



THE IMPACT OF LOCAL WISDOM EDUCATION 'PODA NA LIMA' ON COMMUNITY KNOWLEDGE IN DENGUE INFECTION PREVENTION

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ABSTRACT

Background. Dengue remains an endemic disease in almost all countries worldwide, including Indonesia. One approach to its prevention and control is community empowerment through education. Education is most impactful when aligned with the culture and local wisdom of the target community. *Poda na lima* is a form of local wisdom practiced by the Batak Angkola-Mandailing tribe in North Sumatra Province, Indonesia. This study aims to analyze the effect of *poda na lima*-based education on community knowledge regarding dengue prevention.

Methods. Quasi-experiment with one group pretest-posttest. This study involved 68 respondents from the community in the working area of Puskesmas Sihepeng, Mandailing Natal Regency, through cluster random sampling with inclusion criteria in October – November 2024. Data were collected using questionnaires before and after the dengue education intervention with *poda na lima* and analyzed using the Wilcoxon signed rank test with the SPSS software.

Result. Most of the respondents were in the age range of 19 – 45 years (80.9%), with a female gender (100%) and an education level of high school graduate (39.7%). There was an increase in the average knowledge before and after dengue education with the *poda na lima*, with statistically significant results ($p < 0.05$) and an effect size > 0.5 , meaning that the dengue education with the *poda na lima* has a large effect on the improvement in knowledge.

Conclusion. Dengue education with local wisdom, *poda na lima*, has a significant and large effect on improving community knowledge.

Keyword: Dengue education, Local wisdom, Knowledge, Quasi-experimental, Poda na lima

ABSTRAK

Latar Belakang. Penyakit infeksi dengue masih menjadi penyakit endemik di hampir seluruh negara di dunia termasuk Indonesia. Salah satu upaya dalam hal pencegahan dan pengendalian adalah dengan pemberdayaan masyarakat, yang bisa dilakukan dengan pemberian edukasi. Pemberian edukasi lebih efektif apabila dilakukan sesuai dengan budaya dan kearifan lokal masyarakat di daerah tersebut. Poda na lima merupakan salah satu kearifan lokal yang dimiliki oleh suku Batak Angkola-Mandailing yang berada di Provinsi Sumatera Utara, Indonesia. Tujuan penelitian ini adalah untuk menganalisis pengaruh edukasi kearifan lokal poda na lima terhadap pengetahuan terkait pencegahan infeksi dengue di masyarakat.

Metode. Quasi eksperimen dengan one group pretest – posttest. Penelitian ini melibatkan 68 responden dari masyarakat di wilayah kerja Puskesmas Sihepeng, Kabupaten Mandailing Natal, yang dilakukan secara cluster random sampling dan mengikuti kriteria inklusi, pada bulan Oktober – November 2024. Data dikumpulkan menggunakan kuesioner sebelum dan sesudah dilakukan intervensi edukasi dengue dengan poda na lima, dan dianalisis dengan uji Wilcoxon signed rank test menggunakan aplikasi SPSS.

Hasil. Sebagian besar responden berada di rentang usia 19 – 45 tahun (80,9%) dengan jenis kelamin perempuan (100%), dan tingkat pendidikan tamat SMA (39,7%). Terjadi peningkatan rata – rata pada pengetahuan sebelum dan sesudah edukasi dengue dengan poda na lima dengan hasil signifikan secara statistik ($p < 0,05$) dengan effect size $> 0,5$ yang artinya edukasi dengue poda na lima memiliki pengaruh kuat pada peningkatan pengetahuan.

Kesimpulan. Edukasi dengue dengan kearifan lokal poda na lima memiliki pengaruh yang kuat dan signifikan terhadap peningkatan pengetahuan masyarakat.

Kata Kunci: Edukasi dengue, Kearifan lokal, Pengetahuan, Quasi eksperimen, Poda na lima



