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EFFECTIVENESS OF THE EDUCATIONAL GAME "ENGKLEK" IN PREVENTION OF DENGUE HEMORRHAGIC FEVER

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ABSTRACT

Dengue Hemorrhagic Fever (DHF) is an infectious disease caused by the dengue virus and transmitted by the Aedes aegypti mosquito, which can be prevented by implementing the PSN 3M Plus principle, namely draining, covering, recycling, and taking additional measures. This study aims to evaluate the effectiveness of the educational game "Engklek" in improving children's knowledge, attitudes, and self-confidence towards DHF prevention. The method used is mixed methods with quantitative and qualitative approaches. The quantitative design uses a quasi-experimental design with two groups pretest posttest, while the qualitative design involves in-depth interviews. The sample consisted of 80 students of grades IV and V, divided into intervention and control groups. Quantitative data analysis was carried out using the Paired t-Test and independent t-test. The results showed a significant increase in knowledge scores (p = 0.000), attitudes (p = 0.004), and self-confidence (p = 0.045) after the intervention. The conclusion of this study is that the "Engklek" game is effective as an educational medium for dengue fever prevention, and it is recommended to be widely implemented in schools as part of interactive health promotion.

Keywords: Attitude, Engklek, Dengue Fever Prevention, Knowledge, Self-Confidence

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INTRODUCTION

Dengue fever is a disease caused by the dengue virus, which is transmitted to humans through the bite of the Aedes aegypti mosquito (Kemenkes, 2023). Because there is currently no treatment or vaccine for dengue fever, vector control, which breaks the chain of transmission, is the only method to prevent its occurrence (Diah Utami, 2020).

Data from the European Center for Disease Prevention and Control (ECDC) shows that as of August 2022, there were 2,597,067 dengue cases worldwide, with Brazil, Vietnam, and Indonesia having the highest number of cases (Sah et al., 2023). In 2023, the WHO reported a surge in dengue cases, reaching 6.5 million, with over 7,300 deaths (WHO, 2023). In 2024, the number of dengue fever cases increased to over 7.6 million, including 3.4 million confirmed cases and over 3,000 deaths (WHO, 2024).

In Indonesia, dengue fever cases experienced a significant spike, with 88,593 confirmed cases and 621 deaths in April 2024, three times higher than the same period in 2023 (WHO, 2024). Basic Health Research (Riskesdas) data shows that the prevalence of dengue fever in Indonesia reached 0.64% in 2023, with children aged 5-14 years being the most vulnerable group (SKI, 2023).

The Ministry of Health estimates that dengue fever cases will increase during the rainy season, with a total of 143,266 cases and 1,237 deaths reported by the end of 2022 (Kemenkes, 2022). In 2023, there were 114,720 cases of dengue fever with 894 deaths (Kemenkes, 2023). Monitoring data indicates that the increasing trend in dengue cases is expected to continue into the transitional season, with 60,296 cases and 455 deaths recorded in April 2024 (Kemenkes, 2024).

In Bangka Belitung Province, dengue cases also showed a significant increase. In 2022, there were 1,881 cases with 29 deaths, and in 2024, the Health Office reported 1,667 cases with 20 deaths (Dinas Kesehatan Prov Bangka Belitung, 2024). Sungailiat Community Health Center, located in Bangka Regency, recorded 35 dengue cases and 2 deaths in 2024, making it the community health center with the highest incidence rate in the area (Dinas Kesehatan kab.bangka, 2024).

The Sungailiat Community Health Center covers three sub-districts: Sungailiat, Kuday, and Srimenanti. Sungailiat has the highest number of dengue fever cases compared to the other two sub-districts. Sungailiat 1 Elementary School, located in Sungailiat, had eight cases the previous year. This data was obtained from the teacher in charge of the school health unit at Sungailiat 1 Elementary School.

Dengue fever prevention through the 3M Plus National Health Action Plan (PSN)

activities, which include draining, covering, and recycling, is a crucial step in eradicating mosquito larvae (Kemenkes, 2016). However, to encourage the implementation of the 3M Plus National Dengue Fever Prevention Program (PSN 3M Plus), a strong understanding of dengue fever prevention among the public, especially children, is essential. Research shows that early prevention through education can significantly reduce dengue fever incidence.

Conventional educational media such as lectures and posters are often ineffective in capturing children's attention. Research by Arista & Sugiharto (2024) shows that using educational games, such as Monopoly on Dengue Fever, can improve children's knowledge and attitudes regarding dengue fever prevention. Furthermore, research by Mufida et al. (2023) also found that counseling using the Dengue card game significantly changed students' understanding of dengue fever prevention. This suggests that an interactive and fun approach is more effective in conveying information to children.

Traditional educational games such as hopscotch have great potential in educating children about public health issues. Research by Aziz et al. (2024) shows that hopscotch can improve children's motor and cognitive skills. Furthermore, Herawati et al. (2018) found that the hopscotch game is one of the most effective media for improving students' knowledge and attitudes. Thus, the hopscotch game can be a powerful tool for communicating the concept of dengue fever prevention to children, which in turn can help them understand and implement clean and healthy living behaviors.

