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Spraying Methods, Personal Hygiene, and Use of Personal Protective Equipment are Related to Pesticide Poisoning at Farmers in Gowa District

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ABSTRACT

Background: The World Health Organization (WHO), estimates 1-5 million cases of pesticide poisoning in agricultural workers with a mortality rate of 220,00 fatalities. This study aims to determine the determinants of poisoning in vegetable farmers who use pesticides in Kanreapia Village, Tombolopao District, Gowa Regency. **Methods:** This study uses a type of cross sectional study, by taking a population of 88 vegetable farmers. Sampling was carried out using purposive sampling with a sample of 44 respondents. **Results:** The results of the study found that factors related to the determinants of poisoning in vegetable farmers using pesticides were the method of spraying, personal hygiene and the use of PPE. Meanwhile, the length of work and the period of service have no relationship with the incident. **Conclusion:** This study recommends that farmers pay attention to the use of PPE such as masks and gloves when mixing pesticides, as well as pay attention to personal hygiene after spraying.

Keywords: determinants; poisoning; vegetable farmers; pesticides

ABSTRAK

Latar Belakang: World Health Organization (WHO), memperkirakan 1-5 juta kasus keracunan pestisida pada pekerja pertanian dengan tingkat kematian mencapai 220.00 korban jiwa. Studi ini bertujuan untuk mengetahui determinan keracunan pada petani sayur pengguna pestida di Desa Kanreapia Kecamatan Tombolopao Kabupaten Gowa. **Metode:** Penelitian ini menggunakan jenis penelitian cross sectional study, dengan mengambil populasi pada petani sayur yaitu sebanyak 88 orang. Pengambilan sampel dilakukan dengan menggunakan purposive sampling dengan jumlah sampel sebanyak 44 responden. **Hasil:** Hasil penelitian menemukan faktor yang berhubungan dengan determinan keracunan pada petani sayur pengguna pestisida adalah cara penyemprotan, personal hygine dan penggunaan APD. Sedangkan lama kerja dan masa kerja tidak memiliki hubungan dengan kejadian. **Kesimpulan:** Studi ini merekomendasikan agar petani dapat memperhatikan penggunaan APD seperti masker dan sarung tangan pada saat melakukan pencampuran pestisida, serta memperhatikan personal hygiene setelah melakukan penyemprotan.

Kata Kunci: determinan; keracunan; petani sayur; pestisida

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INTRODUCTION

The World Health Organization (WHO) estimates 1-5 million cases of pesticide poisoning in agricultural workers with a mortality rate of 220,00 fatalities. About 80% of poisonings are reported in developing countries, such as in Asia, Africa, Central America and Latin America. Developing countries use about 25% of pesticides in agricultural activities, but deaths due to the use of pesticides reach 99% (WHO 2017). Globally there are 107,705 cases of people who have died due to pesticide poisoning (WHO, 2015). In addition, based on data from the poisoning information center or sikernas it is known that as many as 771 pesticide poisonings are caused by low education and knowledge related to how to use pesticides properly (SIKERNAS, 2016).

The increase in the use of pesticides is caused by the low level of education and knowledge of farmers so that the method of pesticides is also very unsafe and tends to be excessive and uncontrollable. Based on data referenced from the National Poisoning Information Center, in 2016 there were 771 cases of pesticide poisoning in Indonesia (sikernas). Pesticide poisoning in the April-June 2017 period was recorded as many as 180 cases, while in the July-September 2017 period there were 4 cases of pesticide poisoning in Central Java Province with 2 of them dying.

Poisoning cases reported through the SPIMKer KLB K application during 2019 there were 2,813 hospitals in Indonesia that reported cases of pesticide poisoning. Cases of pesticide poisoning are dominated by the male gender, namely 3,516 cases and 2,689 cases of incidence in women. Based on BPOM data in 2019, there are 5 provinces with the highest number of pestilda cases, namely West Java with 2,377 cases, East Java 1312 cases, DKI Jakarta 943, Bali 373 and Banten 214, while in South Sulawesi there were 3 cases of poisoning during 2019. Based on the cause of poisoning, 334 cases of poisoning caused by pesticides (BPOM, 2019).

