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Research

Relationship between Knowledge and the Use of Personal Protective Equipment in Farmers with History of Goiter Disease in Kismantoro Subdistrict Wonogiri

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ABSTRACT

Background: Farmers have a great potential danger to exposure and poisoning of pesticides due to the application of occupational safety and health, which is still low because it does not use personal protective equipment (PPE). This study aimed to examine the relationship of knowledge using PPE in farmers with a history of goiter disease in the Kismantoro Subdistrict, Wonogiri Regency.
Subjects dan Method: This was a cross-sectional study. Sampling techniques used purposive sampling with inclusion criteria that are willing to participate in this study, reside and become a farmer in Kismantoro Subdistrict for more than ten years, and have a history of goiter disease work actively as a farmer. The dependent variables were complete PPE and PPE masks in farmers. The independent variable was knowledgeable. Population: All farmers who were declared positively affected by goiter and recorded in the Kismantoro Subdistrict Health Center in 2020. Sample: The samples were 54 respondents. Data collection was done directly from respondents with observation techniques or observation into the field and questionnaire filling. The data were analyzed using chi-square test.
Results: There was a relationship between the knowledge of farmers with a history of goiter disease with the use of complete PPE when spraying with p= 0.005 and (OR=0.77; 95%CI= 0.62 to 0.97). And there was a relationship between the knowledge of farmers with a history of goiter disease with the use of masks at the time of spraying with p= 0.002 and (OR= 6.43; 95%CI= 1.93 to 21.39).
Conclusion: There is a relationship between knowledge and complete PPE and masks PPE in farmers with a history of goiter disease in Kismantoro Subdistrict, Wonogiri Regency.

Keywords: knowledge, the use of PPE complete, the use of PPE mask.

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BACKGROUND

Indonesia is an agricultural country with a large majority of the population in the field of agriculture. Agricultural systems widely applied in Indonesia are conventional agri-cultural systems closely related to chemical fertilizers, synthetic pesticides, and other chemicals in large quantities (Farid et al., 2019). According to (Ivnaini, 2019), most of the farmers in Indonesia are 95.29% using

chemical pesticides as control of Plant Destruction Organisms (OPT) because it is considered the most effective. Farmers often use pesticides even many times during crop growth and sometimes still used when leading up to harvest to improve crop yields and improve quality (Adriyani, 2006).

Pesticides used excessively or not by the dose and regulations set will harm the environment and the health of farmers. Farmers have a serious potential danger to exposure and poisoning of pesticides due to the application of occupational safety and health, which is still low, one of which is because it does not use complete PPE (Farid et al., 2019). PPE is a type of protective clothing consisting of trousers, and long-sleeved shirts can also use plastic raincoats and aprons made of plastic or leather. Types of headgear include a wide liquid cap or hard head helmet and glasses to protect against pesticide particles. PPE masks to protect breathing, PPE gloves made of waterproof material, and PPE boots made of leather, synthetic rubber, or plastic (As'ady et al., 2019)

Farmers who do not use PPE when spraying pesticides can experience health complaints such as poisoning. Based on research conducted by (Puspitarani, 2016) proved that as many as 36 (44.44%) vegetable farmers in Sidomukti Village, Bandungan District, Semarang, experienced mild poisoning symptoms due to not using PPE (Personal Protective Equipment) when spraying pesticides. 75% of farmers in Parongpong District, West Bandung, have health problems such as nausea, vomiting, dizziness, and itching on the skin (Amilia et al., 2016)

Another health impact that can cause by exposure to pesticides is the risk factor for thyroid dysfunction. Research conducted by (Marwanto et al., 2018) found that a history of pesticide exposure can be considered a risk factor for thyroid dysfunction in elementary school-age children in the Magelang agricultural area, Central Java. Pesticides are proven to interfere with the synthesis and metabolism of thyroid hormones to become one of the triggers of goiter disease (Ibhazehiebo and Koibuchi, 2014).

