

IMPACT STUDY ON PESTICIDE USE PUBLIC HEALTH IN THE AREA OF AGRICULTURE ALAHAN PANJANG DISTRICT SOLOK

Sari Arlinda¹, Suksmerri², Muchsin Riviwanto³

¹ Politeknik Kesehatan Kemenkes Padang

² Politeknik Kesehatan Kemenkes Padang

³ Politeknik Kesehatan Kemenkes Padang

Email : sariarlinda80@gmail.com

ABSTRACT

Farmers and pesticide are two things that are difficult to separate. Improvement of agricultural products is the hope of farmers. Pesticides are chemicals used to eradicate pests that can increase farmers' yields^(1,2), The use of pesticides by farmers is increasingly growing, but not matched with the increase in understanding of the use of pesticides. The impacts of the use of pesticides are the pollution on water, soil, air, and impacts on the health of farmers, their family and consumers^(1,3), This research is a quantitative research with cross-sectional design (cross-sectional), the samples were selected by simple random sampling. Interviews were conducted and samples of blood were collected from 114 farmers in the agricultural area Alahan Panjang

The farmers are aged 19 to 49 years with an average of 28 years. High level of 63.2% knowledge, experience good skills 59.6%, and a good pesticide handling practices 71.9%. But are not included with the use of Personal Protective Equipment (PPE) which is 12.3% complete in the implementation of pesticide spraying. Adequate nutrition status 64.9% and a high activity of the enzyme cholinesterase 87.7% impact to lower health disorders consist of 22.8% 15.4% 84.6% cancer and gastrointestinal disorders. Analysis using logistic regression that nutritional status (OR = 3.7) and cholinesterase enzyme activity (OR = 6.6) is the main factor that impacts health problems to farmers.

Keywords: Farmer, Pesticides

1. PRELIMINARY

Pesticide poisoning in farmers is a major public health problem, especially in developing countries. They kill 250,000 to 370,000 people each year from pesticide poisoning that goes through the digestive tract. According to the World Health Organization (WHO), at least 20,000 people per year die from pesticide poisoning⁽⁴⁾, An estimated 5000-10000 people per year experience a fatal impact, such as the experience of cancer, disability, infertility and liver disease^(4,5),

Based on data from the year 2012 mentioned that the use of pesticides throughout Indonesia was around 55.42%. It is estimated that as a result of pesticide poisoning each year 300,000 cases of fatal and patches⁽⁶⁾, In 2008 in Kulon Progo Central Java occurred as many as 210 cases of pesticide poisoning cases of poisoning by physical examination and clinical, and laboratory examined 50 of them with the results of 15 people (30%) were poisoned^(7,8),

Based on the results of the 1800 farmers in West Sumatra are often recorded 81.6% of pesticide spraying pesticide poisoning, although not classified as severe poisoning⁽⁹⁾, Based on data from Solok district health department in 2017 in Alahan region there were death in infants and toddlers with 26 cases and the number of people suffering from cancer is found as many as 15 cases⁽¹⁰⁾, Based on the number of cases of pesticide-related health in the agricultural area Alahan Panjang, Solok town it is necessary to study the impact of the use of pesticides on public health in agricultural areas Alahan Panjang, Solok regency

2. RESEARCH METHODS

This research is a quantitative study using cross sectional study design (cross-sectional)⁽¹¹⁾, This study was conducted to determine the impact of the characteristics (age, sex, knowledge, experience, skills, education, the use of personal protective equipment, nutrition, pesticide handling practices, and examination of cholinesterase) to public health in the agricultural area. The experiment was conducted in agricultural areas in Alahan Panjang, Solok regency from March to October 2018.

The population of this study were all farmers in the agricultural area in Alahan Panjang, Solok regency. The samples in this study were farmers. The inclusion criteria were family farmers who have pregnancy / childbirth in the last 3 years. The sampling method in this study is a random probability sampling, where the number of samples in each corner in Kenagarian Alahan Panjang has an equal chance of being selected as a sample. Selection of respondents with Simple Random Sampling (SRS) on every corner were made in accordance with the requirements (a large sample of 111 respondents)⁽¹²⁾,

Univariate analysis done by looking at a picture of health disorders, characteristics of the farmers and families, added with blood cholinesterase enzyme activity and management of pesticides by farmers with tables, graphs and curves. The bivariate analysis use chi square test, t test, ANOVA test where the results of the p-value were compared with 5% alpha. Multivariate analysis was done by using logistic regression method⁽¹¹⁾,

3. RESULTS

Table. 3.1 Relations Knowledge, Skills Experience, Education, Use of PPE, Nutritional Status, Pesticide Management Practices, and the activity of cholinesterase enzyme with Health Problems on Farmers.

variables	Health problems				Total		OR (95% CI)	P- value
	No		There is		n	%		
	n	%	n	%				
Knowledge								
High	52	72.2	20	27.8	72	100	0.4	0154
Low	36	85.7	6	14.3	42	100	0.2-1.2	
amount	88	77.2	26	22.8	114	100		
Skills experience								
Skilled	49	72.1	19	27.9	68	100	0.5	0174
unskilled	39	84.8	7	15.2	46	100	0.2-1.2	
amount	88	77.2	26	22.8	114	100		
Education								
High	26	65	14	35	40	100	0.4	0041

Low	62	83.8	12	16.2	74	100	0.2-0.9	
amount	88	77.2	26	22.8	114	100		
APD								
always use	8	57.1	6	42.9	14	100	0.3	0084
rarely used	80	80	20	20	100	100	0.1-1.1	
amount	88	77.2	26	22.8	114	100		
Nutritional status								
Enough	61	82.4	13	17.6	74	100	2.3	0114
Less	27	67.5	13	32.5	40	100	0.9-5.5	
amount	88	77.2	26	22.8	114	100		
Pesticide Management Practices								
Well	58	70.7	24	29.3	82	100	0.2	0017
Bad	30	93.8	2	6.3	32	100	0.0-0.7	
amount	88	77.2	26	22.8	114	100		
Activity cholinesterase enzyme								
High	81	81	19	19	100	100	4.3	0016
Low	7	50	7	50	14	100	1.3-13.6	
amount	88	77.2	26	22.8	114	100		

