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DHF Learning Module Design for Elementary School Teachers Within the Region Kuta Raja District, Banda Aceh City

Hermansyah[1*], Ismail[2], Munazar[2], Halimatussakdiah[3]

[1] Nursing Study Program Diploma IV, Poltekkes Kemenkes Aceh, Banda Aceh, Indonesia.
[2] Nursing Study Program Diploma III, Poltekkes Kemenkes Aceh, Meulaboh, Indonesia.
[3] Department of Pharmacy, Poltekkes Kemenkes Aceh, Banda Aceh, Indonesia.

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Corresponding Author:
Hermansyah
hermansyah@poltekkesaceh.ac.id

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Abstract: The high number of Dengue Hemorrhagic Fever (DHF) cases from year to year and the endemic status of DHF in Kutaraja District, Banda Aceh City encourages us to always make efforts to reduce the morbidity rate of DHF. The involvement of elementary school teachers is very important to participate in DHF control which will teach their students. This study was conducted to assess the effect of before and after administration of the DHF learning module on the average knowledge score of 90 grade IV and V elementary school students in the Kutaraja District, Banda Aceh City. The quasi-experimental method and Focus Group Discussions involving schools and Puskesmas when designing DHF learning modules were conducted. One-group pretest-posttest design, consisting of 25 questions that were analyzed using the Wilcoxon Signed Ranks Test. The study results obtained an average pre-test score of 76.6% and a post-test average value of 90.6%. The DHF learning module was able to increase elementary school students' knowledge. The provision of DHF material by elementary school teachers through modules can be done to students to increase students' knowledge so that they can participate in reducing the incidence of dengue hemorrhagic fever.

Keywords: DHF; Elementary Teacher; Learning Module

Introduction

Dengue Hemorrhagic Fever (DHF) is one of the many public health problems in Indonesia, if not the world. Dengue fever is caused by the dengue virus, which is carried by the Aedes aegypti mosquito vector. The incidence of DHF worldwide in the last few decades has increased drastically (Lesmana et al., 2022). It is estimated that hundreds of thousands of people suffer from dengue fever every year, the majority of whom are children. They had to undergo medical treatment, and about 2.5% of the total infected people died (Harapan et al., 2019).

Aceh Health Office reports that DHF cases reached more than two thousand cases. DHF in Aceh has entered the category of extraordinary cases with 19 people dying (CFR = 0.72%). If compared to 2015, the number of DHF sufferers was 1,510 cases with 6 deaths and there was a decrease in cases and the number of deaths in 2014 with 2,211 cases. So, the trend of DHF cases over the last 3 years in Aceh Province is still fluctuating, both the number of cases and the death rate. Data from the Banda Aceh City Health Office, DHF cases are still high in Banda Aceh City with a trend of cases increasing from 127 cases in 2015, rising to 152 cases in 2016, 236 in 2017, and dropping to 105 in 2018, but again increased to 344 cases in 2019.

The increase in DHF cases every year is related to environmental sanitation with the availability of breeding places for female mosquitoes, namely vessels filled with clear water (bathtubs, used cans, and other water reservoirs) (Dimjati Lusno et al., 2023). In addition, until now there has been no vaccine to prevent DHF and there are no specific drugs to cure it, so controlling DHF depends on eradicating the Ae. Aegypti (Wang et al., 2020). Trying to recover DHF patients to reduce mortality, while those who are healthy, especially in the group with the highest risk of infection, try not to get a viral infection by eradicating the vector (Thadchanamoorthy et al., 2022). Vector eradication is

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still the best option at this time to reduce the number of dengue sufferers (Alhamda & Barlian, 2019).

Various concepts and methods of DHF control have also been carried out, including DHF control can be carried out at the source, namely sufferers who have the potential as a source of transmission, environment-based control of DHF vectors, and community counseling (Siyam & Cahyati, 2021). However, DHF cases always occur and even increase at the beginning of the rainy season (Agustina et al., 2021; Santosa et al., 2023; Yuan et al., 2020).

