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Anemia and Its Associated Factors Among Women of Reproductive Age in Horticulture Area

Prayudhy Yushananta[1*)]; Yetti Aggraini[2]; Mei Ahyanti[3]; Iwan Sariyanto[4]

[1*),2,3,4] Politeknik Kesehatan Kementerian Kesehatan Tanjungkarang

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ABSTRACT

Anemia continues to be an important and widespread public health problem, so it must be addressed. About 1.74 (1.72-1.76) billion people worldwide suffer from anemia, especially children under five, Women of Reproductive Age (WRA), and pregnant women. As many as 500 million WRA suffer from anemia; this will impact the loss of productivity due to decreased work capacity, cognitive impairment, susceptibility to infections, and increased risk of complications in pregnancy and childbirth. This study analyzes the risk factors for anemia in women of reproductive age (15-49) who work in horticultural agriculture. The study was conducted with a cross-sectional design involving 160 participants from three main centers of horticultural agriculture in West Lampung Regency. SPSS was used for Chi-square analysis, Odds Ratio, and Logistic Regression (alpha = 0.05). The results showed that the prevalence of anemia in women of reproductive age who worked in horticultural agriculture was 27.5%. The study also identified three risk factors for anemia: dissatisfactory nutritional status (AOR = 24.53; 95% CI 5.59-107.70), lack of protein intake (AOR = 28.01; 95% CI 6.97- 112.52), and lack intake of high iron vegetables (AOR = 6.13; 95% CI 1.79-21.01). Nutritional interventions should emphasize increasing protein, iron, and vitamins through improved diet, fortification efforts, and iron supplementation.

Anemia dan Faktor yang Terkait pada Wanita Usia Subur di Daerah Pertanian Hortikultura

ABSTRAK

Anemia masih terus menjadi masalah kesehatan masyarakat yang penting dan meluas, sehingga harus ditangani. Sekitar 1,74 (1,72-1,76) miliar penduduk dunia menderita anemia, terutama anak balita, Wanita Usia Subur (WUS) dan wanita hamil. Sebanyak 500 juta WUS menderita anemia, ini akan berdampak pada hilangnya produktivitas karena penurunan kapasitas kerja, gangguan kognitif, dan kerentanan terhadap infeksi, serta meningkatkan risiko komplikasi kehamilan dan persalinan. Penelitian bertujuan menganalisis faktor risiko anemia pada wanita usia subur (15-59) yang bekerja pada pertanian hortikultura. Penelitian dilakukan dengan rancangan cross sectional, melibatkan 160 orang partisipan dari tiga sentra utama pertanian hortikultura di Kabupaten Lampung Barat. SPSS digunakan untuk analisis Chi-square, Odds Ratio, dan Logistic Regression (alpha=0,05). Hasil penelitian mendapatkan prevalensi anemia pada wanita usia subur yang bekerja pada pertanian hortikultura sebesar 27,5%. Penelitian juga mendapatkan tiga faktor risiko untuk anemia: status gizi yang kurang baik (AOR=24,53; 95%CI 5,59-107,70), kurang konsumsi protein (AOR=28,01; 95%CI 6,97-112,52), dan kurang konsumsi sayuran tinggi zat besi (AOR=6,13; 95%CI 1,79-21,01). Intervensi gizi harus menekankan pada peningkatan asupan protein, zat besi dan vitamin, baik melalui perbaikan menu makanan, upaya fortifikasi dan suplementasi tablet Fe.

Kata kunci:

Anemia
Wanita usia subur
Petani
Protein
Zat besi

**) corresponding author*

Politeknik Kesehatan Kementrian Kesehatan Tanjungkarang, Bandar Lampung, Lampung, Indonesia

Email: prayudhyyushananta@gmail.com

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INTRODUCTION

Anemia is still a very important public health problem around the world, especially in developing countries. Anemia contributes to increased morbidity and mortality, decreased work productivity, neurological development disorders, and the risk of complications of pregnancy and childbirth (Chaparro &Suchdev, 2019; Mantika&Mulyati, 2014; Teshale, Tesema, Worku, Yeshaw, & Tessema, 2020). In the long term, anemia has a major impact on health, economic and social welfare conditions (Priyanto, 2018; Teshale et al., 2020).