Based on Table 3.1 Statistically there was significant correlation between education and health problems of farmers (p-value = 0.041), a significant correlation between the practice of handling pesticides with health problems of farmers (p-value = 0.017), a significant correlation between the activity of the enzyme cholinesterase with health problems of farmers (p-value = 0.016). Variable knowledge, experience, skills, use of PPE, and the nutritional status were not significantly relationship with a p-value value 0154, 0174, 0084, 0114.

Final Table 3.2 Logistic Regression Model

variables	B	SE	Exp (B)	95% CI	p-value
Age	0049	0044	1.1	0.0-0.7	0261
Skills experience	-0389	0609	0.7	1.3-10.5	0523
APD	-1274	0669	0.3	1.7-25.7	0057
Nutritional status	1,297	0536	3.7	1.0-1.1	0016
Pesticide Management Practices					
	-2149	0947	0.1	0.2-2.2	0023
Activity cholinesterase enzyme	1884	0695	6.6	0.1-1.0	0007

Based on Table 3.2 it can be interpreted that the risk of farmers suffered from health problems with the variation of age, skill experience, use of PPE and pesticide handling practices are considered equally good for OR less value equal to one. The risk of farmers who have malnutrition to experience health problems 3.7 times greater compared to farmers with adequate

nutritional status. The risk of farmers with low cholinesterase enzyme activity to experience health problems 6.6 times greater than the farmers with high cholinesterase enzyme activity.

4. DISCUSSION

Base on the results of bivariate analysis, age was not associated with health problems. Due to the age at 19 years old to 49 years old so it does not have significant variations. These results are in line with research conducted Purba GI (2010) that the age was not associated with cholinesterase levels in the blood so it does not cause health problems for farmers⁽¹³⁾,

The higher the level of education and knowledge of farmers have on the use of pesticides, the better they will be to change their behavior to use PPE during work⁽¹⁴⁾, The results showed there is relationship with the education level of existing health problems to farmers. This is not in line with Handojo study (2000), quoted by Marsaulina that there is no relationship between the level of education of pesticide poisoning⁽¹⁴⁾,

The results showed that most farmers rarely use the PPE that is 87.7%, only 12.3% of farmers use a complete PPE. However, the use of PPE are not related to health problems of farmers. This study is not in accordance with the opinion expressed by Ngurensiti, DI (2014), which suggests that poisoning can occur due to the influx of excessive pesticides or for ignoring safety procedures, health and safety and working equipment are inadequate⁽¹⁵⁾.

The results showed that most farmers have adequate nutritional status, namely 64.9%, farmers consume carbohydrates, proteins, vegetables, fruits, and milk every day. Farmers with less nutritional status are at risk for health problems caused by pesticides occurs 3.7 times greater than the farmers with adequate nutritional status. The state of nutrition would result in the decreasing of immune system and increasing of susceptibility to infection. Poor nutritional condition, protein in the body is very limited and the cholinesterase enzyme is made up of protein, so the formation of the cholinesterase enzyme will be disrupted⁽¹³⁾.

The results showed that pesticide handling practices by farmers mostly good that is equal to 71.9%, statistically there is a relationship of pesticide handling practices with health problems of farmers. The results showed some farmers cholinesterase levels are relatively high 87.7%, but 12.3% of the farmers have lower cholinesterase levels.

The results are consistent with research Sukati et al in District Pakis Magelang, which found a prevalence of farmers with lower cholinesterase levels only by 3.8%, and research Purba GI (2010), shows some farmers cholinesterase levels are relatively low, but not to the extent of pesticide poisoning, probably due to the exposure to pesticides on respondents is still low, the interviews with the respondents showed a 20% risk of high exposure^(13,16).

5. CONCLUSION

- a. The proportion of health problems diagnosed by health workers amounted to 22.8%, which means that among 1000 farmers there are 228 farmers who will experience health problems.
- b. Farmers will experience health complaints such as nausea, dizziness, shortness of breath, or irritation of 33.3% after spraying pesticides
- c. Nutritional status is a factor that is associated with health problems of farmers, Farmers with less nutritional status are more likely 3.7 times risked to experience health problems.

- d. Activity cholinesterase enzyme is a factor that is most associated with health problems in farmers. Farmers with activity cholinesterase enzyme are low-risk, 6.6 times more likely to experience health problems.

6. SUGGESTION

- a. By knowing the health problems caused by the use of pesticides, which are less and the nutritional status activity Low cholinesterase enzyme is factor that have risks high to cause health problems of farmers, it means that there should be preventive measures, such as counseling related to the safe use of pesticides behavior like effects caused by pesticides on health. Farmers must pay attention to the consumption of food every day because of exposure to pesticides would require many nutrients for the resilience of the body inward the toxic effects of pesticides, either directly or through contact with a pesticide vegetables consumed.
- b. In addition to that health counseling is done to farmers, training needs to be done periodically and the use of pesticides by farmers should be controle. This is due to the discipline of farmers in dispensing and giving dosage of pesticides.
- c. For the Ministry of Health, they need to produce more advertisements that depict the dangers of pesticides on health
- d. For subsequent researchers who want to conduct related research related, they need to add other risk factors, such as mixing pesticides, storage, post the use of pesticides, as well as other variables that are not included in this study, so that these factors can be controlled in the analysis.

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