

Influence of Pesticide Intoxication Education on Farmer Knowledge and Attitude in Kalidoni District, Palembang City, Indonesia

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Abstract

Knowledge and attitude of farmers are among factors that influence pesticide intoxication in farms. They are influenced by several variables, including education. Farmers' knowledge and attitude on pesticide intoxication may change after they receive interventions, such as education about pesticides. This study aimed to determine the level of knowledge and attitude of farmers on pesticide intoxication before and after an education session on pesticides in Sei Selincah Sub-district, Kalidoni District. This was a quasi-experimental observational analysis with a two-group pretest posttest design with a control group. This study used primary data from farmers in Sei Selincah Sub-district, Kalidoni District. Sampling was performed using the purposive sampling method and seventy-six respondents who met the inclusion and exclusion criteria were recruited. Results of the statistical tests using the Wilcoxon test showed that there was no difference in the level of knowledge and attitude of farmers before and after education, both for the intervention group and the control group ($p > 0.05$). Thus, education does not influence the level of knowledge and attitude on pesticides and pesticide intoxication among farmers.

Keywords: Attitude, farmer, level of knowledge, pesticide

Introduction

A Pesticide is a substance or mixture of substances used to repel and control pests such as insects, snails, rats, fungi, bacteria, and weeds. Pesticides can provide beneficial benefits and vice versa. The occurrence of ecosystem imbalances and poisoning is the impact of damage from pesticides.^{1,2} The level of pesticide intoxication is still very high, in 2016 pesticide intoxication in Indonesia was recorded at 771 cases, then in 2017 there were 124 poisoning cases and 2 of them died.³

The use of personal protective equipment (PPE), inappropriate use of pesticides, low levels of knowledge, and inappropriate work attitudes can be risk factors for pesticide poisoning through direct contact with farmers.⁴ According to Minaka et al.,⁵ it was found many farmers do not use full PPE. As many as 42.2% of farmers do not use long sleeves and 55.4% of farmers do

not use masks when spraying, as many as 78.2% of farmers use doses of pesticides that are not by with the guidelines. The level of knowledge itself is also very influential with the onset of symptoms. Pesticide intoxication, farmers who have a low level of knowledge as much as 76.9% experience symptoms of intoxication.⁶ These factors can increase pesticide exposure to farmers so that it can lead to acute and chronic pesticide intoxication in farmers. According to Pamungkas,⁷ some of the impacts caused by pesticide intoxication such as irritation of the eye or skin membranes on short-term exposure, hormonal system disorders, organ failure, and also death due to long-term exposure to pesticides.

Knowledge, attitudes, and practices of using pesticides farmers can change after the intervention in the form of education about pesticides is given. Based on research by Erwin et al., it is stated that the level of good knowledge of intoxication in farmers will increase from 3% to 27%, a good attitude will increase from 15% to 33%, and good practice it will decrease from 15% to 12% after being given education.⁸ Providing education to farmers about pesticides

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can increase the level of knowledge and attitude of farmers from poor to good.

Kalidoni District is one of the sub-districts in the city of Palembang which has a fairly large agricultural area, Kalidoni District there are still many agricultural areas that have the potential to be developed, and Sei Selincah Sub-district is one of them. Sei Selincah Sub-district has an agricultural land area of 319,00 ha consisting of 250,00 ha of rice fields and 69,00 ha of non-rice fields making the majority of the population work in the agricultural sector.⁹ Based on the results of a visit to the agricultural office of the city of Palembang, it was found that out of 33 farmer groups in the Kalidoni sub-district, 16 of them were in Sei Selincah Sub-district. The wider the agricultural areas mean the increasing pesticides are used to control pests on plants to suppress or reduce the damage of the pests. It also indicates the high possibility of exposing the pesticide.

Based on the description above, it is known that the rate of pesticide intoxication is still quite high in Indonesia. Level of knowledge and attitude is the factors that influence pesticide poisoning. Therefore, here the author was interested in researching on the effect of giving education on pesticide intoxication on the knowledge and attitude of farmers in Kalidoni District, Palembang City.

Methods

In this study, the research design used was a quasi-experimental design with a two-group pre-test and a post-test design with a control group. The sample used in this study were farmers in Sei Selincah Sub-district, Kalidoni District, Palembang City, the inclusion criteria are farmers who handled the pesticide and filled out the informed consent form. In this research, the sampling technique was non-probability sampling using a purposive sampling technique, the total respondents obtained were 76 out of 334 farmers. The method of collecting data in this study was using a questionnaire that had been validated, the knowledge and attitude questionnaire was declared valid with the value of $r > 0.339$ and the reliable value of the coefficient for the knowledge questionnaire is 0.863 and 0,799 for attitude questionnaire.

