Analysis of Levels Blood Cholinesterase and Factors of Defects of Pesticides in Farmer Spraying of Rice in the Pakalu Village Kallabirang District Bantimurung

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ABSTRACT
The use of pesticides is one of the iceberg phenomena for working groups engaged in agriculture. In the 20th century synthetic pesticides were discovered and have various advantages so that they can quickly increase the yield of a desired agricultural product. Anticholinesterase insecticides are the largest part of modern synthetic insecticides which are widely used in plant pest control. This aims of the study was to analyze the factors of poisoning in farmers who spray pesticides on rice plants in Kallabirang Village, Bantimurung District. The type of research used was analytic with a cross sectional research design. The population and the sample is female pesticide spraying farmers living in Pakalu, Kallabirang Village, Maros Regency. The number of samples was 50 samples. Farmers and the sampling technique was total sampling. The data obtained will be analyzed using a bivariate statistical test, namely Chi square. The results after processing and analyzing the data using a statistical test, namely Chi square, the following results were obtained; for the variable method of spraying, the use of personal protective equipment (PPE), the frequency of spraying p value < 0.05 this means that there is a statistically significant relationship with cholinesterase levels, while for the variable spraying time and working period p value > 0.05 means that there is no a statistically significant relationship with cholinesterase levels in the blood of pesticide spraying farmers in Pakalu Hamlet, Kallabirang Village, Bantimurung Maros District. For further researchers can examine other relevant variables such as personal hygiene, nutritional status, types of pesticides used and other variables.
Keywords: *blood cholinesterase farmer spraying pesticide*

INTRODUCTION

Health problems can occur in various workplaces, and the development of programs to solve these problems can be implemented in several approaches. One approach that can be taken, especially for informal sector working groups, is through a community participation approach. The use of pesticides is one of the iceberg phenomena for working groups engaged in agriculture. In the 20th century synthetic pesticides were discovered and have various advantages so that they can quickly increase the yield of a desired agricultural product (Novizan, 2002).

According to Bargumono (2016) states that in the Central Bureau of Statistics data that has been obtained by Sarkenas in 2014 the Indonesian population as much as 38.97% is their livelihood as a farmer or it means that agriculture is still the main occupation of the Indonesian population.

Poisoning or contamination by pesticides in humans enters the body through several ways, namely through the respiratory tract, digestive tract and through the skin. Poisoning by these pesticides can cause adverse health effects. Contamination of pesticides that enter the body, signs and symptoms can initially be felt by sufferers and can also be observed by others. (Djojosumarto 2008). The symptoms caused by each patient vary according to the type of pesticide used. These symptoms range from weight loss, loss of body balance, blurred vision, frequent forgetting and difficulty concentrating (Conant and Fadem, 2009).

Among various types of pesticides, organophosphate and carbamate groups are the most commonly used by farmers. However, the most widely used type of pesticide in developing countries is Insecticide. Hydrocarbon insecticides are chemical compounds that mostly cause damage to the components of the nerve cell sheath so that nerve function is disrupted. Insecticides that are anti-cholinesterase are the largest part of modern synthetic insecticides that are widely used in plant pest control. This insecticide is an enzyme command that plays a role in transmitting nerve stimulation, causing nerve function disorders (Ministry of Health RI, 1992).

Some data also shows that pesticide poisoning in farmers can be seen from the results of research conducted by the Health Office of Dati I, South Sulawesi province,

which is from 1,010 farmers who examined

in an effort to protect rice crops of organisms and plant pests and to increase crop yields of farmers in the village Kallabirang use of pesticides, as for applications in the use of pesticides that is carried out by spraying onto plants or around the plant.

This application of spraying is a job that is often done by farmers, but this application also often causes poisoning for the workers either through breathing, digestion and skin. Based on the results of observations and interviews.