Based on the description above, the researcher is interested in examining in more depth the effectiveness of the educational game "Engklek" in improving children's knowledge, attitudes, and self-confidence in preventing DHF at SDN 1 Sungailiat.

METHOD

This study employed a mixed methods approach with both quantitative and qualitative approaches. The quantitative design employed a quasi-experimental design with two groups, a pretest and posttest, and the qualitative design employed in-depth interviews with triangulation. The sample consisted of fourth and fifth grade students, with 40 respondents from the intervention group and 40 respondents from the control group selected using probability sampling and simple random sampling techniques. Quantitative data analysis was performed using paired t-tests and independent t-tests. Qualitative research was conducted by interviewing 4 students of SD N 1

Sungailiat in grades 4 and 5, 2 homeroom teachers of grades 4 and 5, 2 parents of grades 4 and 5 and 1 Sungailiat Community Health Center officer who holds the DHF program.

RESULTS AND *DISCUSSIONS*

Result

Based on Table 1, There was a significant difference between the pre- and post-intervention scores for all variables in the intervention group ($p < 0.05$). The test results showed a significant difference between the knowledge scores before and after the intervention with an average score difference of -19.125 and a p value of (0.000) < α (0.05). The attitude score test results showed a significant difference with a p value of (0.000) < α (0.05) and an average score difference of -10.05. The average self-confidence score increased significantly with a difference value of -20.12, and a p value of (0.000) < α (0.05). This means that there was a very significant increase in self-confidence after the intervention was given, indicating that the educational approach used was successful in encouraging respondents to feel more confident in facing situations related to the intervention topic.

Based on table 2, the average value of the knowledge variable in the intervention group (73.63) was significantly higher than the control group (63.13), with p (0.000) < α (0.05). This indicates that the intervention provided had a significant effect on increasing student knowledge. In the attitude variable, there was a significant difference between the intervention and control groups in terms of attitude, with the average value of the intervention group being higher (47.40) than the control group (43.58), with p (0.004) < α (0.05). This indicates that the intervention also had a positive impact in forming better attitudes. In the self-confidence variable, the average self-confidence of students in the intervention group (83.05) was higher than the control group (77.72) with p (0.045) < α (0.05). This indicates that the intervention was also effective in significantly increasing student self-confidence.

Interviews with students showed that the majority of children lacked comprehensive knowledge about dengue fever prevention before participating in the educational game "Engklek." After participating in the game, they were able to cite various preventive measures, such as covering water reservoirs and draining bathtubs. Informant 4 stated, *"Tau cuma demam berdarah bai. Pencegahan DBD, hmm membuang sampah pada tempatnya, menutup perairan, membuang air untuk menghindari jentik-jentik nyamuk."* Informant 3 added, *"DBD tu nyamuk yang warna hitam putih gigit orang. Yang maen tu seru kek mudah di denger, yang guru*

bosen tapi paham juga." This demonstrates that educational games successfully enhance children's knowledge in a more engaging and understandable way than lectures.

Interviews with homeroom teachers also supported these findings. Teachers stated that these games can engage children and help them better understand the material. Informant 5 said, "*Bisa sih, karna anak ni kan kalo dijelaskan secara duduk, monoton anak bosen."* Informant 9 added, *"Menarik pasti ya buat anak-anak karna dia bersifat permainan, bukan hal yang asing bagi anak-anak."* This demonstrates that interactive learning approaches can increase student engagement in the learning process.

In terms of attitudes, all children demonstrated awareness of the necessary dengue fever prevention measures. They were willing to share the information they received with others, including parents and friends. Informant 1 stated, *"Membersihkan."* while Informant 4 added, *"Membuang genangan air dan membuang sampah pada tempatnya."* The homeroom teacher also confirmed a positive change in the children's attitudes, with Informant 6 stating, *"Untuk perubahan sikap si la ade. Secara dak langsung mereka sudah ngerti kayak deket bandar bandar tu tanpa di perintah agik."*

The children's self-confidence also increased after participating in the educational games. The majority of children felt confident talking about dengue fever prevention, as Informant 2 expressed, *"Percaya diri dan berani. Membersihkan jentik-jentik jangan dibiarin dan menjaga diri sendiri."* However, the homeroom teacher noted that the increase in self-confidence was not evenly distributed across all children. Informant 6 stated, *"Ada tapi dengan anak-anak tertentu, ga seluruh."* Nevertheless, parents whose children participated in the game reported increased self-confidence, with Informant 8 saying, *"Iya sangat meningkat, pede sekali."* This suggests that the educational game "Engklek" can contribute to increasing children's self-confidence in the context of dengue prevention

Table 1. Results of the Paired T-Test for the Intervention Group on Children at SDN 1 Sungailiat in 2025

Variables	Result of the Paired T-test		
	Mean before	*Mean After*	*P-value*
Knowledge	54.50	73.63	0.000
Attitude	37.35	47.40	0.000
Self-Confidence	62.93	83.05	0.000

