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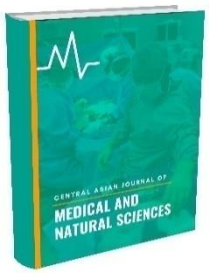

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Empowerment on Jumantik and Planting Mosquito Repellent Plants in the Context of Dengue Vector Control

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Abstract: World Health Organization/WHO (2020); Warsidi (2017) reports that there are 100 million dengue cases worldwide, while in Indonesia around 450,000 people per year, at the Padang Pariaman Regency Health Office there are 132 cases, of these 132 cases in the working area of the Enam Lingkung Health Center occupied the most cases with 9 cases of dengue fever.The purpose of this study was to determine the effect of Lavender Flower Education on Knowledge and Prevention of Dengue Fever Disease in Nagari Pakandangan, Enam Lingkung Health Center Working Area in 2021.This study uses a quasi-experimental design with pre-test and post-test with one group. The research was conducted in Nagari Pakandangan from August 1 to August 7, 2021.Sampling using the accidental sampling technique with a sample size of 20. Data collection tools in the form of questionnaires, and then processed in a computerized system. Based on the results of the study, it was found that the respondent's knowledge and preventive measures for dengue hemorrhagic fever (DHF) before being given education about lavender flowers were on average (48.20%) and after being given lavender flower education it increased to an average of (62.65%). The effect of Education on Lavender Flowers on Knowledge and Prevention of Dengue Fever Disease in Nagari Pakandangan, Enam Lingkung Health Center Working Area in 2021 (p-value = 0.000 < 0.05).The results of this study are expected to add insight to the Nagari Pakandangan community about the prevention of dengue disease. So that it can take advantage of lavender plants as natural ingredients for the prevention of dengue disease.

Key words: Knowledge, Lavender Flower Education, DHF.

Introduction

Public health problems in the world still require high attention from every country, especially health problems related to Dengue Hemorrhagic Fever that require treatment or care. Dengue hemorrhagic fever is a disease that is found in most tropical and subtropical regions, especially Southeast Asia, Central America, America, and the Caribbean (Ayu, 2016).

Like most other diseases, dengue fever is also caused by a virus namely the dengue virus, so this disease is called DHF (Warsidi, 2017). Based on data obtained from the WHO, it is estimated that around 2.5 billion or 40% of the world's population both in tropical and sub-tropical countries have a high risk of contracting the dengue virus. Globally, there are 50 to 100 million cases of Dengue worldwide, 500,000 cases of dengue fever with a death toll of 22,000 people each year. In several countries such as Laos from June 1 to June 8, 2020, there were 1,576 cases, Singapore from January 1 to June 1 2020 recorded 10,234 cases, and Malaysia recorded 21,190 cases (WHO, 2020).

Dengue fever is also one of the public health problems in Indonesia where the number of sufferers is increasing and its spread is increasingly widespread. The Ministry of Health of the Republic of Indonesia (KEMENKES) in 2020 finally released data on cases of DHF in Indonesia in one year. Until the 49th week of 2020, 661 people died from the disease. Citing the Sehat Negeriku page on Friday, December 4, 2020, the total number of dengue cases in Indonesia until the 49th week of 2020 reached 95,893 cases. The total cases of DHF were spread across 472 regencies/cities in 34 provinces, with deaths from dengue hemorrhagic fever reported from 219 regencies/cities (KEMENKES RI, 2020).