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1. Introduction

Dengue infection is an infectious disease that is a common occurrence in tropical and subtropical regions. Dengue infection is caused by the dengue virus, which has four serotypes: Denv1, Denv2, Denv3, and Denv4. The dengue virus enters the human body through the bite of an infected female mosquito. The mosquitoes that often carry the virus include *Aedes aegypti* and *Aedes albopictus* [1]. Currently, dengue infection has become endemic in almost 100 countries worldwide, with Asia representing about 70% of the cases, including Indonesia [2]. According to a report from the Ministry of Health of the Republic of Indonesia, the incidence of dengue infections has been increasing over time and spreading to almost all regions of Indonesia [3]. The high incidence of dengue infections can be caused by multiple factors, including the population and environmental factors observed from the community's hygiene and sanitation behavior [4,5]. The hygiene and sanitation behavior of the community in Indonesia is still considered inadequate, especially in efforts to prevent and control diseases, one of which is dengue fever. According to data from the Indonesian Health Survey in 2023, the proportion of mosquito nest eradication efforts in several provinces in Indonesia is still below average, including North Sumatra Province [6]. Behavioral changes in the community can be achieved through education [7]. Health education in the community is one of the effective efforts in controlling dengue infections [8,9]. Behavioral changes can be seen, among other things, from the

increase in knowledge [10]. A previous study mentioned that groups given health education related to dengue infection showed a better improvement in knowledge compared to groups that did not receive the intervention [11]. Communities with good knowledge are 2.8 times more likely to have a good attitude, and communities with a good attitude are 2.5 times more likely to take correct actions in preventing dengue infection [12]. Health education for the community should be tailored to local culture and wisdom to ensure more effective and efficient communication. Since culture shapes human behavior, aligning health education with cultural values can help improve public health outcomes [13,14]. One of the cultures and local wisdom possessed by Indonesia, particularly in North Sumatra Province, is *poda na lima*, which is a philosophy held by the Batak Angkola-Mandailing community [15]. *Poda na lima* contains five local wisdom philosophies that underlie the social order in the community and include educational values regarding efforts to purify the heart and soul, clothing, body, house, and environment. It also teaches character formation to achieve the desired behavioral change [16,17]. The concept of *Poda Na Lima* is still considered relevant today for preventing the transmission of infections and increasing awareness of diseases [18,19]. Therefore, the *poda na lima* concept is expected to be applicable in the prevention of dengue infection. Thus, this study aims to determine the impact of the local wisdom education of *poda na lima* on the knowledge related to dengue infection prevention in the community.

2. Method

2.1. Study design

The type of study used was quasi-experimental with one group pretest-posttest by providing intervention in the form of education on dengue infection with local wisdom of *poda na lima*.

2.2. Study area and duration

This research was conducted in the working area of Sihepeng Health Center, Mandailing Natal Regency, North Sumatra Province, Indonesia, in October – November 2024.

2.3. Participant selection and sampling method

The inclusion criteria for this study are individuals aged 18 – 50 years, owning their own house, able to read, write, and speak Indonesian, not having hearing and vision impairments, willing to have their house and yard inspected for observation, and willing to participate in the study until the end. This study uses the cluster random sampling technique and employs the average estimation test formula for a single population to calculate the sample size, resulting in a sample size of 68 people.

2.4. Instrument of study

This study uses a questionnaire that has undergone a validity test using the Pearson product-moment correlation formula and a reliability test using the Cronbach coefficient alpha. The questionnaire contains questions about the respondent's characteristics such as age, address, gender, occupation, education, income, and the number of people in one household, as well as questions about knowledge with 20 questions, eight questions about mosquitoes that cause dengue infection, eight questions about dengue infection diseases, and four questions related to dengue infection prevention. The questionnaire was conducted before and after the intervention. The educational intervention in this study was implemented based on the dengue infection education module, incorporating the local

wisdom of *poda na lima*, which was developed by the author. The intervention was managed in several meeting sessions, with each activity as shown in Table 1 and Figure 1.

2.5. Statistical analysis

The data is being analyzed using the IBM SPSS 25.0 application. Descriptive analysis is used to determine the distribution of frequency and percentage, mean, standard deviation, minimum, and maximum values. Statistical analysis is used to determine the effect of education on knowledge with the Wilcoxon signed-rank test with a significant value of $p < 0.05$.

2.6. Ethical considerations

This study has been approved by the Health Research Ethics Committee of the University of North Sumatra with No: 1263/KEPK/USU/2024.

