

Health Belief Model Application Related to Safe Work Behavior Against Poisoning Prevention in Farmers Using Pesticides

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ABSTRACT

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The World Health Organization estimates that pesticide poisoning occurs every year in the world and Indonesia. The purpose of this study was to analyze the influence of the Health Belief Model related to safe work behavior on the prevention of poisoning in farmers who use pesticides. This type of research is observational analytic, with a sample of 400 people. The data collection tool used a questionnaire. Data processing includes coding, tabulating and cleaning. Data analysis used univariate (percentage) and bivariate using the Chi-Square test. The study found a relationship between the dimensions of the Health Belief Model related to safe work behavior on the prevention of poisoning in farmers who use pesticides. The conclusion of this study is that there is a relationship between the dimensions of the Health Belief Model and the prevention of poisoning in farmers who use pesticides, so it is hoped that the community can increase their knowledge by reading books, attending seminars, counseling and training related to the prevention of poisoning due to the use of pesticides.

ABSTRAK

World Health Organization memperkirakan setiap tahun terjadi keracunan pestisida di dunia dan Indonesia. Tujuan penelitian ini adalah menganalisis pengaruh *Health Belief Model* terkait perilaku kerja aman terhadap pencegahan keracunan pada petani pengguna pestisida. Jenis penelitian ini observasional analitik, dengan sampel 400 orang. Alat pengumpul data menggunakan kuesioner. Pengolahan data meliputi *coding*, *tabulating* dan *cleaning*. Analisis data menggunakan univariat (persentase) dan bivariat menggunakan uji Chi-Square. Penelitian mendapatkan adanya hubungan dimensi *Health Belief Model* terkait perilaku kerja aman terhadap pencegahan keracunan pada petani pengguna pestisida. Simpulan penelitian ini adalah ada hubungan antara dimensi *Health Belief Model* dengan pencegahan keracunan pada petani pengguna pestisida, sehingga diharapkan kepada masyarakat agar dapat meningkatkan pengetahuannya dengan cara membaca buku, mengikuti seminar, penyuluhan dan pelatihan terkait pencegahan keracunan akibat penggunaan pestisida.



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A. INTRODUCTION

The agricultural sector in Indonesia is still one of the important aspects as a driving force of the country's economy. Farmers are still the largest group of workers. The number of agricultural sector workers in Indonesia in 2018 was 35.70 million people (28.79%) of a total of 124.01 million workers. The number of agricultural sector workers in Lampung in 2018 was 1,577,819 households. The high number of agricultural sector workers is directly proportional to the high use of pesticides (Miana and Suraji, 2020). The use of pesticides in the agricultural sector in Indonesia is increasing, but this is not balanced by an increase in farmers' understanding of the proper use of pesticides so that it can have an impact on poisoning and health problems (Widianingsih, Muliawati and Mushidah, 2020). There are several factors that influence the inappropriate use of pesticides, including the level of knowledge, attitudes and behaviour of pesticide users, the use of personal protective equipment (PPE), and the lack of information related to the risks of pesticide use (Saragih, 2023). The World Health Organization (WHO) estimates that around 25 million cases of pesticide poisoning occur each year in developing countries in Asia. In 2016, data from the Ministry of Health monitored pesticide poisoning in farmers using organophosphate and carbamate pesticides in 27 provinces in Indonesia. The results showed that 61.82% of farmers had normal cholinesterase activity, 1.3% had severe poisoning, 9.98% had moderate poisoning and 26.89% had mild poisoning. The mechanism of pesticide entry into the body can be through three ways, namely through inhalation, the digestive tract and the skin (Ardiansyah, Setiani and Suhartono, 2023).

Research on the analysis of risk factors for organophosphate pesticide poisoning found a significant relationship between knowledge, frequency of spraying, pesticide dose, duration of spraying, time, and wind direction with the risk of organophosphate pesticide poisoning, there was no significant relationship between work period and PPE with the risk of poisoning. The dominant factors that are closely related to the incidence of pesticide poisoning are dose, duration of spraying and spraying time (Firmansyah, Kasifah and Sartika, 2023). Research on risk factors that influence the incidence of pesticide poisoning, found the results of the majority of respondents (53.3% did not experience poisoning), there was a significant relationship between the level of knowledge, length of service and length of work with the risk of pesticide poisoning, there was no significant relationship between age and pesticide poisoning. Farmers who experienced poisoning (measurement of cholinesterase levels) were 43 people (46.7%) (Ismindarto, Pudjiastuti and Sumarno, 2023). The study found a significant relationship between knowledge, frequency of spraying, pesticide dose, duration of spraying, time, and wind direction with the risk of organophosphate pesticide poisoning. The study also found a significant relationship between the level of knowledge, length of service and length of work with the risk of pesticide poisoning, there was no significant relationship between age and pesticide poisoning (Firmansyah, Kasifah and Sartika, 2023). Prevention of pesticide poisoning can be studied through the Health Belief Model (HBM). According to Rosenstock (1974) in (Glanz, Rimer and Viswanath, 2015), each individual has a belief assessment of their respective levels of vulnerability and severity so that they make prevention efforts. The HBM concept can provide an assessment of healthy actions for safe work behavior in farmers who

use pesticides. So that it will obtain a trust factor that is the background for carrying out safe work behavior on farmers who use pesticides in agricultural areas.

