



THE CORRELATION OF KNOWLEDGE LEVEL WITH OCCUPATIONAL HEALTH AND SAFETY (OHS) BEHAVIOUR OF USING PESTICIDES IN ASPARAGUS FARMERS

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ABSTRACT

The use of pesticides in agriculture is not a new thing anymore. The use of pesticides by farmers aims to protect crops from pests. The use of pesticides by farmers is an activity that is included in a work assignment, so that to minimize the negative impact caused by pesticides, the use should be carried out according to healthy and safe procedures. The limited knowledge and understanding of farmers about the dangers of pesticides and not using work equipment that meets occupational safety and health standards are some of the factors that cause health problems due to exposure to pesticides to farmers. This study aims to determine the correlation between the level of knowledge and the Occupational Health and Safety (OHS) behaviour of pesticide use in asparagus farmers. This study is quantitative research using analytical survey research methods, with cross sectional. The population in this study were asparagus farmers in Pelaga Village, Badung who routinely sprayed, with a sample of 63 people who were taken by purposive sampling technique. Data collection was carried out by giving questionnaires to farmers, and data analysis was carried out by using the test Chi-Square. As many as 42 people (66,7%) farmers have a good level of knowledge about pesticides, 40 people (63.5%) have a safe behaviour in the use of pesticides, and the chi-square test obtained a positive correlation with the value of $P = 0.026 (p < 0.05)$. This shows that there is a corelation between the level of knowledge and the Occupational Health and Safety behaviour of pesticide use in asparagus farmers.

Keywords: knowledge level; occupational health and safety (ohs) behaviour; pesticide use

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INTRODUCTION

Use of pesticides in the agricultural sector and farmers in the modern era is not new anymore. Asparagus farmers who are included in horticultural farmers are very at risk of being exposed to pesticides which will have a negative impact on health. Farmers are often exposed to chemicals such as pesticides which are used to pests or plant disease. Chemical compounds that are widely used for insect pets control in the agricultural sector are class of pesticides organophosphate and group of carbamate (Suratman S, Edwards JW and Babina K, 2015). Pesticides used in asparagus cultivation can have a negative impact on the health of farmers, especially if their use is not in accordance with applicable regulations (Suratman S, Edwards JW and Babina K, 2015). Some of the negative impact that can occur include health problems such us pesticide poisoning, nervous system disorders, respiratory problem, and other health

problems (Kim KH, Kabir E and Jahan SA, 2017). Short-term light exposure may only cause irritation of the lining of the eyes or skin, but long-term light exposure has the potential to cause various health effects such as hormonal system disorders, organ failure and death (Pamungkas, 2016). Research by Samosir states that the long-term effects of pesticide exposure are nervous system disorders or body balance disorders. This is related to the activity of using pesticide in agriculture, such as spraying, preparing, equipment for spraying, mixing pesticides, and storing pesticides (Samosir, Setiani and Nurjazuli, 2017).

Recent studies have shown that pesticides have affected several organs and tissues, such as endocrine organs, liver, pancreas, muscle and adipose tissue, which can cause changes in glucose and lipid metabolism (Hernandez AF et al., 2013; Mostafalou S and Abdollahi M, 2013). There is evidence that exposure to pesticides can also increase the risk of obesity and type 2 diabetes (Xiao, Clark, and Park, 2017) Pesticide exposure is associated with an increased risk of type 2 diabetes, including elevated glucose levels (Aguirre et al., 2016) The intensive use of pesticides in agriculture has led to widespread public concern about the potential risk of chronic diseases, including diabetes. (Kuo et al., 2013)

Many studies have shown a link between pesticide use and worker poisoning cases, one of which is a study that identified 210 physical and clinical examination poisoning cases in Kulon Progo, 50 of which were laboratory tested, resulting in 15 people (30%) being positive for poisoning. Sleman Regency area reported 30 pest control facilities, 14 people (46.66%) developed symptoms of poisoning (Samosir, Setiani, & Nurjazuli, 2017). Many studies have shown a correlation between the use of pesticides and cases of poisoning suffered by workers, one of which is in the research of which states that in Kulon Progo there were 210 cases of poisoning with physical and clinical examinations, 50 of whom were examined in the laboratory with the result, 15 people (30%) positive for poisoning. The Sleman Regency area was reported from 30 pest control officers, 14 people (46.66%) experienced symptoms of poisoning (Samosir, Setiani and Nurjazuli, 2017). As well as in Bali Province, based on data activity examination cholinesterase conducted by the UPT Balai Hiperkes and Kesehatan Kerja (KK) Bali Province in 2013, the prevalence of farmers in Bali who experienced pesticide poisoning by 41% and in the research of Istianah stated that the number of farmers suffering from poisoning in Brebes was 55 people (63.96%) (Istianah and Yuniastuti, 2017). According to WHO, intentional or accidental pesticide poisoning is a serious problem in agricultural communities in developing countries. It is estimated that about 250.000 deaths occur due to pesticides poisoning each year (World Health Organization, 2005).