According to (Raini, 2007), pesticides enter the human body in several ways, namely, through the skin, breathing, or mouth. Pesticides that enter through the mouth and eyes will be absorbed immediately and continue as long as the pesticides are still on the skin. Absorption speed varies by body part. The transfer of pesticide residues from one part of the body to another is effortless. Residues can move from the hands to the sweaty forehead or genital area. At this part, the absorption rate of deposition is very high. Oral exposure can result in severe or even death if pesticides do are ingested.

Compliance with PPE does influence by one of the factors, namely the knowledge of farmers who are still low. Based on research conducted by (Ulva et al., 2019) on farmers spraying pesticides, horticulture crops in Gumanti Valley District, Solok district found that almost half of the farmers (46.4%) have insufficient knowledge. Nearly half of farmers (41.1%) experience symptoms of pesticide poisoning at-risk.

Kismantoro subdistrict is one of the largest chili-producing agricultural areas in the Wonogiri Regency. In 2017 Kismantoro District produced chili peppers of 1300.5 tons and 1665.8 tons in 2018. The favorable natural situation is that the mountains cover almost all villages. Most of the residents in the Kismantoro subdistrict have a livelihood as farmers, and chili peppers as the most produced horticultural products and cassava becomes the most widely

planted crop as food ingredients. Based on the exposure, researchers are interested in researching "Knowledge Relationship with the Use of PPE (Personal Protective Equipment) in Farmers with a History of Goiter Disease in Kismantoro, Wonogiri."

SUBJECTS AND METHOD

1. Study Design

This study was conducted in Kismantoro Subdistrict, Wonogiri, Central Java. Kismantoro is one of the sub-districts in the Wonogiri regency with a natural state that is mostly mountains, dominated by state forests and moorland as farmland. Most of the population works as farmers.

This was a cross-sectional study. Sampling techniques used are purposive sampling with inclusion criteria that are willing to participate in research, reside and become a farmer in Kismantoro Subdistrict for more than ten years, have a history of goiter disease, and work actively as a farmer.

2. Population and Sample

The population in this study is all farmers who were declared positively affected by goiter and recorded in the Kismantoro Subdistrict Health Center Wonogiri district in 2020 as many as 128 people, based on inclusion criteria obtained samples as many as 54 people.

3. Study Variables

The dependent variables were complete PPE and PPE masks in farmers. The independent variable was knowledgeable.

4. Operational Definition of Variables

Knowledge-based on the results of the research questionnaire is knowledge about the negative impact of pesticide use. Complete PPE uses hats, glasses, masks, gloves, long-sleeved clothing and trousers, and boots known based on the interview results and questionnaire filling. PPE mask uses a mask by the standards when spraying pesticides or applying fertilizers on plants, known based on interviews and questionnaire filling.

5. Study Instruments

Data collection is done directly from respondents with observation techniques or observation into the field and questionnaire filling.

6. Data Analysis

Knowledge relationship and use of complete PPE and PPE mask in analysis using Chi-Square test.

7. Research Ethics

Research ethical issues, including informed consent, anonymity, and confidentiality, were addressed carefully during the study process. The research ethical clearance approval letter was obtained from the Research Ethics Committee at Faculty of Medicine, Universitas Sebelas Maret, Surakarta, Indonesia, No.01/UN27.06.6.1/-KEPK/EC/2021, on January 12, 2021.

RESULTS

1. Sample Characteristics

Based on the distribution table characteristics of farmers with a history of goiter disease in Kismantoro Subdistrict Wonogiri District shows that out of 54 samples of farmers there are 45 (83.33%) respondents aged >40 years, there were 6 (11.11%) respondents who have a working period of >15 years, 51 (94.44%) respondents had a low level of education, (90.74%) respondents used incomplete PPE, 31 (57.41%) respondents did not wear masks when spraying pesticides, 22 (40.74%) respondents have good knowledge. There are 32 (59.26%) respondents who have insufficient knowledge.

