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Efforts to strengthen community and health worker participation in the SIAGA DBD application utilization

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ABSTRACT

Dengue Hemorrhagic Fever (DHF) remains a significant health issue in Indonesia, with eleven provinces reporting a Case Fatality Rate (CFR) exceeding 1 percent. This community service activity aims to expand the utility of the SIAGA DBD application at Puskesmas Wagir, Malang Regency, in response to the high incidence of DHF in the area. Through training for health workers and community cadres, the initiative seeks to enhance real-time reporting and monitoring of DHF cases. The implementation methods include coordination with the health office, surveying potential users, adding educational content, and providing training for health workers and community cadres. Results indicate an increase in participation in using the application, although this remains limited to a few areas. Evaluations show that the training successfully improved understanding of the application, and cadres expressed confidence in utilizing the app for DHF monitoring. Socialization throughout the villages is necessary so that SIAGA DBD application can be utilized more widely. For that reason, the development of an accurate village database will be necessary to enhance the application's effectiveness.

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1. INTRODUCTION

Data from the Ministry of Health of the Republic of Indonesia in 2020 states that the Incidence Rate of Dengue Hemorrhagic Fever (DHF) appears to have decreased from 2019 to 2020. In 2020, 108,303 cases of dengue were reported. This number decreased compared to 2019 which was 138,127 cases. Likewise, the number of deaths has decreased. In 2020 the number of deaths was 747, while in 2019 there were 919 deaths. However, there are still eleven provinces with a Case Fatality Rate (CFR) of > 1 percent (Kementerian Kesehatan Republik Indonesia, 2021). This figure is estimated to still fluctuate considering that Indonesia is in the tropics. This is the reason why dengue is still a health problem in Indonesia that needs to be watched out for.

East Java as a densely populated province also has a high risk of dengue cases considering that the CFR is close to 1 percent (i.e. 0.9 percent) (Kementerian Kesehatan Republik Indonesia, 2021). The

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latest data from Malang Regency shows that the trend of deaths due to dengue in the early period of 2024 to March 23, 2024 reached 10 people, with the highest death rate in Turen and Wagir Districts. This figure indicates a significant increase compared to last year, where the number of confirmed dengue cases increased by a total of 905 cases during the first three months of 2024. This indicates the need for serious attention to the treatment of this disease (Isnainiyah, 2024).

Dengue cases were established with a diagnosis consisting of clinical symptoms and laboratory results indicating a decrease in platelets < 100,000/mm3 and the presence of plasma leakage characterized by a 20 percent increase in hematocrit > (Kementerian Kesehatan Republik Indonesia, 2021). The speed and accuracy of dengue diagnosis play an important role in dengue prevention programs. However, considering that dengue is an infectious disease transmitted by mosquito vectors circulating around residential areas, follow-up of the dengue diagnosis must be carried out immediately (WHO, 2009).

A very important first step is the reporting of dengue. According to article 14 of the Minister of Health Regulation Number 1501/Minister/Per/X/2010, diseases that have the potential to cause outbreaks must be reported within 1 x 24 hours (Kementrian Kesehatan Republik Indonesia, 2010). Reporting dengue cases can be sourced from health centers and hospitals.

Puskesmas as a technical implementation unit of the health office, plays an important role in managing health efforts, utilizing health workers, and carrying out evaluations and reporting in the health sector. One of the tasks of the health center related to the management, evaluation, and reporting of dengue cases is the Epidemiological Investigation (*Penyelidikan Epidemiologi*/ PE). PE is carried out if the *puskesmas* receives reports of dengue cases either from the community, hospitals, or the health office. In the PE the health center will track the correctness of patient data and conduct a larval survey of 20 houses around the patient's house. If a lot of larvae are found, counseling and eradication of mosquito nests will be carried out immediately.

