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FARMER EMPOWERMENT IN REDUCING EXPOSURE AND RESIDUAL PESTICIDES IN VEGETABLES: A CROSS SECTIONAL STUDY AT KUTAI KARTANEGARA DISTRICT, INDONESIA

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ABSTRACT

Background: Based on the success of a pesticide in to overcome the problem of pest attacks, more farmers tend to use pesticide in higherdoze.

Aims: The purpose of this research is to identify problems and looking for cause a problem so that obtained alternative problem handling food safety in products of vegetable planted farmers.

Methods: An observational study with cross sectional design. The total sample of 25 farmers with non-random sampling technique that is total population. Analysis of the data used univariate and bivariate analysis using Spearman correlation test and continued with a linear regression test

Results: All respondents in plant vegetable use pesticides. A kind of pesticides most commonly used is the type a fungicide. Doses pesticides used use a unit of cover pesticide per tank. one cropping the average 14 times at least 4 times and most widely 34 cases direction spraying done farmers most 96 % in line with the direction of the wind nutritional status of respondents most normal 64 % knowledge was 76 % knowledgeable either by rerata 90,72 attitude respondents 52 % be negative and rerata a score 84,24 .The majority of respondents in spraying 96 % used a personal protective equipment (PPE). PPE who rarely used the eyes of glass and a mitt tangan. seluruh respondents have not yet undergone poisoning pesticide because the an enzyme cholinestrace 87.5 - 100 % in the category of normal and 8 % of respondents decreasing levels of an enzyme of cholinesterase be 87.5 %

Conclusion: There was the influenced of knowledge of respondents to a decrease in levels of enzymes cholinestrace. Need to be conducted socialization / pesticide management training good and true should socialization and assistance to farmers on management of the purchase of pesticides, pengaplikasian , storage and disposal need to be managed and in continuous observation .

Keywords: Pesticides, empowerment, farmers, poisoning cholinesterase enzyme

INTRODUCTION

The use of pesticides on the farm been used since long good in developed countries and in these countries to increase productivity petanian .Around the world , more than 5 billion pounds pesticide is sprayed into plants every year, 1 and more than 75 percent of the us having a level detected organophosphate [1]. To agricultural workers, their children, and those who live in farming community, exposure to pesticide is the facts of life , but one who places their health in danger serious the impact of the use of psetisida there was either effect short and longer term that have occurred from exposure to pesticides. In the short term, exposure may causes a rash, blisters,

red eyes, blindness, nausea, dizzy, headache, coma, and death. In addition, farmers can be hit by cancer disease and non-cancers such as dermatology, neurological, reproduction, and effects genotoxic.

Poisoning pesticides in agriculture is a public health problem in developing countries, killing at least 250,000-370,000 people every year [2]. Cases of poisoning due to pesticides rarely reported, it is a global problem. Poisoning is a public health problem globally significant. According to WHO data, in 2012 it is estimated that 193,460 people died in the world of poisoning unintentional. From the dead, 84% were in the low income and medium income [3]. The pesticide death of farmers is overall low, but for cancer it has steadily increased, showing that some agricultural exposure is a key determinant in the possibility.

Indonesia as an agricultural country where most of the population works in agriculture, pesticides are used intensively to support agricultural programs to meet food needs. In line with the intensification and extension programs, pesticides are shown to have an important role in improving the welfare of the people, especially in agriculture and public health. The facts show that agricultural products have increased in quality and quantity with the use of pesticides. However, pesticides are toxic and harmful materials which if not managed wisely can cause unintended negative impacts.

The negative impact will cause a variety of problems, because it will affect many aspects of life that eventually directly or indirectly affect human health and welfare, including farmers. Spraying pesticides that do not meet the rules will lead to many effects, including impacts on human health such as the incidence of poisoning to individual farmers [4]. Factors of pesticide poisoning are internal factors of the human body and external factors from outside the human body. Internal factors include age, sex, nutritional status, hemoglobin level, and health status. External factors from outside the body have a major role. These factors include the amount of pesticides used, type of pesticides, pesticide dose, frequency of pesticide, the last contact with pesticides, ambient temperature, spraying time, and the direction of the wind [5].

Pesticides widely recommended for agriculture are the organophosphate class, because this class is more easily broken down. Organophosphates affect neural function by inhibiting the enzyme cholinesterase, a chemical essential for delivering impulses along nerve fibers. With the intensification of agriculture, farmers may not be separated from the use of pesticides, especially if other means are no longer able to control the animal population / weeds. The use of pesticides can harm the health of the user community and surrounding communities for lead poisoning. Pesticide poisoning in Indonesia is not routinely reported, even if there is still very limited based on the reports received in the hospital. According to the Food and Drug Center BPOM in 2012 [6], cases of poisoning in East Kalimantan by 23 cases. However, this number could not be ascertained further due to a very wide area and many remote areas. Farmers' potential as a patient poisoned by pesticides used on agricultural land. Poisoning occurs due to lack of understanding of the dangers of pesticides, there are still many dangerous pesticides in circulation and easily available, lack of personal protective equipment that is safe, cheap and easy to use by farmers. Based on the success of pesticides in overcoming the problem of pests, there is a tendency of farmers to use pesticides continuously with a frequency high enough, is not uncommon even less attention to the rules of its use. So there is a habit of farmers to spray pesticides on crops, although there were no pests. Besides spraying technique improper and unsafe, and did not realize farmers are slowly inhale pesticides [7].

