

Factors Related to the Use of Personal Protective Equipment Among Farmers Using Pesticides

Eky Endriana Amiruddin^{1*}, Waode Azfari Azis², Irma Dunggio³, Wahyuddin⁴,
Taswin⁵

Universitas Dayanu Ikhsanuddin

Corresponding Author: Eky Endriana Amiruddin; aurumdsyua@gmail.com

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ABSTRACT

The low use of complete personal protective equipment among farmers who use pesticides. Health Efforts Post data from 2023-2025 shows recurring health complaints such as headaches, nausea, itching, up to cases of poisoning. This type of research is quantitative with a cross-sectional study design. The study sample consisted of 84 respondents. The sampling technique used was total sampling. Data analysis was done using univariate and bivariate data with the chi-square test. The research results show the knowledge variable $p\text{-value } 0.027 < 0.05$, attitude $p\text{-value } 0.010 < 0.05$, availability of PPE $p\text{-value } 0.000 < 0.05$, availability of funds $p\text{-value } 0.0195 > 0.05$, coworker support $p\text{-value } 0.000 < 0.05$ with the use of personal protective equipment among pesticide-using farmers in the Working Area of Bungi Health Center, Baubau City. The conclusion of this study is that there is a relationship with the variables of knowledge, attitude, PPE availability, and coworker support

INTRODUCTION

The World Health Organization (WHO) states that pesticide poisoning causes about 600,000 cases and 20,000 deaths per year, with around 5,000-10,000 people suffering effects from pesticide poisoning such as cancer, physical disabilities, liver diseases, and this happens in many developing countries (Rahmadani et al., 2023).

Indonesia is an agrarian country located in Southeast Asia with a tropical climate, which makes the soil in Indonesia very fertile. Besides helping meet basic needs, agriculture plays an important role in agrarian countries like Indonesia, where most of the population works as farmers (Manaroinsong et al., 2023). According to data from the Central Statistics Agency, the percentage of informal labor in the agricultural sector in Indonesia in 2024 reached 87.31%, while in Southeast Sulawesi it reached 92.57% (Central Statistics Agency, 2024). The number of farmers in Baubau City in 2023 was 4,304, while the number of farmers in Bungi District in 2023 was 1,362.

The incidence of poisoning in Indonesia sees more than 12,000 deaths each year caused by both acute and chronic poisoning, one of which is pesticide poisoning. The actual number of poisonings is likely even higher, considering that this figure comes from cases reported by the victims themselves as well as statistical data. Many poisoning cases in the field go unreported by the victims, so they're not recorded by the relevant institutions. About 80% of poisonings are reported in developing countries, even though these countries only use 25% of the world's total pesticide usage, the death rate reaches 99% (Salindeho et al., 2020). The use of pesticides is increasing globally, especially in developing countries like those in Asia, Africa, Central America, and Latin America. 25% of all pesticide users in the world are in developing countries, yet these countries account for 99% of all pesticide-related deaths (Mayang Dwi Octavia & Susilawati, 2023)

Pesticides are all chemical substances and other materials, as well as microorganisms and viruses, that can be used to eradicate or prevent pests, animals, weeds, or unwanted plants. Improper use of pesticides endangers the health of farmers, consumers, and non-target microorganisms, and also impacts environmental pollution, both in soil and water (Agriculture et al., 2024)

Pesticides can enter the human body in several ways, including through the skin (dermal contamination), the respiratory system (inhalation), and the mouth (oral). One of the effects caused by pesticide use is poisoning among farmers (Nurul Hasanah, Entianopa, 2022).

According to BPOM data from 2019, there were 334 cases of pesticide poisoning nationwide, with 147 cases caused by agricultural pesticides (Nuryati & Arifah, 2024). Pesticide poisoning is actually among the top five national diseases in Indonesia. The most commonly reported symptoms of pesticide poisoning are migraines (73.8%), skin rashes (62.3%), eye pain (32.8%), fatigue (22.4%), and muscle pain (19.1%) (Maria Eka Yuliastuti, Yuanita Windusari, 2024).

Farming is one of the job sectors that carries a high risk of accidents and health problems that can potentially endanger farmers. These risks can come

from various sources, including mechanical accidents, disease infections, exposure to hazardous chemicals, and physical hazards. To protect themselves from these risks, it is very important for farmers to use Personal Protective Equipment (PPE) (Shakila, 2023). The chemicals commonly used by farmers are usually referred to as pesticides. Pesticides are considered effective, easy to use, have a high success rate, are adequately available and easy to get, and are usually relatively cheap (Rahmadani et al., 2023)..

Personal protective equipment (PPE) is one way to protect farmers while working and prevent the harmful effects of pesticides. PPE includes protective gear and clothing specifically designed for pesticide use, as well as any materials or equipment that protect the user from pesticide exposure during handling and use. (Septiani, 2021). PPE can reduce exposure and the likelihood of pesticide-related incidents in the agriculture sector. Rubber boots, gloves, respiratory protection, head protection, eye and face protection, as well as body protection are some types of PPE that can be used (Mukhtar, 2020).

Based on the health check report data in the work area of Bungi Health Center, which is routinely conducted every month during the UKK post activities, there are always workers reporting health complaints such as headaches, nausea, and itching. In 2023, at the Liabuku UKK Post, out of 35 targets, there were 5 people with headaches, 2 people with nausea, and 1 person with itching. At the Waliabuku UKK Post, out of 20 targets, there were 3 people with headaches and 1 person with itching. At the Ngkari-Ngkari UKK Post, out of 22 targets, there were 8 people with headaches, 2 people with nausea, and 3 people with itching. In 2024, at the Liabuku UKK Post, out of 37 targets, there were 3 people with headaches, 2 people with itching, 2 people with eye pain, and 1 person with nausea. At the Waliabuku UKK post, out of 22 targets, 6 people had headaches, and 3 people had itching. At the Ngkari-Ngkari UKK post, out of 25 targets, 7 people had itching, 6 people had headaches, 4 people had chest pain, 3 people felt nauseous and vomited, and 1 person was poisoned. In 2025, at the Liabuku UKK post, out of 37 targets, 2 people had headaches. At the Waliabuku UKK post, out of 22 targets, 4 people had itching, and 4 had headaches. At the Ngkari-Ngkari UKK post, out of 25 targets, 1 person had a headache.

Based on research conducted on rice farmers using pesticides in Durian Demang Karang Tinggi Village, Central Bengkulu Regency, it shows that only 25.8% of farmers use personal protective equipment (PPE), while the remaining 74.2% do not wear gloves, boots, masks, long-sleeved shirts, long pants, head protection (hats), or eye protection. Most of the farmers who use pesticides don't wear PPE because it's uncomfortable while working (Alimanafh, 2024).

Based on an initial survey conducted by researchers through interviews and direct observation in the working area of Bungi Health Center, it was found that farmers do not use personal protective equipment (PPE) completely while working. When spraying and mixing pesticides in the fields, they only use PPE like hats and long-sleeved shirts. Although they are aware of the health risks that can arise from pesticide exposure, such as dizziness and nausea, they still do not use PPE fully. Farmers who do not wear full PPE feel uncomfortable using it because they think that wearing PPE slows down their work. Even though PPE

is available, not all farmers use it while working. Novelty penelitian ini mengkaji faktor-faktor yang berhubungan dengan penggunaan alat pelindung diri (APD) pada petani pengguna pestisida secara spesifik di wilayah kerja Puskesmas Bungi Kota Baubau yang dimana terdapat lahan pertanian. The purpose of this study is to find out the factors related to the use of personal protective equipment (PPE) among farmers who use pesticides in the working area of Bungi Health Center, Baubau City.