Counseling can increase the knowledge of jumantik cadres and jumantik cadres of elementary school students about DHF and environmental management of Ae. aegypti., community participation as surveyor larvae (performed by jumantik cadres) is more effective than leader larvae (performed by RT heads) (Merbawani & Munfadlila, 2023). It is necessary to involve and empower elementary school teachers to understand DHF knowledge so that later it can be taught to their students and practiced in their school environment and where they live so that they can reduce larvae-free rates and cases of dengue hemorrhagic fever.

Method

This research used a quasi-experimental approach with a one-group pre-posttest design model and Focus Group Discussion (FGD) involving 9 school informants consisting of 3 school principals, 3 class teachers, 3 UKS teachers, and 5 health center informants. The experimental unit was carried out on 90 elementary school students in grades IV and V in the Kutaraja District, Banda Aceh City. Two measurements of the average value (mean) of knowledge before (pre-test) and after (post-test) the administration of the DHF learning module for then a comparison is made between the means in the group. The list for assessing knowledge scores uses a questionnaire that contains 25 questions with a Guttman scale in the form of True=1 and False=0 answer choices.

Furthermore, the research data were processed using the Statistical Package for Social Science (SPSS) computer software version 17.0 for Windows to calculate the distribution of frequencies and their proportions to be presented in a frequency table, as well as the Wilcoxon Signed Ranks Test statistic.

Result and Discussion

DHF Learning Module Design

From the various informants' answers regarding the theme of learning objectives, it was concluded that the design of this module fulfilled one of the substance requirements. However, it is necessary to develop learning objectives to achieve knowledge and psychomotor aspects which can be made in a simpler form. This is in line with that one of the characteristics of self-contained learning modules is that all learning material from one competency unit being studied is contained in one complete module (Johan et al., 2022). The characteristics of teaching-learning modules include; the lesson objectives are formulated specifically and are based on changes in behavior, the goals are formulated specifically so that changes in behavior that occur in students can be identified immediately changes in behavior are expected up to 75% complete mastery (mastery learning), and the module is a teaching package that is self-instruction, by learning like this, the module opens opportunities for students to develop themselves optimally (Bedregal-Alpaca et al., 2022).

Informants' answers regarding the theme of the teaching materials, it can be concluded that the design of this module already contains material on the concept of DHF and its control because the substance of this module material is not only obtained from various reference sources, it is also guided by the Jumantik Technical Guidelines Book published by the Indonesian Ministry of Health in 2013. However, it still needs to be modified. to be adapted to the cognitive and psychomotor abilities of Grade IV and V Elementary School students. The learning modules must also have characteristics, including; students can teach themselves, not depend on other parties (self-instructional), have high adaptive power to the development of science and technology (adaptive), and fulfill friendly rules with the wearer (user friendly).

With the theme of learning methods, the informants agreed that using a combination of two methods, namely discussion and demonstration methods adapted to teaching materials and competency outcomes to be achieved, namely cognitive and psychomotor aspects. In designing a module, it is necessary to pay attention to the characteristics of teaching-learning modules, namely; students can study individually and actively without maximum assistance from the teacher, and open opportunities for students to progress sustainably according to their respective abilities. The modules are a teaching package that is self-instruction, opens opportunities for students to develop themselves optimally, has a fairly strong information power, and elements of association, structure, and sequence of learning materials are formed in such a way that students learn spontaneously, and many modules provide opportunities for students to be active (Bernacki et al., 2023; O'Connor et al., 2023).