The use of pesticides by farmers is an activity that is included in work tasks, so that to minimize the negative impact caused by pesticides, the use should be carried out according to healthy and safe procedures. The limited knowledge and understanding of farmers about the dangers of pesticides and not using work equipment that meets occupational safety and health standards are some of the factors that cause health problems due to exposure to pesticides in agricultural sector workers. Based on a preliminary study, researchers conducted on asparagus farmers, there were several behaviours of farmers who were at risk in using pesticides such as mixing pesticides without using gloves, spraying less attention to wind direction, not using complete PPE, and spraying duration that exceeds the rules. In addition, farmers usually do not immediately change clothes or take a shower after spraying. According to the results of interviews with farmers, they admitted that they often felt sore on the face or body parts affected by pesticides after spraying, but because this symptom is not too disturbing it is usually not a problem. Based on the description above, this study aims to determine the correlation between the level of knowledge and Occupational Health and Safety (OHS)

behaviour in the use of pesticides on asparagus farmers, in order to provide input in the use of safe and healthy pesticides in order to prevent or minimize the long-term negative effects of pesticide use on asparagus farmers.

Knowledge is the result of one's senses or the fact that one knows an object through the five senses. When the senses produce information, it strongly influences the intensity of attention and the perception of objects. The majority of people's information is received through the sense of hearing (ears) and the sense of sight (eyes) (Notoatmodjo, 2010). Knowledge provides a psychological boost to promote attitudes and behaviors on a daily basis, as knowledge stimulates human action (Kholid, 2018). Knowledge-based behavior is more sustainable than non-knowledge-based behavior (Kholid, 2018). Behavior from the biological aspect is defined as an activity or activity of the organism or living thing in question (Notoatmodjo, 2010). Behavioral factors determine 3 main factors, namely: 1) predisposing factors (predisposing factors), namely factors that encourage or promote human behavior, including knowledge, attitudes, beliefs. , beliefs, values, traditions etc. 2) Predisposing factors (predisposing factors), namely factors that favor or promote human behavior, including knowledge, attitudes, beliefs, beliefs, values, traditions, etc. 3) reinforcing factors are factors that encourage and strengthen the occurrence of behavior (Notoatmodjo, 2010). The aim of this research is to determine the level of knowledge in using pesticides among asparagus farmers, determine the K3 behaviour of asparagus farmers in using pesticides, and determine the relationship between the level of knowledge and K3 behaviour in using pesticides among asparagus farmers.

METHOD

This study is a type of quantitative research that uses analytical research methods and is cross-sectional in approach. This study included all asparagus farmers who used pesticides in Pelaga village, ie. 136 farmers, the sampling technique was purposive sampling and the total size of the study. 63 farmers, including assuming 10% leave. The research tool was a list of interviews, a camera as a documentation tool, and a questionnaire. The questionnaire used in this research is a questionnaire created by researchers which consists of a questionnaire to measure the level of knowledge and OHS behavior questionnaire on the use of pesticides among asparagus farmers. Validity and reliability tests have been carried out on 30 respondents. Data analysis with univariate and bivariate analysis with Chi-square test.

RESULTS

Characteristics of Respondents

Respondents in this study were asparagus farmers in Pelaga Village who used pesticides with a total of 63 respondents. The distribution of respondent characteristics data is as follows.

Table 1.
Data distribution of respondent characteristics

Characteristics of Respondents	f	%
Age		
<20	1	1.6
20-30	12	19.0
31-40	28	44.4
41-50	20	31.7
>50	2	3.2
Education		
SD	25	39.7
SMP	5	7.9
SMA	20	31.7

Characteristics of Respondents	f	%
Diploma	6	9.5
Bachelor	7	11.1
Working period		
<5	8	12.7
5- 10	26	41.3
11-15	18	28.6
>15	11	17.5
Information Sources		
Mass	6	9.5
Non Mass	57	90.5

From the results it is known that the most respondents are aged 31-40 years as many as 28 people (44.4%).

Knowledge Level About Pesticides

Measuring the level of knowledge of farmers about pesticides is obtained through answers to respondents' questions on the questionnaire. The level of knowledge in research is divided into two categories, namely: good and enough (Table 2).