LITERATURE REVIEW

This research refers to Lawrence Green's Behavior theory (1980), which explains that human behavior is influenced by three factors: predisposing factors, enabling factors, and reinforcing factors. Predisposing factors include an individual's knowledge, attitude, and beliefs. Enabling factors include the availability of facilities and infrastructure, like access to PPE and training. Reinforcing factors include the attitudes and behaviors of community leaders, family, and coworkers.

In the context of using Personal Protective Equipment (PPE) among farmers who spray pesticides, several variables have been identified related to factors associated with PPE use. PPE is a set of tools used to protect workers from potential hazards at work. Having complete PPE and good knowledge about it can encourage farmers to consistently use PPE properly (Aini & Suwandi, 2023).

Farmers' income also affects compliance with PPE usage. Farmers with higher incomes tend to be more aware of the importance of using PPE, while those with lower incomes might struggle to buy adequate PPE (Wida Yosa Br Tarigan, 2024). Social support from fellow workers and communication among workers also play an important role in improving compliance with PPE use (Aprilianti et al., 2022). Comfort factors also influence PPE compliance, so PPE should be designed to be comfortable to wear and not cause new hazards (Devianti et al., 2022). The conceptual framework in this study is as follows:

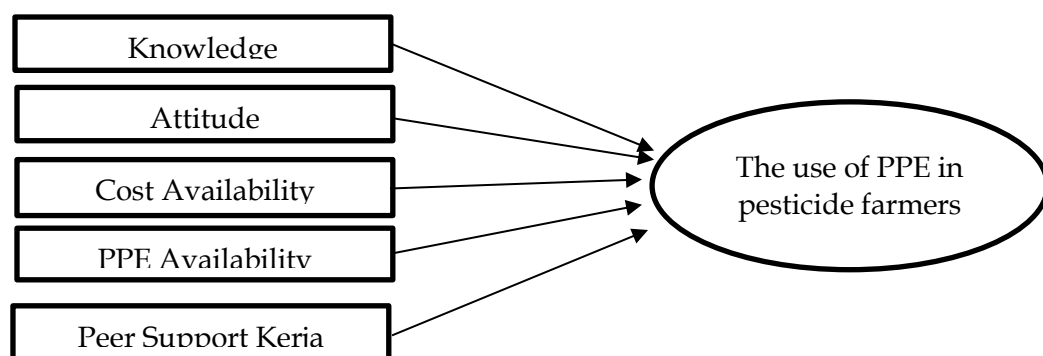


Figure 1. Conceptual Framework

METHODS

The type of research used in this study is quantitative with a Cross-Sectional design approach. A Cross-Sectional study is research that examines the dynamics of the correlation between risk factors and effects (cause and effect) using an observational approach or data collection techniques at a specific point in time (Budiman & Wahyuningsih, 2023). The research instrument used a

questionnaire, and the data collection techniques were primary and secondary data. Quantitative data analysis was conducted using statistical programs (statistics/data analysis), namely univariate and bivariate analysis using chi-square to determine the relationship between independent and dependent variables at a 5% significance level and 95% confidence level. If the p-value ≤ 0.05 , it means there is a relationship between the independent and dependent variables. If the p-value > 0.05 , it means there is no relationship between the independent and dependent variables (Evelyn Sri Wulandari, Tri Joko, 2023). Data processing and presentation, which includes editing, coding, data tabulation, and data presentation.

RESULTS

Based on the research conducted in the Bungi Community Health Center Work Area in Baubau City, the results are as follows

Univariate Analysis

Table 1 Distribution of Respondents Based on Age, Knowledge, Attitude, Availability of PPE, Availability of Funds, and Coworker Support in the Working Area of Bungi Health Center, Baubau City

Age	Frequency (f)	Percentage (%)
25-34	11	13,1
35-44	13	15,5
45-55	29	34,5
56-65	25	29,8
66-76	6	7,1
Total	84	100%
Knowledge	Frequency (f)	Percentage (%)
Enough	40	47,6
Less	44	52,4
Total	84	100%
Attitude	Frequency (f)	Percentage (%)
Positive	22	26,2
Negatives	62	73,8
Total	84	100%
PPE Availability	Frequency (f)	Percentage (%)
Available	51	60,7
Not Available	33	39,3
Total	84	100%
Cost Availability	Frequency (f)	Percentage (%)
Available	20	23,8
Not Available	64	76,2
Total	84	100%
Peer Support	Frequency (f)	Percentage (%)
Good	23	27,4
Not Good	61	72,6
Total	84	100%
Use of PPE	Frequency (f)	Percentage (%)
Complete	24	28,6
Incomplete	60	71,4

Total	84	100%
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Source: Primary Data, 2025

Based on Table 1, it shows that the distribution of respondents by age indicates that most respondents are in the 45-55 years old group, with 29 people (34.5%), and a small number are aged 66-76, with only 6 respondents (7.1%). It is known that the distribution of knowledge among farmers who use pesticides in the Bungi Health Center Work Area shows that most have low knowledge, with 44 respondents (52.4%), and a smaller portion have sufficient knowledge, with 40 respondents (47.6%). Attitudes toward farmers who use pesticides in the Bungi Health Center working area show that most have a negative attitude, with 62 respondents (73.8%), while a smaller portion have a positive attitude, with 22 respondents (26.2%).

The table showing the availability of PPE among pesticide-using farmers in the Bungi Health Center Working Area indicates that most respondents had PPE available, with 51 respondents (60.7%), while a smaller number did not have it available, with 33 respondents (39.3%). The distribution of financial availability among pesticide-using farmers in the Bungi Health Center Working Area shows that most respondents did not have the necessary finances, with 64 respondents (76.2%), while a smaller number had finances available, with 20 respondents (23.8%). The distribution of coworker support among pesticide-using farmers in the Bungi Working Area shows that most respondents had poor coworker support, with 61 respondents (72.6%), while a smaller number had good coworker support, with 23 respondents (27.4%).

Based on Table 1, the distribution of personal protective equipment use among farmers who use pesticides in the Bungi Health Center Work Area shows that most respondents did not use complete PPE, with 60 people (71.4%), and a small portion used complete PPE, with 24 people (28.6%)..