Reporting dengue cases that should have been reported in less than 24 hours turned out to be too late. In Zuhriyah & Rakhmani (2020) research, it was found that the reporting of dengue cases from health cadres is often late, namely after the patient returns home from the hospital because the cadre only found out about it. Meanwhile, reports from hospitals are also often late to the health office. The delay in this report will affect the delay of PE so that the handling action by the health office through the health center is also late. As a result, the spread of dengue disease becomes inevitable.

Currently, the reporting of the results of larvae surveys and dengue cases by the community to the health center in Malang Regency is still carried out manually (paper-based) so that follow-up by the health center can be delayed. In addition, the current reporting system does not allow to find out the CFR directly and quickly.

Digital technologies, especially mobile apps, have emerged as a promising tool to increase public acceptance and participation in dengue surveillance. Purnama et al. mentioned the potential of digital environmental surveillance systems, such as mobile apps, to collect data and educate the public about dengue risk and prevention strategies (Purnama et al., 2021). The use of mobile platforms not only facilitates real-time data collection, but also empowers communities by providing them with the information they need to take proactive action against dengue transmission. This is in line with findings from Mahotra et al. (2024), which show that the NepaDengue app is considered beneficial and easy to use by community members and stakeholders, showing a high acceptance rate for cell-based interventions in dengue prevention.

In 2017, the FKUB community service team has developed an android version of the SIAGA Dengue application whose main function is to optimize the surveillance of environmental risk factors for dengue, entomology, and dengue cases. A version of the website has also been developed in 2021

to make it easier for the community and health centers to report (https://umum.siagadbd.id/welcome). This application has been tested by the community and health centers to report larval surveys in the Malang City area. From the evaluation of the use of the SIAGA DBD application, it was known that the website version was easier for cadres and the public to accept because it did not burden mobile phones. The functionality of this application will run well if the data is always available in real time or 1x24 hours.

Responding to the high incidence of dengue in Wagir District and the availability of the SIAGA DBD application, this community service activity was carried out with the aim of socializing health center officers, health cadres (Volunteers from the community who assist with the *puskesmas'* tasks), and the community to take advantage of the application. It is hoped that with the use of this application, larval surveillance activities can be carried out independently by the community. In addition, it is hoped that the community can also play an active role in reporting dengue patients in the vicinity.

2. METHODS

This community service program is carried out in the working area of the Puskesmas Wagir, Malang Regency. In its implementation, this program utilizes a community-based training approach by the community, which will also be applied to increase the participation and sustainability of the program.

The primary target of this activity is village health cadres in the working area of the Puskesmas Wagir. Meanwhile, the secondary target is *puskesmas* officers who are on duty at the Puskesmas Wagir as well as at three (3) auxiliary health centers (*puskesmas pembantu*) and nine (9) Village Health Ponds (Ponkesdes) in the Puskesmas Wagir work area. The auxiliary health center is managed by 1 nurse and 1 midwife. So, the total sample size of the *puskesmas* workers is 24 people. Meanwhile, the number of samples for health cadres is 36 people, where each village is represented by 3 cadres who are active and can operate Android cellphones. The steps implemented include: (1) taking care of licensing and coordinating with the Malang Regency Health Office; (2) Entering the village and sub-district name into the SIAGA DBD application; (3) Provide training to *puskesmas* officers about the SIAGA DBD application and then get the feedback from them by using a questionnaire with Likert scale; (4) Provide educational content related to dengue fever in the form of videos before starting training to increase health cadres' knowledge, and then measure the score of knowledge before training and one week after training; (5) Provide training to *health* cadres about the SIAGA DBD application so that they can become the main mover in their communities; and (6) Monitor and evaluate the implementation of the program to ensure its effectiveness by paying attention to the number of data points entered on the dashboard by health cadres.

3. RESULTS AND DISCUSSION

Region Overview

Wagir District has many schools with various levels, namely 3 high schools, 8 junior high schools, 37 private elementary schools. Wagir District consists of 12 villages, 9 Village Health Ponds, and 3 auxiliary health centers. Each auxiliary health center is managed by 1 nurse and 1 midwife.