Table 1. The Details of Interventions Implemented in The Study on The Impact of Dengue Education with *Poda Na Lima*

Activity	Description
<i>Poda 1: Paias rohamu</i>	Education about the concepts of health, illness, and the one health approach. Education is delivered through an interactive lecture method, incorporating presentation slides and dengue education modules based on <i>poda na lima</i> .
<i>Poda 2 : Paias pamatangmu</i>	Education about clean and healthy living behavior and all about dengue infection. Education is delivered through an interactive lecture method, which combines presentation slides, posters, leaflets, videos, and dengue education modules based on <i>poda na lima</i> .
<i>Poda 3 : Paias parabitonmu</i>	Education about mosquito nest eradication. Education is delivered through an interactive lecture method, combining presentation slides, posters, leaflets, and dengue education modules based on the five-pillar approach.
<i>Poda 4 : Paias bagasmu</i>	This activity is filled with a 3M+ demonstration featuring videos and live demonstrations.
<i>Poda 5 : Paias pakaranganmu</i>	This activity is filled with community empowerment through cooperation.

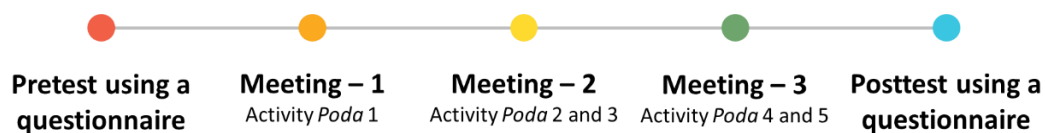


Figure 1. Procedure in the study on the impact of dengue education with *poda na lima*

3. Result

Respondents were predominantly in the age range of 19 – 45 years (80.9%), of female gender (100%), employed (73.5%), and with an income below the minimum wage (80.9%). Respondents were predominantly high school graduates (39.7%) and lived in households with ≤ 5 people (67.6%) (Table 2).

Table 2. Frequency and percentage distribution based on respondent characteristics at Sihepeng Health Center, Mandailing Natal Regency (n = 68)

Characteristics	Freq	(%)
Age (years old)		
19 – 45	55	80.9
> 45	13	19.1
Address		
Sihepeng Sada	34	50.0
Hutaraja	34	50.0
Gender		
Men	0	0
Woman	68	100
Work		
Work	50	73.5
Not working	18	26.5
Education		
Primary school	11	16.2
Junior high school	23	33.8
High School	27	39.7
Master	7	10.3
Income		
Under Regional Minimum Wage	55	80.9
Above Regional Minimum Wage	13	19.1
Number of people in a house		
≤ 5	46	67.6
> 5	22	32.4

Respondents with a good level of knowledge increased from 7.4% before education to 67.6% after dengue education with the *poda na lima* method, and no respondents with a poor level of knowledge were found after education (Table 3).

Table 3. Frequency and Percentage Distribution Based on Community Knowledge Level Before and After Dengue Education Poda Na Lima (N = 68)

Knowledge category	Pretest		Posttest	
	n	%	n	%
Poor	11			16.2
Moderate	52			76.5
Good	5			7.4

There was an increase in the average knowledge before and after dengue education with the *poda na lima* method, with statistically significant results ($p < 0.05$) and an effect size > 0.5 , which means that dengue education using the *poda na lima* method has a large effect on the improve on knowledge (Table 4).

Table 4. Results of the Wilcoxon signed rank test on the impact of local wisdom education *poda na lima* on community knowledge of dengue infection prevention

Variable	Mean ± SD	Min	Max	Z	p-value	Effect size
Knowledge	Pretest	9.99 ± 3.015	2	15	- 6.977	0.001
	Posttest	14.13 ± 2,556	7	19		

4. Discussion

Based on the characteristics of the respondents, the age is dominated by the 19 – 45-year age range, which falls into the productive age group. The involvement of the productive age group in the community will result in more optimal outcomes from the education provided. The function and structure of the brain in the productive age group are still optimal for absorbing and adapting to new information more quickly compared to the elderly [20]. All respondents were female, indicating that women in this study area have a higher level of participation in public health activities. In line with a previous study [21], it is mentioned that women tend to be more concerned about environmental and health conditions than men. Based on education, most respondents have completed high school (39.7%). The varying levels of education can affect the public's understanding of the educational material provided, considering that individuals with higher education tend to more easily receive and process health information [22].

The results of this study show an increase in the level of public knowledge after being provided with an education based on the local wisdom of *poda na lima*. The increase in knowledge can be seen by comparing the average pretest and posttest scores of the community that received education. Before education, the average level of community knowledge was in the moderate knowledge category, and after education, the average level of community knowledge increased to the good knowledge category. After obtaining a significant average improvement, a hypothesis test was analyzed using the Wilcoxon Signed Rank Test, which showed a significant difference with a large correlation between the level of knowledge before and after the education. The results of this analysis indicate that the local wisdom-based educational approach successfully increased the community's knowledge about dengue infection prevention.