The purpose of this study was to determine the relationship between perceived susceptibility, perceived severity, perceived benefits, perceived barriers and cues to action related to safe work behavior on preventing poisoning on farmers who use pesticides.

A. METHOD

This study is an analytical observational study. The study was conducted in July 2020. The population in this study were all households in Jati Mulyo Village, Jati Agung District, South Lampung, totaling 3,778 households, with a sample of 400 people. Research Ethics Approval was submitted to the Research Ethics Commission of the Faculty of Medicine, University of Lampung with Number 1534/UN26.18/PP.05.02.00/2020. Data collection tools in this study included questionnaires and checklist sheets. Data processing included editing, coding, entry and tabulating. Data analysis used the Chi-Square test.

B. RESULTS AND DISCUSSION

1. Results

Table 1. Characteristics of Respondents

Characteristics	n	%
Age		
<25 years	148	37,0
25-35 years	163	40,8
>35 years	89	22,2
Gender		
Male	180	45,0
Female	220	55,0
Education		
No education	17	4,3
Elementary School	6	1,5
Junior High School	57	14,2
Senior High School	312	78,0
College	8	2,0
Information Source		
Internet	302	75,5
TV/Radio	74	18,5
Others	24	6,0
TOTAL	400	100,0

The results of the study found that most respondents were aged 25-35 years (163 people) (40.8%), female (220 people) (55.0%), had a high school education (312 people) (78.0%), and

obtained information about pesticides and poisoning prevention from the internet (302 people) (75.5%).

Table 2. *Health Belief Model* Related to Safe Work Behavior

<i>Health Belief Model</i>	n	%
<i>Susceptibility perceived</i>		
Good	264	66,0
Bad	136	34,0
<i>Severity perceived</i>		
Good	262	65,5
Bad	138	34,5
<i>Benefitism perceived</i>		
Good	260	65,0
Bad	140	35,0
<i>Barrier perceived</i>		
Good	258	64,5
Bad	142	35,5
<i>Cues to action</i>		
Good	261	65,3
Bad	139	34,8
<i>Poisoning Prevention</i>		
Good	262	65,5
Bad	138	34,5
Total	400	100,0

The susceptibility perceived by respondents was 264 people (66.0%) in the good category and 136 people (34.0%) in the bad category. The severity perceived by respondents was 262 people (65.5%) in the good category and 138 people (34.5%) in the bad category. The benefits perceived by respondents were 260 people (65.0%) in the good category and 140 people (35.0%) in the bad category. The barriers perceived by respondents were 258 people (64.5%) in the good category and 142 people (35.5%) in the bad category. The cues to act by respondents were 261 people (65.3%) in the good category and 139 people (34.8%) in the bad category. Prevention of poisoning by respondents was 262 people (65.5%) in the good category and 138 people (34.5%) in the bad category.

Table 4.3 The Relationship Between *Health Belief Model* and Poisoning Prevention

Health Belief Model	Poisoning Prevention		Total	p-value	OR	CI 95%
	Good (%)	Bad (%)				
<i>Susceptibility perceived</i>						
Good	234 (88,6)	30 (11,4)	264 (100,0)	0,000	30,08	(22,34-35,67)
Bad	28 (20,6)	108 (79,4)	136 (100,0)			
<i>Severity perceived</i>						
Good	232 (88,5)	30 (11,5)	262 (100,0)	0,000	27,84	(18,75-45,06)
Bad	30 (21,7)		138 (100,0)			
<i>Benefitism perceived</i>						
Good	230 (88,5)	30 (11,5)	260 (100,0)	0,000	25,80	(15,75-44,68)
Bad	32 (22,9)	108 (77,1)	140 (100,0)			
<i>Barrier perceived</i>						
Good	228 (88,4)	30 (11,6)	258 (100,0)	0,000	24,14	(11,75-35,06)
Bad	34 (23,9)	108 (76,1)	142 (100,0)			
<i>Cues to action</i>						
Good	235 (90,0)	26 (10,0)	261 (100,0)	0,000	37,49	(18,75-49,16)
Bad	27 (19,4)	112 (80,6)	139 (100,0)			
Total	262 (65,5)	138 (34,5)	400 (100,0)			

The susceptibility perceived of respondents in the good category and prevention of poisoning in the good category were 234 people (88.6%), while the perceived vulnerability of respondents in the bad category and prevention of poisoning in the less good category were 108 people (79.4%). Further analysis obtained a p-value of 0.000, which means that there is a relationship between perceived vulnerability and prevention of poisoning due to pesticide use by farmers. The OR value shows 30.08, which means that farmers who consider themselves not susceptible to pesticide poisoning are at 30.08 times risk of pesticide poisoning, compared to respondents who consider themselves susceptible to pesticide poisoning.