The activity began with coordination with the head of the Puskesmas Wagir and the person in charge of the Puskesmas Wagir dengue program on September 4, 2024. From this coordination, the situation of dengue is obtained that: (1) Currently, there are health information system used by health centers and health offices. This health information system recorded dengue patients who were treated; (2) Most dengue patients from Wagir District seek treatment at Sukun Hospital and Aisyah Hospital because the area is quite close to Wagir; and (3) The latest data states that there were 5 deaths due to dengue, consisting of 1 adult patient (42 years old) and 4 school-age patients.

SIAGA DBD Training for *Puskesmas* Officers

The training was held on September 20, 2024. Participants were 2 health workers each from the *puskesmas pembantu* and *ponkesdes* consisting of 1 midwife and 1 nurse, so that the total number of participants is 24 people. However, in the training, 4 people were unable to attend. In this activity, the community service team was assisted by 6 young doctors who were undergoing public health stasis at the Puskesmas Wagir (Figure 1).

Figure 1. SIAGA DBD utilization training for health workers

In this training, health workers are taught how to fill out environmental survey forms, larvae surveys, report patients (general public version), and monitor their area data through dashboards. Health workers welcome the existence of the Siaga DBD application because it can facilitate surveillance reporting by residents.

The results of the evaluation of the training conducted on September 20, 2024 from the *puskesmas* officers were obtained from participants, who were 7 nurses and 10 midwives. Regarding the clarity of the information conveyed by the presenter during the training, most of them stated strongly agree. Likewise, when asked if they were confident that they could use the application, most of the *puskesmas* officers stated that they were strongly agree (Figure 2).

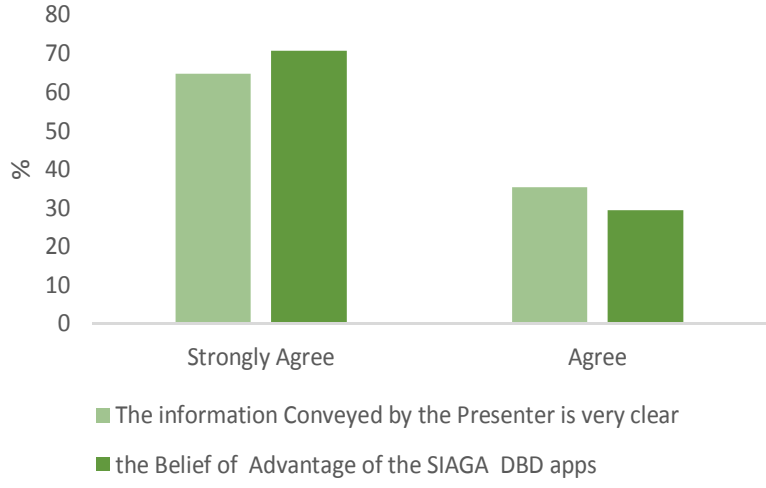

Figure 2. The opinion of the training participants regarding the clarity of information conveyed by the presenter and the belief of being able to take advantage of the SIAGA Dengue App

Dengue Preparedness Training for Health Cadres

The training was held on October 5, 2024. Participants were 3 representatives from each of the 12 villages, so the total number of participants was 36 people. However, in the training, 1 person was unable to attend. In this activity, the community service team was assisted by 6 young doctors who were undergoing public health stase at the Puskesmas Wagir and 2 medical students who were preparing their final projects.

In this training, health cadres can input data based on the name of their respective villages (Figure 4). The description of the list of village names in Wagir District on the website looks like Figure 4. Thus, it is easier for those who will conduct a survey to fill it out because it is enough to choose the name of the village and there is no need to write the name of the village.