In 2019, anemia caused 58.6 (40.14-81.1) million years of living with disabilities (YLDs = Years Lived with Disability) (Gardner &Kassebaum, 2020). Anemia results from an imbalance between erythrocyte loss relative to production, caused by ineffective or ineffective erythropoiesis (for example, from nutritional deficiency, inflammation, or genetic Hb disorder) and / or excessive erythrocyte loss (due to hemolysis, blood loss, or both) (Chaparro &Suchdev, 2019).

Globally, the prevalence of anemia for all ages in 2019 is 22.8% (95% CI: 22.6-23.1), or around 1.74 (1.72-1.76) billion (Gardner &Kassebaum, 2020). The regions with the highest burden are in the tropics, especially Africa, Asia, the Caribbean and Oceania (Chaparro &Suchdev, 2019; Gardner &Kassebaum, 2020; Kassebaum et al., 2014; Priyanto, 2018). Women are consistently at greater risk of developing anemia than men (Chaparro &Suchdev, 2019; Kassebaum et al., 2014; WHO, 2012). The most vulnerable population groups are children under the age of five (toddlers), women of reproductive age (WRA), and pregnant women (Chaparro &Suchdev, 2019; Shah & Gupta, 2002). Approximately 500 million (Teshale et al., 2020; WHO, 2012), and 41.8% of pregnant women suffer from anemia (Chaparro &Suchdev, 2019; WHO, 2012).

The anemia situation in Indonesia is no different from the global situation. Anemia cases were more common in women (27.2%) than men (20.3%), living in rural areas (25.0%) than in urban areas (22.7%) (Kemenkes RI, 2018a). Likewise, for vulnerable groups, children under five (38.5%), WRA (22.7%), and pregnant women (48.9%) (Kemenkes RI, 2013, 2018a; Sudikno & Sandjaja, 2016). Anemia in pregnant women increased from 37.1% (2013) to 48.9% (2018) (Kemenkes RI, 2018a). In addition, the WRA group also saw an increase from 19.7% (2007) to 22.7% (2013) (Kemenkes RI, 2013; Sudikno & Sandjaja, 2016; Wijayanti & Fitriani, 2019)

More than half of anemia cases in the world are caused by a lack of iron which plays a role in erythropoiesis and the formation of hemoglobin. Other nutritional factors that play a role are insufficient intake of protein, folate, vitamin-A, vitamin-B, vitamin-C, and zinc (Gardner &Kassebaum, 2020; Pasalina, Jurnalis, &Ariadi, 2019; Sahana &Sumarmi, 2015; Sudikno&Sandjaja, 2016; Teshale et al., 2020; Widyarni&Qoriati, 2019; Wijayanti&Fitriani, 2019). Based on the Decree of the Minister of Health of the Republic of Indonesia Number 736a / Menkes / XI / 1989, an adult woman is declared anemic if the hemoglobin (Hb) level in the blood is below normal, which is less than 12.0 g / dL, while in a pregnant woman it is less than 11.0 g / dL (Kemenkes RI, 2020).

Anemia contributes to increased morbidity and mortality, decreased work productivity due to fatigue, cognitive decline, and neurological development disorders (Chaparro &Suchdev, 2019; Kemenkes RI, 2018b). In pregnancy, anemia increases the risk of bleeding, premature birth, infant mortality in the womb, impaired fetal growth resulting in low birth weight (LBW) and stunted babies, and causes indirect maternal death (Destarina, 2018; Eskenaziet al., 2004; Jaacks et al., 2019; Petit et al., 2012, 2010; Sudikno & Sandjaja, 2016; Teshale et al., 2020; Whyatt et al., 2004; Yushananta, Ahyanti, &Anggraini, 2020, 2021) .