Bivariate Analysis

Table 2 The Relationship Between Knowledge, Attitude, Availability of PPE, Availability of Funds, and Colleague Support in the Work Area of Bungi Health Center, Baubau City

Knowledge	Use of PPE				Total		<i>p-value</i>
	Incomplete		Complete		n	%	
	n	%	n	%			
Enough	24	60,0	16	40,0	40	100,0	0,027
Less	36	81,8	8	18,2	44	100,0	
Total	60	71,4%	24	28,6%	84	100%	
Attitude	Use of PPE				Total		<i>p-value</i>
	Incomplete		Complete		n	%	
	n	%	n	%			
Positive	11	50,0%	11	50,0%	22	100,0	0,010
Negatives	49	79,0%	13	21,0%	62	100,0	
Total	60	71,4%	24	28,6%	84	100%	
PPE Availability	Use of PPE				<i>Total</i>		<i>p-value</i>
	Incomplete		Complete		n	%	
	n	%	n	%			
Available	27	52,9%	24	47,1%	51	100,0	0,000

Not Available	33	100,0%	0	0,0%	33	100,0
Total	60	71,4%	24	28,6%	84	100%

Cost Availability	Use of PPE				Total		<i>p-value</i>
	Incomplete		Complete		n	%	
Available	12	60,0%	8	40,0%	20	100,0	0,195
Not Available	48	75,0%	16	25,0%	64	100,0	
Total	60	71,4%	24	28,6%	84	100%	

Peer Support	Use of PPE				Total		<i>p-value</i>
	Incomplete		Incomplete		n	%	
Good	7	30,4%	16	69,6%	23	100,0	0,000
Not Good	53	86,9%	8	13,1%	61	100,0	
Total	60	71,4%	24	28,6%	84	100%	

Based on Table 2, out of 84 respondents who are farmers using pesticides in the Bungi Health Center Work Area, there are 40 respondents with adequate knowledge, of which 24 respondents (60.0%) did not use full PPE and 16 respondents (40.0%) used full PPE. In addition, there are 44 respondents with less knowledge, where 36 respondents (81.8%) did not use full PPE and 8 respondents (18.2%) used full PPE.

Out of 84 respondents who are pesticide-using farmers in the Bungi Health Center Work Area, 22 respondents had a positive attitude, with 11 respondents (50.0%) not using complete PPE and 11 respondents (50.0%) using full PPE. In addition, there were 62 respondents with a negative attitude, with 49 respondents (79.0%) not using full PPE and 13 respondents (21.0%) using full PPE. Based on the Chi-Square test results, a $p\text{-value of } 0.010 \alpha = < 0.05$ was obtained, which means there is a relationship between attitude and the use of personal protective equipment among pesticide-using farmers in the Work Area of Bungi Health Center, Baubau City.

Based on Table 2, out of 84 respondents who are farmers using pesticides in the Bungi Health Center Work Area, there are 51 respondents in the 'PPE available' category, with 27 respondents (52.9%) not using full PPE and 24 respondents (47.1%) using full PPE. In addition, there are 33 respondents in the 'PPE not available' category, with 33 respondents (100.0%) not using full PPE and 0 respondents (0.0%) using full PPE. Based on the Chi-Square test results, a $p\text{-value of } 0.000 \alpha = < 0.05$ was obtained, which means there is a relationship between the availability of PPE and the use of personal protective equipment among farmers using pesticides in the Working Area of Bungi Health Center, Baubau City.

Table 2 shows data from 84 respondents who are farmers using pesticides in the working area of Bungi Health Center. There were 20 respondents in the 'available' category, where 12 respondents (60.0%) did not use full PPE and 8 respondents (40.0%) used full PPE. In addition, there were 33 respondents in the

'not available' category, with 64 respondents (75.0%) not using full PPE and 16 respondents (25.0%) using full PPE.

Based on Table 2, out of 84 respondents who are farmers using pesticides in the Bungi Health Center Work Area, there were 20 respondents in the category of having available funds, of which 12 respondents (60.0%) did not use full PPE and 8 respondents (40.0%) used full PPE. In addition, there were 33 respondents in the category of not having available funds, with 64 respondents (75.0%) not using full PPE and 16 respondents (25.0%) using full PPE. Based on the Chi-Square test results, the p-value obtained was $0.195 \alpha \Rightarrow 0.05$, which means there is no relationship between the availability of funds and the use of personal protective equipment among farmers using pesticides in the Bungi Health Center Work Area, Baubau City.

Out of 84 respondents who are farmers using pesticides in the Bungi Health Center Work Area, 23 respondents reported having good coworker support, of which 7 respondents (30.4%) did not use full PPE and 16 respondents (69.6%) used full PPE. Meanwhile, there were 61 respondents with less supportive coworkers, with 53 respondents (86.9%) not using full PPE and 8 respondents (13.1%) using full PPE. Based on the Chi-Square test results, the p-value obtained was 0.000 with $\alpha < 0.05$, which means there is a relationship between coworker support and the use of personal protective equipment among pesticide-using farmers in the Bungi Health Center Work Area, Baubau City.

Multivariate Analysis

Table 3 Multivariate Analysis of Factors Associated with Full PPE Use Among Pesticide-Using Farmers in the Bungi Health Center Work Area

Variabel	B	Say.	OR (EXP. B)	95%CI for EXP.(B)
Attitude	1,602	0,037	4,961	1,101-22,353
Peer Support	2,187	0,002	8,912	2,267-35,033

Sumber : Data Primer, 2025

Based on the results of the multivariate analysis in Table 3, it was found that there are two variables significantly associated with the use of complete PPE among farmers who use pesticides in the Bungi Health Center Work Area, namely attitude and cfoworker support.

The statistical test results for the attitude variable showed a p-value = 0.037 < 0.05 with OR = 4.961 (95% CI 1.101 - 22.353), which means there is a significant relationship between attitude and PPE use. For the coworker support variable, the p-value = 0.002 < 0.05 with OR = 8.912 (95% CI 2.267 - 35.033), indicating a significant relationship with PPE use.

DISCUSSION

The Relationship Between Knowledge and the Use of Personal Protective Equipment Among Farmers Using Pesticides in the Working Area of Bungi Health Center.

Knowledge is the result of knowing, and it happens after a person senses a particular object. Sensing occurs through the human senses, namely hearing, sight, smell, taste, and touch. Most human knowledge is obtained through the

eyes and ears. Knowledge, or the cognitive domain, is a very important area in shaping a person's actions (Nurul Hasanah, Entianopa, 2022)

Based on the results of the Chi-Square test conducted, a p-value of $0.027 \alpha = < 0.05$ was obtained, which means there is a relationship between knowledge and the use of personal protective equipment among farmers using pesticides in the Working Area of Bungi Health Center, Baubau City. This study's results are in line with research conducted by (DIMKATNI, 2024) which found a p-value = $0.018 < 0.05$, meaning there is a relationship between knowledge and farmers' use of PPE in Purworejo Timur Village.

This research is also in line with the study by Susanto et al. (2023), which showed a significant relationship between knowledge and farmers' compliance in using PPE in Triyagan Village, with a p-value of $0.033 < 0.05$. However, this does not align with the study conducted by Hayati et al. (2018), which got a p-value of $0.194 > 0.05$, indicating that there was no relationship between knowledge and PPE use among pesticide-using farmers in Candi Laras Village.

The research results on knowledge about the use of PPE showed that out of 84 respondents, 40 had sufficient knowledge, and 16 respondents (40.0%) used complete PPE. This is because the respondents understood the benefits of using PPE when handling pesticides, which can protect them from pesticide exposure and reduce the risk of pesticide poisoning.

There are 44 respondents with limited knowledge, and 36 respondents (81.8%) use personal protective equipment (PPE) incompletely. This is due to a lack of knowledge and awareness about the importance of using full PPE every time they come into direct contact with pesticides. In this case, respondents only know that the mandatory protective gear when using pesticides includes work clothes, boots, masks, and work hats, even though safety goggles and gloves are really needed during direct contact with pesticides. There's also still a lack of information about standardized PPE usage or training and counseling around their farming areas from agricultural extension workers or relevant parties.