Based on the results of research conducted by the South Sulawesi Provincial Health Office, it is known that 1,010 farmers who were examined for blood cholinesterase activity showed that 225 farmers experienced poisoning (22.7%) with mild poisoning, 201 farmers (89.33%), moderate poisoning of 22 farmers (9.78%) and severe poisoning of 2 farmers (0.89%) (Tampudu, Russeng and Rahim, 2010). Another study conducted by Habibi, namely 62 farmers in Kanreapia, Tombolopao District, Gowa Regency, showed that there were 22 people (35.5%) experiencing mild poisoning and 6 people (9.7%) experiencing moderate poisoning (Habibi, 2021).

An overview of the results of the study in 2021 conducted in Tombolopao District is known that the age category of farmers using pesticides in the control group is 55-65 with a percentage of 42.86%. then the education level in the control and intervention group is the most with elementary education which is 42.85%. The working period in the case and intervention groups was 95.24% with a working period of > 5 years (long). The length of work for the control group was 80.95% (17 people) who worked around ≤8 hours/day and 9.53% (2 people) worked > 8 hours/day. Spraying techniques with categories of not meeting the requirements were in the control group by 66.66% and 71.43% in the intervention group. The use of incomplete PPE in the control group was 85.71% and 90.48% in the intervention group. Based on the above background, it is necessary to conduct research to determine the determinants of poisoning in vegetable farmers who use pesticides in Kanreapia Village, Tombolopao District, Gowa Regency.

METHODS

This study uses a type of cross sectional study research method. With a population of 80 vegetable farmers in Kanreapia Village, Tombolo Pao District, Gowa Regency. The research sampling technique used Purposive Sampling. In this study, the instrument used was a questionnaire to find out pesticide poisoning, length of work, working period, spraying method, personal hygiene, and the use of PPE. Meanwhile, the characteristic data consisted of 4 questions, namely, initial name, age, last education and the type of pesticide used. After the research location was determined, data collection was carried out by visiting farmers who met the criteria of this study for interviews. This study uses data analysis, data reduction, data presentation and conclusion drawn.

RESULTS

Based on table 1, it shows that the frequency distribution based on age of vegetable farmers using pesticides, most respondents are aged 31-40 years with a total of 13 people (29%), most respondents use insecticide pesticides with a total of 21 people (48%), most respondents experience poisoning with a total of 27 people (61%), most respondents do not work long (<8 hours) with a total of 37 people (84%), most

respondents have a long working period with a total of 29 people (66%), most respondents meet the requirements for spraying pesticides with a total of 29 people (66%), most respondents with qualified hygiene personnel with a total of 22 people (50%), and most respondents use complete PPE with a total of 24 people (55%)

Tabel 1
Characteristics Respondent

Variables	Frequency (n)	Percentage (%)
Age		
20-30 Year	10	23
31-40 Year	13	29
41-50 Year	11	25
51-60 Year	10	23
Types of Pesticides		
Insecticide	21	48
Fungiside	15	34
Herbiside	8	18
Poisoning Incidents		
No poisoning	17	39
Poisoning	27	61
Length of Service		
New (≤8 hours)	7	16
Old (≥8 hours)	37	84
Working Period		
New (<6 Years)	15	34
Old (>6 Years)	29	66
How to Spray		
Eligible	29	66
Not Eligible	15	34
Personal Hygiene		
Eligible	22	50
Not Eligible	22	50
Use of PPE		
Incomplete	24	55
Complete	20	45

Based on table 2, the results of statistical tests show that there is a significant relationship between spraying methods (p = 0.000), personal hygiene (p = 0.000), and use of PPE (p = 0.000) with poisoning in vegetable farmers using pesticides in Kanreapia Village, Tombolo Pao District, Gowa Regency.