In addition, farmers also feel things that are not good due to contact with pesticides such as headaches, dizziness, nausea, difficulty sleeping and others, where these symptoms are felt after they finish spraying or after they come into contact with pesticides. Therefore, researchers are interested and interested in conducting research on this pesticide, which the authors write with the title analysis of blood cholinesterase levels and factors of pesticide poisoning in farmers spraying rice plants in Kallabirang village, Bantimurung district.

METHODS

type of this research is analytical research with an observational study approach and the design is a cross sectional study and is supported by clinical trials. This research was carried out in Pakalu hamlet, Kallabirang village, Bantimurung district, Maros district.

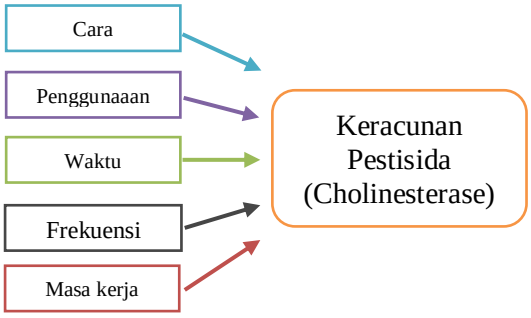
Sources of information in the study include: government (Camat, Lurah, and RT/RW), people living in the sub-district area. The population in this study were farmers who sprayed pesticides who lived in Pakaludesa Kallabirang with a total of 100 farmers.

Primary data retrieval on how to spray, use of PPE, time of spraying, frequency and period of work using interview techniques using a list of questions and checking blood cholesterol levels using the Kita Tintometer. Meanwhile, secondary data collection was obtained through literature studies, research journals, books, websites and other sources. relevant to this research.

After the data is collected, then computerized data processing is carried out. Data testing conducted on the hypothesis with a activity

significance level of : 0.05 is said to be significant if $p < 0.05$. Then analyzed bytest*Chi-square*.

Then the data that has been processed is presented in the form of a frequency distribution table. In this study, the dependent variables were the method of spraying, the use of PPE, the time of spraying, the frequency of spraying and the working period. While the independent variable is blood cholinesterase levels, as shown in the following figure:



RESULTS

Workers as rice farmers are one of the groups of workers in the informal sector who are susceptible to disease due to the work they do. One of the reasons is that farmers use pesticide ingredients in their field work activities as an important part of increasing the production of their agricultural products.

So that it is possible to give the effect of pesticide poisoning if it is carried out continuously without attention to protect oneself. The factors that encourage the occurrence of pesticide poisoning by spraying farmers are caused by the method of spraying, not using personal protective equipment or using but not in accordance with the procedure for using PPE, spraying frequency, working period and time of spraying.

In searching the data, it was found that from the results of research by the Health Office of South Sulawesi province on 1,010 farmers examined, there were 225 farmers experiencing poisoning with varying levels of poisoning, mild poisoning 201 (89.33%), moderate poisoning 22 (9.78%). and severe poisoning (0.89%) (Widianto, 1997)

. This research was conducted in August –

September 2018 in the Pakalu neighborhood of the Kalabbirang village, Bantimurung sub-district with a total sample of 50 spraying farmers. The research location was made in this area because almost 89% of the population works in the paddy field agriculture sector, so almost every rice and other secondary crops planting season uses pesticides in spraying rice and secondary crops.

The results of field observations in spraying application activities are still many who do not pay attention to safety measures in using hazardous materials such as the use of pesticides which allow exposure to pesticide compounds at any time. For this reason, a study was conducted to see if there was a relationship between pesticide spraying on spraying farmers and the incidence of poisoning by measuring cholesterol levels in the farmer's blood.