The cause of the increase in dengue fever in the last 15 years is thought to have several important factors. First, unplanned and uncontrolled urbanization also the population growth, which results in a dense population living in tropical city centers with poor hygiene conditions. Second, the ineffectiveness of the control program against vector mosquitoes, changes in lifestyle, and the worsening of the drinking water system resulting in the expansion and increase in the density of the main vector mosquitoes (Tjitrosantoso, 2018). Cases of DHF have experienced an increasing trend recently, both nationally and in West Sumatra. According to the Head of the West Sumatra Health Office in the West Sumatra region, from the beginning of the year to July 2019, the number of dengue patients reached 430 cases. In 2020 from January to December, there were 292 cases and from early 2021 to February 2021, there were 39 cases of DHF[1]. In 2018 based on data from the Padang Pariaman Regency Health Office, from January to December there were 97 cases of DHF in Padang Pariaman Regency, while in 2019, there were 132 cases and in 2020, there were 38 cases of DHF in Padang Pariaman Regency (Dinkes Padang Pariaman, 2020).

METHODS

This study uses a Quasi-Experimental research design using one group Pretest – Posttest design approach to measure knowledge and prevention and after providing education about lavender flowers on knowledge and prevention of dengue fever in Nagari Pakandangan (Nursalam, 2016). After that, the dependent variable (pre and post) was measured in each experimental group. This research was done in KaNagarian Sarang Gagak Enam Lingkung, Padang Pariaman Regency. The population of this study was all housewives who live in Nagari Pakandangan, the working area of the Enam Lingkung Health Center, as many as 1086 people. In experimental research, the number of samples can be up to 10-20 peoples. So the number of samples in this study was set at 20 people with educational treatment about lavender flowers. The sampling technique was accidental sampling.

[1] https://www.padang.go.id/selama-pandemi-kasus-dbd-di-padang-menurun

RESULTS AND DISCUSSIONS

3.1 Results

3.1.1 Univariate Analysis

Knowledge of preventive measures for DHF before being given education on lavender flowers

In Table 1, it can be seen that from 20 respondents before being given education about lavender flowers, the average value of knowledge was 48.20 with a standard deviation of 17.958, it can be concluded that before giving education about lavender flowers, the average mother's knowledge was low.

Table 1. Frequency distribution based on knowledge of prevention of DHF before education on lavender flowers in *Nagari* Pakandangan working area of Enam Lingkung Health Center (N=20)

Item	Knowledge of preventive measures for DHF Pretest	Category
1.	56	High
2.	36	Low
3.	40	Low
4.	44	Low
5.	40	Low
6.	68	High
7.	40	Low
8.	40	Low
9.	24	Low
10.	28	Low
11.	32	Low
12.	60	High
13.	28	Low
14.	76	High
15.	76	High
16.	80	High
17.	36	Low
18.	72	High
19.	52	High
20.	36	Low
Max	80	
Min	24	
Mean	48.20	
Standard deviation	17.958	

Knowledge of preventive measures for DHF after being given education on lavender flowers

Table 2. Frequency distribution of knowledge on prevention of DHF after being given lavender flower education in *Nagari* Pakandangan working area of Enam Lingkung Health Center (N=20)

Item	Knowledge about preventive measures for DHF Post-test	Category
1.	68	High
2.	48	Low
3.	60	High
4.	72	High
5.	52	High

6.	96	High
7.	60	High
8.	48	Low
9.	60	High
10.	36	Low
11.	44	Low
12.	72	High
13.	88	High
14.	92	High
15.	76	High
16.	96	High
17.	76	High
18.	84	High
19.	64	High
20.	80	High
Max	96	
Min	36	
Mean	68.60	
Standard deviation	17.712	

In the Table 2 above, it can be seen that from 20 respondents after being given education about Lavender Flowers, the average value of knowledge was 68.60 with a standard deviation of 17.712.It can be concluded that before giving education about lavender flowers, the mother's average knowledge is high.

3.1.2 Bivariate Analysis

The effect of lavender flower education on knowledge about preventive measures for DHF in *Nagari* Pakandangan Working Area of the Enam Lingkung Health Center

Table 3. The effect of lavender flower education on knowledge about preventive measures for DHF in *Nagari* Pakandangan working area of the Enam Lingkung Health Center (N=20)

Knowledge	Test =0					
					95% Confidence Interval of the Difference	
	t	Df	Sig (2-tailed)	Mean diffence	lower	upper
Before	12.003	19	0.000	48.200	39.80	56.60
After	17.321	19	0.000	68.600	60.31	76.89

Based on Table 3, it can be seen that the average knowledge of respondents about preventing DHF increased after being given lavender flower education, the sig. test value (2 tailed) was obtained at 0.000 <0.05 because the test results were statistically significant. Thus, we can accept the alternative hypothesis (Ha) where there is an effect of education about lavender flowers on respondents' knowledge about DHF prevention before and after education.