Apart from being influenced by nutritional and physiological problems, anemia can also be influenced by environmental factors, one of which is pesticide poisoning. Pesticide poisoning causes nervous system disorders (such as headaches, paresthesias, tremors, discoordination, seizures) due to the accumulation of acetylcholine in nerve tissue and in vector organs. In the long term (chronic), it causes weight loss, anemia, anorexia, and impaired liver function (Agustina &Norfai, 2018; Arwin&Suyud, 2016; Azmi, Naqvi, Azmi, & Aslam, 2006; Fauziyyah, Suhartono, &Astorina , 2017; Nassar, Salim, &Malhat, 2016; Neghab, Jalilian, Taheri, Tatar, & Haji Zadeh, 2018; Okvitasari& Anwar, 2017; Patil, Patil, &Govindwar, 2003; Prasetyaningsih, Arisandi & Retnosetiawati, 2017; Yushananta et al., 2020).

In the case of pesticide poisoning, sulfhemoglobine is formed from the sulfur content in pesticides, as well as methemoglobine due to excessive oxidation so that the ferrous compounds turn into ferries. The formation of sulfhemoglobine and methemoglobine will interfere with the function of hemoglobin in delivering oxygen (Britt &Budinky A, 2000; George, Shaikh, Thomas, &Kundavaram, 2014; GS Nutakki, Madhav Makineni, &Madhukiran, 2016; G. Nutakki, Siripurapu, Kumar, &SasiSekhar, 2017; Pinkhas& All, 1963; Shihana, Dawson, & Buckley, 2016). The largest use of pesticides is especially in agriculture, horticulture, which uses large doses of pesticides and continuously during the growing season (Yushananta et al., 2020).

West Lampung Regency has the largest horticultural farming area in Lampung Province and is the largest source of regional income (53.81% of GRDP). Horticultural land area reaches 1,254 hectares with a production of 237,500 tons of vegetables (BPS, 2019). Until now, there are still few studies that discuss anemia in female women who work with pesticide exposure. This study aims to analyze the risk factors for anemia in women of reproductive age (WRA) (15-59) who work in horticultural agriculture.

METHOD

A cross sectional study was conducted in West Lampung Regency, to determine the risk factors for anemia in women of reproductive age (WRA) (15-59) who work in horticultural agriculture. Three sub-districts as the main horticultural agricultural centers were chosen to follow the area of agriculture and the amount of horticultural agricultural production (BPS, 2019), namely Balik Bukit, Sukau and Sekincau Districts. The research was conducted after obtaining approval from the Health Research Ethics Committee, Tanjungkarang Health Polytechnic (No.211 / EA / KEPK-TJK / VII / 2019) and permission from the West Lampung District Health Office. Guided by the Helsinki protocol, participant informed consent was taken, and data handling was confidential. There is no risk of harm to participants, and all participants have the right to withdraw during the study. All study procedures were explained prior to the interview.

The study was conducted from July up to August 2019. Women of reproductive age (WRA) aged 15-49 years were selected purposively. Women who were pregnant, had blood disorders, were taking drugs that inhibited iron absorption were excluded from the study. Respondents are declared anemic, if the blood Hb level is <12 gr / dL and normal if the blood Hb level is ≥ 12 gr / dL (Kemenkes RI, 2020).

The sample is calculated based on the infinite population, with the prevalence of anemia in WRA from previous studies, amounting to 22.7% (Kemenkes RI, 2013, 2018a; Sudikno & Sandjaja, 2016). The sample size calculation follows the following formula:

$$n = \frac{Z^2_{1-\frac{\alpha}{2}} \cdot P \cdot (1-P)}{d^2}$$

Where, n = number of samples, P = attribute proportion (0.227), d = precision (10%), 1 - P = proportion of non-attribute (0.511), Z 1-α / 2 = Z value at alpha 5% (1, 96). The results of the calculation of the minimum sample size are 68 women of reproductive age (WRA). However, in this study, data were collected from 160 samples. So that the precision (d) increases to 6.5%.

Data were collected from measurements and interviews using a questionnaire. All blood samples were taken and analyzed using the Hemocue Point of Care Testing (POCT) method. Height and weight were measured by WHO standard measurements. All respondents were asked about their diet, type and amount of food they usually consume.