After the data is collected, processing is obtained, the results are displayed in a frequency distribution table with analysis of research variables (Bivariate analysis) to see the relationship between the independent variables and the dependent variable using statistical tests using *Pearson correlation*and logistic regression. as follows:

1. Relationship Cholesterenase levels in the blood by way of spraying pesticides

Table 1. The frequency distribution of cholinesterase levels in the blood by means of spraying the pesticide sprayer village farmers Kallabirang

Levels cholinesterase	How spraying				Total	
	UnidirectionalWind Direction		Contrary Wind Direction			
	N	%	N	%	N	%
Normal	1	3,7	26	96.3	27	100
Abnormal	22	95.7	1	4.3	23	100
Total	23	46	27	54	50	100

In table 1 shows that from 50 respondents whose blood was taken, the level of cholesterenase was normal (negative) in the blood, there was 26 (96 %) people who spray pesticides in the direction a it was cold and there were 1 (3.7%) people spraying in the direction of the wind. While the blood cholesterenase levels were abnormal (positive) there were 1 (4.3%) people spraying against the wind and 22 (95.7%) spraying in the direction of the wind. The total results showed that there were 23 (46.0%) farmer respondents who sprayed in the direction of the wind and 27 (54.05) who sprayed against the wind. With the results of statistical tests using chi square, the value of p = 0.001 (p <0.05) and the significance of p < 0.05 means that statistically it states that there is a significant relationship between the spraying method (attention to wind direction) and the presence of cholinesterase levels in the blood. spray farmer.

2. The relationship of cholesterol levels in the blood with the use of Personal Protective Equipment (PPE) in spraying pesticides.

Table 2. Frequency distribution of blood cholesterol levels with the use of Personal Protective Equipment (PPE) on pesticide spraying farmers in the village of Kallabirang

Levels Cholinesterase	Personal Protective Equipment				Total	
	Using		Not Using			
	N	%	N	%	n	%
Normal	0	0	27	100	27	100
Abnormal	5	21.7	18	78.3	23	100

Total	5	10	45	90	50	100

In table 2 shows that of the 50 farmer respondents whose blood was checked, the blood levels were found to be normal (negative) there were 27 people (100%) not using PPE and 0 people using PPE. (0%) . while at abnormal (positive) cholenetrenase levels there were 5 people (21.7%) using PPE and 18 people (78%) not using PPE.

The total data showed that there were 23 people (46.0%) spraying in the direction of the wind and 27 people (54%). With the results of statistical tests using the chi squaredi test, the value of p = 0.037 (p < 0.05) and the obtained value of P < 0.05 means that statistically it states that there is a significant relationship between the use of Personal Protective Equipment (PPE) in spraying and the presence of levels of Cholinesterase in farmer's blood.

3. The relationship of Cholenesterase levels in the blood with the frequency of spraying pesticides.

Table 3. Frequency distribution of blood cholenetrase levels with frequency of spraying on farmers who spray pesticides in Kallabirang Village

Levels Cholinesterase	Frequency of Spraying				Total	
	Not Often		Often			
	N	%	N	%	N	%
Normal	24	88.9	3	11.1	27	100
Abnormal	0	0	23	100	23	100
Total	24	48	26	52	50	100

In table 3 shows that of the 50 respondents who sprayed pesticides examined, 24 farmers (88.0%) had normal blood cholenestrase conditions with frequent spraying behavior and there were 3 farmers (11.1 %) frequent spraying. There were 23 farmers (100%) who frequently sprayed with a little poisoning and farmers who did not spray frequently were also not found with abnormal blood cholenestrase conditions. With the results of statistical tests using Chi square, the value of p = 0.001 (p < 0.05) with a significance level of p < 0.05 means that statistically there is a relationship between the frequency of spraying and Cholinesterse levels in the blood of farmers.

4. Relationship between blood cholinesterase levels and years of service as farmers spraying pesticides

Table 4. Distribution of blood cholenestrase levels in farmers' blood with years of service as spraying pesticides on farmers spraying pesticides in Kallabirang Village

Levels Cholinesterase	Working Period				Total	
	New		Old			
	N	%	N	%	N	%
Normal	1	3, 7	26	96.3	27	100
Abnormal	1	4.3	22	95.7	23	100
Total	2	4	48	96	50	100

Table 4 shows that of the 50 respondents who sprayed pesticides examined, 26 farmers were found with normal blood colenesterase levels (96.3%) with a long working period and there is 1 farmer (3.7%) as a farmer worker (95.7%) as a sprayer for long work and there is 1 farmer (4.3%) with a new tenure.