Based on the informants' answers, it can be concluded that the learning tools used are adequate, but

various changes and revisions are still needed in the layout aspects, color selection, images, shapes, and writing used. This is very important to note because the function of the module is to act as a substitute for the teacher and for students to learn independently. Media is all the means or efforts to display information messages that the communicator wants to convey so that the target can increase his knowledge which is ultimately expected to change his behavior in a positive direction toward health (Ort & Fahr, 2022). Through the media, the message conveyed can be more interesting and understandable, so that the target can study the message they decide to adopt it into positive behavior (Al-Dmour et al., 2020). The goals or reasons why media are needed in learning include media being able to; facilitate the delivery of information, avoid misperceptions, clarify information, facilitate understanding, reduce verbalistic communication, display objects which cannot be caught with the eye, and facilitate communication (Martinović et al., 2023). This is very closely related to one of the characteristics of the learning module, namely; stand-alone, where the developed module does not depend on other media or does not have to be used together with other media; and consistency, which is consistent in the use of fonts, spacing, and layout.

Informants' opinions regarding the theme of the evaluation system used in the DHF learning module already exist, although only in the form of True-False answer choices. The existing evaluation system only assesses cognitive aspects, and there is no assessment of psychomotor aspects. Considering that the learning module is one of the learning materials that students can use independently, it is necessary to revise the form of the questions and measure psychomotor aspects, as well as write answer keys so that students can assess themselves (Efendi et al., 2023). A good module must be arranged systematically, attractively, and clearly. Modules can be used anytime and anywhere according to student needs.

The Effectiveness of the DHF Learning Module

After the process of designing the DHF teaching module was completed, the researcher then conducted a knowledge test on Grade IV and V Elementary School students to measure their understanding of the basic concepts of DHF with as many as 25 questions to obtain an overview of easy and difficult questions to answer, as well as assess the effectiveness of the DHF learning module. The percentage of correct answers for 90 elementary school students during the pre-test and post-test can be seen in Table 1.

Table 1. Percentage of Correct Answers of Elementary School Students in the Pre-Test and Post Test

Question Items	% Correct answer		
	Pre-test	Post test	Difference
Dengue hemorrhagic fever is a fever accompanied by bleeding caused by mosquitoes	95.6	98.9	3.3
DHF is a disease transmitted from person to person through mosquito bites	78.9	87.8	8.9
The cause of DHF comes from the dengue virus	76.7	96.7	20
The dengue-carrying mosquito is Anopheles	92.2	98.9	6.7
DHF mosquito bite time is at night	16.7	53.3	36.6
The place where the DHF transmitting mosquito lives is in dirty water	33.3	66.7	33.4
DHF will not happen to children	85.6	91.1	5.5
Symptoms of acute fever (suddenly) 2-7 days, weakness, and heartburn	78.9	98.9	20
DHF can be overcome by drinking a lot	74.4	83.3	8.9
If red spots appear and nosebleeds gums appear, the DHF sufferer must be immediately taken to the hospital	93.3	95.6	2.3
Dengue prevention efforts can be done with 3M, namely draining, covering, and burying	74.4	86.7	12.3
Covering the water container tightly will prevent dengue	92.2	96.7	4.5
If a family member has a sudden fever, they will be left alone because it can heal on its own	87.8	97.8	10
The act of cleaning the bathtub at least once a week so that it does not contain mosquito larvae	73.3	85.6	12.3
Sowing larvicidal powder in a water storage container is done once every 1 month	77.8	87.8	10
Cleaning the home environment and mass cooperation activities can prevent the occurrence of DB disease	81.1	96.7	15.6
If someone suffers from DHF, it is necessary to spray/fog by a health worker	73.3	95.6	22.3
Until now no drug or vaccine can cure dengue	72.2	95.6	23.4
Eradicating mosquitoes and dengue-transmitting larvae is everyone's responsibility	74.4	85.6	11.2
If you find a DHF patient in your school, you must immediately report it to a teacher or health worker	85.6	94.4	8.8

Question Items	% Correct answer		
	Pre-test	Post test	Difference
DHF mosquitoes can be found/live in: used tires, cans, flower vases, water dispenser reservoirs, and refrigerators	81.1	95.6	14.5
One way to eradicate mosquitoes is by keeping betta fish	78.9	94.4	15.5
The characteristics of the DHF mosquito are its body with black and white stripes	82.2	93.3	11.1
Characteristics of DHF mosquitoes, among others, when they bite	74.4	94.4	20
The characteristics of the Aedes Aegypti mosquito larvae are parallel to the surface of the water	80.0	94.4	14.4
Average Percentage of Correct Answers	76.6	90.6	14.0

