

Enhancing Knowledge and Attitudes Towards Malaria and Dengue Through Video Education: A Comparative Study in Taiwan and Indonesia

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Abstract. This study aimed to (1) compare the levels of knowledge and attitudes towards dengue and malaria in Indonesia and Taiwan; (2) test the effectiveness of video media in improving knowledge and attitudes towards dengue and malaria in Indonesia; and (3) explore participants' perceptions of using video media in Indonesia. The research employed a mixed-methods approach, with a quantitative survey involving 33 respondents from Indonesia and 25 from Taiwan, and qualitative insights from 10 informants in Indonesia. Quantitative data were analyzed using Spearman correlation and t-tests, while qualitative data were gathered through Focus Group Discussions (FGDs). The results showed significant differences in knowledge and behavior towards malaria between Indonesia and Taiwan, but not for dengue. The findings suggest that video media is a powerful tool for health education campaigns, particularly for complex topics requiring behavior change, such as infectious disease prevention. However, based on qualitative findings, challenges related to technological accessibility were identified, underscoring the need for combining multiple educational mediums to reach a broader audience.

1 Introduction

Two infectious diseases, malaria and dengue, remain global health problems that have a major impact on human well-being throughout the world. These two diseases have complex distribution patterns and impact various aspects of public health. The Plasmodium parasite causes malaria, which is transmitted through the bite of the Anopheles mosquito. Although the number of cases and deaths from malaria has decreased significantly in recent decades, malaria remains a major health problem in many countries, especially in tropical and subtropical areas.

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Indonesia has one of the highest malaria rates in Southeast Asia. By the end of 2018, over 50% of Indonesia's districts (285) received malaria-free certificates from the Ministry of Health, covering 72% of the population. Despite this achievement, more than 70 million people, including pregnant women and children, still reside in malaria-prone areas [1]. Although the number of malaria cases has decreased, several regions, especially border areas, remain vulnerable. Efforts to control malaria, such as distributing insecticide-treated bed nets, using anti-malarial drugs, and increasing access to health services, continue to face challenges like poverty, inadequate sanitation infrastructure, climate change, and drug resistance [2].

Taiwan faced severe malaria outbreaks in the 1800s and 1900s, peaking at 1.2 million cases in 1952 [3,4]. The World Health Organization (WHO) declared Taiwan malaria-free in November 1965. Despite this, Taiwan continues to monitor malaria cases to identify potential re-infection and resistance patterns. Imported malaria cases remain a concern due to overseas travel and local transmission associated with present mosquito species. Over the past forty years, increasing tourism and immigration from endemic countries have led to a rise in imported malaria cases [2,5].

Dengue, caused by the dengue virus transmitted by *Aedes* mosquitoes, affects approximately 3.9 billion people in over 128 countries, making it one of the most prevalent infectious diseases globally. Dengue infections, common in tropical and subtropical regions, result in around 96 million cases annually, with approximately 500,000 requiring serious medical treatment [6]. Indonesia is one of the countries with a high number of dengue cases. Incidence rates tend to increase each year, with significant variations between regions and seasons depending on environmental and social factors. Along with urban expansion and population growth, *Aedes* mosquitoes have increasingly ideal habitats for breeding, causing an increase in the potential for dengue virus transmission. In addition, factors such as a warm and humid climate, rapid urbanization, and lack of adequate sanitation infrastructure have contributed to the spread of this disease in Indonesia [7]. Taiwan has also faced dengue challenges, with significant outbreaks and a record 540 imported cases in 2019. Despite various prevention and control measures, annual cases persist, complicating local control efforts [5,8].

Even though various efforts have been made to control it, malaria and dengue are still one of the main problems in the global health sector. Despite increased awareness of the disease and efforts made by governments, non-governmental organizations, and other health institutions, cases of malaria and dengue still exist. Resistance to this disease is influenced by many things, which makes it difficult to eliminate it completely. Several efforts have been made to reduce the spread of both diseases such as the implementation of mosquito control programs (such as insecticides, fogging, and mosquito nest eradication) [9], distribution of insecticide-treated bed nets [10], administration of vaccines [11], and the provision of education to the community [12].

One of the most effective methods for increasing public awareness of a disease is to provide education to the general public. Video media represents one of the most effective mediums for disseminating educational content. A number of studies have demonstrated that video-based health education can enhance awareness of dengue and malaria among children [13,14], students [15,16], dan health workers [17]. However, there is a need for more targeted research to assess the effectiveness of video media in raising awareness of malaria and dengue, particularly among women and the elderly, taking into account factors such as gender-specific health behaviors and age-related vulnerabilities [18].