From the results of statistical tests

using *chi square, the*value of p = 1.00 (p > 0.05 with a significance level of p > 0.05 means that statistically it states that there is no relationship between working period and cholinesterase levels in the blood of spraying farmers.

DISCUSSION

1. Cholenesterse levels in Blood

In general, pesticides enter the body in three ways, namely through the skin, respiratory tract and digestive tract (LU Prank 1991). Pesticides that enter the body in the blood will be metabolized and distributed into tissues and excreted through sweat or urine Use of pesticides in prolonged contact for years will have an impact on pesticide poisoning.

One of the indicators used to determine the level of poisoning by pesticides in humans is the decrease in blood cholinesterase in the body. If the activity of blood cholinesterase levels decreases to a certain level it will result in the function of body tissues This will be disturbed and the decrease in blood cholinesterase is closely related to pesticide poisoning (Mysita 2012)

The quantity of pesticide substances entering the body is strongly influenced by various factors, including the duration of exposure, the frequency of exposure, and the dose of the pesticide itself. From the results of research that has been carried out with the results of checking the blood cholinesterase activity of pesticide spraying farmers using the Tintometer Kit at the Health Service Laboratory of Maros Regency, to see the levels of cholinesterase in the blood of pesticide spraying farmers in the Pakalu neighborhood, Kalabbirang village, data obtained from 50 farmer respondents was 23 farmers. (46%) with normal blood cholinesterase levels and 27 farmers (54%) experienced blood cholinesterase levels below the required standard or abnormal conditions.

Against farmers with abnormal blood cholinesterase levels with varying cholinesterase values with the recommended rules or follow-up, some spraying farmers are recommended to take a complete break and some are advised to take a break from spraying for a certain time.

From these results, it can be seen how the relationship between blood cholinesterase levels with pesticide spraying farmers and various factors that are closely related to the occurrence of pesticide exposure, namely, how to spray, use of Personal Protective Equipment (PPE) in spraying, frequency of spraying, duration of spraying and time of spraying.

The direct impact of pesticides on users, resulting in poisoning, either acute mild, acute severe or chronic. Mild acute poisoning usually causes dizziness, headache, mild skin irritation, body aches and diarrhea. Severe acute poisoning usually presents with symptoms of nausea, chills, stomach cramps, difficulty breathing, salivation and increased pulse, while chronic poisoning is difficult to detect, it takes a long time for symptoms to appear.

2. The relationship of cholinesterase levels in the blood of farmers by spraying pesticides

A good spraying technique if carried out in the direction of the wind so that the spray mist is not blown towards the applicator or sprayer and spraying should be carried out at a wind speed of 750 m per minute, so that the applicator is relatively safe from pesticide exposure.

From the results of the study through interviews with spraying farmers, they still did not pay attention to this, which was based on a lack of understanding or knowledge about the proper spraying position, there were 42 farmers (84%). pesticides with varying degrees of toxicity. From the results, there were 27 farmers (54.0%) who sprayed against the wind so that they experienced low levels of Cholinesterase below normal, the interview data showed that

spraying farmers did not pay attention to this because they lacked counseling and attitudes that existed in themselves. the farmers themselves do not pay attention to the risks that will be experienced if the spraying is not in accordance with the provisions of good spraying.

From the interviews, they also eat, drink and smoke during breaks without cleaning their bodies first, so that residual or pesticide vapors can enter the body through the mouth (swallowed) or breathing. This is in line with the research conducted by Jumriah A. (2007) which in his research found that farmers who sprayed in the wrong position tended to experience higher exposures than those who sprayed in the correct position.

