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Relationship between Spraying Technique and Use of PPE (Personal Protective Equipment) With Anemia Farmers in Juhar Ginting Sadanioga Village, Karo Regency in 2018

Imelda Yuristi[1], Nurmaini Nurmaini[2], Albiner Siagian[2]
[1]Master Student in Faculty of Public Health, Universitas Sumatera Utara, Medan, Indonesia
[2]Lecturer in in Faculty of Public Health, Universitas Sumatera Utara, Medan, Indonesia
Email: imelda.yuristi@yahoo.com

Abstract:
Being poisoned by pesticide used for farming becomes public health's problem. One of the poisoning sources is organophosphate pesticide. The impact of poisoning due to pesticides is anemia. The purpose of this study was to analyze the relationship between spraying techniques, and the use of PPE (personal protective equipment), with anemia farmers in Juhar Ginting Sadanioga Village, Karo Regency in 2018. The research method used was cross sectional in Juhar Ginting Sadanioga Village, Karo Regency with a total sample of 61 people obtained by Simple Random Sampling. Data were obtained through interviews with questionnaires and examination of hemoglobin levels using a portable hemoglobin meter. The study found that spraying techniques were not good (p = 0.033), and the use of PPE was not good (p = 0.025) relationship with anemia. It's suggested to farmers should pay more attention to the direction of the wind, long time spraying/ day, spraying doses, and in the use of PPE that meets the requirements to reduce the risk of pesticide exposure.
Keywords:
anemia; pesticides; spraying techniques; use of PPE

I. Introduction

Pesticides are chemical compounds used to kill pests, including insects, rodents, fungi and unwanted plants (weeds). Pesticides are used in public health to kill disease vectors, such as mosquitoes, and in agriculture, to kill pests that damage crops. By their nature, pesticides have the potential to be toxic to other organisms, including humans, and must be used safely and disposed of properly and correctly (WHO, 2018).

The impact of the use of pesticides, the use of PPE (personal protective equipment) and its relationship with health complaints due to pesticides have been shown from several previous studies. One of the studies in the Philippines showed that the most common health complaints were skin irritation (32.95%), headache (29.55%), cough (23.30%), dry throat (15.34%), tight breath (14.96%), dizzy (14.20%), queasy (12.69%), and eye irritation (11.36%). Increasing the intensity of agricultural activities, not wearing PPE gloves, and masks when using organophpsfat pesticides (Minaka et al., 2016).

According to the World Health Organization (WHO, 2017), anemia is a condition in which the number and size of red blood cells, or hemoglobin concentration, falls below the set limit value, consequently damaging the capacity of the blood to be transported to oxygen around the body. Anemia is an indicator of poor nutrition and poor health.

According to the National Basic Health Research Report (Riskesdas, 2007), the incidence of anemia nationally was found to be 14.8% (based on the Decree of the Minister of Health) and 11.9% (based on the Basic Health Research report). Twenty provinces were found which had a high prevalence nationally, as in the provinces of Southeast Sulawesi and North Maluku based on

the two references mentioned above.

According to Maksuk (2017), the results of the study showed that many farmers who experienced anemia were farmers who sprayed not following the wind direction, statistically, there was a correlation with anemia.

Based on the research conducted by Djau (2009), there are effects of pesticides on hemoglobin levels. Pesticides can destroy red blood cell. This makes the formation of methemoglobin in red blood cells, and this causes hemoglobin become abnormal so that it cannot carry out its function in delivering oxygen, while the research conducted by Kurniasih et al. and it was found that as 19 farmers were poisoned by pesticides and 17 farmers suffered from anemia.

Prasetyaningsih et al research (2017) states thatanemia is a condition that occurs when the number of red blood cells (erythrocytes) or the amount of hemoglobin found in red blood cells is less than normal. The results of this study showed 25 farmers did not got anemia and 7 farmers get anemia. The results showed that farmers who were anemic had the habit of not wearing personal protective equipment (PPE) in the form of gloves, shoes, and masks while working and having been using pesticides 20 years ago. Exposure to the body by pesticides affects the components in the human body, one of which is blood. Pesticides can cause abnormalities in the blood profile because pesticides can interfere with the organs of forming blood cells, the process of forming blood cells and also the immune system.