People in Indonesia's greatest livelihood was agriculture. Similarly, in Kutai regency, the majority of communities are farmers of food crops and horticulture. In the community in

planting planting can not be separated from the pesticide allegedly even been cases of pesticide poisoning that causes death. Governments with integrated pest control team to provide guidance to the seller of pesticides and farming communities who use pesticides, to prevent unwanted side effect and provide maximum benefits. The risk of poisoning can be reduced if it is done how to work safe and not detrimental to health. Therefore, efforts should be encouraged occupational health program intended to prevent, monitor and treat the risk of health problems caused by work. Moving on from this it is necessary to study Farmer Empowerment in reducing Pesticide Exposure In Vegetables in the village Bangunrejo Tenggarong Sebrang Kutai Regency.

METHODS

An observational study with cross sectional design. The total sample of 25 farmers. data collection techniques with a questionnaire that has been tested for validity and reliability data Analysis of the data used univariate and bivariate analysis using Spearman correlation test and continued with a linear regression test

RESULTS

Respondents in this study is the Farmers Group Panca Karya planted vegetables and horticulture in the Village District of Tenggarong Sebrang Bangunrejo Kukar. The farmer groups including farmer groups are active. Every month, exactly on 15 there was a meeting to discuss things at the same gathering problems faced by group members. Members of the group totaled 25 people Panca Karya. Almost entirely 88% respondents' education level is primary school. Based on the age, weight and height can be seen in the following table:

Table 1. Characteristics of Respondents by Age, Weight, Height, Lenght of Work, Knowledge and Atitude

No	Variable	Mean	Median	Sd	Nilai min-max	95% CI
1	Age	55,52	55	9,038	39-80	51,79-59,25
2	Weigh	59,64	60	8,517	49-79	56,12-63,15
3	Height	159,52	159	6,856	144-174	156,69-162,35
4.	Lenght of work	28,36	39	7,117	20- 45	25,42-31,30
5.	Knowledgge	90,72	92,02	12,44	58-100	85.58-95,86
6.	Attitude	84,24	84	7,10	72-96	81,31-87,17

The results of table 1 the analysis obtained on average age, weight, height and length of the respondent as much as 55.52 years, 59.64 Kg, 159.52 cm and 28.36 years. Median 55, 60, 159 and 39. The standard deviation of 9.038. 8.517, 6.856 and 7.117. The smallest age 39 and 80. From the estimation is believed that the average age of between 51.79 to 59.25 years. Weight smallest and largest 49 79. From the estimation is believed that the weight average from 56.12 to 63.15 Kg. The smallest height 144 cm and 174 cm greatest. The estimation result is believed that the average height is between 156.69 to 162.35 cm.

Table 2. Distribution of Respondents According Directions Spraying, Spraying Time, the Old Time spraying

No	Direction Spraying	f	%
1	About the direction of the wind	24	96
2	Contrary to the wind direction	1	4
Total		25	100
No	Spraying time	f	%
1	Morning	21	84

2	Afternoon	4	16
Total		25	100
No	Spray a long day	f	%
1	One Hour	1	4
2	Two Hour	10	40
3	Three Hour	9	36
4	Four hour	4	16
Total		25	100

From tabel 2 most respondents to spray in the mornings. The reason for choosing the time in the morning because the air is still cool and fresh 15 (60%), pests still get together and cover 2 (8%), time effective for the target pest 1 (4%) and the process of assimilation is faster (4%) reason to choose a time afternoon adjust to the situation if no morning so the afternoon four people (16%) and oral plant could eat if not morning at 08:00 to 10:00 and 14:00 to 17:00 o'clock in the afternoon, as many as 2 people

Table 3. Completeness of Personal Protective Equipment (PPE)

No	Personal Protective Equipment	Yes	%	No	%	Total	%
1	Mask	19	76	6	24	25	100
2	Hat	24	96	1	4	25	100
3	Clothes Long Sleeve	24	96	1	4	25	100
4	Glasses	4	16	21	84	25	100
5	Gloves	8	32	17	68	25	100
6	Boots	18	72	7	28	25	100

Almost entirely 96% of respondents in the spraying using the PPE

DISCUSSION

Pesticides that have resulted in the binding properties of anti-cholinesterase cholinesterase thereby increasing the risk of poisoning one group organophospat. Some pesticides used are fungicides and insecticides respondents [8]. Pesticides that have resulted in the binding properties of anti-cholinesterase cholinesterasethereby increasing the risk of poisoning one group organophospat. Some pesticides used are fungicides and insecticides respondents. doses used using a variety of sizes, there is no cap pesticides or spoon and ml least 1 tablespoon of the greatest 40 ml per tank.