The alternative that can be done is to improve counseling and preparation of farmer cadres about good spraying techniques according to standards such as good spraying done in the morning at 8.00 - 10.00 and in the afternoon at 16.00 - 17.00 which allows the pesticide spraying steam to quickly seep into the plants before evaporating by heat or wind. In addition, integrated supervision must also be increased by the Health Service and local government officials or with existing working groups.

3. The relationship between cholinesterase levels in the blood of farmers and the frequency of spraying pesticides

From the description of the results of previous studies, it was found that the higher the frequency of spraying, the farmers will experience a decrease in cholinesterase activity, compared to farmers who spray with less frequency. It can be seen from the data from interviews with respondents that there are 26 farmers (52%) with a high frequency of spraying (often) and data is also obtained that there are still many farmers who spray with a high frequency (often) 1-3 hours per day and there are 16 farmers (32 %). The average frequency of spraying can be 1 - 2 hours per day, there are 54%, if this activity is carried out continuously every day without control or guidance by the relevant agency, there will be an impact on health problems (poisoning) of pesticides with varying levels of poisoning, mild poisoning or severe poisoning.

Epidemiologically, people who spray with a higher frequency (often) have a greater chance of being exposed to pesticides with more risk than someone who sprays less frequently (rarely), especially if the farmer has inappropriate behavior such as not washing his hands. after touching/ managing pesticides and/or smoking when touching pesticides.

Preventive efforts that need to be done are the formation of cadres in farmer groups who are first given guidance or training on procedures for processing and applying pesticides in the field to farmers and health education on the risks of exposure to pesticides to health problems in the form of poisoning.

4. The relationship between farmer's blood cholinesterase level and years of service as a pesticide sprayer.

The effect of working period on cholinesterase levels in the blood of farmers from the results of the study was found to be less significant from the statistical test results because the time (month or year) did not change but it really depends on how to do the application (spraying), frequency of spraying, use and how to use personal protective equipment (PPE), especially how to process or mix pesticides in the field.

So it's not because of the working period that is the main thing but these factors are very influential on the decrease in blood cholinesterase levels due to exposure to pesticides. From the results of research with respondent interviews, there is a percentage of farmers with a long working period of more than one year found blood cholinesterase levels are still normal there are 26 farmers (96%) and

there is only one farmer (3.7%) with abnormal cholinesterase conditions.

From the data obtained, the number of farmers with many working periods (long) but normal blood cholinesterase conditions compared to farmers with abnormal blood cholinesterase was less than 14% of the respondents examined.

5. Relationship between farmer's blood cholinesterase level with pesticide spraying time.

From the results of research conducted on 50 respondents who sprayed pesticides as samples or respondents to the relationship with the time of spraying on blood cholinesterase levels of farmers.

The results of the statistical analysis test were found to be less significant and not significantly related, it can be seen from the data that there were 44 farmers who sprayed in the morning/afternoon (right time) there were 25 farmers (56.8%) normal and 19 farmers (43.2%)) with abnormal blood cholinesterase and more visible on daytime sprays (incorrect) from 6 spraying farmers with normal blood cholinesterase conditions 2 people and 4 abnormal ones.

When studied and analyzed in the field, the main factor in the decrease in blood cholinesterase levels is how farmers handle pesticides starting from storage, compounding pesticides, maintaining application tools, how to apply in the field that is not appropriate because it only depends on compliance and the achievement of application targets alone so that the -Good application rules are ignored, so the risk of pesticide poisoning can occur at any time either in the field or in their living environment.

The results of interviews with farmers also provide an overview of their treatment and attitude in application activities in the field, paying less attention to ways to maintain cleanliness from pesticide residues and how to destroy pesticide residues, both on application tools or leftovers from packaging according to the statement. they just throw it around behind the house or in existing canals, which allows contamination of water sources or the environment in general.