Based on the aforementioned background, this study aimed to achieve three research objectives: (1) to compare knowledge and attitudes towards dengue and malaria between Indonesia and Taiwan, (2) to test the effectiveness of educational video as about dengue and

malaria in Indonesia, and (3) to explore participants' perceptions of educational videos as intervention media in Indonesia.

2 Methodology

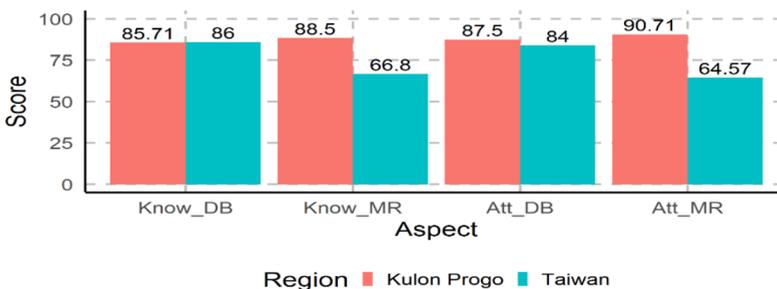
This study employed a mixed-methods approach, combining quantitative and qualitative methods to measure and analyze knowledge and attitudes towards malaria and dengue in Indonesia (Kulon Progo) and Taiwan. A total of 58 respondents participated in the study, consisting of 33 respondents in Kulon Progo and 25 respondents in Taiwan. The sample was determined using purposive sampling based on several criteria: being female, over 20 years old, having a history of international travel, and voluntarily participating as indicated by signing a written informed consent. Quantitative data were collected using a questionnaire designed to measure respondents' knowledge and attitudes towards malaria and dengue.

An educational intervention on dengue and malaria using video media was provided to the 33 respondents in Kulon Progo. To assess the effectiveness of the video media, knowledge and attitude levels were measured before and after the intervention. The data obtained were analyzed using paired sample t-tests to determine significant changes in respondents' knowledge and attitudes. Additionally, qualitative data were collected through Focus Group Discussions (FGDs) involving 10 participants from Kulon Progo. The FGDs were conducted by researchers for 45-60 minutes, recorded, and transcribed. The transcripts were read multiple times to understand the participants' perspectives, and their accuracy was confirmed through discussions with other researchers to avoid bias. Qualitative data were then analyzed using a content analysis approach. The analysis process involved identifying codes through an inductive approach, which were summarized into subcategories and categorized through an inductive process. Major themes were then derived through data analysis.

3 Results and Discussion

3.1 Knowledge and Attitude Toward Dengue and Malaria in Kulon Progo and Taiwan

Preventing and controlling the transmission of dengue and malaria requires understanding of knowledge and attitudes towards these diseases. The measurement of knowledge and attitudes aims to determine the level of understanding among participants in both regions. Figure 1 shows the average score of knowledge and attitude measurements in both regions.



Note. Know_DB: Knowledge of Dengue; Know_MR: Knowledge of Malaria ; Att_DB: Attitude toward Dengue ; Att_MR : Attitude toward Malaria

Fig. 1. Comparison of Mean Knowledge and Attitude Scores by Region

Figure 1 illustrates significant differences in participants' knowledge and attitudes towards dengue and malaria between the two regions, Kulon Progo and Taiwan. Participants in Kulon Progo demonstrated a higher level of knowledge about dengue fever (Know_DB) with an average score of 85.71, while participants in Taiwan had a similar score of 86. This suggests that both groups of participants have a good understanding of dengue. However, regarding malaria (Know_MR), participants in Kulon Progo demonstrated a more comprehensive understanding with a score of 88.5, compared to the score of 66.8 achieved by participants in Taiwan.

In terms of attitude, both groups of participants exhibited a positive attitude towards dengue fever, with a score of 87.5 for Kulon Progo and 84 for Taiwan. This indicates a high level of awareness regarding the significance of dengue prevention and control in their respective regions. Meanwhile, there was a clear difference in attitudes towards malaria, with participants in Kulon Progo scoring significantly higher at 90.71 compared to participants in Taiwan who scored 64.57.

Table 1. Independent Sample t-test Results for Each Aspect

Aspect	Test	Mean Difference	Statistic	df	p
Know_DB	Welch	2.364	0.821	44.214	0.416
Att_DB	Welch	0.866	0.196	38.348	0.846
Know_MR	Welch	21.685	3.093	25.955	0.005
Att_MR	Welch	25.904	3.016	26.016	0.006

Note: Know_DB = Knowledge toward dengue; Know_MR = Knowledge toward malaria; Att_DB = Attitude toward dengue; Att_MR = Attitude toward malaria

According to the independent sample t-test results presented in Table 1, there is a significant difference in knowledge and attitudes towards malaria between Kulon Progo and Taiwan participants, but not for dengue fever. This finding suggests that health education interventions should be conducted routinely and tailored to improve knowledge and attitudes towards malaria in Taiwan, particularly for migrant workers.