Table 2.
Distribution of respondents based on knowledge level

Knowledge Level	f	%
Good	42	66,7
Enough	21	33,3

From the results of the research it is found that farmers' knowledge level about pesticides in Pelaga Village is mostly good as much as 42 people (66,7%).

Behaviour of K3 Pesticide Use

Measurement of Occupational Health and Safety (OHS) behaviour in this study was carried out on asparagus farmers, namely measuring the Occupational Health and Safety (OHS) behaviour of farmers towards the use of pesticides obtained through answers to respondents' questions on the questionnaire. Occupational Health and Safety (OHS) behaviour is divided into safe behaviour and unsafe behaviour (Table 3).

Table 3.
Distribution of respondents based on OHS behavior

OHS Behavior	f	%
Safe	40	63.5
Unsafe	23	36.5

From the results of the research most of them have behaved safely in the use of pesticides, as many as 40 people (63.5%).

The correlation between knowledge level and Occupational Health and Safety (OHS) behaviour in using pesticides in asparagus farmers in Pelaga Village.

Based on the result of The correlation between knowledge level and Occupational Health and Safety (OHS) behaviour in using pesticides in asparagus farmers in Pelaga Village show in Table 4.

Table 4.
Correlation with the knowledge level of OHS behaviour

Correlation with the knowledge level of OHS behaviour										
Knowledge Level	OHS behaviour				Total		Value <i>p</i>	<i>OR</i>	95% <i>CI</i>	
	Safe		Not Safe						<i>Lower</i>	<i>Upper</i>
	f	%	f	%	f	%				
Good	31	73,8	11	26,2	42	100	0,026	3,758	1,245	11,340
Enough	9	42,9	12	57,1	21	100				

Based on the results, the *p value* obtained by the test *chi-square* for *Exact.Sig (2-sided)* is 0.026 (*p value* <0.05)

DISCUSSION

Characteristics of Respondents

According to the psychological theory of worker development, most of the respondents age data are in the early adulthood group, namely the age range of 18-40 years. Age factor will affect a person's physical, mental, work ability, and responsibility (Irwanto, 2002). So that the age of early adult workers is believed to be able to build their health by preventing and overcoming their disease disorders, and young workers also tend to be more disciplined in maintaining their health, while for older adult workers aged 41-60 years, they will experience freedom in social life and the obligations of adult workers. further will be reduced to life together. According to the labor law No.13 of 2003, the age of the research respondents in table 1 is the productive age group at work, namely 16-64 years. The productive age group is more active and faster at work, this is because the body's strength is still not weakened so that it has the potential to support farming activities. This is supported by research by Jannah which states that there is a correlation between age and the use of pesticides. This can occur because the productive age affects the respondent's understanding of the recommendations and steps contained in the pesticide label, so that age also influences the acceptance of farmer insights and knowledge (Jannah, Koerniasari and Sunarko, 2018).

From the research results, it is known that the most respondents have elementary education as many as 25 people (39.7%). The level of education also determines whether it is easy for someone to absorb and understand the knowledge they acquire, in general the higher the level of education, the better the knowledge will be (Khamdani, 2009). However, this does not mean that farmers with low education are not able to understand and behave safely in the use of pesticides, when someone with low education is willing and able to gather information by reading and listening, good knowledge will be obtained. This is in accordance with Jannah, that not only highly educated respondents use pesticides according to the guidelines, respondents with secondary education also use pesticides according to the guidelines. This is due to factors other than education that affect knowledge about pesticide use, such as age, years of service, information media and employment (Jannah, Koerniasari and Sunarko, 2018).

Based on the data in Table 1, it can be seen that most of the respondents have a new work period, which is <10 years and there are 26 people (41.3%) of them have long work experience ≥10. With work experience that has been owned by farmers will influence farmers knowledge of tolerant use of pesticides. Farmers with longer working tenure are usually more skilled at determining the type of pesticide suitable for their crops than farmers with new tenure. This is in accordance with Khamadani that work experience will provide a lot of expertise and work skills to a person and vice versa, limited work experience results in a lower level of expertise and skills (Khamdani, 2009). From the results of the research conducted, it is known that the source of information on the use of pesticides by farmers is

mostly obtained from non-mass media, namely as much as 57 people (90,5%). Sources of information have an influence on a person's knowledge, according to Notoadmotjo which states that even though a person has a low level of education, if he gets information to find out about a knowledge, it can be obtained through mass media and non-mass media (Notoatmodjo, 2005).