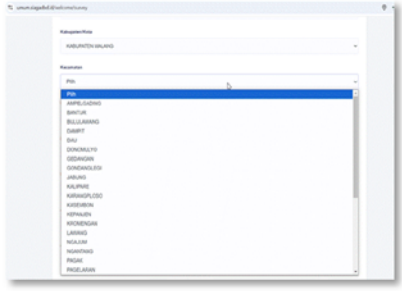

Figure 3. Assistance by facilitators during SIAGA DBD utilization training for health workers
Figure 4. List of village names in Wagir District

In this training, health cadres are taught how to fill out environmental survey forms, larvae surveys, and report the presence of patients in the vicinity (general public version). The material is provided through the following videos: (1) Aedes Aegypti Mosquito: https://youtu.be/1YpE4h2fjpQ; and (2) DHF and its prevention: https://youtu.be/t7Ju1ps1yW0?feature=shared.

One week later, we measure the knowledge of health cadres. The results of knowledge for before-and-after training can be at Figure 5. In general, before training, the average score of knowledge was 7.05, while after training, the score was 12.48.

According to Figure 5, the biggest learning gains were in the areas where baseline knowledge was extremely low, specifically in the areas of mosquito flight range (from 19.44 percent to 96.55 percent) and mosquito bites at night (from 19.44 percent to 89.65 percent). Topics like the need to drink enough fluids (from 41.67 percent to 86.21 percent) and bleeding as a symptom (from 19.44 percent to 58.62 percent) showed moderate improvements. The items that participants already knew a lot about, like the features of the Aedes aegypti mosquito (from 88.89 percent to 100 percent) and the fact that dengue fever is caused by Ae. aegypti mosquito bites (from 75.00 percent to 100 percent), showed the least amount of change. Overall, the data suggest that the intervention was most effective in strengthening weak areas of knowledge, while areas with strong baseline understanding showed only slight improvement.

The findings of this study are consistent with previous research emphasizing the critical role of health education in strengthening the capacity of community health cadres. Cahyani (2025) established that educational interventions through animated video media not only increased knowledge but also positively impacted cadres' dengue fever preventive behaviors since effective and easily understandable media filled knowledge gaps caused by low exposure to information (Cahyani et al., 2025). This is further

supported by Yazid and Hartono (2025), who reported a significant improvement in cadres' abilities after watching dengue mosquito eradication videos, with the number of cadres showing good competence increasing from only 10 respondents (28.6 percent) before the intervention to 30 respondents (85.7 percent) afterward. These results prove the effectiveness of visual media in increasing cadres' capability and highlight the importance of jumantik (larvae monitoring volunteers) in community-based dengue prevention programs (Yazid & Hartono, 2025). Similarly, Fatmasari (2023) found a 34.1 percent increase in knowledge following health education sessions, which subsequently heightened community awareness and participation in the 3M movement as a preventive measure. Altogether, these studies confirm the present findings that structured, media-based educational interventions are effective in improving cadres' knowledge, particularly in areas where baseline understanding is weak (Fatmasari et al., 2023). This, subsequently, enables cadres to educate communities more effectively and strengthens broader dengue prevetion and control efforts.

