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Correlation between Pesticides Exposure with Gestational Anemia at Horticulture Farming Area, Ngablak District, Magelang Regency

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Abstract:*The application of pesticides in agriculture can cause a detrimental effect on poisoning and long term health problem. Anemia is one of the chronic effects of pesticide poisoning, some of the populations are at risk of pesticides poisoning, one of them is a pregnant women who live and work in agricultural areas. This research aims to determine the correlation of pesticides exposure with the incidence of anemia in pregnant women in the horticultural farming area Ngablak sub-district, Magelang Regency. The research design uses cross sectional with 60 subjects purposive sampling. Data collection uses questionnaires and laboratory tests. The results shows that 41.7% have anemia and 58.3% are not anemic. There is a meaningful correlation between the working hour (p=0,001); and type of pesticides (p=0,033). The conclusion of this research is the variable of working hour and type of pesticide have a significant correlation with the incidence of anemia in pregnant women in the horticultural agriculture area.*

Keyword: Pesticides exposure, Anemia, Pregnant Women

I. INTRODUCTION

The application of pesticides is expected to be able to support increasing agricultural yields and create the costs of managing agriculture more efficient and economical. However, the use of pesticides also contains some risks because of their toxic nature in human body and their impact on the environment.

If it is not managed properly, pesticides can cause poisoning for the farmers or agricultural workers and can also happen to the families and neighbours where this activity is carried out. Pesticide poisoning causes decreased of cholinesterase enzyme. Referring to the WHO that cholinesterase activity that drops into more than 25% of normal level can be considered to have been poisoned. Anemia is one of the chronic effects of pesticide poisoning.

Some populations are at risk of pesticide poisoning, one of the example is pregnant women who lives and works in agricultural areas. Anemia and iron deficiency can occur among women of childbearing age, pregnant women and globally, Anemia is found to be more than 20% in a pregnancy.

Poisoning of mild, moderate, and heavy pesticides will bring a negative impact on the metabolic system in the human body, and indeed pregnant women who is living in the area will also receive a negative impact. Based on the results of a preliminary study in the horticultural agriculture area of Ngablak Subdistrict, Magelang Regency, the results obtained from 242 total pregnant women in 2017 is found that 164 pregnant women (67.7%) had anemia.

This is likely related to their participation in every activity in farming. Based on this description, it is necessary to do research to determine the impact of pesticides exposure with the incidence of Anemia in pregnant women in the horticultural agriculture area of Ngablak Subdistrict, Magelang Regency.

II. METHOD

This study was an observational study with a cross-sectional approach. The population in this study were all pregnant women in the agricultural area of Ngablak Subdistrict, Magelang Regency, with the total amount of 242 pregnant women. The number of samples was determined by purposive sampling technique as many as 60 respondents with the criteria: Willing to be the subject of research and willing to be examined for haemoglobin levels in the blood; Women who are in pregnancy at the time of the research; Respondents work as farmers and / or farm labourers in Ngablak District; and have no history of infectious diseases. The research

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instrument useda questionnaire that included research questions lead to research variables. Measurement of haemoglobin level was carried out by the Regional Health Laboratory of Magelang Regency. The variables in this study were the length of work and the type of pesticide with the dependent variable of the incidence of Anemia. Analysis of statistical data was using *chi square* Test with SPSS 20 software.

III. RESULT

Based on the results of hemoglobin test levels, it was obtained as many as 25 respondents (41.7%) suffered Anemia while 35 respondents (58.3%) did not suffer from Anemia.On the table 1 shows that the majority of the age of respondents are in the age group between 20-35 years. The majority of the respondents' on the second trimester were 36 respondents from 60 respondents (60.0%), followed by respondents with first trimester and then respondents with third trimester of their pregnancy age.In the variable of working period, 28 respondents (46.7%) worked for more than three hours per day, and the majority of 40 respondents (66.7%) used more than 1 type of pesticide in agricultural activities.

Tabel 1.Variable Frequency Distribution of Respondents' Age, Gestational Age, Working Hour, Type of Pesticides, and Haemoglobin Level of Pregnant Women in Ngablak sub-district, Magelang Regency at 2018.