3.2 Discussions

3.2.1 Univariate Analysis

Frequency distribution Knowledge about preventive measures for DHF before being given education on lavender flowers

Based on the results of the study before giving Lavender Flower education, it was found that the average knowledge score was 48.20 with a low category with a standard deviation of 17.958. With 40% of respondents categorized as having high knowledge, 60% of respondents categorized as having low knowledge.

Based on the results of this study, it is in line with the research conducted by long Liu & Chu (2012) on the effect of counseling about mosquito repellent (lavender flower, fragrant lemongrass) on the level of knowledge, attitude, and practices in preventing DHF. From the results of the study, the KAP score of the treatment group on the pretest was 106.07 (poor category). While in the control group the pretest was 113.63 (medium category). Research strengthened by research conducted by Thomas (2017) on the effect of counseling on the density of Aedes Aegypti in the prevention of dengue fever also found that the prevention of DHF increased to (82%). Research strengthened by research conducted by Trianda (2019) the effect of health education on student behavior in preventing DHF at El'fatah Christian Vocational School, Manado, it was found that the prevention of DHF was not good in the experimental group increased to 73.2%.

Knowledge is the result of knowing and this occurs after people have sensed a certain object.Sensing occurs through the five human senses, namely the senses of sight, hearing, smell, taste, and touch. Some human knowledge is obtained through the eyes and ears (Notoatmodjo, 2012). Based on the characteristics of the respondents, namely the characteristics of the level of education that the researcher got, there are 4 levels of education, namely elementary, junior high, high school, and college. Respondents who have elementary education are 15%, respondents who have junior high school education are 35%, respondents who have high school education are 45%, and respondents who have a college education are 5%. From the results of filling out the questionnaire and the evaluation carried out by the researcher, it was found that some respondents (40%) who had a high school and college education level had knowledge that was categorized as high. For example, respondent number one who has a high school education level has a high level of knowledge, namely 56%, and respondent number sixteen who has a college education level has a high level of knowledge, namely 80% before being given lavender flower education. While some respondents (60%) who have elementary and junior high school education levels have knowledge that is categorized as low before being given lavender flower education. For example, respondent number three who has an elementary education level of knowledge is categorized as low at 40%, and respondent number nine who has a junior high-level education level is categorized as low at 24%.

The level of education is the stage of education that is determined based on the level of development of students, the goals to be achieved, and the willingness to be developed. The level of education affects changes in attitudes and behavior of healthy living. A higher level of education will make it easier for someone to absorb information and apply it in daily behavior and lifestyle, especially in health. According to the researcher's analysis, the researcher can conclude that the level of education is very influential on knowledge because the level of education affects the learning process. The higher a person's education, the easier that person is to receive information. Where it is expected that someone with higher education will have more extensive knowledge. This is following the theory put forward by Notoadmodjo (2016) which states that knowledge is the result of knowing and this occurs after a person has sensed certain objects, which in general, the higher the level of education, the more

information he receives, then the higher the level of knowledge. This is a domain for the formation of a person's attitude; good knowledge will have an impact on a good or positive attitude.