3.2 Effectiveness of video as extension media in Kulon Progo

Reinforcement of knowledge and attitudes towards infectious diseases, such as dengue and malaria, needs to be routinely carried out in the community. In this study, counseling and educational videos were provided to participants in the Kulon Progo area. Correlation analysis of dengue disease showed that the attitude score before the provision of educational materials correlated with the participants' attitude score after the provision of education. Participants with a higher attitude score prior to receiving educational material tend to increase their awareness of dengue disease. This is supported by the results of a paired sample t-test analysis ($t(32) = 1.94, p < .05$), presented in Table 2, which shows a change in attitude scores before and after the provision of dengue education materials. Meanwhile, there is typically no significant change in knowledge before and after the presentation of educational materials.

Table 2. Correlation and Pairwise T-test Results for Participants from Kulon Progo

Pair	Group	N	M (SD)	ΔM	r	t (df)
Pair 1	Pre_Know_Dengue	33	8.45 (0.87)	0.34	0.22	1.94 (32)
	Post_Know_Dengue	33	8.79 (0.69)			
Pair 2	Pre_Att_Dengue	33	6.06 (0.86)	0.58	0.44*	4.18 (32)*
	Post_Att_Dengue	33	6.64 (0.55)			
Pair 3	Pre_Know_Malaria	33	8.85 (0.79)	0.61	0.14	3.73 (32)*
	Post_Know_Malaria	33	9.46 (0.51)			
Pair 4	Pre_Att_Malaria	33	6.39 (0.61)	0.28	0.36*	2.50 (32)*
	Post_Att_Malaria	33	6.67 (0.48)			

Note: * means p -value < 0.05

The correlation analysis on malaria material revealed a correlation between attitude scores towards malaria before and after participants received educational materials. Participants with higher attitude scores before tended to increase their awareness of malaria after receiving educational materials, resulting in an increase in their attitude scores. The results of the paired sample t-test indicate a difference in attitude scores of participants before and after exposure to educational materials related to malaria ($t(32) = 2.50$, $p = 0.018$). However, there was no significant correlation between participants' knowledge scores before and after exposure to the educational materials. There was a significant difference in participants' knowledge before and after the provision of educational materials on malaria ($t(32) = 3.73$, $p = 0.001$).

3.3 Positive perceptions of the educational video intervention among participants

The FGD results indicate that the use of video as a medium for delivering educational materials on dengue and malaria is highly appreciated. Videos are considered more interesting than writing because they have moving images, making them easier to receive information from. This feature makes them attractive to various groups, especially children.

"I think it's more interesting, because there are moving images, compared to writing. Of course, it will be more interesting and easier to accept, especially for younger children." (Sp_02)

"In my opinion, to convey information, whether it is a module that has to be read or we watch a video, it is better conveyed through video. Because it will be easier to remember and also more interactive, more interesting." (BL)

The results of the Focus Group Discussion (FGD) confirmed that using video as a delivery tool for educational materials has significant advantages in attracting attention and facilitating understanding. Participants in the FGD, who spanned a wide range of ages and

backgrounds, consistently expressed a preference for video content over written text. Videos, with their combination of dynamic visuals and audio, are considered more effective in conveying complex messages and maintaining audience interest. This is especially true among children who are often more responsive to visual stimuli than text. This conclusion demonstrates the great potential of using video media in health education campaigns, particularly in raising awareness about diseases such as dengue and malaria, which require a deep understanding and a change in preventive behavior.

3.4 Obstacle of educational videos for preventing infectious diseases

While most participants appreciated the use of video, there are still obstacles to its utilization. One such obstacle is that videos require accessible technology, such as that found on mobile phones or personal computers. As a result, educational videos may be difficult to access when the necessary technology is not available, as one participant noted below.

“If I am an elderly person, the video is also happy and the module is also happy, for example my cellphone is low battery, or lagging behind, I can read the module again, and if I socialize it to the branch, there is proof.” (BE)

Combining two media, such as modules and videos, can be a wise choice to facilitate education about dengue or malaria.

A Comparative Study of Knowledge and Attitudes Related to Dengue and Malaria in Indonesia and Taiwan found that the knowledge and attitudes of both regions towards dengue disease were relatively similar. In general, both regions demonstrated good knowledge and attitudes towards dengue. Previous studies have indicated that good knowledge and attitude are crucial factors in preventing and controlling the spread of dengue disease in an area [19,20]. In contrast, the level of knowledge and attitude towards malaria in Taiwan is significantly lower than that in Kulon Progo. Taiwan's absence of malaria since 1956 [21] makes the result unsurprising. According to a literature review, when malaria cases decrease, countries tend to shift their focus to other health priorities and become complacent, resulting in a lack of preparedness for malaria outbreaks [22]. When a country reaches or is on the verge of malaria elimination, the disease may be forgotten by doctors and organizers, and surveillance may be jeopardized [23].