Awareness can be understood as an individual's understanding, acceptance, and willingness to act according to the knowledge they have. In practice, even though most farmers know the dangers of pesticides, not everyone is highly aware of protecting themselves by fully using PPE (mask, gloves, long-sleeved shirt, protective goggles, and boots).

Knowledge about someone can have different intensities or levels. Lawrence Green analyzed that knowledge is a predisposing factor of behavior. The higher the farmer's knowledge, the better the use of PPE, and conversely, the lower the knowledge, the less the use of PPE. According to Bloom's theory, knowledge starts from knowing to the application domain; the knowing domain only involves understanding the principles of PPE but does not necessarily mean applying them in behavior at work (Abigail, 2022)

Farmers' knowledge about pesticides is closely related to the use of PPE (Personal Protective Equipment) for farmers because with knowledge, farmers can use PPE properly to avoid the negative effects of pesticide use (Nurul Hasanah, Entianopa, 2022).

The use of PPE can affect farmers' safety because PPE acts as a shield against the risk of pesticide contact. The PPE that farmers use also needs to be maintained to stay safe while in use. Farmers should pay attention to the wind direction when planning to spray pesticides. This is because if the wind blows the wrong way, the pesticides could go back toward the farmers themselves (Souisa & Claudya, 2019).

Efforts that can be made to increase farmers' knowledge and understanding so that they pay more attention to using personal protective equipment (PPE), especially about the negative impacts or dangers that pesticides can cause if PPE is not used, include providing counseling on how to use PPE properly and completely, such as hats, masks, gloves, long-sleeve shirts, long pants, and boots, as well as the dangers of not using PPE. It is also necessary to put up posters about PPE for farmers that must be used to remind them and raise their awareness of the importance of safety and health at work.

The Relationship Between Attitude and the Use of Personal Protective Equipment Among Farmers Using Pesticides in the Working Area of Bungi Health Center

Attitude is a thought accepted as truth that leads someone to think, feel, or act either positively or negatively towards a person, idea, or event, and attitude also reflects an emotional readiness to behave in a certain way (Jannah et al., 2023). Knowledge and understanding of the use of PPE among farmers will ultimately be applied in the form of attitude and actions while working. Attitude can arise from an individual's knowledge. Meanwhile, knowledge can directly influence an individual to behave in using PPE (Satindo, 2022). Based on the Chi-Square test results, a p-value of 0.010 was obtained with $\alpha = < 0.05$, which means there is a relationship between attitude and the use of personal protective equipment among pesticide-using farmers in the Bungi Public Health Center Work Area, Baubau City.

This study aligns with the research conducted by Nurul Hasanah and Entianopa (2022), which found a p-value of 0.000, meaning that there is a relationship between attitude and the use of PPE among farmers at the UKK Post in the Paal Merah II Health Center Work Area in 2021. However, it does not align with the research conducted by Souisa & Claudya (2019), which found a p-value of 0.137, meaning that there is no relationship between attitude and the use of PPE among pesticide-using farmers in Taeno Village in 2019. The results of the study on attitudes towards PPE use show that out of 84 respondents, 22 had a positive attitude, with 11 respondents (50.0%) using full PPE. This is because the respondents had fairly good knowledge about mixing and spraying pesticides, which requires using complete PPE.

There were 62 respondents with a negative attitude, and 49 respondents (79.0%) used personal protective equipment (PPE) incompletely. This happens because the respondents think that PPE only restricts movement and makes working uncomfortable. For example, some don't wear masks because they feel it makes breathing difficult, and they are used to working without PPE. Respondents also only use PPE that they feel comfortable wearing, like long-sleeve shirts and hats, mainly to protect themselves from the sun while working.

There are several factors that affect comfort according to Hakim (2006) in (Kurnianto, 2020), including circulation, noise, aromas or smells, shape, beauty, and lighting. PPE is very important for workers to use comfortably because using it uncomfortably can create new hazards. There are many reasons workers are reluctant to use PPE, one of which is the comfort factor (Devianti et al., 2022).

The results of this study are in line with research by Medalio Bellano and Ratika Febriani (2023), which found that 63% of rubber farmers feel uncomfortable using PPE while working. Comfort is one of the key factors that greatly influences the behavior of using PPE. Uncomfortable PPE can lead to reluctance to use it, work fatigue, risk of skin irritation from uncomfortable PPE, and can also limit movement while using it.

Using personal protective equipment (PPE) is highly recommended when mixing and spraying pesticides. Due to a lack of awareness about protective gear, farmers who use pesticides are at risk of several health problems, including acute poisoning symptoms like headaches, nausea, vomiting, and dizziness from exposure to harmful chemicals. Symptoms such as skin and eye irritation, as well as chronic respiratory issues, can develop over time, along with long-term effects like endocrine disorders, organ damage, cancer, and reproductive problems (Apriyuni et al., 2024).

Long-term exposure to pesticides can increase the likelihood of toxin buildup in the body, which can eventually lead to chronic poisoning. When a farmer uses a pesticide sprayer and is over 50 years old, there's a chance they could get poisoned by the pesticides (Mayang Dwi Octavia & Susilawati, 2023). Attitude is more of a process of awareness that is individual in nature. An attitude doesn't automatically translate into action. How someone acts toward a certain stimulus is largely determined by their beliefs and feelings about that stimulus (Sapriana, 2021). The output of attitudes in each individual can vary; if someone likes or agrees with an object, they will approach, find out more, and join in. On the other hand, if they dislike it or disagree, they will avoid or stay away. Attitudes can arise from an individual's knowledge. Meanwhile, knowledge can directly influence an individual to behave in using PPE (Souisa & Claudya, 2019).

Efforts that can be made to improve farmers' attitudes include conducting demonstration-based extension methods on the proper and correct use of Personal Protective Equipment, the risks of not using PPE during spraying, the benefits of PPE, as well as monitoring PPE use and giving rewards to farmers who comply with using PPE.

The Relationship Between PPE Availability and the Use of Personal Protective Equipment Among Pesticide-Using Farmers in the Work Area of Bungi Health Center, Baubau City

Personal protective equipment (PPE) is one way to protect farmers while working and to prevent the harmful effects of pesticides. PPE includes protective gear and clothing specifically designed for pesticide use, as well as any materials or equipment that protect the user from pesticide exposure during handling and use (Septiani, 2021). Availability of facilities is one of the factors that influence the formation of safe behavior at work, and the availability of facilities must

match the risks and hazards faced in the workplace. As Lawrence Green stated, all facilities essentially support the realization of a health behavior (Abigail, 2022).

Based on the Chi-Square test results, a p-value of 0.000 was obtained with $\alpha = < 0.05$, which means there is a relationship between the availability of PPE and the use of protective equipment among farmers who use pesticides in the Working Area of Bungi Health Center, Baubau City. This study aligns with research conducted by (Zamra, 2024), which obtained a p-value of 0.000, indicating that there is a relationship between availability and the use of PPE among pesticide-spraying farmers in Nagari Lubuk Basung. This study is also consistent with research conducted by (Melda Yenni, Sugiarto, Cici Wuni, 2022) which obtained $p=0.018$, concluding that there is a relationship between the availability of PPE and pesticide use among farmers.