This theory is also in line with Nursalam (2016) theory, that the higher a person's level of education, the more information he receives, the higher his level of knowledge. So that someone with a higher level of education will have better knowledge than those with a lower level of education. However, some respondents have a high level of education but have low knowledge. For example, what the researcher found during the study was respondent number seven whose education level was high school but his knowledge was categorized as low, namely 40%. The results of the questionnaire analysis turned out to be many housewives who still have low knowledge about lavender flowers. More than half of the respondents still have low knowledge about lavender flowers (60.0%). Many think that lavender flowers are just for ornamental plants, without knowing the uses and benefits of these flowers where planting lavender flowers have benefits as a preventive measure against dengue fever and this is caused by one of the other factors that also affect knowledge is information. Someone who has more sources of information will have broader knowledge.

This is because there has never been education on Lavender Flowers and the lack of information either through the internet, magazines, brochures, or media about lavender flowers and their benefits. Good knowledge about lavender flowers is very important for respondents to know because lavender flowers can prevent dengue hemorrhagic fever. According to the analysis of the researchers, this is also related to lavender education, promotion in the form of counseling from the internet, magazines, and others about the benefits of lavender flowers in preventing dengue fever.So that it gives suggestions to the public that lavender flowers are effective in preventing dengue fever and not just as an ornamental plant.The right source of information with the right information can affect personal knowledge.

Following the opinion of Widiyono (2017), namely the ease of obtaining information can help speed up a person to acquire new knowledge.Sources of information are data that is processed into a form that has meaning as the recipient and has real and felt value for current and future decisions.The sources of information about health in this study can generally be obtained by the public through the media (print and electronic) or directly from health workers.

Likewise, according to Thomas (2017), the origin of information other than the media can also be obtained from formal and non-formal education and this can have a short-term effect resulting in changes or increases in knowledge.Advances in technology will provide a variety of media that can affect public knowledge about innovations.In delivering information as to its main task, the media also brings messages that contain suggestions that can direct one's opinion.The existence of new information about a matter provides a new cognitive foundation for the formation of knowledge about it.

Frequency distribution of knowledge and prevention of DHF after being given education about lavender flowers

After being given education, it was found that the results of observations on the knowledge of respondents with DHF prevention measures that the average knowledge score was 68.60 with a high category with a standard deviation of 17.712. It was concluded that after giving education about lavender flowers, the mother's average knowledge was high. With 80% of respondents categorized as having high knowledge, 20% of respondents categorized as having low knowledge. The results of this study are in line with research conducted by Tumbeleka et al (2017) on the effect of counseling about mosquito repellent (lavender flower, fragrant lemongrass) on the level of knowledge, attitude, and practices in preventing DHF. From the results of the study, it was found that the KAP score for the treatment group on the 15th-day posttest was 131.59 (medium category), and the 30th-day posttest was

135.07 (medium category). While in the control group on the 15th-day posttest was 114.04 (medium category) and the 30th-day posttest was 113.78 (medium category).

Research strengthened by research conducted by Yesi (2016) on the effect of counseling on the density of Aedes Aegypti in the prevention of dengue fever also found that the prevention of DHF (82%) after counseling was very low. Research strengthened by research conducted by Trianda (2019) on the effect of health counseling on student behavior in preventing DHF at El'fatah Christian Vocational School, Manado, found that the prevention of DHF was not good in the control group (72.2 %). Based on research conducted by Benthem et al (2013), it was found that people who had better knowledge about DHF had better prevention and eradication efforts.These results are also consistent with the research of Koenraadt et al and Kittigul et al who reported that knowledge about DHF was associated with efforts to perform PSN. Soedarto (2019) reports that public knowledge about DHF affects the incidence of DHF, where people who have low knowledge of DHF have a 6.9 times risk of getting DHF compared to people who have high knowledge.

Severalfactors influence knowledge, namely age, intelligence, level of education, information, and environment (Hendra, 2016). Knowledge or cognition is a very important domain for the formation of one's actions (over behavior). Rogers' research in Notoatmodjo (2016) reveals that behavior based on knowledge will usually be better than behavior that is not based on someone's knowledge based on high knowledge, so disease prevention will be better than someone with low knowledge.