Table 2. Results of the Independent Test of Knowledge, Attitudes, and Self-Confidence of Children at SDN 1 Sungailiat in 2025

Variables	Group	Mean	SD	*p*-value
Knowledge	Intervention	73.63	10.88	0.000
	Control	63.13	12.15	
Attitude	Intervention	47.40	6.33	0.004
	Control	43.58	5.20	
Self-Confidence	Intervention	83.05	11.14	0.045
	Control	77.72	12.28	

Discussion

Knowledge is the result of gathering information about an object, in this context, dengue fever prevention. After intervention using the educational game "Engklek," there was a significant increase in children's knowledge, with the average pre-intervention score (54.50) increasing to (73.63) after the intervention. Previous research by Wirantika & Susilowati (2020) showed that health education can improve students' knowledge and behavior regarding dengue fever prevention. Furthermore, research by Rahmawati (2023) supports this finding, where the snowball throwing method successfully increased knowledge of dengue fever prevention from 18.2% to 40.9%. This demonstrates that interactive and fun approaches, such as games, can make material easier for children to understand and remember.

Qualitative data from interviews with children showed that the "Engklek" game made them more enthusiastic about learning. Each step of the game included questions related to dengue fever prevention, encouraging children to actively ask and answer questions. Teachers and community health center staff reported that children were able to relate the game's content to their environment, indicating that they not only remembered the information but also understood its application in everyday life.

Children's attitudes toward dengue fever prevention also improved significantly, with an average score of (37.35) before the intervention and (47.40) after the intervention. Children began to maintain a clean school environment and remind their friends not to litter. This change in attitude reflects the internalization of values and responsibility for the environment, which aligns with Notoatmodjo's (2012) theory that attitudes are an individual's tendency to respond to certain situations. This indicates that educational games not only increase knowledge but also influence children's attitudes and behavior.

Children's self-confidence also increased significantly after the intervention, with an average score of (62.93) before the

intervention and (83.05) after the intervention. Children felt more confident speaking up and explaining preventive measures independently. Research by Khadijah (2019) shows that playing hopscotch can boost children's self-confidence, and Yuliani & Sudarti (2022) add that a fun learning approach can make children feel valued and empowered to express themselves. These improvements demonstrate that playful play not only activates cognitive skills but also positively impacts children's affective and psychological dimensions, which are crucial for their development.

The educational game "Engklek" works through an experiential learning approach, where children directly experience the material being taught through play activities. This concept aligns with Piaget's theory of learning for elementary school-aged children, which emphasizes the importance of direct involvement in the learning process. Research (Zein & Rahayu, 2022) indicates that the learning process using the traditional game of Engklek is effective in increasing student motivation and learning outcomes in environmental pollution. This occurs because the playful method in the learning process creates a fun learning atmosphere. Consequently, the learning process does not lead to boredom, allowing students to fully focus on the environmental pollution material.

Traditional games also tend to be more engaging for students because they are interactive and fun. Traditional games often have strong cultural roots, which can enhance students' sense of identity and connection to their cultural heritage. Engaging in culturally familiar games may make students feel more comfortable and motivated (Faradila et al., 2024). Therefore, the effectiveness of this method is also supported by the relevance of the material content and educational visualization. Each box in the "Engklek" game contains information or questions about dengue fever, enabling children to actively engage and receive cognitive reinforcement. Research (Herawati et al., 2018) found that the most effective knowledge gain was through the "Engklek" game, with an average score of 33.30, followed by the "Monopoly" game with the second highest average score (21.83), and the lowest score was through lectures (13.87). Therefore, it can be concluded that the "Engklek" game is the most effective means of increasing knowledge.

Thus, both statistically and through qualitative observations, the "Engklek" educational game has proven effective as an innovative learning medium for improving children's knowledge, attitudes, and confidence regarding dengue fever

prevention. This model can be recommended for wider implementation in elementary schools as part of health education programs.

CONCLUSION

The educational game "Engklek" is effective in increasing children's knowledge, forming and strengthening positive attitudes, and increasing their confidence in dengue fever prevention. The intervention group showed higher improvement than the control group, indicating that the intervention group using the educational game "Engklek" was more effective in increasing children's knowledge, attitudes, and confidence in dengue fever prevention.

Based on the conclusions above, the researcher recommends that SDN 1 Sungailiat adopt the educational game "Engklek" as an alternative learning method in health education. Schools are expected to integrate this game into routine activities to encourage sustainable changes in student behavior. Furthermore, higher education institutions, such as the Citra Internasional Institute, are advised to develop curricula that encourage students to design and implement innovative learning media based on other educational games. Other educational institutions are also advised to adopt educational games as part of active learning strategies, thereby increasing the effectiveness of information delivery and developing positive character traits in students.

Health institutions are also advised to adopt innovative educational approaches to promoting children's health, by implementing interactive education in school health programs and other school health programs. The community is expected to actively support children in adopting clean and healthy lifestyles and support the use of traditional games like "Engklek" as engaging educational tools. This will improve children's knowledge, attitudes, and confidence in dengue fever prevention and enable them to apply them in their daily lives.

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