To maintain public awareness, it is important to continuously improve knowledge and attitudes towards malaria. Health education should focus on disseminating basic information about malaria, including its symptoms and transmission vectors, to target populations such as youth, students, and people living in remote or previously eliminated areas [24]. Furthermore, it is important to address the education of migrant workers and travelers who have visited or will visit areas with malaria transmission. Delayed detection by the healthcare system can significantly increase the risk of transmission and lead to poor patient prognosis [25]. Targeted malaria awareness campaigns should be tailored to improve people's knowledge of malaria and increase the timeliness of visits to the doctor, as education and health promotion play important roles in malaria control, prevention, and elimination.

The evaluation of the effectiveness of educational videos in improving participants' understanding and attitudes towards dengue fever and malaria in Kulon Progo indicated that educational videos improved participants' knowledge of malaria, which is consistent with previous research in the health sector. Another research shows educational video significantly improved outpatients' knowledge about antibiotics. Knowledge increased by 41% in MZ General Hospital and 42% in SG General Hospital. In this article, the authors evaluated the effectiveness of an educational video about antibiotics and antibiotic use to increase outpatients' knowledge shown in two public hospitals in East Java, Indonesia [26]. There is

a significant influence in knowledge before and after nutrition education [27]. Educational video media is effective in increasing knowledge and attitude towards HIV/AIDS. Video media can be used to inform junior high school students about the dangers of HIV/AIDS. In this article, the effectiveness of educational video media on the knowledge and attitude of students in knowing HIV/ AIDS was investigated. And the results of this study showed that video media can be used as one of the media informing about the dangers of HIV / AIDS in adolescent junior high school students [28]. Furthermore, video is considered a superior medium for educating the public or health workers [17]. Therefore, utilizing video to deliver information and increase knowledge has great potential.

In contrast to malaria, the educational videos did not significantly increase knowledge related to dengue. This may be due to the higher prevalence of dengue in Kulon Progo, making participants more familiar with it. Malaria is less known in Kulon Progo, as it is more common in regions like Papua, West Papua, and East Nusa Tenggara [29]. However, the videos did improve attitudes towards both dengue and malaria, suggesting their effectiveness in raising disease awareness [30]. Similar studies have found that video interventions can increase attitudes towards dengue [31]. However, other research indicates that video education impacts knowledge more than attitudes, as seen in studies on pneumonia [32]. Additionally, studies on Italian pharmacists show a need for better knowledge and practices related to travel medicine [3].

Participant perceptions in Kulon Progo indicated that video is an effective medium for health education on dengue and malaria. The videos were well-received, providing specific and concise information through engaging animations, enhancing participants' knowledge and intent to disseminate information. Previous research supports the effectiveness of educational videos in public health due to their clarity and visual appeal [17,33]. These elements increase knowledge and awareness among diverse audiences [15,34]. While effective, video interventions may face accessibility issues for those without smartphones. Future research should explore combining videos with other mediums, like modules, to reach broader audiences.

Numerous studies have reported the effectiveness of educational videos on malaria and dengue across various population groups, such as children [13,14], students [15,16], and health workers [17]. This study aims to assess the effectiveness of educational videos on malaria and dengue among adult and middle-aged women, incorporating their perspectives on the provided educational videos. However, this study has several limitations, including the absence of a comparison group to evaluate the level of knowledge and attitudes when using alternative educational media.

4 Conclusions

This study aimed to (1) compare the level of knowledge and attitudes towards dengue and malaria in Indonesia and Taiwan; (2) test the effectiveness of video media in improving knowledge and attitudes towards dengue and malaria in Indonesia; and (3) explore participants' perceptions of using video media in Indonesia. The results showed significant differences in knowledge and behavior towards malaria between Indonesia and Taiwan, but not for dengue. The findings suggest that video media is a powerful tool for health education campaigns, particularly for complex topics requiring behavior change, such as infectious disease prevention. However, challenges related to technological accessibility were identified, underscoring the need for combining multiple educational mediums to reach a broader audience. The implications of this study are significant for public health strategies, suggesting that health authorities should incorporate video-based educational content and address technological barriers by providing alternative formats. Future research should explore the long-term impact of video-based education on behavior change, investigate the

effectiveness of combining various educational tools, and include larger and more diverse samples to refine and generalize educational strategies.

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