After being given a pretest questionnaire the respondents would be given an intervention in the form of giving leaflets and speech for the intervention group and giving leaflets only to the control group, after giving the intervention

respondents were given a posttest questionnaire. The data analysis used in this research was the Wilcoxon test. The research has been ethically approved by the Health Research Ethics Committee of Faculty of Medicine, University of Muhammadiyah Palembang No.20/EC/KBHKI/FK-UMP/XI/2021.

Results

This study has used 2 questionnaires about knowledge and attitude about pesticide intoxication. After the validation and reliability test, there were 12 questions from 22 questions about pesticide intoxication on knowledge and 9 questions from 11 questions about the attitude that had been validated ($r > 0.339$).

Based on Table 1, it was found that there were 76 respondents mostly consisting of the age category of 30–50 years as many as 41 farmers

Table 1 Frequency Distribution of Farmer Characteristics in Sei Selincah Sub-district, Kalidoni District, Palembang City

Variable	Frequency (n)	Percentage (%)
Age (years)		
<30	16	21%
30–50	41	54%
>50	19	25%
Gender		
Man	51	67%
Woman	25	33%
Level of education		
Not completed in primary school	19	25%
Elementary school	22	29%
Junior high school	17	22%
Senior high school	17	22%
College	1	1%
Length of work (years)		
<5	11	14%
>5	65	86%

Table 2 Frequency Distribution of Farmers' Knowledge Levels Before and After Education in the Intervention Group and Control Group

Group	Before Education	After Education
	Frequency (n)	Frequency (n)
Intervention		
Enough	33	30
Good	5	8
Less	0	0
Control		
Enough	34	32
Good	4	6
Less	0	0

Table 3 Frequency Distribution of Farmers' Attitudes Before and After Education in the Intervention Group and Control Group

Group	Before Education	Before Education
	Frequency (n)	Frequency (n)
Intervention		
Good	37	38
Bad	1	0
Control		
Good	38	38
Bad	0	0

Table 4 Farmers' Knowledge Level of Pesticide Intoxication Before and After Education on Pesticides in the Intervention and Control Group

Variable Level of Knowledge	P-Value
Intervention Group	0.180
Control Group	0.414

Table 5 Farmers' Attitudes to Pesticide Intoxication Before and After Education on Pesticides in the Intervention and Control Group

Variable	P-Value
Intervention Group	0.426
Control Group	0.206

(54%), for gender itself the most dominated by men, namely 51 farmers (67%) and for the education level, most of the respondents graduated from elementary school as many as 22 farmers (29%) and for the length of work the most respondents worked >5 years as many as 65 farmers (85%).

The result of farmer's knowledge is divided into 3 categories, there are enough, good and less. The farmer who answered <7 questions correctly were included in the less category, 7-10 questions in the enough category, and >10 questions in the good category. Based on table 2 showed that the level of knowledge of farmers before being given education was mostly in the sufficient category, namely 33 of 38 farmers for the intervention group and as many as 34 of 38 farmers for the control group. After being given education, the farmer's level of knowledge remained mostly in the sufficient category, with as many as 30 of 38 farmers in the intervention group and 32 of 38 farmers in the control group. However, there was an increase in the number of respondents both after being given education by 3 farmers in the intervention group and an increase in 2 farmers in the control group.

The result of the farmer's attitude is divided into 2 categories, there are good and bad. The farmer who answered ≤11 questions correctly were included in the bad category and >11 questions in the good category. Based on Table 3 showed that the attitude of farmers before being given education was mostly in the good category, namely 37 of 38 farmers for the intervention group and 38 farmers for the control group. After being given education on the attitude of farmers, all of them were in a good category, namely 38

farmers both in the intervention group and the control group.

Based on table 4 showed that after the Wilcoxon test was carried out, the p-value was 0.180 and the p-value 0.414 ($p\text{-value} > 0.05$). This shows that there is no difference in the level of knowledge before and after being given education in the intervention group and control group.

Based on Table 5, shows that after the Wilcoxon test, a p-value of 0.426 and a p-value of 0.206 was obtained ($p\text{-value} > 0.05$), this indicates that there is no difference in attitudes towards pesticide intoxication before and after the intervention and control group.