According to the researchers, after the researchers conducted education about lavender flowers and evaluated the questionnaires filled out by the respondents, they were able to accept and understand it well. And this is clear in the results of the questionnaire filled in by housewives who previously did not understand, became aware of lavender flowers, with increasing knowledge reaching 68.60% which means that respondents' knowledge about lavender flowers is better and is categorized as high. Although there are still respondents whose knowledge is categorized as low. It can be seen from the characteristics of the respondents, namely age, the percentage of the age range of 35-40 years is 40%, the age range of 41-45 years is 30% and the age range >45 years is 30%.From the characteristics of the respondent's age, the researcher evaluated based on filling out the questionnaire, it was found that 20% of respondents who had approaching old age (>45 years) had low knowledge. It can be seen in respondent number eight who has an age of 49 years with the results of a questionnaire after being given lavender education, his knowledge has increased but not significantly, namely 48% (low category). Respondent number ten who is 52 years old with the results of the questionnaire after being given lavender education, his knowledge has increased but not significantly, namely 36% (low category). This was also found in respondent number eleven who was 54 years old with the results of the questionnaire after being given lavender education that his knowledge had increased but also not significant, namely 44% (low category).

According to the researcher's analysis, what the researcher found at the time of the study was caused by one of the other factors that also affected knowledge, namely age. Age is very closely related to knowledge, because with increasing age a person, the level of maturity and strength of a person will be more mature in thinking and working. In terms of public trust, someone who is more mature is more trusted than someone who is not yet mature. This is determined by the experience and maturity of the soul. But sometimes with increasing age of a person can also affect said person's memory. A similar theory was put forward by Notoadmodjo (2016), namely a person's age can affect the increase in the knowledge he acquires, but at certain ages or near old age the ability to accept or remember knowledge will decrease.

In addition to age, according to the researcher's analysis, everyone's knowledge increase is also influenced by intelligence factors. Intelligence is a person's ability to learn, understand, and remember newly acquired information. Everyone has different intelligence so that the increase in knowledge after

being given lavender education is also different. Some respondents experience a significant increase in knowledge and some respondents experience an insignificant increase in knowledge. This can happen because of the factors that influence one of the factors of intelligence.

Following the theory presented by Hendra (2016) that intelligence is defined as the ability to learn to think abstractly to adjust mentally to new situations. Differences in a person's intelligence will also affect the level of knowledge. So the researcher concludes that whether or not a person's knowledge can increase is influenced by several factors that are interrelated with each other from the knowledge itself.

3.2.2 Bivariate Analysis

The effect of lavender flower education on knowledge about preventive measures for DHF in *Nagari* Pakandangan Working Area of the Enam Lingkung health center

The results of research that has been carried out on providing education about lavender flowers on average respondents' knowledge about preventing DHF increased after being given education with sig. test scores (2 tailed) were obtained at 0,000 <0,05 therefore the test results are statistically significant.Thus, we can accept the alternative hypothesis (Ha) where there is an effect of education about lavender flowers on respondents' knowledge about DHF prevention before and after education.

In the given treatment group, it was proven that the group who was given education about lavender flowers, the knowledge of respondents about prevention of DHF increased. It can be seen that before being given education on lavender flowers (48.20%) who had low knowledge and after being given education about lavender flowers increased knowledge of respondents (68.60%) who had high knowledge about preventive measures for DHF.

The results of this study are also similar to the research conducted by Tumbeleka (2017) on the effect of counseling about mosquito repellent (lavender flower, fragrant lemongrass) on the level of knowledge, attitude, and practices in preventing DHF. From the results of the study, it was found that in the treatment group, there was a significant increase in the KAP score up to the 30th day of observation ($p<0.001$), while in the control group the difference in KAP scores was not significant ($p=0.9$).It was concluded that counseling about mosquito repellent plants (lavender flowers, red lemongrass) affected the level of knowledge, attitudes, and practices of mothers in preventing dengue hemorrhagic fever.