Knowledge Level About Pesticides

From the results of the questionnaire answers, it is known that most farmers already know about the use of pesticides including the types of pesticides and their target pests, reading the rules of use before using pesticides, using Personal Protection Equipment (PPE), laying pesticides, handling residual pesticide mixtures, pesticides entering, mixing pesticides and symptoms of pesticide poisoning. However, 37 people of respondents answered that they did not know that the time to use pesticides in one day was 5 hours, and 36 people of respondents answered that they did not know that when using pesticides they were not allowed to work alone. This can be caused by low levels of education, new years of service, limited sources of information, and the age at which respondents are above the productive age of employment.

Knowledge is the result of human senses or someone's knowledge of objects through their five senses, and most knowledge is obtained through the senses of hearing and sight (Notoatmodjo, 2010). The level of knowledge of farmers is not only influenced by formal education factors. This is because there are factors other than education that affect farmers' knowledge about pesticide use, such as: occupation, age, print media, social media, and other information media (Wawan and Dewi M, 2010).

Behaviour of K3 Pesticide Use

This result means that most farmers have practiced safe behaviour when using pesticides. Safe OSH behaviour is that farmers in using pesticides have worn complete PPE, read the rules of use, mixed pesticides in an open space, the spraying process follows the wind direction and does not take more than 5 hours / day, does not eat / drink when using pesticides, has washed equipment before store, bathe and change clothes after contact with pesticides, wash separately contaminated clothing, and do not mix pesticides when sick. Safe behaviour for farmers is also based on the farmer's good level of knowledge about pesticides. This is in line with Notoatmodjo which states that knowledge is one of the predisposing factors or factors that facilitate a person's behaviour (Notoatmodjo, 2010). Based on the results of the answers to the respondents' questionnaires, there were unsafe behaviours that were still practiced by many respondents, namely 44 people (69.8%) who did not wear gloves when using pesticides and 16 people (33.3%) sprayed more than 5 hours / day. From the interview results, the farmers admitted that they did not wear gloves because they did not have special gloves for pesticide use, and they sprayed more than five hours per day to get it done so they could do other work. This means that farmer behaviour is not only influenced by knowledge, but there are other factors such as means. This is in line with Notoatmodjo which states that behaviour is determined by three main factors, namely, (1) predisposing factors or facilitating factors such as knowledge, (2) enabling factors such as facilities and infrastructure, and (3) reinforcing factors or factors that drive behaviour (Notoatmodjo, 2010)

The correlation between knowledge level and Occupational Health and Safety (OHS) behaviour in using pesticides in asparagus farmers in Pelaga Village

The result show that there is a positive correlation between the level of knowledge and Occupational Health and Safety (OHS) behaviour in using pesticides in asparagus farmers. This is supported by the opinion of Khoid that behaviour based on knowledge will be more

lasting than behaviour that is not based on knowledge (Kholid, 2018). The *Odds ratio* (OR) value obtained was 3,758 with a 95% *confidence interval* (CI), namely 1,245 – 11,340, so it can be interpreted that the level of farmer knowledge is a factor that increases the risk associated with behaviour. K3 in the use of pesticides on asparagus farmers in Pelaga Village.

From data table 4 that as many as 2 respondents with a good level of knowledge, 31 people (73,8%) of them behave safely, and 11 people or (26.2%) of them behave unsafe. A total of 21 respondents with enough level of knowledge, 9 people (42,9%) of them behaved safely, and 12 people (57,1%) behaved unsafe. It can be interpreted that not all farmers with good knowledge level have safe behaviour, and vice versa, not all farmers with enough knowledge have unsafe behaviour. This is because the factors that influence behaviour are not only the level of knowledge. According Notoatmodjo behavioural factors are determined by three main factors, namely: (1) predisposing factors or factors that facilitate a person's behaviour, such as: knowledge, beliefs, traditions, beliefs and so on, (2) enabling or facilitating factors. behaviour such as facilities and infrastructure, (3) reinforcing factors or factors that encourage behaviour (Notoatmodjo, 2010).

CONCLUSION

The level of knowledge about pesticides in asparagus farmers is that most farmers have a good level of knowledge about pesticides, namely, 42 people (66,7%). The Occupational Health and Safety (OHS) behaviour in pesticide use by asparagus farmers is that most of the farmers have safe behaviour in using pesticides, namely, as many as 40 people (63.5%). And there is a positive correlation between the level of knowledge and Occupational Health and Safety (OHS) behaviour in using pesticides on asparagus farmers in Pelaga Village, the result is that the p value is <0.05.

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