The research results on the availability of PPE versus its usage show that out of 84 respondents, 51 had access to PPE, and among them, 24 respondents (47.1%) used full PPE. This is because the respondents knew about the benefits of using PPE when handling pesticides, which can protect them from pesticide exposure and reduce the risk of poisoning. There were 33 respondents who didn't have full personal protective equipment (PPE) and all 33 of them (100.0%) used incomplete PPE. This happened because they felt uncomfortable or were used to not wearing full PPE, and some didn't use any PPE at all while mixing and spraying pesticides because it could get in the way of their movements during work.

This study also found that some farmers still use cloth masks instead of standard masks (like respirators or N95 masks). This aligns with research by Zaenab et al. (2022), which showed that the masks used by farmers aren't up to the proper standard for pesticide use. Farmers often use work clothes as masks because they find it more practical, even though these clothes can't filter out pesticide particles carried by the wind.

A mask is one of the personal protective equipment used to protect oneself from pesticide exposure during spraying. The mask functions to protect the respiratory system from gases, vapors, dust, or contaminated air at the workplace that can be toxic, corrosive, or irritating (Zaenab et al., 2022). Cloth masks basically only filter large dust particles and cannot protect the respiratory tract from harmful pesticide vapors or particles. This aligns with research (Handayani, 2021) which states that farmers who use cloth masks are still at high risk of pesticide poisoning due to their low filtering ability. On the other hand, standard masks are designed to block harmful chemical particles, making them more effective in preventing direct exposure to the lungs.

According to L. Green, behavior can be shaped by three factors, one of which is the enabling factor, which refers to the availability of health facilities or resources. In this case, the availability of PPE is a form of an enabling factor for behavior, because a behavior does not automatically turn into action if there are no facilities supporting the formation of that attitude (Nurul Hasanah, Entianopa, 2022).

The availability of tools or personal protective equipment is one of the factors related to a person's behavior in protecting themselves from various things that could disturb their health (Notoatmodjo 2012) as cited in (Melda et al., 2022). In this study, the availability of PPE includes the types of PPE that farmers have, namely protective clothing (long-sleeved shirts and long pants), head covers (hats), eye protection (glasses), masks, gloves, and work boots. Most farmers do not have glasses and gloves.

As for the types of personal protective equipment that can be used in the agricultural sector (Yuliansari, 2021), they include:

1. Mask

Personal protective equipment used to protect farmers' respiratory tracts from the dangers of pesticide poisoning. Usually, the mask is made of waterproof material, so the face doesn't get splashed with pesticide particles..

2. Gloves

Personal protective equipment used to avoid direct contact of pesticides with the farmer's hands when mixing and spraying pesticides. The requirements for the gloves used are: Gloves should cover your wrists. Gloves shouldn't be made of leather because it will be hard to clean off the pesticide particles that stick to them. It's better if the gloves are made of rubber.

3. Hat

Personal protective equipment used to protect a farmer's head from pesticide exposure while spraying pesticides. The hat used is made from asbestos, leather, wool, and cotton mixed with aluminum. The hat is comfortable to wear even under the hot sun.

4. Boots

Personal protective equipment that functions to protect a farmer's feet from pesticide exposure while using pesticides. Made from leather, synthetic rubber, or plastic.

5. Glasses

Protective gear used to protect farmers' eyes from exposure to pesticides while mixing and spraying them. The type of glasses used for work is made of plastic.

Work Clothes

To protect the body from pesticide exposure, it consists of:

a. long-sleeve shirt

Long-sleeved shirts shouldn't have too many folds; if necessary, the front pocket shouldn't be included, and the collar must cover the neck.

b. long pants

Pants shouldn't have folds, because those folds can become places where pesticide particles gather.

Efforts that can be made to improve the availability of complete Personal Protective Equipment for spraying, such as long shirts, long pants, masks, boots, hats, goggles, and gloves, include regularly monitoring, supervising, and providing guidance on the availability of PPE.

The Relationship Between Cost Availability and the Use of Personal Protective Equipment Among Pesticide-Using Farmers in the Work Area of Bungi Health Center

Cost availability refers to the ability of a person or an entity to access the funds or financial resources needed to meet a specific need or goal. In the context of agriculture, cost availability means that farmers have adequate access to the funds or financial resources required to buy agricultural inputs such as seeds, fertilizers, pesticides, equipment, and also Personal Protective Equipment (PPE) (Azzarah, 2024). Based on Table 5.18, out of 84 respondents who are pesticide-using farmers in the Bungi Health Center Work Area, 20 respondents fall into the available category, with 12 respondents (60.0%) not using complete PPE and 8 respondents (40.0%) using full PPE. Additionally, there are 60 respondents in the not available category, with 48 respondents (75.0%) not using complete PPE and 16 respondents (25.0%) using full PPE.

Based on the Chi-Square test results, a p-value of $0.195 \alpha = > 0.05$ was obtained, which means there is no relationship between the availability of funds and the use of personal protective equipment among pesticide-using farmers in the Bungi Health Center Work Area, Baubau City. This study is not in line with the research conducted by (Azzarah, 2024) which obtained a p-value of 0.001 ($p < 0.05$), meaning that there is a significant relationship between the availability of funds and the use of PPE among pesticide-using farmers in Kanreapia Village, Tombolo Pao District, Gowa Regency. And the study conducted by (Hayati et al., 2018) shows that there is a relationship between economic status and the use of personal protective equipment ($p = 0.002$)

The research results on the availability of funds for PPE usage show that out of 84 respondents who had available funds, 20 respondents used full PPE, with 8 of them (40.0%) doing so. This is because the respondents understood the benefits of using PPE when handling pesticides, which can protect them from pesticide exposure and reduce the risk of poisoning. For respondents who did not have available funds, there were 60 of them, with 48 respondents (75.0%) not using complete PPE. This is because the respondents felt uncomfortable and were already used to not wearing full PPE.

Also, most respondents, whether they have complete PPE or not, feel that the cost of PPE they need to buy is quite affordable and they don't feel financially burdened when they have to purchase it. The respondents also don't feel financially strained when buying PPE. According to interview results, besides planting rice, farmers also grow vegetables, coconut trees, and bananas. Even though the cost of PPE isn't a barrier for them, farmers still don't use complete PPE while working. This happens because farmers feel uncomfortable and are used to not wearing full PPE while working. Additionally, they feel that it limits their movement during work.

The Relationship Between Coworker Support and the Use of Personal Protective Equipment Among Pesticide-Using Farmers in the Working Area of Bungi Health Center

Coworkers are one of the reinforcing components in forming healthy living behaviors, in this case, the use of PPE. The influence of coworkers increases as

more workers exhibit the behavior (in this case, using PPE) (Medalio Bellano, Ratika Febriani, 2023).

Based on the results of the Chi-Square test conducted, a p-value of 0.000 was obtained, $\alpha = < 0.05$, which means there is a relationship between coworker support and the use of personal protective equipment among farmers using pesticides in the working area of Bungi Health Center, Baubau City. This study aligns with research conducted by Abigail (2022), where a p-value of 0.004 was obtained, meaning $p < 0.05$, so statistically it indicates that there is a relationship between coworkers and PPE usage. The research results on coworker support for the use of PPE showed that out of 84 respondents who had good coworker support, 23 respondents used PPE completely, with 16 respondents (69.6%) doing so. This is because some respondents reminded each other to use PPE.