The results of the analysis obtained an average score of knowledge of respondents was 90.72,92.02 and the median standard deviation of 12.44. The smallest knowledge score of 58 and the largest was 100. From the estimation is believed that the average score of knowledge between 85.58 to 95.86. If the score of knowledge are categorized into two groups: the poor level of knowledge based on the cut-off point is not normal distribution data deficient ($<$ median = 92.02) and well (\geq median = 92.02). At table 16, obtained an average score of attitude as much as 84.24, a median of 84 and a standard deviation of 7.01. The smallest knowledge score of 72 and the largest was 96. From the estimation is believed that the average score of attitude between 85.58 to 95.86. If scores attitudes are categorized into two groups: the level of negative and positive attitude by the cut off point of normal distribution of data, the negative attitude categories ($<$ mean = 84.24), and a positive attitude (\geq mean = 84.24). As for the attitude of the respondents were largely negative 52%. The results of the analysis obtained on average frequency of spraying in one planting as many as 14 times, a median of 13.92 and a standard deviation of 8.5 times. The frequency of

spraying least 4 times and the highest is 34 times in one planting vegetables. From the estimation, it is believed that the average frequency of spraying between 10.89 to 17.91 times.

Spraying is good to be in the direction of the wind so that the spray mist is not blown toward sprayers and spraying should be performed at wind speeds below 750 m per minute. Measures to spray against the wind direction is the act of farmers when spraying crops with pesticides against the wind is blowing. Spraying is good when farmers facing the direction of the wind at the time of spraying. Farmers who do the spraying upwind will get more exposure to pesticide poisoning occurs making it easier especially if the plants are sprayed has a high form. The higher plants are sprayed farmers tend to get greater exposure [9]. Spraying was not considered wind direction will cause poisoning not only on farmers alone, these chemicals will be the accumulation of pesticide active ingredients that result in pollution of agricultural land. If it enters the food chain, the toxic nature of the pesticide can cause various diseases such as cancer, mutations, birth defects, CAIDS (Chemically Acquired Deficiency Syndrome) and so on. It was reported that 60-99 percent of pesticides applied will be left behind on the target or targets, while when used in powder form, only 10-40 percent of which hit the target, while the rest drifted along the wind flow or soon reach the ground [10].

Farmers who ware poor nutritional status has a tendency to get a greater risk of poisoning when working with organophosphate and carbamate pesticides because less nutrient affect the levels of enzyme material is essentially a protein. Based on body mass index was obtained The results of the analysis obtained an average body mass index (BMI) of respondents was 23.52 kg / m², median 22.31 kg / m² and a standard deviation of 3.72 kg / m². The smallest BMI 17.93 kg / m², and the largest was 30.92 kg / m². From the estimation, it i wasbelieved that the average BMI among 21,99-25.06 kg / m². Based on the analysis Rank Spearman statistical test IMT no effect on cholinesterase enzyme levels due to farmers' groups with a normal BMI is not normal not decreased cholinesterase enzyme levels. This study differs from Habib Mualim 2002 [7] research study by design Case Control concluded that nutritional status is the most influential factor (OR = 6.87) against organophosphate pesticide poisoning in farmers spraying pests, as well as the results of research conducted by Yuantari 2009 [11] shows that there is a relationship with the nutritional status of cholinesterase activity in the blood spraying farmers who conduct research by cross sectional method Tintometer-kit. This is because at the examination kholinesterase spectrophotometer method using serum or blood plasma while the Tintometer kit using red blood granules. The nutritional status of a person is also influenced by genetic factors and diet. Determination of the nutritional status of a person is not based on BMI alone, but must be supported by measurements of head circumference and body fat measurements [12]. An assessment of a participatory training approach in changing crop protection by farmers from chemically depen- dent, to more sustainable practices in line with the tenets of Integrated Pest Management (IPM). We review the evidence from the studies on an educational investment designed to capacitate farm- ers to apply IPM, and discuss these data in the light of an on-going policy debate concerning cost effectiveness [13].

CONCLUSIONS

There is no effect of dose, frequency of spraying, spraying direction, the spraying time, the respondents' attitudes about handling pesticides on cholinestrse enzyme levels decrease. No influence respondents' knowledge cholinestrse enzyme levels decrease. It is to be disseminated / pesticide management training is good and right. Based on this conclusion, it is recommended to provide better socialization and assistance to farmers on pesticide management of the purchase, application, storage and disposal need to be managed and monitored continuously. Keep aternatif

use of natural pesticides instead of chemical pesticides because the frequency is already exceeding the limit. The use of PPE is complete when handling pesticides, especially the eye and the hand has not been protected by using the complete application, including goggles and gloves mainly made of plastic. There should be periodic checks to farmers cholinesterase coordinated by PHC Sebrang Tenggara and to encourage farmers who have poor health status for not doing the spraying. Need for guidance and assistance from related parties either the clinic or BPOM order problems pesticide residues in vegetables can be controlled. Need for monitoring and evaluation of activities Empowerment of farmers, so that this empowerment model can be continued.

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