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RELATED FACTORS TO THE SUBJECTIVE PESTICIDE POISONING INCIDENT OCCURS TO RICE FARMERS IN DISTRICT MERAUKE VILLAGE CANDRAJAYA YEAR 2017

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ABSTRACT

Introduction: *Pesticides are toxic and hazardous substances used in agriculture, if not managed properly can cause poisoning. The purpose of this study is to analyze the factors associated with the incidence of pesticide poisoning in rice farmers in Candra Jaya Village Merauke regency.*

Method Research: *The study design was descriptive analytic cross sectional study. The population in this study totslly 413 farmers who then performed the calculations using Slovin formulas thus obtained a sample of as much as 81 rice farmers who had met the inclusion criteria and relationship analysis conducted with statistical analysis by chi-square analysis and Mann-Whitney. Research variables observed were age, nutritional status, length of service, spray time, use of Personal Protective Equipment (PPE), number of pesticides, pesticide dose and spray frequency.*

Results: *The interviews showed as much as 66 (81.5%) of rice farmers experiencing symptoms of pesticide poisoning subjectively, farmers characteristics most in the category of the elderly (46.7%), mostly good nutritional status (71.6%), partly working period (91,4%), the use of PPE is mostly unfavorable (91,4%), pesticide characteristic for pesticide type is mostly poor (65,4%). , the dose of use was mostly good (96.3%) and the frequency of spraying was mostly good (81.5%). Results of analysis using the chi-square test showed there is only one variable that has a relationship that the amount of pesticides that are less good with pesticide poisoning incident subjectively (p = 0.009), while the other variables do not have a relationship.*

Keywords*: Pesticide Poisoning, Rice Farmers.*

1. PRELIMINARY

Agricultural conditions in Indonesia today are mostly directed to the interests of agro-industry. These conditions resulted in the existence of various types of diseases that are not known or become a problem before will be an obstacle for increasing the yield of various agroindustry commodities (Afriyanto, 2008). In 1942 was the beginning of the chemical revolution movement in agriculture, where in that year has been successfully created an artificial pesticide (synthesis) which is a form of compound that has an active group. The first pesticide DDT produced is kind of *(Dikhloro Diphenyl Trikhloroetana),* and then followed by a variety of other types (Palar, 2008).

Poisoning due to pesticides caused the entry of pesticide residues into the human body directly and indirectly. Directly when farmers do spraying while indirectly especially on food. According to WHO *(World Health Organization)* in 2000, about 40% ie 20,000 deaths in the world are caused by environmental pollution. WHO quotes in LESKOFI (Studidan Consultation Institute of Pharmacology, 2009), at least 20,000 people have died of pesticide poisoning and about 5,000-10,000 have been adversely affected by cancer, disability, sterility and hepatitis every year.

The first *Dikhloro Diphenyl Trikhloroetana/* DDT poisoning in Indonesia is located in West Sumatera, then in Kulon Progo area as many as 210 poisoning cases with physical and clinical examination, 50 of them are examined with 15 people (30%) positive poisoning. According to reports on Sleman regency of 30 people pest eradication officers 14 people (46.66%) have symptoms of poisoning (Fikri, 2012). Farmers' habits in using pesticides sometimes violate the rules, in addition to the doses used in excess of the dosage, farmers also often mix some types of pesticides, on the grounds to increase the poisons to plant pests. Such action is actually very harmful,

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because it can lead to higher levels of pollution in the environment by pesticides (Afriyanto, 2008).

Central Bureau of Statistics (BPS) released the results of agricultural census 2013. The number of farmers in 2003 was 31.17 million households and by the year 2013 was 2613 million households. Data on the number of Papua Rice Farmers in 2003 were 280,502 households and by 2013 there were 438,658 households. Data on the number of households of Merauke Regency farmers in 2003 were 20,873 households and in 2013 there were 21,645 households covering agriculture, food crops, forestry, fishery, livestock, horticulture, plantation and agricultural services (Census BPS, 2013).