The severity perceived by respondents in the good category and prevention of poisoning in the good category were 232 people (88.5%), while the severity felt by respondents in the bad category and prevention of poisoning in the bad category were 108 people (78.3%). Further analysis obtained a p-value of 0.000, which means that there is a relationship between perceived severity and prevention of poisoning due to pesticide use by farmers. The OR value shows 27.84, which means that farmers who consider themselves in a non-severe condition for pesticide poisoning are at risk of 27.84 times for pesticide poisoning, compared to respondents who consider themselves in a severe condition for pesticide poisoning.

The benefits perceived by respondents in the good category and prevention of poisoning in the good category were 230 people (88.5%), while the benefits perceived by respondents in the bad category and prevention of poisoning in the less good category were 108 people (77.1%). Further analysis obtained a p-value of 0.000, which means that there is a relationship between the benefits felt and the prevention of poisoning due to pesticide use by farmers. The OR value shows 25.80, which means that farmers who consider there are no benefits to preventing pesticide poisoning are at risk of 25.80 times for pesticide poisoning, compared to respondents who consider themselves to have benefits to preventing pesticide poisoning.

The barriers perceived by respondents in the good category and prevention of poisoning in the good category were 228 people (88.4%), while the obstacles felt by respondents in the bad category and prevention of poisoning in the less good category were 108 people (76.1%). Further analysis obtained a p-value of 0.000, which means that there is a relationship between perceived barriers and prevention of poisoning due to pesticide use by farmers. The OR value shows 24.01, which means that farmers who consider there are barriers to preventing pesticide poisoning are at 24.01 times risk of pesticide poisoning, compared to respondents who consider themselves to have no barriers to preventing pesticide poisoning.

The cues to action by respondents in the good category and prevention of poisoning in the good category were 235 people (90.0%), while the cues to action by respondents in the bad category and prevention of poisoning in the less good category were 112 people (80.6%). Further analysis obtained a p-value of 0.000, which means that there is a relationship between cues to action and prevention of poisoning due to pesticide use by farmers. The OR value shows 37.49, which means that farmers who consider there are no cues to action in preventing pesticide poisoning are at 37.49 times risk of pesticide poisoning, compared to respondents who consider there are cues to action in preventing pesticide poisoning.

2. Discussion

a. Characteristics of Respondents

The results of the study found that most respondents were aged 25-35 years (163 people) (40.8%), female (220 people) (55.0%), had a high school education (312 people) (78.0%), and obtained information about pesticides and poisoning prevention from the internet (302 people) (75.5%).

b. The relationship between perceived susceptibility related to safe work behavior and prevention of poisoning in farmers who use pesticides.

The results of the study showed that there was a relationship between perceived susceptibility or perceived vulnerability to the prevention of poisoning due to pesticide use. Rosenstock (1966) in (Glanz, Rimer and Viswanath, 2015) stated that this theory is used to determine individual perceptions of whether young people accept or not their health conditions. The variables assessed are the individual's desire to avoid disease, as well as the belief that there are efforts to avoid the disease. Belief can be interpreted as trust or belief. Belief in this study can be interpreted as a belief in something that can give rise to certain behaviors. The Health Belief Model is a

concept that reveals a person's reasons for wanting or not wanting to behave healthily. The Health Belief Model is also a theoretical construct about individual beliefs in carrying out healthy behaviors (Juliani and Salcha1, 2022).

Perceived susceptibility or perceived vulnerability refers to subjective assessments of the risk of health problems. This model predicts that individuals who feel that farmers are susceptible to certain health problems will engage in behaviors to reduce the risk of health problems. Farmers who believe that they are susceptible to disease or poisoning if they carry out activities related to pesticides will protect themselves and use health protocols when in contact with pesticides. Individuals with low perceived susceptibility may deny that farmers are at risk of poisoning or experiencing certain diseases. Farmers with low perceived susceptibility assume that contact with pesticides will not cause illness or contract a disease or impaired body function or poisoning. Farmers who believe that they are at low risk of contracting disease when in contact with pesticides are more likely to ignore health protocols when in contact with pesticides. Meanwhile, farmers who perceive a high risk that farmers will be personally affected by certain health problems due to contact with pesticides are more likely to engage in pesticide contact behaviors that can cause health problems for farmers (Mulyani, Machfud and Solihin, 2023).