Table 1 shows that during the pretest, the lowest percentage of elementary school students (16.7%) answered correctly the question about when the Aedes mosquito bit, and increased during the posttest (53.3%). While the questions most elementary school students answered correctly during the pre-test were about the definition of dengue fever (95.6 %) and increased during the post-test (98.9%). Table 4.8 also shows that the average pre-test score was 76.6 % and the post-test average score was 90.6%. The difference between the two test scores shows that there is an average increase of about 14% after the intervention. Table 2., the following are the results of the mean difference test before and after the administration of the teaching modules which were analyzed using the Wilcoxon Signed Ranks Test.

Comparison of the two scores obtained p-value = 0.000 at α = 0.05, 95% CL, which means that there is a significant relationship between the knowledge of elementary school students before and after learning the Dengue Hemorrhagic Fever learning module. There was an increase in the average percentage of elementary school students' knowledge scores before and after giving the DHF learning module, indicating that the material or teaching materials could be well understood by elementary students. With good knowledge, it is hoped that it will have implications for the behavior of elementary school students so that they can apply it at school and home, as well as in the environment in which they live (Casmana et al., 2023). The respondents who have good knowledge about vector behavior will have a better ability to identify mosquito breeding places that are the targets of vector control measures (Kumaran et al., 2018). The significant relationship between the knowledge of elementary school students training participants before and after the Sismantic training which was carried out at elementary schools (Susanna et al., 2019).

Table 2. Results of the Wilcoxon Signed Ranks Test Analysis

		N	MeanRanking	Sum of Ranks
Average Post Score - Average Pre-Score	Negative Ranks	5(a)	20.10	100.50
	Positive Ranks	77(b)	42.89	3302.50
	Ties	8(c)		
	Total	90		

	Average Post Score – Average Pre-Score
Z	-7,425(a)
Symp. Sig. (2-tailed)	0.000

The socio-demographic and socio-cultural factors, as well as knowledge, attitudes, practices, and environmental factors, influence the incidence of dengue hemorrhagic fever (Udayanga et al., 2018). Education and knowledge about dengue fever play an important role in reducing the incidence of dengue hemorrhagic fever (Manulang et al., 2023). In previous study found the association between education level and knowledge, attitudes, and practices regarding dengue fever and concluded that there was a relationship between knowledge level and behavior (Diaz-Quijano et al., 2018; Shafie et al., 2023).

Learning to use modules has many benefits, students can be responsible for their learning activities, and learning with modules respects individual differences, so students can learn according to their level of ability, so learning is more effective and efficient. Even learning using modules also has some fundamental weaknesses, namely that it requires quite a large amount of money, takes a long time to procure or develop the module itself, and requires high diligence from the teacher as a facilitator to continuously monitor the student learning process (Bacomo et al., 2022; Noroozi et al., 2023).

The teacher's role in health promotion in schools is very important because teachers are generally more obeyed by children than their parents (St. Leger et al., 2022). Healthy schools and school environments are very conducive to healthy behavior in children. For teachers and the school environment to be conducive to the healthy behavior of their students, the target of health promotion in schools is the teacher (Lee et al., 2018). Teachers receive sufficient training on health and health promotion, then the teacher will pass it on to their students (Hu, 2023).

Conclusion

In sum, the DHF learning modules are good learning materials that students can use independently. For this reason, good modules must be arranged in a systematic, attractive, and clear manner so that they can be used whenever and wherever according to the needs of students. The provision of DHF material by elementary school teachers through modules can be done to students to increase students' knowledge so that they can participate in reducing the incidence of dengue hemorrhagic fever. Therefore, the involvement of teachers is necessary for reducing and controlling the incidence of DHF in the school environment and where they live.

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Conflicts of Interest
The authors declare no conflict of interest.

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