Data Extension Workers (PPL) Kurik District, the number of farmers in Kurik Village based on ownership of land in 2014 was 769 people. While the number of farmers Candra Jaya Village with the ownership of agricultural land in 2014 is 413 people (PPL 2014 data). Initial survey results taken by the researchers, from 6 respondents who were interviewed there were 5 (83.3%) respondents experiencing health problems due to exposure to pesticides, Only one (16.7%) of the respondents did not experience health problems. Symptoms of poisoning arise include itching of the skin, the skin feels hot, shortness of breath, dizziness, vomiting and nausea, as much as 3 (60%) of 5 respondents had the same symptoms are nausea and dizziness, as much as 2 (40%) of respondents experiencing itching and feeling hot on the skin and shortness of breath after the application of pesticides on the plant. Signs and symptoms of frequent toxicity are anxiety, diaphoresis (cold sweat), shortness of breath, rapidly progressive circulatory collapse or shock (Yodenca, 2008). The incidence of poisoning caused by pesticides on farmers can be influenced by many factors both by environmental factors and the farmer's own behavior factor in any contact with pesticides.

2. RESEARCH METHODOLOGY

The type of research used in this study is descriptive analytics is a method of research conducted with the main purpose to create a description or description of a situation objectively and research design that aims to obtain explanations to explore how and why a phenomenon occurs (Elfindri et al, 2011), with a *Cross Sectional study* approach which is a non-experimental research in order to study the dynamics of the correlation between risk factors with effects in the form of a specific disease or health status, to the *point time* approach model. Variables that include risk factors and variables that include effects are observed simultaneously (Sumantri, 2011).

Population in this research is all rice farmer who work and live in Candra Jaya Village totally 413 people. Determination of the number of samples that will be used using the formula *Slovin* and obtained the number of respondents who will participate in this study were as many as 81 respondents. The sampling technique used *purposive sampling* technique that is all sample determination techniques with particular consideration. Questionnaire (questionnaire) and the *check list* is the main data collection techniques used in this study by using a number of written questions to the respondents to identify the variables age, year, old spraying, use of Personal Protective Equipment /PPE, the amount of pesticides, pesticide dosage and frequency of spraying. While the nutritional status is measured by measuring the weight and height using weight scales *(Camry)* and measuring height *(microtoise).* Data processing was performed using *SPSS version* 16.0 for windows. The data analysis using *Chi-square* and *Mann-Whitney test.*

3. RESULTS AND DISCUSSION

Characteristics of farmers consist of age, nutritional status, length of service, duration of spraying and use of Personal Protective Equipment (PPE). Characteristic of pesticide consist of pesticide type, dose and frequency of spraying. Characteristics of rice farmers in Village Dusun Candra Jaya is the youngest age of 27 years old and the oldest is 74 years old with the most age in the elderly as much as 38 respondents (46,9%), nutrient status of most of farmer either 58 people (71,6%) , the longest work period is 50 years with an average service life of 25 large tahunsebagian old rice farmer in the category of 80 respondents (98.8%), the longest time to spray is 4 hours 30 minutes with an average length of 2 hours and long spraying spraying mostly good as much 74 respondents (91,4%), use of Personal Protective Equipment (PPE) mostly less good that is 74 responden (91,4%). Pesticide characteristic for the type of pesticide used is mostly not good as much as 53 respondents (65,4%), dosage of most of farmer good that is 78 respondent (96,3%), and frequency of spraying mostly good that is 66 respondent (81,5 %).

The results of the bivariate analysis showed no relationship between the characteristics of rice farmers by pesticide poisoning incident, age, nutritional status, longer working lives spraying and use of Personal Protective Equipment (PPE). Results of bivariate analysis showed no relationship between the type of pesticide to pesticide poisoning

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incident, there was no relationship between dose and frequency of spraying with pesticide poisoning incident on rice farmers. The result of bivariate analysis can be explained as follows:

1. Respondent Age Relationship with Pesticide Poisoning Incidence on Rice Farmers in Dusun Candra Jaya Merauke Regency 2015.