The data was entered into SPSS (24.0) after completing it was checked, edited, and coded. Univariate analysis is used to describe the distribution of each research variable with frequency and proportion. Bivariate analysis used Chi-square statistics to measure variables associated with anemia. Variables with p value <0.25 were continued to multivariate analysis to identify risk factors. To determine the relationship between risk factors and anemia, a Logistic Regression analysis was used. Odds Ratio (OR) and 95% Confident Interval (CI) calculations were also performed. For all statistical tests, p-value ≤ 0.05 was considered significant.

RESULTS AND DISCUSSION

The results (Table 1) found that 27.5% of women of reproductive age (WRA) who work in horticultural agriculture suffer from anemia. The proportion of respondents with good nutritional status (54.4%) was slightly higher than those with dissatisfactory nutrition (45.6%). All respondents (n = 160), the majority of respondents (81.9%) had been pregnant more than once (multigravida), and (73.8%) gave birth to live babies more than once (multiparous), so they are at risk of developing anemia.

Table 1 also describes the eating habits and types of food that the respondents usually consume. Based on the results of the interviews, the majority of respondents (71.3%) had intake adequate amounts of protein. However, it was found that 28.8% were still experiencing shortages. The types of side dishes that are often intake as a source of protein and iron are fish, eggs and meat. As many as 71.9% of respondents have intake types of green vegetables that are high in iron, including cassava leaves, kale, genjer*(edible riverine plant)*, papaya leaves, mustard greens, and pumpkin leaves. Likewise for fruit intake, the majority (78.8%) had intake fruits high in vitamin-C and vitamin-A content, such as oranges, mangoes, bananas, and papayas.

Table 1
Respondents Characteristics

Variables	Frequency (n)	Percentage (%)
Anemia′ s Status		
Anemia	44	27,5
Normal	116	72,5
Nutritional Status		
Dissatisfactory	73	45,6
Good	87	54,4
Total Pregnancy		
Risk	131	81,9
Good	29	18,1
Total birth		
Risk	118	73,8
Good	42	26,3
Protein Intake		
Lack	46	28,8
Good	114	71,3
Vegetable intake		
Lack	45	28,1
Good	115	71,9
Fruit Intake		
Lack	34	21,3
Good	126	78,8

Bivariate analysis was performed to determine the correlation between each research variable and the prevalence of anemia, using the Chi-square test at alpha = 0.05. From Table 2, it can be seen that in the group suffering from anemia, 42.5% had a dissatisfactory nutritional status. The analysis showed a significant relationship between nutritional status and the prevalence of anemia (p <0.05).

Based on the number of pregnancies and births, the proportion of anemia sufferers was greater in the group who had been pregnant more than once (25.2%) and had given birth more than once (24.6%). However, the statistical results did not show a significant correlation between the two variables (p> 0.05).

Lack of protein intake showed a significant correlation (p <0.05) with anemia. Likewise, the intake of green vegetables and fruit also showed a very significant correlation with the prevalence of anemia in women who work in horticultural agriculture (p <0.05).

Table 2
Chi-square test of Respondents Characteristics and Anemia

Variables	Anemia (n=37)		Normal (n=123)		p-value
	Frequency	(%)	Frequency	(%)	
NutritionalStatus					
Dissatisfactory	31	42,5	42	57,5	0,000
Good	6	6,9	81	93,1	
Total Pregnancy					
Risk (more than once)	33	25,2	98	74,8	0,283
Good (once)	4	13,8	25	86,2	
Total Birth					
Risk (more than once)	29	24,6	89	75,4	0,605
Good (once)	8	19,0	34	81,0	
Protein Intake					
Lack	29	63,0	17	37,0	0,000
Good	8	7,0	106	93,0	
Vegetable Intake					
Lack	25	55,6	20	44,4	0,000
Good	12	10,4	103	89,6	
Fruit Intake					
Lack	16	47,1	18	52,9	0,000
Good	21	16,7	105	83,3	

Variables with p value <0.25 were continued to multivariate analysis to identify risk factors and determine the correlation between risk factors and anemia. The analysis was performed using Logistic Regression (alpha = 0.05).

