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Snake Bite Health Education on Community and Pre Hospital Handling

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ABSTRACT

Background: Snake bites are one of the most common health problems in tropical and subtropical countries. WHO has included snakebite in the list of neglected tropical diseases. The majority of Indonesians work in agriculture and are at high risk of being bitten by snakes. Pre-hospital handling of snakebites according to WHO recommendations by immobilizing using bandages and splints on the part affected by the snakebite then immediately refer to the nearest health service center.

Purpose: This study aims to determine the effect of snakebite health education on people's knowledge and behavior about handling snakebites before going to the hospital in Wungu Village, Wungu District, Madiun Regency.

Method: The research design is quasi-experimental with a one-group pre-test and post-test design. The population is the entire community of Wungu Village, Wungu District, Madiun Regency with a sample of 100 respondents by random sampling. Collecting data using a questionnaire analyzed with the Wilcoxon test.

Results: The results of the research on community knowledge and behavior before being given health education were 44 people (88%) less knowledgeable and 39 people (78%), after being given health education, more than half of the respondents had good knowledge, namely 26 people (52%) and many changes from good behavior as many as 29 people (58%).

Conclusion: There is an effect of health education on people's knowledge and behavior about handling snake bites before going to the hospital with p = 0.000 <0.05.

Keywords: health education, pre hospital handling**,** snake bite

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BACKGROUND

Indonesia is one of the largest tropical countries in the world which has a very high number of snakebite cases. This is because many Indonesians work in agriculture which is considered a high risk population for snake bites. Even so, there are no reports on national epidemiology, national policies on snakebite control programs, and national guidelines in the management of snake bites to date in Indonesia (Wintoko & Prameswari, 2020).

Snakebite cases are a major cause of morbidity and mortality in tropical countries, especially in Asia. The incidence of snakebite cases reported throughout Asia is estimated at 1,162/100,000 population per year with a mortality rate of 162/100,000 population per year (Nugraha, 2022). WHO reports a worldwide incidence of 5 million snakebites per year, with 100,000-200,000 deaths. Incidence rates and possible complications are higher in children compared to adults. According to WHO, 35% of child deaths related to poisonous animal bites are caused by snakebites and are more common in boys than girls (Alya et al., 2022). Other countries with a high prevalence of snakebite cases are Pakistan, Bangladesh, Sri Lanka and Nepal (Chauhan S, at all, 2005).

Based on several epidemiological studies, snakebite cases are more often experienced by farmers, plantation workers, herders, fishermen, and people with the habit of sleeping on the floor or in the open (Nia & Latief Abdul, 2013). However, most snakebite victims do not know the type of snake that bites, causing difficulties in treatment, especially in the use of anti-snake venom serum. Snake identification is important because most snakebite cases involve dangerous snake species, such as the families *Elapidae* (cobra, mamba, krait, sea snake) and *Viperidae* (*rattle, pit viper*) (Liwang et al., 2021).

The case of snakebite in Indonesia has become a neglected health problem and has received little attention. This is due to the lack of data or case reporting and the lack of knowledge about handling snakebite cases. Patients often come to health care centers with severe conditions due to delays in handling, inappropriate initial treatment, and not infrequently patients prefer to go to traditional medicine so that it will affect the outcome (Jaya & Panji, 2016).

From a preliminary study conducted by researchers at the Pari Dungus Hospital in Madiun within 3 months from October to December 2016 there were 6 cases of snake bites. 4 cases were brought to the hospital in a swollen condition and tied with rope. 2 cases were taken to the hospital for 1 day at home and treated by a traditional healer but they are getting swollen and have black blisters. From the information of the family and the patient, they do not know the proper and correct way of handling the first snakebite.

