect with older and less educated individuals, alternate modes of communication should be investigated.

5. Conclusions

High awareness and support for a *Wolbachia* Randomized Control Trial in Yogyakarta were found in the study locations, which is indicative of the ongoing communication among the impacted populations. It was discovered that participants with greater educational attainment (pre-university and above) and longer project exposure (> 5 years) were more knowledgeable about *Wolbachia*-Aedes technology and more aware of the project overall. The survey also indicated a knowledge gap in the population and that misinformation must be addressed through messaging.

Future intervention studies must be carried out to fill in knowledge gaps and assess levels of awareness and support in these new areas as the project expands to encompass 15% of Yogyakarta's public housing apartment blocks as well as new towns with high dengue risk.

As the research moves forward, it would be beneficial to assess the study sites' input in order to comprehend the reasons behind their willingness or unwillingness to participate in the experiment as well as the elements that influenced attitudes over time. It is nevertheless crucial to respond to public concerns through tailored messaging and proactive involvement since doing so will affect the project's operations and sustainability.

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