Tabel 3.
Logistic Regression Test on the Risk Factors of Anemia

Variables	Anemia Frequency (%)	Normal Frequency (%)	Unadjusted OR (95%CI)	Adjusted OR (95%CI)
NutritionalStatus				
Dissatisfactory	31 (42,5%)	42 (57,5%)	9,96 (3,85-25,77)	24,53 (5,59-107,70)
Good	6 (6,9%)	81 (93,1%)	1	1
Protein Intake				
Dissatisfactory	29 (63,0%)	17 (37,0%)	22,60 (8,87-57,59)	28,01 (6,97-112,52)
Good	8 (7,0%)	106 (93,0%)	1	1
Vegetable Intake				
Dissatisfactory	25 (55,6%)	20 (44,4%)	10,73 (4,64-24,82)	6,13 (1,79-21,01)
Good	12 (10,4%)	103 (89,6%)	1	1

In the analysis (Table 3), there are three risk factors for anemia among women who work in horticultural agriculture in West Lampung Regency, namely nutritional status, protein intake, and vegetable intake. dissatisfactory nutritional status increases the risk of anemia by 24.53 times (5.59-107.70). Lack of protein intake is the dominant risk factor for anemia, amounting to 28.01 times (6.97-112.52). Meanwhile, less intake of green vegetables shows a risk of 6.13 times (1.79-21.01).

The results showed that the prevalence of anemia among women working in horticultural agriculture was 27.5% (Table 1). This result is greater than some previous research reports, amounting to 22.7% (Ministry of Health, 2013; Sudikno & Sandjaja, 2016; Wijayanti & Fitriani, 2019). This condition has the potential to increase morbidity and mortality, impaired neurological development, decreased productivity due to fatigue, illness, and cognitive impairment (Chaparro & Suchdev, 2019; Kemenkes RI, 2018b; Teshale et al., 2020).

Anemia in the women of reproductive age (WRA) group will also increase the risk of experiencing anemia during pregnancy, so that it has the potential to cause complications of pregnancy and childbirth (Chrispinus Siteti, 2014; Wijayanti & Fitriani, 2019). Pregnancy complications include premature birth, infant mortality in the womb, impaired fetal growth leading to low birth weight and stunted babies (Chaparro & Suchdev, 2019; Destarina, 2018; Eskenazi et al., 2004; Jaacks et al., 2019; Petit et al., 2012, 2010; Sudikno & Sandjaja, 2016; Whyatt et al., 2004; Yushananta et al., 2021). While labor complications are bleeding that can cause maternal death (ChrispinusSiteti, 2014; Sudikno & Sandjaja, 2016; Widyarni & Qoriati, 2019; Wijayanti & Fitriani, 2019).

The women of reproductive age (WRA) group are one of the groups at high risk of developing anemia, apart from toddlers and pregnant women (Chaparro &Suchdev, 2019; Chrispinus Siteti, 2014; Shah & Gupta, 2002). Physiologically, women of reproductive age (WRA) are prone to anemia because they experience menstrual cycles every month so that there is an increased need for iron (Chaparro & Suchdev, 2019; Mantika & Mulyati, 2014; Pasalina et al., 2019; Priyanto, 2018; Sudikno & Sandjaja, 2016; WHO, 2004;

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Wijayanti & Fitriani, 2019). In one menstrual period, the amount of blood lost is around 20-25 cc, or the equivalent of losing iron around 12.5-15.0 mg / month or about 0.4-0.5 mg a day (Sya`Bani & Sumarmi, 2016). So it requires more iron intake to replace lost iron (Priyanto, 2018; Sya`Bani & Sumarmi, 2016).