DISCUSSION

In this study, the distribution of vegetable farmers who have a working time of more than 8 hours per day (Long Category) as many as 5 respondents who have mild poisoning, while vegetable farmers who have a working time of less than 8 hours per day (Not Long Category) as many as 16 respondents have normal poisoning. A p value of 0.149 (P> 0.005) was obtained which means that there was no meaningful relationship between poisoning and length of work

This study was also conducted by (Muqaddar et al. 2018) who stated that there was no relationship between the length of work and the incidence of pesticide poisoning in farmers. This can be caused by several things, namely, the spraying activities carried out by farmers are below the limit of the stipulated length of work per day, which is only for 2 hours per day.

Inversely proportional to the research conducted (Yuniastuti, 2018) The results of statistical analysis using the Chi-square test (p value) = 0.044) show that there is a relationship between the duration of each spraying and the incidence of poisoning. This means that the longer the respondents sprayed, the lower the cadarcholinesterase in the respondents' blood.

In this study, there was no relationship between the length of work and poisoning because agricultural activities were not carried out continuously for 8 hours of work, most farmers also provided a place to rest in the garden so that when farmers felt tired, farmers immediately rested in the existing garden house or under a large tree. Usually, farmers leave for the garden at 07.00, then farmers return home at

11.00 if they do not bring food to the garden. And will return to the garden from 13.00 to 17.00, often farmers also sleep/rest in the garden house.

Table 2
Results of bivariate analysis

Variables	Poisoning Incidents						P value
	Poisoning		No Poisoning		Total		
	n	%	n	%	N	%	
Length of Service							
Old	21	48	16	36	37	84	0.149
New	6	14	1	2	7	16	
Working Period							
New	7	16	8	19	15	34	0.15
Old	20	50	9	20	29	66	
How to Spray							
Eligible	13	30	2	5	15	34	0.000
Not Eligible	4	9	25	57	29	66	
Personal Hygiene							
Eligible	6	14	16	36	22	50	0.000
Not Eligible	21	48	1	2	22	50	
Use of PPE							
Incomplete	19	43	1	2	20	45	0.000
Complete	8	18	16	36	24	65	

The results of a study conducted (Muqaddar et al., 2018) stated that there was no relationship between the working period and the incidence of pesticide poisoning in farmers. The working period is not related to the incidence of pesticide poisoning in farmers can occur because farmers do not carry out agricultural activities continuously, or it can be said that farmers have time to take a break from agricultural activities. So that kadarcholinesterase in farmers' blood can return to normal after carrying out activities related to pesticides.

In line with research conducted by Vicky (2017) shows that there is no relationship or effect of working life with pesticide poisoning. In contrast to the research conducted by Lucky, Fitrisyah; Hanani, Yusnia; Yunita, (2018) showed that the working period of farmers was related to the known cholinesterase level from the value of p value = 0.008 and r count -0.467 which means that the working period had a moderate and negative relationship with cholinesterase levels. This means that the longer a farmer's working period, the lower the level of cholinesterase in the farmer's blood, also explained by Rustia et al. (2010) in (Osang et al., 2016) that the longer the farmer sprays, the higher the contact with pesticides and the higher the risk of poisoning. Prasetya (2010) explained that chronic poisoning is more difficult to detect because it is not immediately felt and does not cause specific symptoms and signs. However, chronic poisoning over a long period of time can cause health problems.

In this study, it was obtained that the distribution of farmers who met the requirements in the Dominant Spraying Method had Normal and Mild Poisoning each with a total of 14 respondents.While farmers who did not meet the requirements in the spraying method mostly had Moderate poisoning with a total of 6 respondents. With a P value of 0.000 (P < 0.005) it means that there is a meaningful relationship between Poisoning and Spraying Method

In line with the research (Siahaan, 2020) based on the statistical test with the Chi square test, the value of P Value = 0.000 (p < 0.05) is obtained, there is a relationship between wind direction and cholinesterase levels. The results of statistical testing in this study show that farmers who do not pay attention to the direction of the wind when spraying will have a risk of pesticide poisoning compared to farmers who spray in the direction of the wind. Research (Adamu & Abebe, 2022) also reveals that farmers have good practices in calibrating spraying machines and maintaining wind direction during spraying.