The knowledge and behavior of the community in the initial handling of snakebite cases is very much determined by the success of the next management. Early errors in handling snakebites can be fatal. Snake bite cases can be deadly if not treated immediately. Morbidity and mortality are caused by the toxic effects of snake venom which can cause local tissue damage and circulate in the systemic circulation so that it attacks various target organs (Cindy Nurul Afni & Nasrul Sani, 2020). Death usually occurs in children, the elderly, and in cases that do not or are late in getting treatment (Jaya & Panji, 2016). Specific treatment in snakebite cases to date is by administering anti-venom serum. However, the use of anti-venom serum for snakebite cases is still debated because the risk of loss and benefit is still unclear (Wintoko & Prameswari, 2020).

The behavior of the community in handling before going to the hospital to reduce or prevent the spread of toxins with traditional methods such as installation of a tourniquet, pressure bandages, suction can, incisions, or ice packs has been proven does not give clinical benefits (Suprastiyo & Mohammad Ali Hamid, 2015). This is often the cause of delays in

patients being taken to health care centers. Pre-hospital treatment in accordance with WHO recommendations is immobilization with bandages and splints on the part affected by the snake bite then immediately refer to the nearest health service center (World Health Organization, 2016).

Based on the problems above, the researcher will conduct research on "The Effect of Snakebite Health Education on Community Knowledge and Behavior About Handling Snakebites Before going to the Hospital in Wungu Village, Wungu District, Madiun Regency".

METHOD

This study used a quasi-experimental method *with one-group pre-test and post-test*. And in this design does not use a control group or comparison group. The population is all people in Wungu Village, Wungu District, Madiun Regency who work in the fields or search for wood in the forest as many as 160 people. The sampling technique used *systematic random sampling* with 100 respondents. Measurement of knowledge and behavior prior to snakebite health education using a questionnaire. The validity of the questionnaire was carried out in Kresek Village, Wungu District, Madiun Regency as many as 20 respondents. The validity test can be seen by using the *product moment* value of r table = 0.444. Health education is given in accordance with the Extension Event Unit using *leaflets*, posters and direct presentations. Research data processed and analyzed using statistical tests *Wilcoxon match test* with the value of Sig. (0.05).

RESULTS

a. Characteristics of respondents based on age

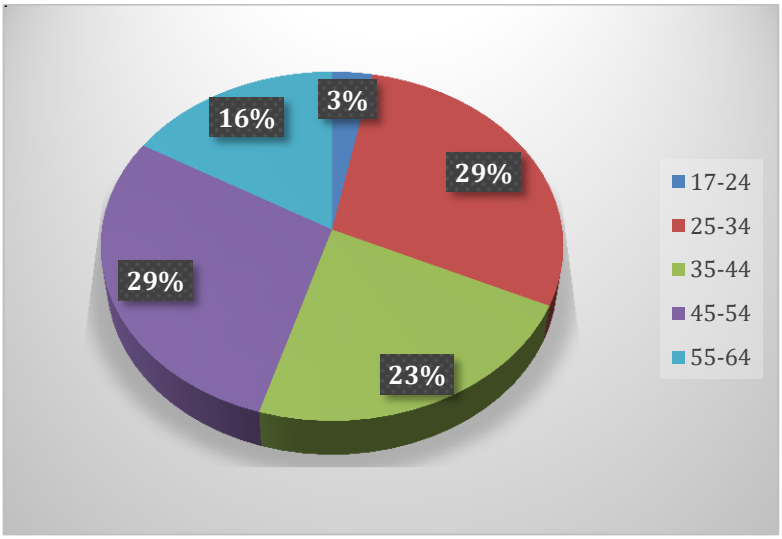

Figure 1. Characteristics of respondents based on age

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b. Characteristics of respondents based on education level