Anemia in adolescents and women of reproductive age (WRA) will continue during pregnancy (Azwar, 2004), so that it becomes an independent predictor of anemia during pregnancy (Demmouche, S, & S, 2011). Nutritional problems in certain age groups will affect nutritional status in the next life cycle period (intergenerational impact) (Azwar, 2004; Demmouche et al., 2011). So that the effort to control anemia in pregnant women is to ensure the fulfillment of iron needs in the period before pregnancy (Mariana, 2013; Priyanto, 2018; Sya`Bani & Sumarmi, 2016).

Research has proven that nutritional status is a risk factor for anemia (AOR = 24.53; 95% CI 5.59-107.70). The results of this research are consistent with several previous studies which state that nutritional status is closely related to the prevalence of anemia (Mariana, 2013; Pasalina et al., 2019; Priyanto, 2018; Sahana & Sumarmi, 2015; Sikoway, Mewo & Assa, 2020; Sudikno. & Sandjaja, 2016; Sya`Bani & Sumarmi, 2016; Widyarni & Qoriati, 2019; Wijayanti & Fitriani, 2019).

Nutritional status was determined based on the calculation of body mass index (BMI), then categorized as thin (BMI <18.5 kg / m2), normal (BMI 18.5-22.9 kg / m2), obese (BMI 23.0-24 , 9 kg / m2), obesity I (BMI 25.0-29.9 kg / m2), and obesity II (BMI ≥ 30.0 kg / m2) (Kanazawa et al., 2005). In this study, cases of anemia were mostly found in women who were underweight. The results of this study are in accordance with the results of previous studies which concluded that anemia sufferers were more often found in WRA with the thin category (Sihombing & Riyadina, 2009; Sudikno & Sandjaja, 2016; Wijayanti & Fitriani, 2019).

Nutritional requirements and age are related to the prevalence of anemia. In etiology, increasing age will be followed by a decrease in bone marrow erythroid progenitor, resulting in a decrease in the number of red blood cells released into the bloodstream. Bone marrow decline begins at the age of 30 years by 30% and increases to 50% at the age above 60 years (Mahlknecht & Kaiser, 2010). Not meeting nutritional needs causes a decrease in the production of red blood cells, resulting in anemia (Demmouche et al., 2011; Mantika&Mulyati, 2014). Nutritional status and anemia provide a picture of chronic malnutrition (Azwar, 2004).

This research found that lack of protein intake and consumption of vegetables high in iron was a risk factor for anemia (Table 3). Lack protein intake gives a risk of 28.01 times (6.97-112.52) and lack consumption of vegetables high in iron gives a risk of 6.13 times (1.79-21.01). Lack of protein and iron intake is the leading cause of anemia, in addition to deficiencies of vitamin-A, vitamin-B, vitamin-C, infection, and thalassemia (Chaparro & Suchdev, 2019). Lack protein intake, energy, and iron in food is a significant factor that can trigger anemia (Hunt, 2003; Mantika & Mulyati, 2014).

Hemoglobin synthesis requires the availability of iron and protein in sufficient quantities as the main component of heme formation in hemoglobin (Marcia, Ketryn, Karen, & Long, 2010; Wijayanti&Fitriani, 2019). Protein is also a major component of globin which plays a role in iron transport and storage (Marcia et al., 2010; Siahaan, Siallagan, Purba, & Oppusungu, 2018; Wijayanti & Fitriani, 2019). If the body lacks protein, the transport of iron into the blood plasma will be disrupted so that it will affect blood hemoglobin levels (Sya`Bani & Sumarmi, 2016). Research by Thomson et al, which involved a cohort of 963,676 people concluded that the lower the protein intake, the lower the hemoglobin level in the blood (Thomson et al., 2011). Lack of protein and iron causes a decrease in the formation of red blood cells resulting in reduced red blood cells in the body and causes anemia (Cavalcanti, de Vasconcelos, Muniz, dos Santos, & Osório, 2014). The relationship between protein intake adequacy was also presented in several other studies (Azizah & Adriani, 2018; Azwar, 2004; Barth-Jaeggi et al., 2020; Mantika & Mulyati, 2014; Setyaningsih, AP, &Nurwijayanti, 2014; Wijayanti & Fitriani, 2019).