Variable		Total (N)	Precentage (%)
Respondents' Age	<20 and>35 years	13	21,7
	20 - 35 years	47	78,3
Gestational Age	Trimester I (0-12 weeks)	14	23,3
	Trimester II (13-28 weeks)	36	60,0
	Trimester III (29-40 weeks)	10	16,7
Working hour	Long (≥3 hours/day)	28	46,7
	Short (<3 hours/day)	32	53,3
Type of Pesticides	Mix (>1 type)	40	66,7
	Non Mix (1 type)	20	33,3
Haemoglobin levels	Anemia (<11 gr/dL)	25	41,7
	Non Anemia (≥11 gr/dL)	35	58,3

Based on table 2, it is known that the anemia at the work time ≥3 hours is 82.1% greater than the length of work <3 hours but does not suffer from anemia (17.9%). The results of the chi square test (p-value = 0,000) showed p-value <0.05, so Ho was accepted therefore, there was a significant relationship between the length of work and Anemia in pregnant women. The value of RP = 13.143 (95% CI; 3.397-50,848) explains the respondents with a length of work ≥3 hours at risk of more than 13 times to experience Anemia compared to respondents with a length of work <3 hours.

Tabel 2 Cross tabulation of the correlation between working hour with the incidence of anemia in pregnant women in Ngablak sub-district, Magelang regency, at 2018

Working Hours	Anemia		Non Anemia		Total		p-value	RP (95%CI)
	n	%	N	%	n	%		
Long (≥3 jam)	23	82,1	5	17,9	28	100	0,000	13,143
Short (<3 jam)	2	6,2	30	93,8	32	100		(3,397-50,848)
Total	25	41,7	35	58,3	60	100		

Based on table 3, it is known that the anemia in the use of pesticide > 1 type is 52.5% greater than the use of pesticides> 1 type but does not suffer from anemia (47.5%). The results of the chi square test (p-value = 0.033) showed p-value <0.05, so Ho was accepted, so that there was a significant relationship between the types of pesticides and the incidence of anemia in pregnant women.The value of RP = 2,625 (95% CI; 1,041-6,618) explains that respondents with the use of pesticides > 1 type of mixture risks 2.6 times to experience anemia compared to respondents with the use of 1 type of pesticide.

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Tabel 3 Cross tabulation of the correlation between the type of pesticide and the incidence of anemia in pregnant women at Ngablak sub-district, Magelang regency at 2018

Type of Pesticides	Anemia		Non Anemia		Total		p-value	RP (95%CI)
	N	%	n	%	n	%		
Varied (>1 type)	21	52,5	19	47,5	40	100	0,033	2,625
Non Varied (1 type)	4	20,0	16	80,0	20	100		(1,041-6,618)
Total	25	41,7	35	58,3	60	100		

IV. DISCUSSION

In this study it was shown that theanemia in pregnant women in Ngablak Subdistrict was related to theeir working hours as a farmer. These results can be affected because pregnant women work with pesticides every day during their pregnancy. Based on the interviews, it was found that pregnant women always go to the fields or agricultural areas every day. Harvesting, weeding, and continuously living in the agricultural area every day for a long time allows pregnant women to breathe in pesticide residues that are absorbed by the skin. Afterwards, the pregnant women still mix pesticides that will be sprayed but they were using no gloves and masks and they do not immediately wash their hands after contact. This affects the accumulation of pesticides that enter the body. The longer and carried out continuously, the higher the risk of experiencing pesticide's poisoning and this can reduce the haemoglobin level of pregnant women. Someone who works using pesticides should not work more than 4 to 5 hours a day working, if they are exposed to pesticides from day to day continuously and repeatedly for a long time. Whereas in this research, it was found that the working hours of pregnant women as farmers within ≥3 hours per day was enough to show the low of haemoglobin levels. Based on the interviews, the majority of respondents used more than one or a mixture of pesticides, namely more types of herbicides and fungicides with groups of organophosphate and carbamate pesticides.Meanwhile the use of several types of pesticides at one time can increase the risk of pesticide poisoning because the active ingredients contained in the pesticides, it can react synergistically and mutually reinforce the toxic effects.

Pesticides can enter the body through splashes on the skin surface and inhaled by the nose. In mixing pesticides should have chosen a place where the air circulation is clear enough because if it is in a closed place, high toxicity pesticides are more evaporating. Moreover, the type of pesticide used is a mixture of several types of pesticides, this can add to its toxicity. In addition, be careful in opening the packaging so that pesticides do not splatter the body parts and pesticides should also be poured in containers or special buckets instead of the usual containers for eating, drinking and washing.