Based on data from the Monthly Report of Juhar Public Health Center, it was found that in February 2018 there were 74 new cases of anemia. Based on the results of interviews regarding health complaints to 30 farmers, information was obtained that from 30 farmers 5 people had narrowed heart arteries, 10 people had high blood pressure (hypertension), 6 people had diabetes (diabetes mellitus), and 9 people have Hb levels (hemoglobin) below normal. also, all farmers interviewed had complaints on other health problems such as hives, pain in the waist, dizzy, fatigue and weakness, and some farmers had complaints on frequent urination at night.

II. Research Method

To analyze the relationship of spraying techniques, and the use of PPE (personal protective equipment) with anemia on farmers in Juhar Ginting Sadanioga Village, Karo Regency 2018. This type of research is an epidemiological survey with Cross-Sectional design. The location of this study was in Juhar Ginting Village, Sadanioga, Karo Regency. The population of this study was 765 farmers. The sample used was 61 people with a Simple Random Sampling technique. Blood samples were taken directly by officers to analyze Hb levels. Hb level analysis was carried out directly at the location with samples. Respondents were said to be anemia, if Hb levels were <13 g / dl for men, <12 g / dl for women.

Some tools and materials used are questionnaire aids to determine spraying techniques, and the use of PPE and Portable Hemoglobin Meter to determine hemoglobin levels. Data analysis in this study there is 2, namely univariate, and bivariate analysis. Bivariate analysis using the chi-square test.

III. Discussion

Juhar Ginting Sadanioga Village is one of the villages in Juhar District, Karo Regency, which has a population of 1,369 people with 733 men and 636 women. Juhar Ginting Sadanioga village has an area of 6.76 Km2, with the area of agricultural land of 852 Ha. Based on data from the Karo Regency Central Bureau of Statistics (2017), the number of people who work is 864 people with 765 working as farmers or around 88.54% of the total working population. Plants that are cultivated in this area are corn, chocolate, rice, tomatoes, and chili.

The result of the study showed that there were 48 blood samples from male farmers (78.7%) and 13 female farmers (21.3%). In the spraying technique, the result showed that farmers who were not good at spraying techniques were 34 people (55.7%) and those who were good at spraying techniques were 27 people (44.3%). In the use of PPE, the result showed that farmers were not good at using PPE as 36 people (59.0%), and those who were good at using PPE as 25 people (41.0%), and farmers affected by anemia were 25 people (41.0%) and those who were not anemia 36 (59.0%).

Table 1. Gender Frequency Distribution, Spraying Techniques, Use of PPE, and Anemia in Farmers

Variable	n	%
Gender		
Male	48	78.7
Female	13	21.3
Amount	61	100
Spraying Technique		
Not Good	34	55.7
Good	27	44.3
Amount	61	100
Use of PPE		
Not Good	36	59.0
Good	25	41.0
Amount	61	100
Anemia		
Anemia	25	41.0
No Anemia	36	59.0
Amount	61	100

Spraying techniques have anemia contribution to farmers. Farmers with spraying techniques that do not conform to the procedure will have a greater risk of anemia. The results of the study showed that 18 farmers (52.9%) who sprayed were not well suffering from anemia. 19 farmers (52.8%) who were not good at using PPE when spraying suffered anemia. The results of the study showed that there was a relationship between spraying techniques (p-value = 0.033), and the use of PPE (p-value = 0.025) relationship with anemia.

Table 2. Relationship between Spraying Technique and The Use of PPE with Anemia in Farmers.

Variable	Anemia						P Value
	Yes		No		Amount		
	n	%	n	%	N	%	
Spraying Technique							

Not Good	18	52.9	16	47.1	34	55.7	0.033
Good	7	25.9	20	74.1	27	44.3	
Amount	25	41.0	36	59.0	61	100	
The Use of PPE							
Not Good	19	52.8	17	47.2	36	59.0	0.025
Good	6	24.0	19	76.0	25	41.0	
Amount	25	41.0	36	59.0	61	100	

Some farmers spray at 08.00-11.00 WIB because the research location at 12.00 WIB tends to rain. When spraying is related to the ambient temperature that can cause more sweat, especially during the day, it is easier for poisoning, especially absorption through the skin.