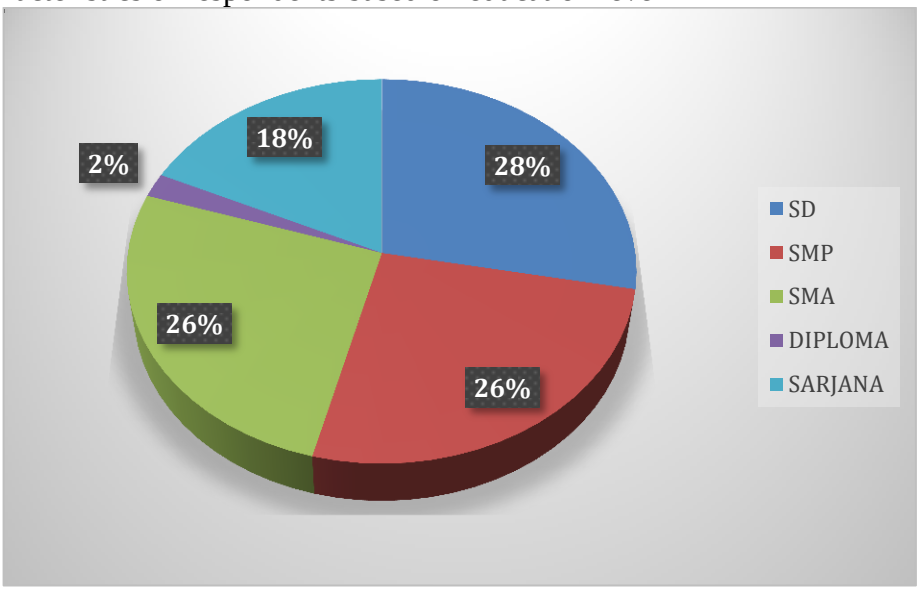

Figure 2. Characteristics of respondents based on Education level

c. Characteristics of respondents based on information on handling snakebites

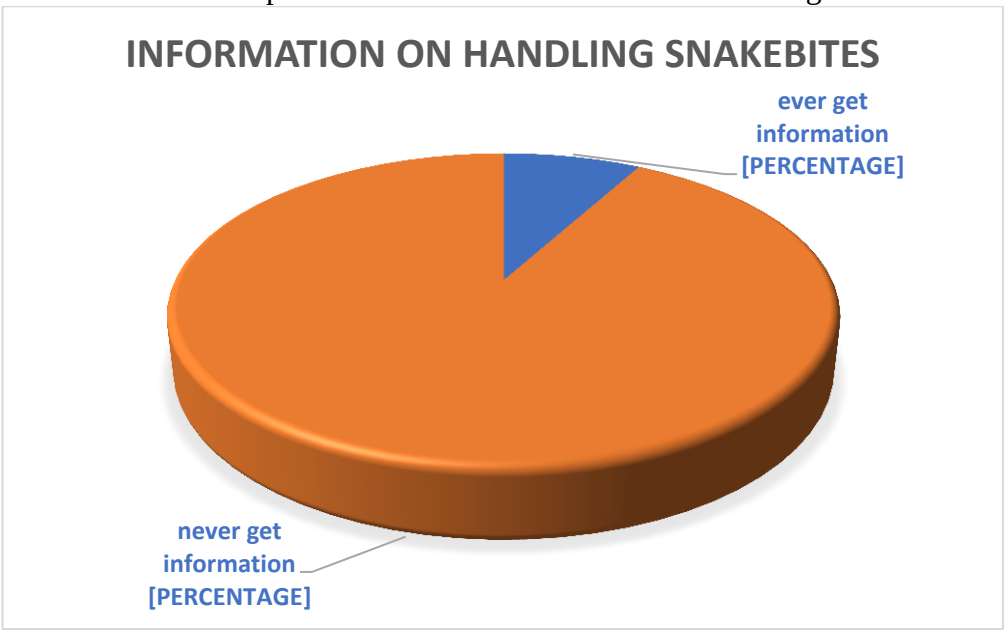

Figure 3. Characteristics of respondents based on information on handling snakebites

Community knowledge before and after being given health education about handling snake bites before going to the hospital.