This result is in line with previous research, which stated that respondents who received physical intervention and dengue infection education experienced an increase in knowledge scores by 1.16 points [11]. The results of this study are also in line with several previous studies that show education has a high effectiveness in improving knowledge of dengue infection prevention [23].

The instrument in this study uses a questionnaire with questions grouped into three points, focused on mosquitoes that cause dengue infection, dengue infection disease, and prevention of dengue infection. Before education, many people did not understand the three points well. Most of the community answered incorrectly. However, after the educational intervention, there was a significant change in knowledge, especially regarding the mosquitoes that cause dengue infections. Most of the community responded correctly after being educated about dengue with the five-point method regarding the breeding places of mosquitoes that cause dengue infection (76.5%), the resilience of *Aedes* sp mosquito eggs in dry areas (73.5%), the life cycle of *Aedes* sp mosquitoes (82.4%), female mosquitoes that carry the dengue virus (88.2%), and the time *Aedes* sp mosquitoes bite humans (76.5%).

The improvement in knowledge after this education is due to several factors, including the dengue education with *poda na lima* conducted in this study, which is a local wisdom-based education derived from the culture of the Batak Angkola-Mandailing community, one of the ethnic groups in North Sumatra Province, Indonesia [15]. *Poda na lima* is a philosophy encompassing educational values embedded in daily life and aligned with the socio-cultural practices of the Batak Angkola-Mandailing community. *Poda na lima* contains five pieces of advice to maintain cleanliness, starting from the cleanliness of the heart and soul, clothing, body, home, and environment [16]. Education with a local wisdom-based approach to the community can enhance the effectiveness of health interventions because it emphasizes understanding and alignment with the community's culture,

thereby achieving more meaningful outcomes. Many interventions based on local wisdom have been researched. However, they often remain minimal, such as only using the local language without understanding the social and cultural context of the community [24]. The systematic review conducted by previous researchers mentioned that educational interventions carried out by the culture of each group yielded positive results in all analyzed studies [25]. The material provided in dengue education with *poda na lima* aligns with the national health program often presented to the public, so the community already has a basic understanding. Previous knowledge positively impacts new knowledge, with curiosity connecting existing and newly provided knowledge [26]. The effectiveness of dengue education in improving knowledge depends on the selection of the media used. Dengue education using the *poda na lima* method was implemented multimodally, utilizing dengue education modules with *poda na lima*, presentation slides, educational videos, posters, and leaflets. The presentation of education through multimodal methods yields better results in cognitive aspects compared to the use of a single learning modality [27]. The combination of several educational media involves multiple senses, which can facilitate the reception of information, resulting in a deeper and better understanding of knowledge by the community [28]. The research conducted in Nepal showed a higher increase in knowledge after educational intervention with two media compared to only one [24]. The same result was found in a study conducted in Indonesia, which also recorded improved public knowledge after multimodal education [29]. The *poda na lima* uses a variety of methods to teach dengue. Apart from engaging lectures, demonstrations were held to give the community firsthand experience. By making learning more understandable and concrete, the demonstration method of instruction makes up for the drawbacks of the lecture technique and promotes comprehension that can improve public knowledge [30]. Another factor that influences the effectiveness of this education is that dengue education in the *Poda Na Lima* is structured and comprehensive. Dengue education is implemented through five activities that align with the philosophy of *poda na lima*, with each activity divided into sessions. The educational material covers all information about dengue infection and prevention, tailored to the dengue education module with *poda na lima*. The education provided in a structured and comprehensive manner is effective in increasing public knowledge regarding dengue infection prevention [31,32]. The presentation materials in the dengue education program are conducted using simple language so that they are comfortably accepted and understood by the community. Low health literacy triggers health inequalities and causes non-compliance by the community, including in disease prevention and control. Therefore, communication in simple language is a crucial skill that health professionals must possess so that the education conveyed can be understood by various community groups [33].

5. Conclusion

This study shows an increase in the average level of public knowledge regarding dengue infection prevention before and after the *poda na lima* education, with a change in the knowledge category from moderate to good. This study also shows a large effect of local wisdom *poda na lima* education on the prevention of dengue infection knowledge among the community in the working area of Sihepeng Health Center, Mandailing Natal Regency.

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Conflict of Interest

The authors declare no conflict of interest in this study.

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