The results of this study explain that farmers who are not good at using PPE are at risk of experiencing abnormal hemoglobin levels (anemia). The use of PPE can prevent and reduce the occurrence of anemia, by using PPE the possibility of direct contact with pesticides can be reduced so that the risk of toxic pesticides entering the body through the respiratory, digestive and skin can be avoided, which can cause anemia. The study also explained that farmers did not pay attention and ignored the personal protective equipment they used, they only used trousers, long clothes, masks, and hats.

This study shows about spraying techniques that are in line with the research conducted by Afriyanto (2008), showing that there is a relationship between the direction of spraying on the wind direction with the incidence of organophosphate poisoning on chilli-spraying farmers. The action of spraying on the wind direction is the action of farmers when spraying plants by using pesticides on the direction of the blowing wind. Good spraying if the farmer faces in the direction of the wind while spraying. Farmers who spray downwind will get more exposure to pesticides so that poisoning is easier to have occurred especially if the plants that are sprayed have high forms.

This research is also in line with the result of Isnawan's research (2013), which states that there is a relationship between how to spray and the incidence of pesticide poisoning in onion farmers in Kedunguter village Brebes District, Brebes Regency. This is evidenced by the significance value of the results of the statistical analysis as 0.038 with the value RP 95% CI between 0.609 0.984. Based on CI value means farmers in agricultural activities by spraying are protective factors for poisoning because the range of CI values includes a value of 0.

According to Kurniawan's research (2009), that is the relationship between the use of masks and pesticide poisoning in pest spraying farmers in the Ngrapah Village, Banyubiru District, Semarang Regency.

Research conducted by Achmadi (2014) suggested that there is a close relationship between the value of hemoglobin (Hb) and the high and low levels of a person's initial cholinesterase. The lower the Hb level, the lower the level of cholinesterase in the blood. Thus anemia sufferers are actually a high-risk group for the effects of pyrethroid, organophosphate and carbamate pesticides.

The spraying technique is very influential on the occurrence of pesticide poisoning which can lead to a decrease in the production of hemoglobin in the blood, so spraying techniques must be carried out due to the procedures established by Agricultural Research and Development (2014), which must pay attention to spraying time, spraying dose, wind speed, walking speed, spraying equipment, temperature, and humidity.

This study shows that the use of PPE is in line with Achmadi's research (2014), which states that information about the part of the body which are the most exposed to risk as a way of entering poisoning, and protective clothing should be used. The parts of the body that are very susceptible to pesticide users using sprayers are the hands and chest, while the closer parts of the body the health effects of using pesticides at work can be reduced.

And research conducted by Kurniasih (2013), suggests that the use of PPE when spraying is very influential on the amount of infiltration into the farmer's body. In this study, there was no relationship between the use of Personal Protective Equipment (PPE) and the incidence of anemia.

The use of PPE when spraying is very influential on the amount of pesticide entry in the farmer's body. The use of PPE should be according to procedures according to Agricultural Research and Development (2014), farmers must use hats, glasses, masks, long clothes, rubber gloves, trousers, and rubber shoes. If farmers use complete PPE, they can reduce and minimize exposure to pesticides that can cause human health problems.

Nepalese farmers who are exposed to pesticides have more symptoms of the possibility of pesticide poisoning than a healthy individual control group. AChE levels adjusted for lower hemoglobin were seen among farmers compared to controls. The use of highly toxic pesticides, inadequate use of PPE, and poor hygienic equipment and practices may explain the reasons for symptoms of pesticide poisoning and those that are lower among farmers (Neupane, 2014).

IV. Conclusion

Based on research conducted on 61 samples of farmers in Juhar Ginting Sadanioga Village, Karo Regency, it was found that poor spraying techniques on pesticides and the use of farmers' PPE are not good according to the established procedures so that they could still cause pesticide exposure that could affect anemia in farmers. The results also show that there is a relationship between spraying techniques and the use of PPE with anemia. It is hoped that farmers should pay more attention to wind direction, spray/ day duration, spraying doses, and use of PPE in accordance with procedures implemented by agricultural research and development agencies, thereby reducing the risk of pesticide exposure.

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