KNOWLEDGE	FREQUENCY	PROCENTAGE	FREQUENCY	PROCENTAGE
	BEFORE		AFTER	
Good	8	%	52	52 %
Enough	4	4%	42	42%
Less	88	88%	6	6%

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d. Community behavior before and after being given health education about handling snake bites before going to the hospital

BEHAVIOR	FREQUENCY	PROCENTAGE	FREQUENCY	PROCENTAGE
	BEFORE		AFTER	
Good	12	12%	58	58 %
Enough	10	10%	32	32%
Less	78	78%	10	10%

e. Effect of health education on public knowledge about handling snake bites before going to hospital

Knowledge	Good		Fairly		Less	
Behavior	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Good	58	58 %	32	32%	10	10%
Enough	32	32%	42	42%	19	19%
Less	10	10%	19	19%	6	6%

The results of the Wilcoxon statistical test with a significance level of 0.05 obtained a probability result (*p value*) equal to 0.000.

DISCUSSION

A. Knowledge and behavior of the community before being given health education about handling snake bites before going to the hospital.

The results of research conducted in Wungu Village, Wungu District, Madiun Regency, showed that the knowledge of respondents before being given snakebite health education was as many as 88 respondents (88%) had less knowledge and as many as 78 respondents (78%) behaved less. Most of the respondents were aged 25-34 years (29%), elementary school education (28%), and 92 respondents never get information about handling snake bites (92%).

A venomous snake that bites envenomates (a bite that injects venom or venom), the snake's venom passes through a venom gland through a duct to the snake's fangs, and finally to its prey. Snake venom contains various enzymes. The enzymes released include hyaluronidase, phospholipase A and various proteinases that cause tissue damage. Snake venom spreads in the body through capillaries and superficial lymphatic. Local effects on venomous snake bite wounds are rapid and painful swelling (Dafa & Suyanto, 2021).

Snake venom is the only effective antidote for snake venom. Administration of snake antivenom is carried out as soon as possible according to indications. Snake venom can counter systemic poisoning even if it has been present for several days. Antivenom is given as long as there is evidence of coagulopathy. Snake antivenom plays a role in overcoming coagulopathy and reducing severe extremity edema. In addition to causing hemostasis disorders, systemic poisoning of snake venom can also take the form of neurological, cardiovascular, and acute kidney injury (Avau et al., 2016; Godpower Chinedu Michael & , Bukar Alhaji Grema, 2017).

Based on research data, 88% of the people in the Wungu Village, Wungu District, Madiun Regency have less knowledge regarding how to handle victims of venomous snake bites. Knowledge of the impact if someone is bitten by a venomous snake, so they still use traditional treatments such as sucking the wound, burning the wound, giving traditional medicines, or making new wounds, tying the snakebite wound tightly with rope. In theory, everything that is traditionally done by the community will have an adverse impact on the condition of the wound (Liwang et al., 2021; Suprastiyo & Mohammad Ali Hamid, 2015).

In a study conducted in Kenya, it was found that 68% of snakebite victims sought treatment from a traditional healer before reaching a health facility, in a similar study conducted among the pediatric population in India, only 12% received the correct type of treatment and the rest did not performed according to standard care.

People believe that snake bites are still an ordinary accident when people are in the garden, in the fields or in the forest. People have not been able to distinguish which types of snakes are venomous and which types of snakes are not venomous. Some people know that the type of venomous snake can be seen from its attractive color, triangular head and aggressive when attacking, but many people also state that venomous snakes are seen from their fangs and bite marks.

The most common type of snake encountered by respondents was a red-tailed green snake (luwak snake) which they often met in the fields with a total of 51.4%. In addition, other types of snakes that cause bite wounds are 20% of respondents said that the shape of the snake's head is triangular, some 14.3% said that the Javan spoon snake, and the remaining 14.3% did not remember and had doubts about the type of snake that often bit. From the questionnaires distributed by respondents, most of the 56% chose the answer that the red-headed green snake was a non-venomous snake.

Three categories of venomous snakes are found in Southeast Asia, namely Elapidae, Viperidae, and Colubridae. Elapidae: have short canines in front (proteroglyph). This family includes cobras, king cobras, kraits, coral snakes, Australian snakes and sea snakes. Some species of cobras can spit venom up to 1 meter or more into the eyes of their victims. Viperidae: have fairly long canines (solenogyphs) which normally fold flat against the maxilla, but become tense when attacking. Colubridae: two important species in the Southeast Asian region are the red-necked Rhabdophis subminiatus and Rhabdophis triginus. Large pythons cause bite wounds, 20% of respondents said that the snake's head was triangular, 14.3% said that the Javan spoon snake, and the remaining 14.3% did not remember and had doubts about the type of snake that had bitten (Parker-Cote & Meggs, 2018; Singaravelu et al., 2021).