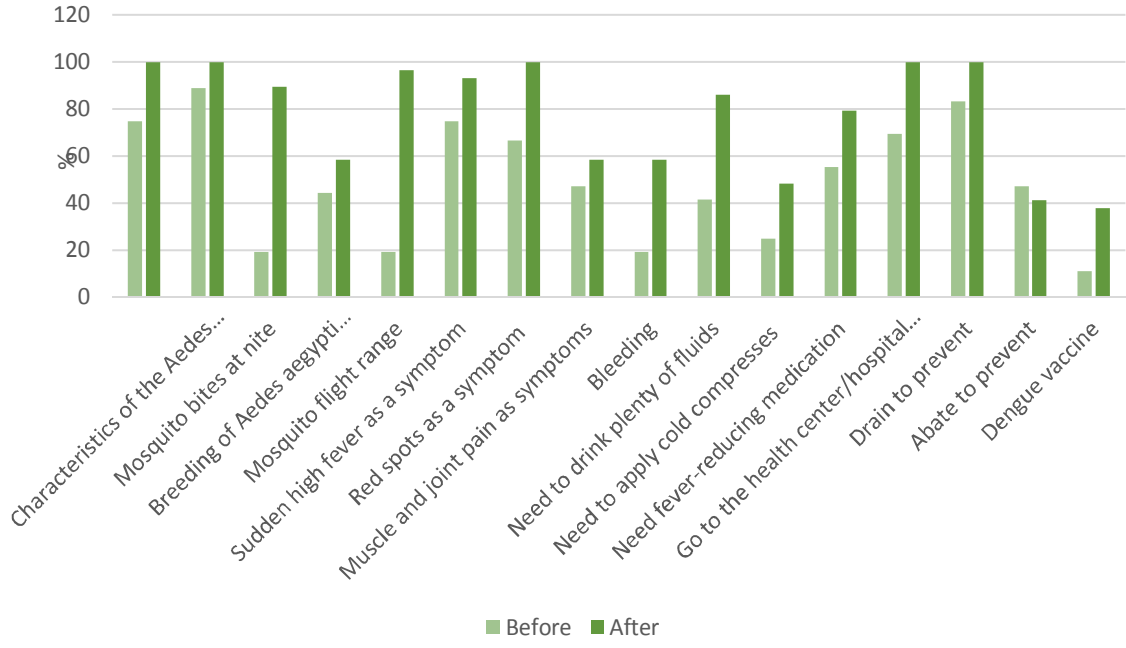

Figure 5. Pre-and-post test score of health cadres' knowledge

Community service activities at the Puskesmas Wagir showed results that are in line with other studies that emphasize the importance of community involvement in dengue control. Research conducted by Zuhriyah & Rakhmani (2020) revealed that the development of information technology-based applications can significantly improve surveillance and response to dengue fever. In the study, the use of electronic applications for reporting dengue cases succeeded in increasing the speed of reporting and facilitating the involvement of health cadres in data collection.

The acceptance of dengue risk factor surveillance systems for dengue fever control is greatly influenced by community involvement, education, and the use of technology. Community involvement is important for the effectiveness of dengue control because it can encourage people to feel that they have a program (Zinszer et al., 2020). To increase community involvement, education is needed for the community to consciously monitor mosquito breeding sites independently.

In addition, a study conducted by Syurandhari et al. (2021) shows that increasing the knowledge and understanding of jumantic cadres in carrying out their duties as surveillance and vector eradication through training contributes to strengthening community behavior. Research conducted by Juwita (2018) also explains the importance of special training for cadres in increasing knowledge and increasing the level of activity in mosquito nest eradication. This is in line with the findings in this community service activity, where the training provided succeeded in increasing participants' understanding of the importance of reporting dengue cases, and in this service health cadres were taught how to use the SIAGA DBD application to report cases in a timely manner.

After the training took place, there was 1 village that actively filled out the application, but it was still limited to 2 medium neighborhood associations (*Rukun Warga/RWs*). For this reason, in the upcoming community service, socialization and training are needed. Public knowledge and awareness are important factors influencing the acceptance of mobile surveillance systems. Liew et al. (2019) emphasize that inadequate knowledge of dengue transmission and vector control can hinder effective community participation in surveillance efforts. However, the Puskesmas Wagir is interested in introducing the SIAGA DBD application to all villages in Wagir District. In addition, it is necessary to introduce it to the Malang Regency Health Office.

As revealed in the results of this community service activity, there are still challenges related to the limited understanding of technology, where limited access to technology and the gap in understanding among the community can hinder the effectiveness of surveillance applications. Therefore, continuous socialization and capacity building at the village level are needed so that the application can be optimally utilized by all levels of society.