There were 61 respondents who had poor coworker support, with 53 of them (86.9%) not using complete PPE. This happened because fellow farmers didn't remind their coworkers to wear PPE, and even when some farmers did remind them, the farmers didn't follow their coworkers' advice. Even though there is good support from coworkers, respondents have different perceptions regarding the use of PPE. Support from peers might not be enough to change habits or decisions in using PPE. However, support in using PPE among farmers is very important for collective safety and health in the agricultural environment.

The safe behavior of workers in using PPE depends on the role of their coworkers. To behave healthily, people sometimes not only need knowledge, a positive attitude, and facility support, but they also need examples of behavior from community leaders, peers, the social environment, religious leaders, and especially officials like health workers (Abigail, 2022). Coworkers or social support can influence someone's behavior because coworkers are the closest people who can serve as role models in behavior (Alhogbi, 2017). Communication between workers to remind each other to use PPE is considered quite important, as explained in Green's theory, which states that external reinforcements, like peer influence from friends and close surroundings, can affect behavior (Aprilianti et al., 2022).

CONCLUSIONS AND RECOMMENDATIONS

Based on the research results on the Factors Related to the Use of Personal Protective Equipment Among Pesticide-Using Farmers in the Working Area of Bungi Health Center in Baubau City, it can be concluded as follows:

1. There is a relationship between knowledge and the use of personal protective equipment among farmers who use pesticides in the working area of Bungi Health Center, Baubau City.
2. There is a relationship between attitude and the use of personal protective equipment among farmers who use pesticides in the working area of Bungi Health Center, Baubau City.
3. There is a relationship between the availability of PPE and the use of personal protective equipment among farmers who use pesticides in the working area of Bungi Health Center, Baubau City.

4. There is no relationship between the availability of funds and the use of personal protective equipment among farmers who use pesticides in the working area of Bungi Health Center, Baubau City.
5. There is a relationship between coworker support and the use of personal protective equipment among farmers who use pesticides in the working area of Bungi Health Center, Baubau City.

FURTHER STUDY

It is hoped that future researchers will study the factors of supervision in farmer groups and the role of agricultural extension officers related to the use of PPE in farmer groups that use pesticides

REFERENCES

- Abigail, M. (2022). Faktor-faktor yang berhubungan dengan penggunaan alat pelindung diri pada petani sayur di kelurahan kolhua kota kupang.
- Achmad, A. N., Arfah, A., La Mente, & Murfat, M. Z. (2021). Pengaruh Keselamatan dan Kesehatan Kerja Terhadap Produktivitas Kerja Karyawan Bagian Engineering di PT. Industri Kapal Indonesia (IKI) Makassar. *Center of Economic Students Journal*, 4(3), 215–224. <https://doi.org/10.56750/csej.v4i3.444>
- Aeni, H. F., Nisa, R., & Nurfadillah, R. (2020). Pendidikan Kesehatan Tentang Pemakaian Alat Pelindung Diri Dan Bahaya Pestisida Di Desa Sigambir Kabupaten Brebes. *Dimasejati: Jurnal Pengabdian Kepada Masyarakat*, 2(1), 45. <https://doi.org/10.24235/dimasejati.v2i1.6641>
- Aini, A., & Suwandi, W. (2023). Hubungan antara Pengetahuan dengan Kepatuhan Pemakaian Alat Pelindung Diri (APD). *Jurnal Ilmiah Permas: Jurnal Ilmiah STIKES Kendal*, 13(2), 363–368. <https://doi.org/10.32583/pskm.v13i2.812>
- Ajeng Tyas. (2022). PENGARUH PELATIHAN KESELAMATAN DAN KESEHATAN KERJA (K3) TERHADAP SIKAP KERJA SELAMAT DALAM PERAWATAN SARANA KA. *Jurnal Ilmiah Indonesia*, 9(6), 356–363.
- Alhogbi, B. G. (2017). Faktor-Faktor Yang Berhubungan Dengan Perilaku Penggunaan Alat Pelindung Diri (Apd) Pada Pekerja (Kajian Literatur). *Journal of Chemical Information and Modeling*, 53(9), 21–25. <http://www.elsevier.com/locate/scp>
- Alimanafh. (2024). ANALISIS TINDAKAN PENGGUNAAN ALAT PELINDUNG DIRI (APD) PADA PETANI PENGGUNA PESTISIDA DI DESA DURIAN DEMANG KARANG TINGGI KABUPATEN BENGKULUH TENGAH. *Journal of Nursing and Public Health*, 12(1), 1–23.
- Ananda, M. T. U. (2022). Fanktor Yang Berhubungan Dengan Kepatuhan Penggunaan Alat Pelindung Diri Pada Petani Pengguna Pestisida Di Desa Lempang Kabupaten Barru. 9, 356–363.
- Aprilianti, Y. W. K., Ratriwardhani, R. A., Hakim, A., & Fassya, Z. (2022). Literature Review: Faktor-Faktor yang Berhubungan dengan Perilaku Penggunaan APD. *Media Kesehatan Masyarakat Indonesia*, 21(2), 113–117. <https://doi.org/10.14710/mkmi.21.2.113-117>
- Apriyuni, A., Hasibuan, N., Bara, R. S. B., & Purba, S. H. (2024). Analisis Penggunaan APD Terhadap Risiko Kesehatan Petani PenyemprotPestisida. 2(3), 94–114.