Discussion

The research was conducted in Kalidoni District, Palembang City, 76 respondents participated in this study which was divided into two groups, namely the intervention group and the control group. It was found that the majority of respondents' knowledge before education was mostly in the sufficient category and no respondents were included in the less category (Table 2). The attitude of farmers before being given education was mostly in the good category, both in the intervention group and the control group (Table 3).

After the pre-test assessment, the respondents were given education about pesticide intoxication. In the intervention group, the education form was leaflets and teaching techniques included discussion sessions, while in the control group were only given leaflets. After the education session, the respondent was given a post-test to measure the knowledge change. The result was the knowledge level of farmers had increased to the good category, both in the intervention group and in the control group because of the addition of information at the time of education using leaflet media and the teaching techniques. This increase occurred more in the intervention group than in the control group due to differences in the media used. The same result was conducted by Sharifzadeh and Abdollahzadeh¹⁰ that there was an improvement in the farmer's knowledge and practice about pesticide exposure after the implementation of educational intervention using Focus Group Interaction, Personal Field Interaction, and Group Media Approach. Another study affirmed that there was an improvement in the farmer's knowledge and practice about pesticide

exposure after educational intervention using a lecturer and videotape.¹¹ The findings showed that there was an improvement in attitude after the educational intervention in the intervention group (2.6%).

After the Wilcoxon test analysis, found that there was no difference in the level of knowledge before and after education with a p-value of 0.180 for the intervention group and a p-value of 0.414 for the control group. The knowledge values of respondents before and after education in this study were not much different so the increase in the level of knowledge did not occur significantly. Attitudes before and after being given education, there was also no difference after the same test that was carried out with a p-value of 0.424 in the intervention group and a p-value of 0.206 in the control group. The farmer's knowledge about pesticides can be influenced by training on the pesticide used twice per year from the Department of Agriculture, which was conducted before the planting time. According to Öztaş et al.,¹² the label of a pesticide also important role in using a pesticide correctly so the risk of pesticide intoxication can be minimalized.

Education is an adult education system where the methods are more complementary and also share experiences or information and share knowledge. The success of education is measured by how far the learning process takes place together, not by how much teaching or information is conveyed, where the dialogue that occurs between the instructor and the listener will be able to grow attitude, knowledge, and new behavior. It can change the target towards a more prosperous life than before.¹³ There was no difference in the level of knowledge and attitudes before and after education in this study because the discussion session was not an interactive discussion. Besides that, discussion session involved 76 respondents at one time so there was a possibility that the respondents did not focus on the discussion session.

In this study, the farmer's working period also influenced the result. Respondents in this study were mostly included in the old work category (Table 1), with a working period of more than 5 years, with a long working period, individuals have also received information about pesticides, both from electronic media and from agricultural extension workers. A current study showed that experience in farming is an important role in acquiring the skill of farming.¹²

Another factor that can also affect the level of knowledge and attitude in this study was that the respondents still remember the statements that

have been given previously so the respondents' answers before and after the intervention did not change. The shorter the time gap between the initial test and the final test, the greater the effect of the retention factor which results in respondents still remembering the answers at the pretest. The ideal time interval for carrying out the pretest and posttest is 15–30 days, intending to avoid the subject from not remembering this at the time of the pretest.¹⁴ In this study, the distance between the pretest and the posttest was 30 minutes. So, in this study there was no difference in the level of knowledge and attitude before and after it was given education.

The farmer's knowledge level tends to influence their attitude toward farming. Farmers who have a high level of knowledge tend to think more rationally and have the foresight to make decisions with less risk. So that the higher level of knowledge, the better attitude toward the use of pesticides in the environment.

This study has several limitations such as the use of a one-way communication method in the educational intervention, we did not use the interactive discussion session, and also the short time between the pretest and the post-test session couldn't change the farmer's level of knowledge and their attitude to become better. In this study, there were no differences in the level of knowledge and attitudes before and after education in the two groups, so it can be concluded that the giving of education in the form of speeches and leaflets did not affect the level of knowledge and attitudes in both groups. Speeches and leaflets are not effective methods to increase the level of knowledge and attitude. Further research are needed such as the use of interactive media (combination method between lecturer and videotape), focus group discussion, and using a larger sample size.

Acknowledgement

We would like to thank for Kalidoni district to support this research and give permission to collect the data in Sei Selincah sub-district.

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