Table 1. Characteristics of farmers with a history of goiter disease in Kismantoro Subdistrict

Characteristics	Category	Frequency	Percentage
Age	>40 years old	45	83.33%
	≤40 years old	9	16.67%
Working Period	>15 years	6	11.11%
	≤15 years	48	88.89%
Level of Education	High	3	5.56%
	Low	51	94.44%
Use of PPE	Using complete PPE	5	9.26%
	Using incomplete PPE	49	90.74%
Use of masks	Wearing a mask	23	42.59%
	Not wearing a mask	31	57.41%
Knowledge	Good	22	40.74%
	Not good	32	59.26%

2. Bivariate Analysis

Table 2. Knowledge Relationship with The Use of PPE is complete in Farmers with a history of goiter disease

Knowledge	Complete PPE usage				Total		OR (95% CI)	p
	Wearing		Not wearing					
	N	%	N	%	N	%		
Good	5	9.26	17	31.48	22	40.74	0.77 (0.62-0.97)	0.005
Poor	0	0	32	59.26	32	59.26		

Table 2 shows a relationship between farmers' knowledge and the history of goiter disease using complete PPE when spraying with a (OR= 0.74; CI95%= 0.62 to 0.97; p= 0.005).

Table 3. Knowledge relationship with the use of masks in farmers with a history of goiter disease

Knowledge	Use of masks				Total		OR (95% CI)	p
	Wearing		Not Wearing					
	N	%	N	%	N	%		
Good	15	27.78	7	12.96	22	40.74	6.43 (1.93 to 21.39)	0.002
Poor	8	14.81	24	44.44	32	59.26		

Table 3 shows a relationship between farmers' knowledge and the history of goiter disease using masks when spraying with a (OR= 6.43; CI95%= 1.93 to 21.39; p= 0.002).

Based on the results of the bivariate analysis of knowledge related to the use of PPE in farmers with a history of goiter disease shows that there is a relationship between the knowledge of farmers with the history of goiter disease with the use of complete PPE when spraying with (OR= 0.77; CI95%= 0.62 to 0.97; p=0.005) and there is also a relationship between the knowledge of farmers with the history of goiter disease with the use of masks at the time of spraying with (OR= 6.43; 95% CI= 1.93 to 21.39; p= 0.002).

DISCUSSION

This study aimed to determine the relationship between Knowledge and the Use of PPE (Personal Protective Equipment) in Farmers with a History of Goiter

Disease in the Kismantoro Subdistrict, Wonogiri Regency.

1. Knowledge and the use of mask personal protective equipment complete in farmers with a history of Goiter disease

Based on the research results, there is a relationship between the knowledge of farmers and the use of complete PPE in Kismantoro Subdistrict Wonogiri.

This research was in line with a study conducted by (Dinaediana, 2017), which states that most citrus farmers in Dadok Nagari Koto Tinggi River have low knowledge about the use of PPE (65.7%).Most respondents had a negative attitude about the use of PPE (61.4%), there is a relationship of comfort ($p<0.001$), knowledge ($p= 0.028$) and attitude ($p<0.001$) to the use of PPE. There is a significant relationship between knowledge and attitude towards PPE in farmers in Sialang Panjang Village, Tembilan Hulu Subdistrict (Indrawati, 2017).

Poor knowledge based on the results of the research questionnaire is knowledge about the negative impacts of pesticide use. Most respondents did not know the negative effects of pesticide use. They only knew that pesticides were good for improving crop yields. The behavior of farmers in the Kismantoro Subdistrict Wonogiri district towards the use of pesticides is still not good and at risk of exposure to pesticides when mixing, spraying, and storing. Especially at the time of mixing and spraying because it does not use complete PPE. Such behavior does influence by the level of knowledge of farmers, which is also still low.

The knowledge possessed by farmers tends to influence their attitudes. In addition, the value of farmers' attitudes is usually not always consistent with their actions. Lower levels of knowledge about pesticides tend to result in incorrect attitudes towards pesticide use rules. Behavior towards pesticides that are not appropriate for recommendations will harm farmers' health and the environment (Sahat et al., 2019).