Iron is found in foods such as meat, fish and poultry (heme iron) and in plants such as vegetables, fruit and seeds (nonheme iron). Iron derived from heme is more easily absorbed by the body than non-heme (Mantika & Mulyati, 2014). Iron deficiency causes iron stores in the body to decrease, so that the supply to the bone marrow for hemoglobin formation is insufficient. As a result, the number of free protoporphyrin erythrocytes increases, resulting in the production of microcytic erythrocytes and the hemoglobin value decreases (Hunt, 2003; Marcia et al., 2010; Thomson et al., 2011).

Working on horticultural agriculture poses a risk of exposure to large amounts of pesticides which result in poisoning (Sulistyawati, Margawati, Rosidi, &Suhartono, 2019; Yushananta et al., 2020). Pesticides are included in the group of chemical hazardous toxic substances and the endocrine disrupting chemicals (EDCs), namely chemical compounds that can interfere with the synthesis, secretion, transport, metabolism, binding action and elimination of natural hormones that function to maintain homeostasis, reproduction and growth and development processes (Diamanti-Kandarakis et al., 2009; Sulistyawati et al., 2019).

Anemia is one of the long-term effects of pesticide poisoning (Agustina &Norfai, 2018; Arwin & Suyud, 2016; Azmi et al., 2006; Fauziyyah et al., 2017; Nassar et al., 2016; Neghab et al., 2018; Okvitasari&Anwar, 2017; Patil et al., 2003; Prasetyaningsih et al., 2017; Yushananta et al., 2020). The formation of sulfhemoglobine and methemoglobine compounds in the blood due to pesticide poisoning causes a decrease in hemoglobin levels in red blood cells which results in anemia (Britt &Budinky A, 2000; George et al., 2014; GS Nutakki et al., 2016; G. Nutakki et al., 2017; Pinkhas& All, 1963; Shihana et al., 2016; Sulistyawati et al., 2019).

In this research, it is known that the food sources of protein intake are fish, eggs, and meat. Meanwhile, the dominant type of vegetables is green vegetables. However, 28.8% and 28.1% (Table 1) intake insufficient amounts. Insufficient intake, difficulty in absorbing non-heme iron, and exposure to pesticides are thought to be the causes of the high prevalence of anemia in the study sites. Efforts are needed to increase the amount of protein, iron, and other micronutrients through good food selection and improved diet. The absorption of iron can be achieved optimally if the dish consists of a combination of food ingredients that contain high iron in animals (heme), vegetables (non-heme), vitamin-A, vitamin-B, and vitamin-C (Balarajan, Ramakrishnan, Özaltin, Shankar, & Subramanian, 2011; Basith, Agustina, & Diani, 2017; Bharati, Som, Chakrabarty, Bharati, & Pal, 2008; Ghosh et al., 1980; Prihartono et al., 2011). Selection of good food is expected to prevent or overcome anemia (Stephen et al., 2018). Efforts for fortification and supplementation of Fe tablets are an important part to be carried out by the health authorities to WRA. Control of anemia in pregnant women is to ensure the fulfillment of iron needs in the period before pregnancy (Mariana, 2013; Priyanto, 2018; Sya`Bani&Sumarmi, 2016)

CONCLUSIONS AND SUGGESTIONS

Anemia continues to be a widespread and significant public health problem, so it must be treated adequately. The results showed that the prevalence of anemia among women working in horticultural agriculture was 27.5%, higher than the previous report (22.7%). Three risk factors for anemia were found, namely dissatisfactory nutritional status (AOR = 24.53; 95% CI 5.59-107.70), lack of protein intake (AOR = 28.01; 95% CI 6.97-112, 52), and lack consumption of high-iron vegetables (AOR = 6.13; 95% CI 1.79-21.01).. Increasing protein and iron intake is an intervention that must be implemented immediately, both through food selection and food menu improvements. Give special attention to chronic anemia in the group of WRA, post menarche adolescents, and the Dissatisfactory through fortification and supplementation of Fe tablets.

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Conflict of Interest

The author states there is no conflict of interest.

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