The results of the study (Mahyuni et al., 2021) found that one of the determinants of pesticide poisoning is bad behavior when spraying such as spraying while smoking, it can also be caused by farmers' ignorance of the effects of toxins that cause chronic poisoning. Meanwhile, in farmers in Kanreapia Village, Tombolo Pao District, Gowa Regency, most farmers know how or how to spray such as following the cardinal

direction and avoiding smoking, eating/drinking when spraying, therefore the dominant vegetable farmers in Kanreapia Village, Tombolo Pao District, Gowa Regency have High Cholinesterase Levels or Normal Poisoning

The results of the statistical test in this study based on Table 4.15 obtained a p value of 0.000 (P = < 0.05) this shows that there is a meaningful relationship between personal hygiene before and after spraying with pesticide poisoning, which means that the better farmers apply their personal hygiene, the less risk of exposure to pesticide poisoning

Research by Herdinanti, (2018) shows that there is a meaningful relationship between personal hygiene and symptoms of pesticide poisoning in pineapple farmers in Sungai Gelam Muaro Jambi sub-district. The research conducted (Ulva et al., 2019) as many as 26.8% of respondents ate and drank immediately after spraying. As many as 33.9% of respondents are not good at managing pesticide waste. As many as 48.2% of respondents rarely clean spraying equipment. In addition, farmers also generally do not immediately change the clothes used after finishing spraying. This can cause the entry of pesticide content through the farmer's skin, resulting in pesticide poisoning in the farmer

In line with the research conducted (Andarini & Rosanti, 2018), the majority of personal hygiene of horticultural farmers in Demangan Village is included in the category of not good as many as 27 people (90%), while 3 farmers have good personal hygiene with a percentage of 10%. Ganjar's research (2014) proves that personal hygiene is a risk factor for pesticide poisoning, meaning that unhygienic farmers have a greater risk compared to hygienic farmers by looking at other factors that can affect the level of risk of pesticide poisoning in farmers.

One way to avoid pesticide poisoning is to use Personal Protective Equipment. The results of this study obtained a P Value of 0.000 less than 0.05, which shows that there is a meaningful relationship between the use of PPE during spraying and poisoning, meaning that if farmers spray by using PPE that meets the requirements, they can avoid pesticide poisoning.

In line with previous research conducted by (Yuniastuti, 2018) as many as 7 respondents, most of the respondents experienced poisoning due to pesticides as many as 51 people (72.9%) and those who were not poisoned as many as 19 people (27.1%). Meanwhile, only 16 respondents used PPE completely and only 4 people (25%) experienced poisoning and 12 people (75%) were not poisoned. Related research conducted by Winandar (2016), the percentage of farmers who use complete PPE is 20%, while those who do not use complete PPE is 56.3%. As a result of Budiawan's (2013) research, there are 63% of farmers who use complete PPE and do not experience pesticide poisoning.

From the results of observations made by researchers on vegetable farmers in Kanreapia Village, Tombolo Pao District, Gowa Regency.Most farmers wear complete PPE such as long-sleeved shirts and long pants, head coverings, gloves and boots.

CONCLUSION

The results of this study found that factors related to the incidence of poisoning in vegetable farmers using pesticides were the method of spraying, personal hygiene and the use of PPE. This study recommends that farmers pay more attention to things that can cause pesticide poisoning such as the use of PPE such as masks and gloves when mixing pesticides, pay attention to personal hygiene after spraying and how to spray in the direction of the cardinal. For health workers to be able to improve health promotion or health counseling related to pesticide poisoning in the community in Kanreapia Village, Tombolo Pao District, Gowa Regency, especially on the map.

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