Strategies to increase public understanding of dengue fever and its vectors are needed to foster a culture of active participation in surveillance and control activities. This is as conveyed by Purnama et al., who found that the public generally has a positive attitude toward digital technology for dengue fever control, especially during the COVID-19 pandemic, when digital platforms are increasingly used for health monitoring (Purnama et al., 2022). The effectiveness of online surveillance systems depends on their acceptance by the public, which can be influenced by factors such as their perceived usefulness, ease of use, and relevance to the information provided (Bhattarai et al., 2019).

Dengue disease control is a shared responsibility between the Provincial, Regency/City Governments, and the community, which can be carried out through various efforts, such as prevention, countermeasures, handling of suspects or dengue sufferers in health service facilities according to applicable standards, as well as overcoming extraordinary events (outbreak) of dengue (Prahesti, 2018). The government cannot solve dengue cases without the cooperation and participation of the community, so the success of controlling dengue cases is highly dependent on the commitment of stakeholders in the region (Fatmasari et al., 2023).

4. CONCLUSION AND RECOMMENDATIONS

The community service activity carried out at the Puskesmas Wagir, Malang Regency, succeeded in achieving the main goal, namely increasing the participation of the community and health workers in the use of the SIAGA DBD application as an early warning system for Dengue Hemorrhagic Fever (DHF). Through training and socialization, there is an increase in understanding and skills in the use of the application, which is reflected in active participation in data filling and reporting of dengue cases. Although there are still challenges in terms of limited access and understanding in some areas, the evaluation results show that participants feel confident that they can leverage the app for dengue

monitoring in their areas. This effort is also expected to increase the speed and accuracy of case reporting, which in turn will support efforts to prevent and control dengue more effectively in the community. Further development and continuous socialization will be needed to optimize the use of the application and reach more villages in Wagir District.

This community service shows that the development of the SIAGA DBD application has great potential in improving public understanding of dengue fever. However, in order for the impact to be wider and more sustainable, several improvement efforts are needed. Increasing technological capacity is needed through routine training for health workers and community cadres so that they can make optimal use of the SIAGA DBD application. Another aspect that can be improved is the optimization of features and application design to be more interactive and easily accessible to various age groups. Continuous socialization in the community is also important to ensure that information remains available, while strengthening collaboration between the health office, *puskesmas*, and civil society organizations will create synergy in dengue control. In addition, a long-term evaluation is needed to measure the effectiveness of the application in reporting dengue cases in the community. Furthermore, this research can be expanded by conducting trials in various regions with diverse social and economic characteristics to find out the extent to which this application can be applied more widely.

REFERENCES

Bhattarai, A. H., Sanjaya, G. Y., Khadka, A., Kumar, R., & Ahmad, R. A. (2019). The addition of mobile SMS effectively improves dengue prevention practices in community: An implementation study in Nepal. *BMC Health Services Research, 19*(1). https://doi.org/10.1186/s12913-019-4541-z

Cahyani, N. M. I. D. (2025). Pengaruh pemberian pendidikan kesehatan menggunakan video animasi terhadap perilaku pencegahan penyakit demam berdarah dengue pada kader kesehatan di Banjar Dinas Pemenang Kediri dan Banjar Dinas Dajan Tenten Kediri tahun 2024. *Jurnal Nawacita Usada*, *1*(1), 17-23.

Fatmasari, E. Y., Asmita Wigati, P., Sriatmi, A., Suryawati, C., & Suryoputro, A. (2023). Penguatan peran kader kesehatan dalam kewaspadaan terhadap Demam Berdarah Dengue (DBD) di Kota Semarang. *Journal of Public Health and Community Service*, *2*(2), 68–72. https://doi.org/10.14710/jphcs.2023.18882

Isnainiyah, L. (April 1, 2024). *Angka kematian akibat DBD di Malang capai 10 orang, paling banyak di Turen dan Wagir*. Tribun Jatim.