The results of the bivariate statistical analysis using the *Mann-Whitney* test showed that the age of farmers do not have a relationship with the incidence of pesticide poisoning *(p-Value* = 0.976). Based on interview data from respondents age of respondents in the study known age average is 48 years. The youngest respondent age is 27 years old and the oldest is 74 years old. Rice farmers in Candra Jaya Hamlet belong to age elderly and adults. In addition, most farmers have a good IMT, with good nutritional status can increase endurance so that humans are protected from foreign microorganisms and others. Statistically and population in Indonesia is currently aged 19-49 years classified in adult age, age 50-60 years belonging to the age of half old, while age 65 years and above belonging to old age. The process of aging *(aging)* is the process of disappearance is slowly ability of tissue to maintain the structure and function normally, so it can not survive against foreign objects, including microorganisms, and the decline in the ability to repair damage suffered (Almatsier, et al., 2011).

2. Relationship Between Nutritional Status and Pesticide Poisoning Incidence in Rice Farmers in Dusun Candra Jaya Merauke Regency 2015

The results of the bivariate statistical analysis using *chi-square* test showed that the nutritional status had no connection with the incidence of pesticide poisoning *(p-Value* = 0, 431). This is contrary to research conducted by Marsaulina and Wahyuni (2005) states that there is a relationship of nutritional status to the incidence of pesticide poisoning (p = 0.019, OR = 2,2; 95% CI: 1,109-5,398) explained that farmers have a lot of activity remove calories such as hoeing, fertilizing, and spraying, and gathering at night until late at night. In the rice farmers in the hamlet Candra Jaya most have s tatus of good nutrition, the average nutritional status of rice farmers in this study was 22.43 with a low of 16.88 nutritional status and a high of 28.80, in addition to consumption the farmers also grow vegetables on the embankment (empty land between rice fields and gulps). So, for the nutritional needs of the farmers is sufficient. In addition, many farmers have used technology such as to cultivate the land using tractors, to spray using electric-fueled tanks and gasoline, for harvesting using kombayan, so that the activities of rice farmers do not require large calories.

3. Relationship Between Work Periods with Pesticide Poisoning Events in Rice Farmers in Dusun Candra Jaya Merauke Regency 2015.

Several studies have suggested that employment as a farmer is a risk factor for pesticide poisoning in farmers. But in this study the results of the bivariate statistical analysis using *chi-square* test showed that there was no relationship between tenure with the incidence of poisoning in farmers *(p-Value* = 1.000). This is in accordance with research conducted by Runia (2008) states that there is no relationship between the working period and the incidence of poisoning in farmers (RP: 0.973; 95% CI = 0.857 - 1.105). Research conducted on rice farmer in the hamlet Candra Jaya mostly farmers pioneers who have a lot of agricultural land, farmers who have vast land can only grow rice as much as 2 times per year in the same fields, while for farmers who have land can slightly Menan am as much as three times per year in the same fields, the number of farmers who have vast land causing pesticide exposure is not continuous because there spraying distance. The working period of respondents as rice farmers in the study is known to have an average value is 25 years. The shortest working period is 3 years and the longest is 50 years. In addition to the behavior of spraying pesticides that farmers do in a good category that is less than 3 hours. This makes the relationship between the working period of rice farmers and the incidence of pesticide poisoning becomes insignificant.

4. Relationship Between Any Time of Spraying with Pesticide Poisoning Events in Rice Farmers in Dusun Candra Jaya Merauke Regency 2015.

The results of the bivariate statistical analysis using *chi-square* test showed that there was no relationship between the length of time when spraying with a poisoning incident at the farmers *(p-Value* = 1, 000). Caused by It because in this study for farmers spraying time is still within safe limits ie 1-3 hours so spraying of pestisida can be minimized. In addition, this study was conducted from March to early April, most of the farmers are busy taking care of the rice harvest and not spraying the rice. The results of the research on farmers in Candra Jaya Village showed that the average respondent did spraying for 2 hours and 74 respondents (91,4%) did good spraying less than <3 hour in every spraying practice. Prabu (2008) states that the symptoms of

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poisoning of organophosphate and carbamate pesticides usually occur after 4 hours of contact, but may arise after 12 hours. Research conducted by Afriyanto (2008) states that spraying pesticides with spraying longer than 3 hours without rest will lead to chronic poisoning (RP: 4,242).