CONCLUSION

1. There is a significant relationship between the method of spraying and levels of cholinesterase in the blood of farmers spraying pesticides.
2. There is a significant relationship between the use of Personal Protective Equipment (PPE) with cholinesterase levels in the blood of farmers spraying pesticides.
3. There is a significant relationship between the frequency of spraying with cholinesterase levels in the blood of farmers spraying pesticides.
4. There is no significant relationship between working period and cholinesterase levels in the blood of pesticide spraying farmers.
5. There is no significant relationship between the time of spraying with choilnesterase levels in the blood of farmers spraying pesticides.

REFERENCES

Arikunto, S. 2010. *Research Procedures A Practical Approach*. Jakarta, PT.Rineka Cipta.

P2PL Section of the South Sulawesi Provincial Health Office. 2010. *P2 ARI Program Report*. Tidak diterbitkan

Bargumono, H. 2016. Pertanian Organik Solusi Alternatif Pertanian.Yogyakarta: Global Pustaka Utama

Conant J, Pam F. 2009. Panduan Masyarakat Untuk Kesehatan Lingkungan. Bandung

Djojosumarto, P. 2008. Pestisida dan

Aplikasinya. Jakarta :Agromedia Pustaka

Depkes RI. 2005. *Rencana Kerja Jangka Menengah Nasional Penanggulangan Pneumonia Balita Tahun 2005-2009*. Jakarta.

Depkes RI, 2002, *Pedoman Pemberantasan Penyakit Infeksi Saluran Pernafasan Akut*,

Dirjen PPM & PLP

Hasibuan, R. 2015. Insektisida. Yogyakarta :Plantaxia.

Hisyam, B., Budiyono, E. 2000. *Pola Kuman Pnemonia pada Penderita di RSUP Dr. Sardjito 1995-1998*. Berkala Ilmu Kedokteran, Vol. 32, No. 3 http://dinkes.go.id/situasi_derajat_kesehatan/angka_kesakitan.html. diakses 2 september 2016

Kementerian Kesehatan Republik Indonesia, 2012, *Pedoman Pengendalian infeksi saluran pernafasan akut*, Direktorat Jenderal Pengendalian Penyakit danpenyehatan Lingkungan, Jakarta.

Kemenkes RI, 2015, Profil Kesehatan Indonesia 2014, Setjen Kemenkes RI, Jakarta

Noor, Nasry N, 2000, Pengantar Epidemiologi Penyakit Menular, Rineka Cipta, Jakarta

Probowo, Sony. 2012. Penyakit yang Paling Umum pada Anak. Majalah Kesehatan. (Online)http://majalahkesehatan.com/penyakit-yang-paling-umum-pada-anak-bag-1/Diakses 11 Oktober2012.

Poltekkes Makassar, 2016, Buku Pedoman Penelitian Dosen dan mahasiswa, Unit Penelitian Poltekkes Makassar, Makassar

Profil Kesehatan Kabupaten Pangkep, 2012, Bidang P2P Dinas Kesehatan Kabupaten Pangkep

Riset Kesehatan Dasar (Riskesdas) 2007. Pedoman Pewawancara Petugas Pengumpul Data. Jakarta: Badan Litbangkes, Depkes RI, 2007

Riset Kesehatan Dasar (Riskesdas) 2013. Pedoman Pewawancara Petugas Pengumpul Data. Jakarta: Badan Litbangkes, Depkes RI, 2013

Riduwan. 2005. Belajar Mudah Penelitian Untuk Guru, Karyawan dan Peneliti Pemula, Bandung : Alfabeta.

Sandy. Tjang. S. 2005. Infeksi Saluran Nafas dan Penyakit Jantung

WHO. 2003. Penanganan ISPA Pada Anak di Rumah Sakit Kecil Negara Berkembang. Pedoman Untuk Dokter Dan Petugas Kesehatan Senior. Alih Bahasa: C. Anton Widjaja. Penerbit Buku Kedoteran EGC. Jakarta