- Azzarah, N. F. (2024). ANALISIS FAKTOR PENGGUNAAN ALAT PELINDUNG DIRI (APD) PADA PETANI PENGGUNA PESTISIDA DI DESA KANREAPIA KECAMATAN TOMBOLO PAO KABUPATEN GOWA. Table 10, 4-6.
- Budiman, L. A., & Wahyuningsih, A. S. (2023). Indonesian Journal of Public Health and Nutrition Faktor yang Berhubungan dengan Perilaku Tidak Aman Pada Pekerja di PT X. *Ijphn*, 3(3), 357-366. <http://journal.unnes.ac.id/sju/index.php/IJPHN>
- DENO, K. (2021). Hubungan Pengetahuan Dan Sikap Dengan Penggunaan Alat Pelindung Diri (Apd) Petani Penyemprot Sayuran Di Desa Tangsi Duren Kecamatan Kabawetan Kabupaten Kepahiang Tahun 2021 Program Studi Diii Sanitasi Hubungan Pengetahuan Dan Sikap Dengan Penggunaan Ala.
- Devianti, I. C., Rupiwardani, I., & Susanto, B. H. (2022). Faktor-Faktor yang Mempengaruhi Kepatuhan Penggunaan Alat Pelindung Diri (APD) pada Pekerja Konstruksi di PT "X". *Banua: Jurnal Kesehatan Lingkungan*, 2(2), 50-58. <https://doi.org/10.33860/bjkl.v2i2.1579>
- Dewi, R. (2021). Pengaruh Kemampuan Kerja, Motivasi dan Pengembangan Karier Terhadap Kinerja Karyawan PT. Bina Buana Semesta. *JEBI) Jurnal Ekonomi Bisnis Indonesia*, 16(1), 19-25. www.jurnal.stiebi.ac.id
- DIMKATNI, N. W. (2024). Hubungan Antara Pengetahuan dan Masa Kerja dengan Penggunaan Alat Perlindungan Diri (APD) pada Petani Penyemprot Pestisida di Desa Purworejo Timur Kabupaten Bolaang Mongondow Timur. *Environmental Occupational Health and Safety Journal*, 5(1), 7. <https://doi.org/10.24853/eohjs.5.1.7-12>
- Evelyn Sri Wulandari, Tri Joko, S. (2023). Hubungan Praktik Kebersihan Perorangan Karyawan dan Kondisi Lingkungan Kerja dengan Terinfeksi Covid-19 di PT X Jakarta Barat. 9(September), 17-23.
- Fabiana Meijon Fadul. (2019). Pengetahuan Dan Sikapdan Penggunaan Alat Pelindung Diri Pada Petani Penyemprotan Di Des Karang Indh Kabupaten Barito Kuala. *Prosiding Hasil-Hasil Penelitian Tahun 2018 Dosen-Dosen Universitas Islam Kalimantan*, 385-392.
- Gardinia, G., Setyaningsih, Y., Wahyuni, I., & Kunci, K. (2024). Hubungan Karakteristik Individu , Safety Sign , Kondisi APD , dan Pengawasan dengan Penggunaan APD Depo Lokomotif Semarang Poncol. 19, 17-23.
- Handayani, S. (2021). Faktor-faktor yang berhubungan dengan Penggunaan Alat Pelindung Diri (APD) Pada Petani Pengguna Pestisida. *Jurnal Kesehatan Masyarakat Indonesia*, 2(16), 134-142.
- Harahap, M. E. U., & Rambe, F. N. (2021). Kesejahteraan Petani Karet di Desa Ujunggading Jae Kecamatan Simangambat Kabupaten Padang Lawas Utara. *Jurnal At-Taghyir: Jurnal Dakwah Dan Pengembangan Masyarakat Desa*, 4(1), 15-28. <https://doi.org/10.24952/taghyir.v4i1.4632>
- Hayati, R., Kasman, K., & Jannah, R. (2018). Faktor-Faktor Yang Berhubungan Dengan Penggunaan Alat Pelindung Diri Pada Petani Pengguna Pestisida. *PROMOTIF: Jurnal Kesehatan Masyarakat*, 8(1), 11. <https://doi.org/10.31934/promotif.v8i1.225>
- Jannah, N., Asmaningrum, N., Rosyidi, K., Nur, M., Keperawatan, F., Jember, U., Kalimantan, J., 37 Jember, J., & Timur, I. (2023). Pengetahuan dan Sikap Petani tentang Alat Pelindung Diri dalam. *Pengetahuan Dan Sikap Petani Tentang Alat Pelindung Diri e-Journal Pustaka Kesehatan*, 11(1), 34.

- Kurnianto, A. (2020). Pengaruh Harga, Produk dan Kenyamanan Terhadap Preferensi dalam Belanja Online pada Mahasiswa Fakultas Ekonomi Universitas Negeri Semarang. Universitas Negeri Semarang, 15–16. <http://lib.unnes.ac.id/41782/1/7101416289.pdf>
- Manaroinson, G., Pangkey, M. S., & Mambo, R. (2023). Pemberdayaan Masyarakat Petani Sayur Di Desa Palelon Kecamatan Modoinding. *Jurnal Administrasi Publik*, 9(3), 90–101. <https://doi.org/10.35797/jap.v9i3.47490>
- Maria Eka Yulastuti, Yuanita Windusari, N. (2024). Study Literature yang Berkaitan dengan Penggunaan Alat Pelindung Diri (APD) yang Aman dalam Pestisida di Kalangan Petani. *Jurnal Ilmiah Permas ...*, 14(April), 605–620. <http://journal2.stikeskendal.ac.id/index.php/PSKM/article/view/1860%0A> <http://journal2.stikeskendal.ac.id/index.php/PSKM/article/download/1860/1122>
- Mayang Dwi Octavia, & Susilawati, S. (2023). Analisis Penggunaan Alat Pelindung Diri Terhadap Status Kesehatan Petani Penyemprot Pestisida. *Sehat Rakyat: Jurnal Kesehatan Masyarakat*, 2(3), 328–337. <https://doi.org/10.54259/sehatrakyat.v2i3.1746>
- Medalio Bellano, Ratika Febriani, N. (2023). PREVALENSI BEBERAPA FAKTOR YANG BERPENGARUH TERHADAP PENGGUNAAN ALAT PELINDUNG DIRI OLEH PETANI KARET. 3(1), 34–45.
- Melda Yenni, Sugiarto, Cici Wuni, T. A. M. (2022). FAKTOR YANG BERHUBUNGAN DENGAN PENGGUNAAN PESTISIDA PADA PETANI. 3, הארץ(8.5.2017), 2005–2003.
- Momongan, D. G., Mantiri, M., & Singkoh, F. (2020). Strategi Dinas Pertanian Kabupaten Minahasa dalam Pemberdayaan Masyarakat Petani Jagung di Desa Tempok Selatan Kecamatan Tompaso. *Eksekutif Jurnal Jurusan Ilmu Pemerintahan*, 2(5), 1–9.
- Mukhtar, M. I. (2020). Penggunaan Alat Pelindung Diri (APD) Petani Penyemprot Pestisida.
- Normalitasari, F. (2019). Faktor – Faktor Yang Mempengaruhi Angka Kuman Pada Peralatan Makan Di Rumah Makan Di Wilayah Kabupaten Magetan. *Stikes Bhakti Husada Madiun*, 31.
- Nurul Alfiah R. (2022). Determinan Penggunaan Alat Pelindung Diri Pada Petani Hortikultura Penggunaan Pestisida Di Kelurahan Kalosi Kecamatan Alla Kabupaten Enrekang. Universitas Hasanuddin Fakultas Kesehatan Masyarakat Keselamatan Dan Kesehatan Kerja, 4(1), 74–84.
- Nurul Hasanah, Entianopa, R. L. (2022). Faktor Yang Berhubungan Dengan Perilaku Penggunaan Alat Pelindung Diri (APD) Pada Petani Penyemprot Pestisida Di Puskesmas Paal Merah II. 2(9), 87–94.
- Nurul Hasanah^{1*}, Entianopa², R. L. (2022). FAKTOR YANG BERHUBUNGAN DENGAN PERILAKU PENGGUNAAN ALAT PELINDUNG DIRI (APD) PADA PETANI PENYEMPROT PESTISIDA DI PUSKESMAS PAAL MERAH II. 1(3), 3039–3046.
- Nuryati, A., & Arifah, S. (2024). Jurnal Riset Kesehatan Modern PENGARUH PAPARAN PESTISIDA GOLONGAN ORGANOFOSFAT DAN KARBAMAT TERHADAP JUMLAH SEL DARAH MERAH PADA PETANI : Meta-Analisis *Jurnal Riset Kesehatan Modern*. 6(2), 26–32.