Juwita, R. (2018). Pemberdayaan kader dan dasawisma dalam pencegahan kasus demam berdarah dengue di Banjar Menak, Kabupaten Gianyar, Provinsi Bali. *WMJ: Warmadewa Medical Journal, 2*(2). https://doi.org/10.22225/wmj.2.2.398.60-70

Kementerian Kesehatan Republik Indonesia. (2021). *Profil kesehatan Indonesia tahun 2020*. Jakarta.

Kementerian Kesehatan Republik Indonesia. (2010). *Permenkes Nomor 1501/Menteri/Per/X/2010 tentang jenis penyakit menular tertentu yang dapat menimbulkan wabah dan upaya penanggulangan*.

Liew, J. W. K., Selvarajoo, S., Tan, W., Ahmad Zaki, R., & Vythilingam, I. (2019). Gravid oviposition sticky trap and dengue non-structural 1 antigen test for early surveillance of dengue in multi-storey dwellings: Study protocol of a cluster randomized controlled trial. *Infectious Diseases of Poverty, 8*(1). https://doi.org/10.1186/s40249-019-0584-y

Mahotra, A., Pokhrel, Y., Thapa, T. R., Arguni, E., & Andono, R. A. (2024). Feasibility of NepaDengue mobile application for dengue prevention and control: User and stakeholder perspectives in Nepal. *BMJ Public Health, 2*(1). https://doi.org/10.1136/bmjph-2023-000599

Prahesti, M. G. (2018). Analisis pemenuhan standar promosi kesehatan rumah sakit di Rumah Sakit Islam Surabaya. *Jurnal PROMKES, 6*(1). https://doi.org/10.20473/jpk.V6.I1.2018.23-34

Purnama, S., Susanna, D., Achmadi, U. F., Krianto, T., & Eryando, T. (2021). Potential development of digital environmental surveillance system in dengue control: A qualitative study. *Open Access Macedonian Journal of Medical Sciences, 9*, 1443–1453. https://doi.org/10.3889/oamjms.2021.7653

Purnama, S. G., Susanna, D., Achmadi, U. F., & Eryando, T. (2022). Attitude towards dengue control efforts with the potential of digital technology during COVID-19: Partial least squares-structural equation modeling. *F1000 Research, 11*. https://doi.org/10.12688/f1000research.125318.1

Syurandhari, D. H., Fardiansyah, A., Yuniarti, A. M., Hariyadi, Y., Mahmudah, R. L., Abidah, R. S. (2021). Pendidikan dan pelatihan kader jumantik Desa Sumbertebu di era adaptasi kebiasaan baru pandemi COVID-19. *Jurnal Pengabdian Masyarakat (ABDIMAKES), 1*(2), 47–55. https://doi.org/10.55316/amk.v1i2.729

World Health Organization (WHO). (2009). *Dengue guidelines for diagnosis, treatment, prevention and control treatment*. Switzerland.

Yazid, R., Kusyairi, A., & Hartono, D. (2025). Pengaruh video edukasi pemberantasan sarang nyamuk demam berdarah dengue melalui aplikasi Whatsapp terhadap kemampuan kader kesehatan sebagai jumantik di Desa Liprak Kulon. *Health research Journal*, *3*(2), 72-80.

Zinszer, K., Caprara, A., Lima, A., Degroote, S., Zahreddine, M., Abreu, K., Carabali, M., Charland, K., Dantas, M. A., Wellington, J., Parra, B., Fournet, F., Bonnet, E., Pérez, D., Robert, E., Dagenais, C., Benmarhnia, T., Andersson, N., & Ridde, V. (2020). Sustainable, healthy cities: Protocol of a mixed methods evaluation of a cluster randomized controlled trial for Aedes control in Brazil using a community mobilization approach. *Trials, 21*(1). https://doi.org/10.1186/s13063-019-3714-8

Zuhriyah, L., & Rakhmani, A. N. (2020). Pengembangan aplikasi electronic real-time dengue surveillance (Info DBD Malang) untuk pengendalian demam berdarah dengue. *Laporan Penelitian PNBP TA 2017 [Preprint]*.