Three categories of venomous snakes are found in Southeast Asia, namely Elapidae, Viperidae, and Colubridae. Elapidae: have short canines in front (proteroglyph). This family includes cobras, king cobras, kraits, coral snakes, Australian snakes and sea snakes. Some species of cobras can spit venom up to 1 meter or more into the eyes of their victims. Viperidae: have fairly long canines (solenogyphs) which normally fold flat against the maxilla, but become tense when attacking. Colubridae: two important species in the Southeast Asian region are the red-necked Rhabdophis subminiatus and Rhabdophis triginus. The large python (Boidae), a Python reticularis in Indonesia, has been reported to attack and swallow humans, which are usually farmers (World Health Organization, 2016).

There are also many respondents who do not know about the symptoms experienced if someone is bitten by a venomous snake. As many as 46% of respondents answered that local symptoms of venomous snake bites were only fangs. Even though in the answer choices there are already available signs of a venomous snake bite, including two-point fangs, bleeding that is difficult to stop, swelling, redness and bullae, skin starting to turn black and numbness which is all listed in the correct answer choices.

In accordance with the reference that bites by Viperidae / Crotalidae often cause symptoms at the bite site in the form of pain and swelling that can occur within a few minutes, can spread proximally, then edema and ecchymosis occur. In severe cases, bullae and necrotic tissue may develop, as well as systemic symptoms such as nausea, vomiting, muscle weakness, itching around the face and convulsions. Patients rarely develop shock,

generalized edema or cardiac arrhythmias, but bleeding is common. Boyer LV et al, reported that of 38 Viperidae snakebite victims, 29 (76%) had coagulopathy, with 20 (53%) having some component of coagulopathy (eg hypofibrinogenemia and thrombocytopenia). Elapidae bites are usually painless. However, the absence of local or minimal symptoms does not mean that more serious symptoms will not occur. Serious symptoms are less common and usually develop within 12 hours. The venom is neurotoxic, has a very rapid venom within a few hours, ranging from feeling drowsy to cranial nerve paralysis, muscle weakness and death due to respiratory failure (Dafa & Suyanto, 2021; Parker-Cote & Meggs, 2018).

While in the question of the questionnaire no 9 related to if someone is bitten by a snake, where should they be taken, there are still 30% of respondents who answered that they were taken to a shaman and snake charmer. This will be fatal if people do not know about the first aid that must be done and where the snakebite victim is taken. In the statement of questionnaire number 9 there are also 28% of respondents who answered first aid to snakebite victims, namely by sucking or cupping, and being cut and using ice packs, only 5% of respondents who answered in splints / spalek / godi. The knowledge possessed by the community in the study area is still a lot who do not understand the types of venomous and non-venomous snakes, the signs and symptoms when bitten by a venomous snake and the first method of handling before being taken to the hospital.

The WHO recommendation that must be done on someone who is bitten by a venomous snake is to apply a bandage or splint to immobilize the pressure on the bite area and is useful in delaying the onset of systemic toxicity from a venomous snake bite but can increase local toxicity for toxins that damage tissues at the bite site, resulting in increased local toxicity. Its use must be tailored to the needs state and nature of the poison. The position of the extremities below or at heart level should be adjusted for the snakebite patient. Apart from applying a bandage or splint to the extremity area of the snakebite victim as well as positioning the affected limb below the patient's heart level, this can delay further systemic toxicity in patients with features of systemic toxicity. While patients with severe local tissue damage and less systemic toxicity, positioning the limb below the heart may increase local toxicity (Parker-Cote & Meggs, 2018; Thiagesan et al., 2020; World Health Organization, 2016).

B. Knowledge and behavior of the community after being given health education about handling snake bites before going to the hospital.