Pesticide Use in Development Guidelines explained that the respondent operators / farmers should not conduct spraying pesticide application continuously more than 4 (four) hours in a day. The length of time during the construction is something to watch out for because the longer the farmer contacts with the pesticide, the more likely the farmer will experience poisoning especially if accompanied by spraying time. In the March-April study the researchers found that not many rice plants were attacked by pests so farmers only sprayed as much as possible and more organic fertilizer treatments. Most rice farmers sprayed less than 3 hours of duration and long spraying spacing, resulting in exposure to pesticides to the farmer not continuously. Spraying during the day with high temperatures will increase the chance of poisoning because high temperatures will cause the metabolism in the body increases and the absorption of pesticides into the body becomes larger (Rangan, 2013). Temperatures in Merauke range between 25-32 ^{0} C but during the month of August affected by the cold of Australia, to reach 19 ^{0} C (Romanus and Sunarjo, 2010).

5. Relationship Between the Use of PPE With Incidence Pesticide Poisoning on Rice Farmers in Dusun Candra Jaya Merauke Regency 2015.

The results of the bivariate statistical analysis using *chi-square* test showed that there was no association between the use of PPE with a poisoning incident at the farmers *(p-Value* = 0.220). This is according to research conducted by Runia (2008) states that there is no association between the use of PPE with the incidence of poisoning in farmers (RP: 1.297; 95% CI = 0.736 to 2.287). Based on the Decree of Directorate General P2PL MOH No. 31-I / PD.03.04.LP 1993 on minimal supplies of personal protective equipment should be used based on the type of work and the classification of pesticides, some types of Personal Protective Equipment (PPE) to be used for spraying outside the building include: protective headgear (hats or caps), facial or mask protection, body armor (long-sleeved and separate armshirts, hand protection (gloves) and foot protector (long-barreled boots made of rubber, no easily torn and not easily shrink). In this study, more pesticide contamination through the skin of the hands, breathing and eyes. This is evident from data showing the number of farmers who do not use the gloves in this study were 75 respondents (92.6%), do not use the mask as much as 49 respondents (60.5%), do not use the boots as much as 72 (88.9 %) and do not use eye protection as much as 78 respondents (96.3%). The absence of a relationship between the use of Personal Protective Equipment (PPE) and the incidence of pesticide poisoning in farmers could be due to the direction of rice fields extending southwest-northeast so that when spraying blast of pesticide fluid blown away from farmers. In addition, farmers also spray in the condition do not suffer a scratch or wound wound on the hands so that toxins are not easily absorbed. The ability of a chemical to penetrate the skin depends on the solubility of the substance in fat, such as organic solvents and phenol can be absorbed through the skin. If the skin is damaged by irritation, scratching, or disease, the absorption of chemicals that it contacts enters into the body more quickly (Sucipto, 2014).

6. Relationship Between Number Type Pesticides Poisoning Genesis Pestisidapada Paddy Farmers in Hamlet Candra Jaya Merauke 2015.

Results of bivariate analysis showed no relationship between the amount of pesticides used by farmers incidence of pesticide poisoning in rice *(p-Value* = 0.009). This is in accordance with research conducted by Afriyanto (2008) states that there is a relationship between the types of pesticides with poisoning occurrence at farmers sprayers (RP: 4,685, 95% CI = 1,155 - 19,004). Rice farmers do have a habit of using bany ak insek types of pesticides such as insecticides, fungicides, fertilizers, adhesives and herbicides for the period before planting and at planting time, its use by mixing some pesticides. Most farmers use more than two types of pesticides, it is not in accordance with the rules of the spraying of the department of agriculture that require spraying one type for one spraying. In addition, many farmers who after spraying hand wash using rice water. One kind of effect can be caused by more than one toxic and vice versa, a single poison can cause various effects (Soemirat, 2003). High-frequency pesticide spraying will result in considerable side effects, as resistance and resurgence of target pests may occur, in which case secondary pest infestations are not targeted, and the destruction of some non-target biota. Besides pesticide residues in soil and plants can cause environmental pollution, and also cause toxicity which can result in the occurrence of death and disability (Afriyanto, 2008). In studies in Hamlet Candra Jaya spraying practices, care and knowledge of the function of the spray equipment

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is lacking, with many ditemuakan habit of mixing of pesticides that do not notice Ph. The habits of rice farmers who mix pesticides can be attributed to the limited time spraying (duration of spraying), in the previous discussion most of the farmers sprayed in a good category because it offset the time when rice flowering and fruiting, therefore farmers mix pesticides in order to shorten the time of application for 2 types of pesticides.