Counselling can improve farmers' knowledge. The local government can do counselling to increase farmers' knowledge about the dangers of pesticides and the importance of using PPE. Research conducted by (Okoffo et al., 2016) found that farmers in Ghana's Dormaa District have good knowledge of pesticide exposure routes but have poor operational and safety practices, especially pesticide container disposal, pesticide storage, and PPE use. Farmers have poor technical knowledge because counselling and training on safe pesticide use are still inadequate.

Based on research conducted by (Yuliyanah and Meikawati, 2015) on shallot farmers in Sidamulya Village, Wanasari District, Brebes Regency, found that there was no relationship between knowledge about the dangers of pesticides ($p=0.512$), education ($p= 1.000$), and attitude ($p= 1.000$) with the practice of using pesticides. Good knowledge about the use of pesticides is due to the Agriculture Office and local Health Office routinely conduct counselling to increase knowledge about the dangers of pesticides and PPE use. Counselling does by lecture method, brochure giving, and leaflet. The health office also routinely monitors the health of farmers, especially beware of symptoms and signs of pesticide poisoning.

2. Knowledge and the use of personal protective equipment masks in farmers with a history of goiter disease

Based on the research results, there is a relationship between the knowledge of

farmers and the use of PPE masks in Kismantoro Subdistrict Wonogiri.

This research is in line with a study conducted by (Vitasari and Suraji, 2018), which found a relationship between knowledge and the practice of using PPE masks ($p<0.001$). Farmers with good knowledge amounted to 42.9%. The use of masks and gloves do more commonly used in farmers with higher education levels in Mexico (Ndayambaje et al., 2019). Masks do use to prevent droplets of pesticide sprays, small particles, and steam from entering the lungs (Yarpuz-Bozdogan, 2018).

PPE can reduce the risk of exposure to pesticides if farmers want to use them, especially masks. But the reality is PPE, especially masks, are considered too expensive and uncomfortable to use, especially when the weather is hot. Most farmers in Kismantoro sub-district do not wear masks that are up to standard when spraying. Most only wear t-shirts or headscarves that do use to cover their noses and mouths. According to (FAO and WHO, 2020), this type of mask used while working is a type of mask resistant to liquids so that a splash of pesticides can not penetrate the respiratory tract or gastrointestinal tract.

This study concludes that there is a relationship between knowledge and the use of complete PPE (OR = 0.77, 95%CI= 0.62 to 0.97; p=0.005,) and PPE mask (OR= 6.43, 95%CI= 1.93 to 21.39; p=0.002) in farmers with a history of goiter disease Kismantoro Subdistrict Wonogiri Regency. This can be interpreted that in groups of farmers with a history of goiter who have low knowledge have the opportunity not to use complete PPE by 0.77 times and PPE masks by 6.43 times greater than farmers with a history of knowledgeable goiter disease.

This research has been attempted and carried out by scientific procedures but still has limitations of the study, namely: (1) The number of respondents, who are only 54 people, of course, is still lacking to describe the actual situation, (2) Research subjects in the selection of respondents who only focus on farmers with goiter events only, (3) In the process of data collection, the information provided by respondents through questionnaires sometimes does not show the respondent's actual opinion. This happens because sometimes differences in thinking, assumptions, and understanding are different for each respondent and other factors such as honesty factors in filling the respondent's opinion in the questionnaire, (4) Factors related to the use of personal protective equipment in farmers in this study consist only of farmers' knowledge. At the same time, many other factors can influence farmers' behavior in using masks and complete personal protective equipment.

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CONFLICT OF INTEREST

There was no conflict of interest in this study.

AUTHOR CONTRIBUTION

Ahshaina Ramadhaningtiyas is the lead researcher who chooses topics, observes, and collects research data. Yulia Lanti Retno Dewi and Sugihardjo played a role in analyzing the data and reviewing the research.

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