V. CONCLUSIONN

The majority of respondents aged between 20-35 years (78.3%); The highest pregnancy age in the second trimester (60%). The average respondents have a working hours ≥3 hours per day (53.3%), and mixes > 1 type of pesticide (66.7%). Respondents were Anemic with a haemoglobin levels<11 gr / dL of 25 people (41.7%). We recommend that always pay attention to security on doing agricultural activities by paying attention to the way of application and good management, always use PPE to prevent exposure and poisoning of pesticides in pregnant women.

VI. ACKNOWLEIDMENTS

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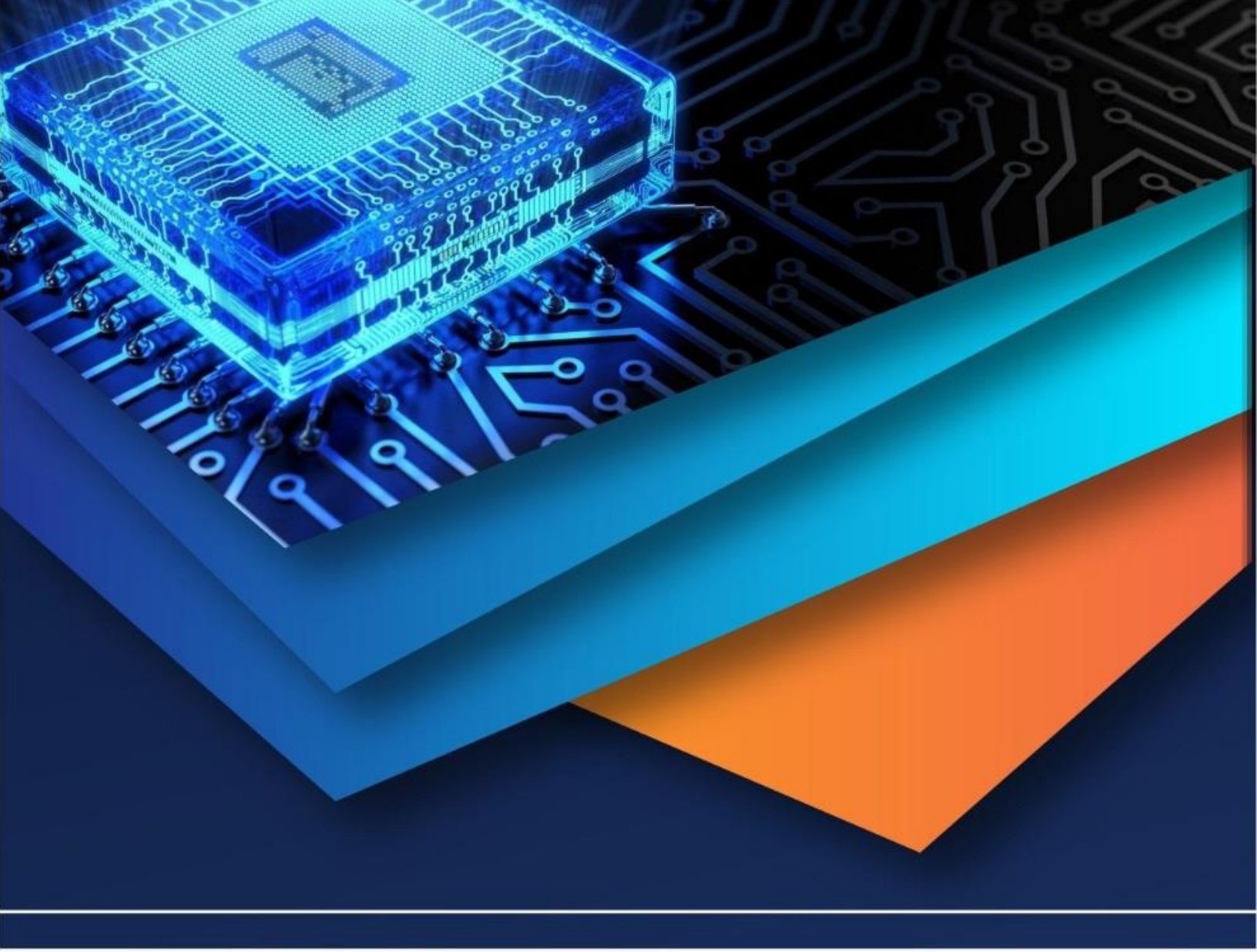

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