Research that is strengthened by research conducted by Yesi (2016) there is an effect of counseling on the density of Aedes Aegypti in the prevention of dengue fever. It was also found that preventive measures for DHF were found. The results of the paired t-test analysis obtained a p-value of 0.011. Research strengthened by research conducted by Trianda (2019) found that there was an influence between health counseling on student behavior in preventing DHF at El'fatah Christian Vocational School, Manado, it was found that the prevention of DHF was not good in the experimental group t 5,371 with a p-value of 0,000. According to WHO (2016), health education is a way to change the behavior of people or society from unhealthy behavior to healthy behavior. As we know, if the behavior is notfollowing health principles, it can cause health problems. In line with his opinion, Amaliya & Rahmat (2019), said that counseling is the assistance given to individuals in solving life problems by interviewing or in ways that are appropriate to the individual's circumstances to achieve a prosperous life.

Likewise, Rochman Natawidjaja defines Extension as a type of service that is an integrated part of the guidance. Counseling can be interpreted as a reciprocal relationship between two individuals, where one person (ie counseling) tries to help the other, namely the client, to reach an understanding of himself about the problems he faces in the future. Counseling or education carried out by researchers

is to explain the Lavender plants (Lavandula angustifolia). Lavender plants(Lavandula angustifolia) are one of the most popular small garden shrubs. Grows well in highland areas, at an altitude of about 600-1350 masl (Kardinan, 2016). Morphologically, this plant has narrow leaves that are evergreen, oily, and fragrant, and has small tubular spika flowers. Lavandula angustifolia is commonlyknown as English Lavender. Most varieties of Lavandula angustifolia produce purple flowers, but some cultivars produce white or pink flowers (Lansida, 2017). Lavender (Lavandula angustifolia) is one of the plants that can be used for natural insecticides because it is effective in controlling insects (mosquitoes).This is because lavender plants have kairomone, a chemical that causes an odor that mosquitoes don't like. Plants have a content of Flavanoid, Rosmarinic acid 2- (3-4-dihydroxyphenyl) ethenyl ester (found on flowers), Hypolaetin, Scutellarin, Salvagenin, Malvidin, Xanthimicrol, Delphinidine (found on leaves), and Terpenoi, Linalil asetat, Ursolic acid, Oleanolic acid which is as a repellent (insect repellent) about the effectiveness of lavender flowers by working as a contact poison and respiratory poison to prevent dengue hemorrhagic fever (Lansida, 2017). An increase in the knowledge of respondents after lavender education was carried out from an average knowledge of 48.20% to 68.60%. So it is proven that there is an effect of lavender flower education on knowledge about the prevention of dengue fever.

According to the researcher's assumption, the increase in knowledge of the respondents was due to the respondents having been exposed to information about lavender flowers and their benefits through the provision of education/counselling/health education carried out by researchers. Respondents also received the information well so that they could understand the information provided.So that there is an increase in the knowledge of the respondents. It is also expected that respondents can apply the knowledge about lavender flowers obtained as an action to prevent dengue fever. But the increasing knowledge of respondents who are given education about lavender flowers depends on each respondent. This is because the increase in knowledge also does not escape the factors that influence it, such as age, education level, intelligence, and information so that the increase in knowledge depends on each respondent.

Conclusions and Suggestions

From the results of research on Community Empowerment on Jumantik and Planting Mosquito Repellent Plants in the Context of Controlling Dengue Fever Vectors in *KaNagarian* Sarang Gagak Enam Lingkung, Padang Pariaman Regency, it can be concluded that: 1) The average knowledge score of the respondents was 48.20% before the lavender flower education was given; 2) The average knowledge score of respondents was 68.60%, after being given lavender education; and 3) The existence of community empowerment towards Jumantik and planting mosquito repellent plants in the context of controlling dengue fever vectors with meaning. This research is expected to enrich knowledge and experience that can add insight, especially on the prevention of dengue disease. So that people can take advantage of knowledge about lavender plants as an action to prevent dengue.

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