- Pertanian, K., Hidup, L., Pertanian, F., Hkbp, U., & Medan, N. (2024). DAMPAK PENGGUNAAN PESTISIDA DALAM KEGIATAN PERTANIAN TERHADAP LINGKUNGAN HIDUP DAN KESEHATAN The Impact of Pesticide Use in Agricultural Activities on The Environment and Health Bilker Roensis Sinambela. 8(2), 178–187.
- Prajawahyudo, T., K. P. Asiaka, F., & Ludang, E. (2022). Peranan Keamanan Pestisida Di Bidang Pertanian Bagi Petani Dan Lingkungan. *Journal Socio Economics Agricultural*, 17(1), 1–9. <https://doi.org/10.52850/jsea.v17i1.4227>
- Putra, N., & Yasa, S. (2023). Implementasi Penggunaan Alat Pelindung Diri Dalam Keselamatan Pekerja Pada Cv. Dwi Jaya Mandala Di Kota Denpasar. *Jurnal Kertha Desa*, 9(7), 15–27.
- Rahmadani, R., Melda Yenni, & T. Samsul Hilal. (2023). Faktor-Faktor Yang Berhubungan Dengan Kesehatan Pada Pekerja Di Toko Pertanian Kecamatan Pasar Kota Jambi Tahun 2022. *Jurnal Cakrawala Ilmiah*, 2(6), 2715–2724. <https://doi.org/10.53625/jcijurnalcakrawalailmiah.v2i6.5050>
- Robi Rojaya Simbolon, Farrel Pasya Harramain, & Mochamad Rizaldi Putra Sonjaya. (2024). Pentingnya Penerapan Keselamatan Dan Kesehatan Kerja (K3) Sebagai Faktor Penentu Optimalisasi Produktivitas Kerja. *Pajak Dan Manajemen Keuangan*, 1(3), 17–31. <https://doi.org/10.61132/pajamkeu.v1i3.122>
- Rosmiati, R. (2019). PENGGUNAAN APD DI PABRIK KATEL B DI KECAMATAN CIKONENG. 24–37.
- Salindeho, chesya P. ., Pinontoan, O. R., & Warouw, F. (2020). Kadar Pestisida Orgonofosfat Dalam Tumbuhan Kangkung (*Ipomoea aquatica*) di Lahan Pertanian. *Journal of Public Health and Community Medicine*, 1(1), 52–56.
- Sapriana, S. (2021). Hubungan Pengetahuan dan Sikap dengan Penggunaan Alat Pelindung Diri (APD) pada Pekerja Bongkar Muat di Pelabuhan Pantoloan. *Banua: Jurnal Kesehatan Lingkungan*, 1(1), 26–31. <https://doi.org/10.33860/bjkl.v1i1.427>
- Satindo, I. T. (2022). FAKTOR-FAKTOR YANG BERHUBUNGAN DENGAN PERILAKU PENGGUNAAN APD PADA PETANI HOLTIKULTURA PENYEMPROT PESTISIDA DI KENAGARIAN ALAHAN PANJANG. *Gastronomía Ecuatoriana y Turismo Local*, 1(69), 5–24.
- Septiani, E. (2021). Faktor-faktor Yang Mempengaruhi Perilaku Penggunaan Alat Pelindung Diri (APD) Pada Pekerja Sektor Pertanian. *Pharmacognosy Magazine*, 75(17), 399–405.
- Shakila, R. (2023). Pengaruh Penyuluhan Kesehatan Dan Keselamatan Kerja Terhadap Perilaku Penggunaan Alat Pelindung Diri Pada Petani (Studi Literature Riview). *Zahra: Journal of Health and Medical Research*, 3(Januari), 135–145.
- Souisa, G. V., & Claudya, A. (2019). PERILAKU PENGGUNAAN ALAT PELINDUNG DIRI PADA PETANI SAYUR Behavior of Vegetable Farmers in Use Personal Protective Equipment. *Jurnal Suya Medika*, 7(1), 48–55.
- Statistik, B. P. (2024). Persentase Tenaga Kerja Informal Sektor Pertanian (persen) 2024. <https://www.bps.go.id/id/statistics-table/2/MTE3MSMy/persentase-tenaga-kerja-informal-sektor-pertanian--persen-.html>
- Subhaktiyasa, P. G. (2024). Menentukan Populasi dan Sampel: Pendekatan Metodologi Penelitian Kuantitatif dan Kualitatif. 9, 2721–2731.

- Sukma Senjaya, Aat Sriati, Indra Maulana, & Kurniawan, K. (2022). Dukungan Keluarga Pada Odha Yang Sudah Open Status Di Kabupaten Garut. *Jurnal Cakrawala Ilmiah*, 2(3), 1003–1010. <https://doi.org/10.53625/jcijurnalcakrawailmiah.v2i3.4037>
- Suparajang Sandi Eka. (2020). Pengaruh Karakteristik Produk Terhadap Terhadap Kepuasan Dan Loyalitas Pengunjung Perpustakaan Proklamator Bung Karno Blitar. *Jurnal Kompilasi Ilmu Ekonomi*, 3(2), 1–11.
- Susanto, A., Syahrotun Nisa Suratna, F., & Sari, Y. (2023). Relationship between Knowledge and Working Period with Compliance with the Use of Pesticide Spray PPE by Farmers in Triyagan Village. *JURNAL KESEHATAN LINGKUNGAN: Jurnal Dan Aplikasi Teknik Kesehatan Lingkungan*, 20(1), 51–58. <https://doi.org/10.31964/jkl.v20i1.459>
- Syaichuddin, M., Agustin, S., & Chotijah, U. (2021). Peramalan Kuantiti Penjualan Herbisida Menggunakan Metode Single Exponential Smoothing Studi Kasus Pt. Petrokimia Kayaku. *Indexia*, 2(2), 36–48. <https://doi.org/10.30587/indexia.v2i2.2561>
- Wasty, I., Doda, V., & Nelwan, J. E. (2021). Hubungan Pengetahuan Dengan Kepatuhan Penggunaan APD Pada Pekerja di Rumah Sakit: Systematic Review. *Jurnal Kesmas*, 10(2), 117–122.
- Wida Yosa Br Tarigan, S. D. S. H. (2024). Hubungan Faktor Pendidikan, Pelatihan, Pengetahuan, Ekonomi dan Penggunaan APD dalam Penggunaan Pestisida di Desa Cinta Rakyat Tahun 2023. 5(September), 8259–8265.
- Yosia Yigibalom, O., Lumintang, J., & Paat, C. J. (2020). Sikap Mental Petani Dalam Usaha Bidang Pertanian Tanaman Pangan Di Desa Jirenne Kabupaten Lanny Jaya Propinsi Papua. *Holistik*, 13(2), 1–18.
- Yuliansari, D. (2021). Hubungan Perilaku Petani Pengguna Pestisida Terhadap Pemakaian Alat Pelindung Diri (Apd) Di Desa Babussalam Kecamatan Gerung Kabupaten Lombok Barat. Hubungan Perilaku Petani Pengguna Pestisida Terhadap Pemakaian Alat Pelindung Diri (Apd) Di Desa Babussalam Kecamatan Gerung Kabupaten Lombok Barat, 2(2), 1–13. <https://e-journal.sttl-mataram.ac.id>
- Zaenab, Z., Mulyadi, M., & Sulastris, S. (2022). Hubungan Antara Penggunaan Alat Pelindung Diri APD Dengan Kejadian Keracunan Pestisida Pada Petani Bawang Merah di Desa Tampo Kecamatan Anggeraja Kabupaten Enrekang. *Media Kesehatan Politeknik Kesehatan Makassar*, 17(2), 320. <https://doi.org/10.32382/medkes.v17i2.3053>
- Zamra, L. P. (2024). FAKTOR-FAKTOR YANG BERHUBUNGAN DENGAN PERILAKU PENGGUNAAN ALAT PELINDUNG DIRI (APD) PADA PETANI PENYEMPROT PESTISIDA DI NAGARI LUBUK BASUNG TAHUN 2024. Table 10, 4–6.