- c. The relationship between perceived severity related to safe work behavior and prevention of poisoning in farmers who use pesticides.

The results of the study indicate that there is a relationship between perceived severity and the prevention of poisoning due to pesticide use. The Health Belief Model is a model to describe a person's belief in healthy behavior, so that they will realize the healthy behavior. The healthy behavior in question can be in the form of disease prevention and use of health facilities. The Health Belief Model is often used to predict individual prevention and treatment behavior for both acute and chronic diseases. Furthermore, the Health Belief Model is used to predict health-related behavior. The Health Belief Model has a main concept in the form of health behavior determined by individual beliefs or perceptions about the disease and the means available to prevent a disease.

Perceived severity refers to the subjective assessment of the severity of health problems and their consequences. Farmers who consider certain health problems due to pesticide contact activities to be serious problems are more likely to engage in behavior to prevent health problems from occurring by carrying out safe pesticide contact activities according to health protocols, such as using personal protective equipment and managing pesticides according to standards. Farmers who come into contact with pesticides consider that contact with pesticides is not medically hazardous, but if someone feels that there will be serious consequences of respiratory tract disorders as a result of toxic substances inhaled from pesticide spraying, then he or she may consider that pesticide splashes will harm health (Wang *et al.*, 2019).

- d. The relationship between perceived benefits related to safe work behavior and prevention of poisoning in farmers who use pesticides.

The results of the study showed that there was a relationship between perceived benefits and the prevention of poisoning due to pesticide use. The Health Belief Model is a model of how someone shows healthy behavior or efforts towards health or healing from an attack of a disease. This model is based on a person's belief or trust about healthy behavior or treatment that can make a person healthy or recover from disease. The Health Belief Model was developed with the aim of understanding a number of psychological factors based on beliefs or beliefs in decision-making regarding healthy behavior. Through this model, a person can show behavior based on beliefs that can be predicted and give rise to behavior, so that the values attached to a person's behavior can be studied. Health-related behavior is also influenced by the perceived benefits of taking action. The perceived benefits of farmers using personal protective equipment when in contact with pesticides refer to farmers' assessments of the values involved in health-promoting behavior to reduce the risk of disease. If farmers believe that using personal protective equipment can prevent poisoning due to pesticides, then farmers will use the personal protective equipment when in contact with pesticides. Farmers who believe that using personal protective equipment will prevent poisoning will continue to use personal protective equipment when in contact with pesticides (Ramdan, Candra and Purwanto, 2020).

- e. The relationship between perceived barriers related to safe work behavior and prevention of poisoning in farmers who use pesticides.

The results of the study indicate that there is a relationship between perceived barriers or perceived obstacles to preventing poisoning due to pesticide use. The Health Belief Model focuses on the perception of threats and evaluation of health behavior as the main aspects to understand how a person generates healthy actions. This model has four main variables involved in health behavior, namely perceived susceptibility to a disease, perceived seriousness, benefits received and obstacles experienced in fighting the disease, and things that motivate the behavior (Boedeker *et al.*, 2020).

Perceived barriers or perceived barriers to change, or when someone faces obstacles in taking certain actions. Health-related behavior is also a function of perceived barriers to taking action. Perceived barriers refer to an individual's assessment of barriers to behavior change. Even if a person perceives a health condition as a threat and believes that certain actions will effectively reduce the threat, barriers can prevent engagement in health-promoting behavior. In other words, perceived benefits must exceed perceived barriers for behavior change to occur. Farmers who want to use personal protective equipment when in contact with pesticides, but experience obstacles because they feel bothered, feel hot, and are not free to use personal protective equipment when in contact with pesticides (Lende, Berek and Salmun, 2023).

- f. The relationship between cues to action related to safe work behavior and prevention of poisoning in farmers who use pesticides.

The results of the study showed that there was a relationship between cues to action or signals to act on preventing poisoning due to pesticide use. Cues to action or a behavior is related to something that is a signal for someone to carry out an action or behavior. This model argues that cues or triggers are needed to encourage involvement in health-promoting behaviors. Data findings found that farmers who had shortness of breath, itchy skin due to exposure to pesticides, would use personal protective equipment to reduce the adverse effects of pesticide use, such as itching of the skin (Niesobecki *et al.*, 2019).

C. CONCLUSION

This study found that there is a relationship between perceived susceptibility, perceived benefits, perceived barriers, cues to action related to safe work behavior towards prevention of poisoning in farmers using pesticides. Suggestions that can be given to farmers are to increase their knowledge by reading books, attending seminars, counseling and training related to prevention of poisoning due to pesticide use. For the Health Center, it is expected to provide programs that can increase knowledge about prevention of poisoning due to pesticide use through health counseling, health discussions, seminars or other health science activities.

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