7. Relationship Between Dose of Pasticide Use with Pesticide Poisoning Incidence on Rice Farmers in Dusun Candra Jaya Merauke Regency 2015.

The results of the bivariate statistical analysis using *Chi-square* test showed that there was no relationship between dose pesticide poisoning incident at the farmers *(p-Value* = 1.000). The dosage of pesticide used in one spray per hectare in the research was known that the average value was 793 cc / ha. The dose of pesticide is at least 110 cc / ha and most of it is 2,500 cc / ha. This is contrary to research conducted by Marsaulina and Wahyuni (2005) that farmers want to get quick results in eradicating pests and plant growth, thus doing compounding by adding predefined dosage. Extra become more concentrated dose, inhalation via inhalation can be risky to health and can cause environmental pollution such as soil and water (p = 0.005, OR = 2.6). All types of pesticides are toxic, the larger the dose the greater the occurrence of pesticide poisoning. Because if the dosage of pesticide use increases, the effects of pesticides will also increase. Dosage of pesticides that are not appropriate dose is related to the occurrence of organophosphate pesticide poisoning farmers. Incorrect doses may also result in resistance and resurgence of plant pests (Mualim in Afriyanto, 2008). Symptoms of poisoning by farmers can be caused not using Personal Protective Equipment /PPE completely, the observation shows that most farmers do not use a mask (60.5%) and gloves (75%) while spraying, as well as the entry of pesticide safety gloves also prevents friction with the leaves or stems of rice plants were covered with short hair and rarely can make itching if touched / rubbed. Not significant dose with poisoning event can be caused even though farmer mixing 2 kinds of pesticide but still in dosage recommendation on pack or not over dose other than that pest attack also influence with amount of dose used by farmer in Village Candra Jaya.

8. Relationship Between Frequency of Spraying with Pesticide Poisoning Incidence on Rice Farmers in Dusun Candra Jaya Merauke Regency 2015.

The results of the bivariate statistical analysis using *Chi-square* test showed that there was no relationship between dose pesticide poisoning incident at the farmers *(p-Value* = 1.000). This is in accordance with research conducted by Afriyanto (2008) states indirectly farmers activities that reduce the frequency of spraying can reduce the exposure of farmers by pesticides. There was no correlation between spraying frequency and pesticide poisoning in this study because respondent mode sprayed chilli plant in one week 1 times, median 1 time with standard deviation 0.66 times in one week. Rice farmers in spraying at least one time in a week and no more than 5 times in one week, most farmers are spraying more > 2 times a week as many as 15 respondents (18.5%). The frequency of spraying pesticides by rice farmers in a week in the study known the average value is 2 times / week. The frequency of spraying the pesticide is at least 1 / week and the most is 5 times / week. Farmers apply plant spacing system because it can affect the distance of harvest time so as not to trouble farmers when harvest arrives, with the system spraying frequency on rice plants ranging from 7 (seven) to 10 (ten) days.

The use of pesticides is rarely due to the application of row spacing causes the relationship between the frequency of spraying with pesticide poisoning incident becomes insignificant. Exposure to pesticides on the human body with frequency often and with short intervals cause of pesticide residues in the human body becomes higher, it is because kholinesterase levels in the blood return to normal takes 310 hours. Breaking time minimum of one week can raise blood kholinesterase activity on farmers on spraying. Break of at least one week in mild poisoning farmer can raise kholinesterase activity in the blood to normal (87.50%) (Mariani in Afriyanto, 2008). In addition to planting rice spacing for harvest, the frequency of pesticide spraying in Candra Jaya Village is closely related to the application of pesticide types by farmers, rice farmers have an average of 2.7 types of pesticides used and an average up to 2 hours of spraying. Normal application time for 1 Ha land up to 2 hours, if applied al least 2 types of pesticides then it takes a maximum of 4 hours, with the system rice will be sprayed at the time of blossoming flowers. For that farmers do the ability to save time, so there is a spraying pause that affects the frequency of spraying in this study.