In this study, health education was provided to respondents by providing material in the form of presentations, leaflets and videos related to how to recognize venomous and non-venomous snakes, signs and symptoms if bitten by a venomous snake and first aid if bitten by a venomous snake taken to the hospital. In this research, the material has been given directly by an expert on Snake Bite Indonesia, he is Dr. dr. Tri Maharani, M.Sc., Sp. EM, who is an advisor to the World Health Organization (WHO) for snakebite cases and he was also part of the team involved in the preparation of the Management of Snakebites guidelines.

The results of the research conducted by Wungu Village, Wungu District, Madiun Regency, showed that the knowledge of respondents after being given snakebite health education was 52 respondents (52%) with good knowledge and 58 respondents (58%) well behaved. Most of the respondents are aged 25-34 years, and have a high school education.

From the results of the questionnaire distributed to statements related to the characteristics of venomous snakes, including a triangular head, attractive color and traces of two fangs, 70% of respondents answered. As for the question of what kind of damage if bitten by a venomous snake, most of the respondents 58% answered that there was damage to body tissue/ body defects, nerve damage, heart damage and kidney damage and death.

While on the question of local symptoms of venomous snake bites, most of the respondents 67% answered that there were two-point fangs, bleeding that was difficult to stop, swelling, redness and bullae appeared and the skin began to turn black and numb. From the results of the respondents' answers, it has been shown that after providing health education about handling snake bites before going to the hospital, the community at the research site can understand. In addition to increased knowledge, the behavior of respondents related to handling snake bites before being taken to the hospital also increased.

This is evidenced in the answers to the questionnaire about behavior in number 1, which asks about what materials are made to bind/band splints/spalk on snakebite victims, as many as 67% percent of respondents answered correctly, namely using shawls, long cloth, dadung ropes. , rubber rope can be used to bandage or tie wooden boards or bamboo sticks or logs that function as splints or spalk on the victim's body part bitten by a venomous snake. Respondents also knew about 62% not to move the bitten extremities (hands and feet) to anticipate unnecessary movements so that they could spread the toxic to other tissues.

In accordance with the WHO reference that inappropriate prehospital treatment such as the installation of a tourniquet, pressure bandages, suction can, incisions, or ice packs in the community does not provide clinical benefits. This is often the cause of delays in patients being taken to health care centers. Pre-hospital treatment in accordance with WHO recommendations is immobilization with bandages and splints on the part affected by the snake bite then immediately refer to the nearest health service center (Godpower Chinedu Michael & , Bukar Alhaji Grema, 2017; Singaravelu et al., 2021).

First aid is carried out immediately after the snake bite and before the patient arrives at the hospital or clinic, it can be carried out by the victim or other people with appropriate procedures. The recommended first aid is an effort to calm the victim, immobilize the victim's entire body by lying in the recovery position¸ and immobilize the affected hand/leg using a sling, splint, or pressure bandage immobilization (PBI) method. In addition, transport the victim as quickly as possible to the nearest health facility and if possible together with the biting snake, because it will greatly affect the final outcome of the victim's medical treatment (Wintoko & Prameswari, 2020).

The following is a pressure bandage immobilization (PBI) method performed on snakebite victims:

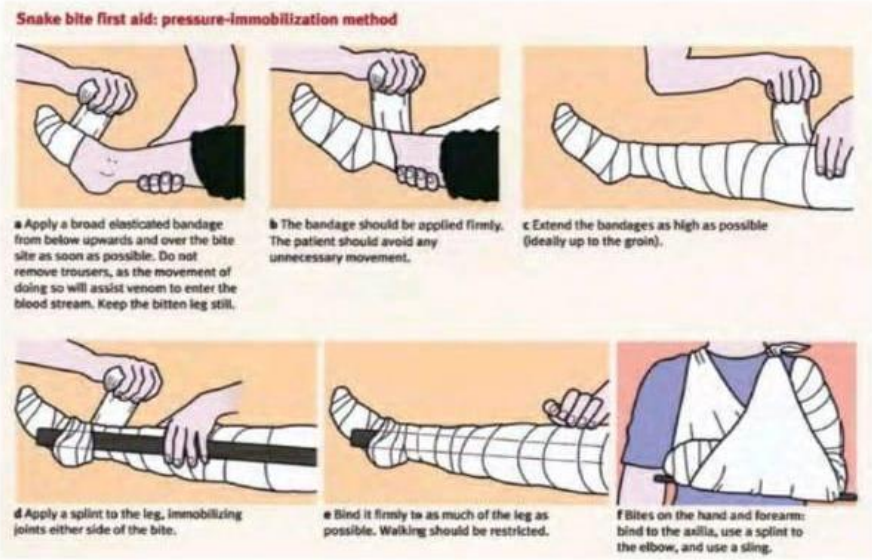

Figure 4. Immobilization techniques for snake bites. (WHO, 2016)

If in the community there is no splint, splints and bandages can use makeshift ropes such as scarves, long cloth, dadung ropes, rubber ropes can be used to bandage or tie wooden boards or bamboo sticks or wooden sticks that function as splints or spaleks on the victim's body. bitten by a venomous snake

C. The effect of health education on community knowledge about handling snake bites before going to the hospital.

The results of the research conducted in Wungu Village, Wungu District, Madiun Regency, after analyzing the Wilcoxon statistical test with a significance level of 0.05, the probability (*p value*) was equal to 0.000. This shows the statistical test value is less than the significance level of 0.05 and this means that H0 is rejected. Then H1 is accepted, which means that there is an effect of health education on people's knowledge about handling snake bites before going to the hospital. While the behavioral variables obtained statistical test results obtained a probability value (*p value*) equal to 0.000. This shows that the statistical test value is less than the significance level of 0.05 and this means that H0 is rejected. Then H1 is accepted, which means that there is an effect of health education on people's behavior regarding handling snake bites before going to the hospital.

Researchers used the Health education method directly face to face with respondents with the help of tools in the form of LCDs, leaflets and videos of snakebite handling before being taken to the hospital. From the results of the study, direct health education methods were effective in increasing public knowledge and behavior in understanding and implementing snakebite handling before being taken to the hospital.

Similar research has been carried out by….. with the results of research conducted by giving pretest and posttest questionnaires with a total of 37 respondents, the average value of the ability of farmers to help snakebite victims in Panti village farmers, Jember Regency before being given first aid health education shows that most of the ability to help the poor category as many as 26 respondents (70.3%). The characteristics of the experience of farmer respondents in the Panti village, Jember Regency, mostly have no experienced experience, as many as 8 respondents (21.3%).

Psychomotor is a domain related to skills or the ability to act after a person receives a certain learning experience. This means that the skill as an implication of achieving knowledge competence from the individual, the skill itself shows the level of a person's expertise in a task or set of tasks (Niasari, Nia; Latief, 2003; Suprastiyo & Mohammad Ali Hamid, 2015).

The form of applying knowledge into action is called skill. A person's skills can be affected by practice and education. The researcher argues that the ability to help snakebite victims after being given first aid health education with psychomotor components that the factor that increases the ability or skill to help disaster victims from being unable to being able is because respondents feel the situation is like real where respondents see and feel directly the demonstration that is being done. demonstrated with victims who seemed to exist and evaluated the simulation actions that had been carried out before the demonstration was carried out and could directly apply the knowledge that had been previously learned (Alya et al., 2022; Singaravelu et al., 2021).

Health education using lecture and demonstration methods as well as video screenings is very effective in increasing the ability to help snakebite victims. This is because health education has a very important role for the community, individuals and groups in adding information obtained through the learning process so as to improve knowledge, attitudes, and skills to be better and more correct.

CONCLUSION

From the results of the study, it can be concluded that there is health education given to the community in Wungu Village, Wungu District, Madiun Regency, which can increase knowledge and change people's behavior about handling snake bites before going to the hospital.

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CONFLICTS OF INTEREST

There is no conflict of interest in this study.

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