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Table 1. Characteristics of Respondents and All Factors Role In Genesis Pesticide Poisoning In Subjective.

No.	Variables	**Frequency**	%
1.	Age		
	Adults (26-45 years)	37	45.7
	Elderly (46-65 years)	38	46.9
	Elderly (> 65 years)	6	7.4
2.	nutritional Status		
	Poor (<18.5 or> 25)	23	28.4
	Good (18.5 to 25)	58	71.6
3.	working period		
	Long (≥5 years)	80	98.8
	New (<5 years)	1	1,2
4.	Long time spraying		
	Less (≥3 hours)	7	8.6
	Good (<3 hours)	74	91.4
5.	Use of PPE		
	Less	74	91.4
	Good	7	8.6
6.	J enis amount of pesticides		
	Less well (≥ 3 types)	53	65.4
	Good (<3 types)	28	34.6
7.	Number of doses of pesticides		
	Less good (not as recommended)	3	3.7
	Good (as recommended)	78	96.3
8.	Spray frequency		
	Less well (> 2 times / week)	15	18.5
	Good (≤ 2 times / week)	66	81.5
9.	Spray frequency		
	Less well (> 2 times / week)	15	18.5
	Good (≤ 2 times / week)	66	81.5

Source: Primer data, 2015.

Table 2. *Mann-Whitney* analysis Results Between Age With the incidence of pesticide poisoning in rice farming.

Variables	Mann-Whitney	Z	n	p-value
Age with the incidence of pesticide poisoning	492,500	-0.030	81	0.976

Source: Primer data, 2015.

Table 3. Recapitulation of the bivariate analysis with *chi square* test variables associated with the incidence of pesticide poisoning in rice farming.

No.	Variables	***P-value***	RP	95% CI	**Information**
1.	Nutritional status	0, 431	0, 875	0.670-1.142	No connection
2.	Years of service	1,000	0.812	0.731-0.903	No connection
3.	Long time spraying	1, 000	1.057	0.766-1.458	No connection
4.	Completeness p use of total APD	0.220	1,466	0.766-2,807	No connection

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5.	Many types of p estisida	0.009	1.407	1,055-1,882	There is a Relationship
6.	Dose of pesticide used	1,000	0.812	0.363-1.821	No connection
7.	Frequency of spraying	1,000	0.978	0.741-1.290	No connection

Source: Primer data, 2015.

3. CONCLUSION

1. Characteristics of farmers consist of age, nutritional status, length of service, duration of spraying and use of Personal Protective Equipment /PPE. Characteristic of pesticide consist of pesticide type, dose and frequency of spraying.

   a. Characteristics of paddy farmers in Candra Jaya Village is the youngest age of 27 years old and the oldest farmer is 74 years old with the most age in the elderly as much as 38 respondents (46,9%), nutrient status of most of farmer either totally 58 people (71,6%) , the longest work period is 50 years with an average service life of 25 years and half as old rice farmer in the category of 80 respondents (98.8%), the longest time to spray is 4 hours 30 minutes with an average length of 2 hours and spraying mostly good long spraying as much as 74 respondents (91.4%), Using Personal Protective Equipment /PPE largely unfavorable, with as much as 74 respondents (91.4%).
   b. Pesticide characteristic for the type of pesticide used is mostly not good as much as 53 respondents (65,4%), dosage of most of farmer good that is 78 respondent (96,3%), and frequency of spraying mostly good that is 66 respondent (81,5 %).

2. A total of 66 rice farmers (81.5%) in Candra Jaya Village experienced symptoms of poisoning and 15 respondents (18.5%) were rice farmers who had negative symptoms of poisoning.
3. Results of bivariate analysis showed no relationship between the characteristics of rice farmers with the incidence of pesticide poisoning, age *(p-Value:* 1,000), nutrition status *(p-Value:* 0, 431), length *(p value:* 1.000), duration of spraying *(p value:* 1, 000) and the use of Personal Protective Equipment /PPE *(p value:* 0.220).
4. Results of bivariate analysis showed no relationship between the type of pesticide to pesticide poisoning incidence *(p value:* 0.009), there was no relationship between dose and frequency of spraying with the incidence of pesticide poisoning in rice farmer *(p value:* 1.000 and *p value:* 1.000).

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